Beginning Guitar

By:
Catherine Schmidt-Jones

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Online:
< http://cnx.org/content/col10421/1.2/ >

C O N N E X I O N S

Rice University, Houston, Texas

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Chapter 1

Lessons

1.1 Guitar Lesson 1: The High E String, and Introduction to Notations[1]

1.1.1 Notes on Using This Course

NOTE: This is the "latest" version of this course. It includes some major changes from the original. If you prefer any of the old exercises or songs, see the "version history" at the bottom of any lesson.

Guitar is an unusual instrument, in that there are a number of very different, widely-accepted styles of playing. (Think of the difference in technique between, say, a classical guitarist, a rock guitarist, and a blues guitarist). There are also several common, but very different, ways of notating music for guitar, including common notation, tablature, and chord symbols. The purpose of these lessons is to acquaint the beginning guitarist with the basics needed for most guitar styles and genres. Many beginners are not certain what style of playing, and what type of notation, suits them; this general introduction not only gives them a little time to decide such things, but also gives them some basic music theory and background in other styles and other kinds of notation, so that they become more well-rounded musicians, capable of making forays into new genres and styles.

The exercises are my own. The music on the song sheets and ensemble sheets are my arrangements of public domain[2] tunes. All exercises and arrangements are published under the Creative Commons attribution license that covers all material in Connexions. Basically any use is allowed, as long as the author and source (Catherine Schmidt-Jones, and Connexions, http://cnx.org) are properly attributed. (Keep in mind that other arrangements of these same tunes may be under stricter copyright licenses!) In order to make the requirement easy for you to fulfill, the attribution information has been added at the bottom of each lesson and practice page.

Author Recommendations for Students

- The lessons are designed to be done with a knowledgeable teacher.
- If regular lessons are not feasible, it is strongly recommended that self-teaching students consider joining a beginning guitar class, getting a few beginning lessons, or getting occasional lessons to answer questions, correct bad habits, and get some guidance.
- If even that is not feasible, the student should try to study guitar-method videos for the information that cannot be conveyed on paper. Watching performances of favorite guitarists can also be useful.
- Self-teaching students should also seriously consider taping practice sessions regularly, and listening to and/or watching the tape carefully. This exercise is also very useful, even for those students who have

[1] This content is available online at <http://cnx.org/content/m12663/1.7/>.
[2] "Public Domain Music in Connexions Music Activities" <http://cnx.org/content/m22967/latest/>

a teacher. Like all good criticism, self-criticism should be as specific as possible, and focus on what needs to be done to improve.

Author Recommendations for Teachers

- Highly-motivated students, adult beginners, and students who have already studied other instruments may be able to do these lessons at the rate of one per week. Young or musically-inexperienced students may need more time on some, or all, of the lessons. As long as students practice well and regularly, they should be encouraged to move at a comfortable pace.
- Students should not go to the next lesson until they can successfully play the music on the **practice page**. Some students will need extra practice at some point in the lessons. If this is the case, an extra lesson book, song book, or etude book, in a style of music that the student enjoys, can be studied alongside these lessons.
- **Lesson pages** focus on giving information, including suggestions for understanding music theory. Some students will be more interested than others in this information. A guitarist who understands theory is a more well-rounded, capable musician, but as long as they can play the exercises adequately, students do not have to understand everything on the lesson page in order to move to the next lesson. They can refer back to it later, as things begin to make sense and questions arise.
- The "find out more" links are to on-line theory lessons, which often include exercises. If theory is an important part of your program, you may wish to include theory exercises as part of the lesson assignment. Otherwise, simply point them out as extra easily-available information.
- Beginning at Lesson 3, **Song Sheets** and **Ensemble** pages are included. These can be used for extra practice, for beginners' recitals, and/or for developing an early "repertoire". The tunes are from a wide variety of traditions and genres, to help young students decide what type of music they like. Songs that are already widely available in many other guitar method books are avoided. A student can start working on a song or ensemble any time after completing the lesson indicated near the song title.
- When the student indicates an interest in learning specific songs or types of music, simple versions of those pieces should be included alongside the lesson music as soon as possible.

1.1.2 Lesson Pages

Here are PDF files of the Lesson page[3] and Home practice page[4]. If you can't get the PDF files, you can use the figures below. The suggested theory assignment for this lesson are The Staff[5] and Clef (Section 2.1).

[3] See the file at <http://cnx.org/content/m12663/latest/1GuitarLesson.pdf>
[4] See the file at <http://cnx.org/content/m12663/latest/1GuitarPractice.pdf>
[5] "The Staff" <http://cnx.org/content/m10880/latest/>

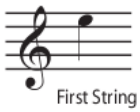
Lesson 1

Common Notation

High E string

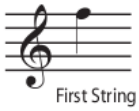
Highest-sounding
"First string"

E



First String
Open String

F



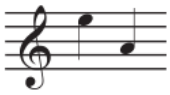
First String
First Fret
(First finger)

G

First String
Third Fret
(Third Finger)

Common notation is written on a five-line staff.*

Both common notation and tablature
are read from left to right.



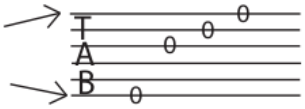
Quarter notes have:
a solid head
a stem pointing up or down

Treble clef symbol
Guitar music is usually written on a treble clef.^

Tablature Notation

Top line is First String,
(highest-sounding string)

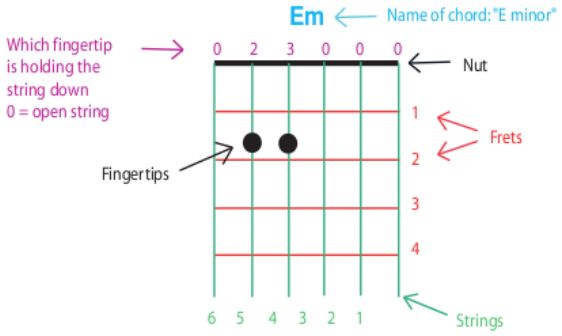
Bottom line is Sixth String
(lowest-sounding string)



Tablature notation is written on six lines.
Each line represents a string.
The top line is the first string.
"0" means pluck the open string.

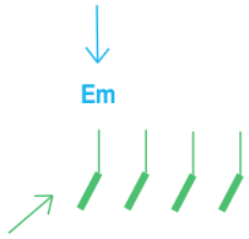
Chord Diagrams

Chord Diagrams are "pictures" of
the strings being held down by fingertips.



Chord Symbols

This means play E minor chord.



This means strum quarter note chords.

*learn more about the staff: http://cnx.org/content/m10880/latest/
^learn more about clefs: http://cnx.org/content/m10941/latest/

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Figure 1.1

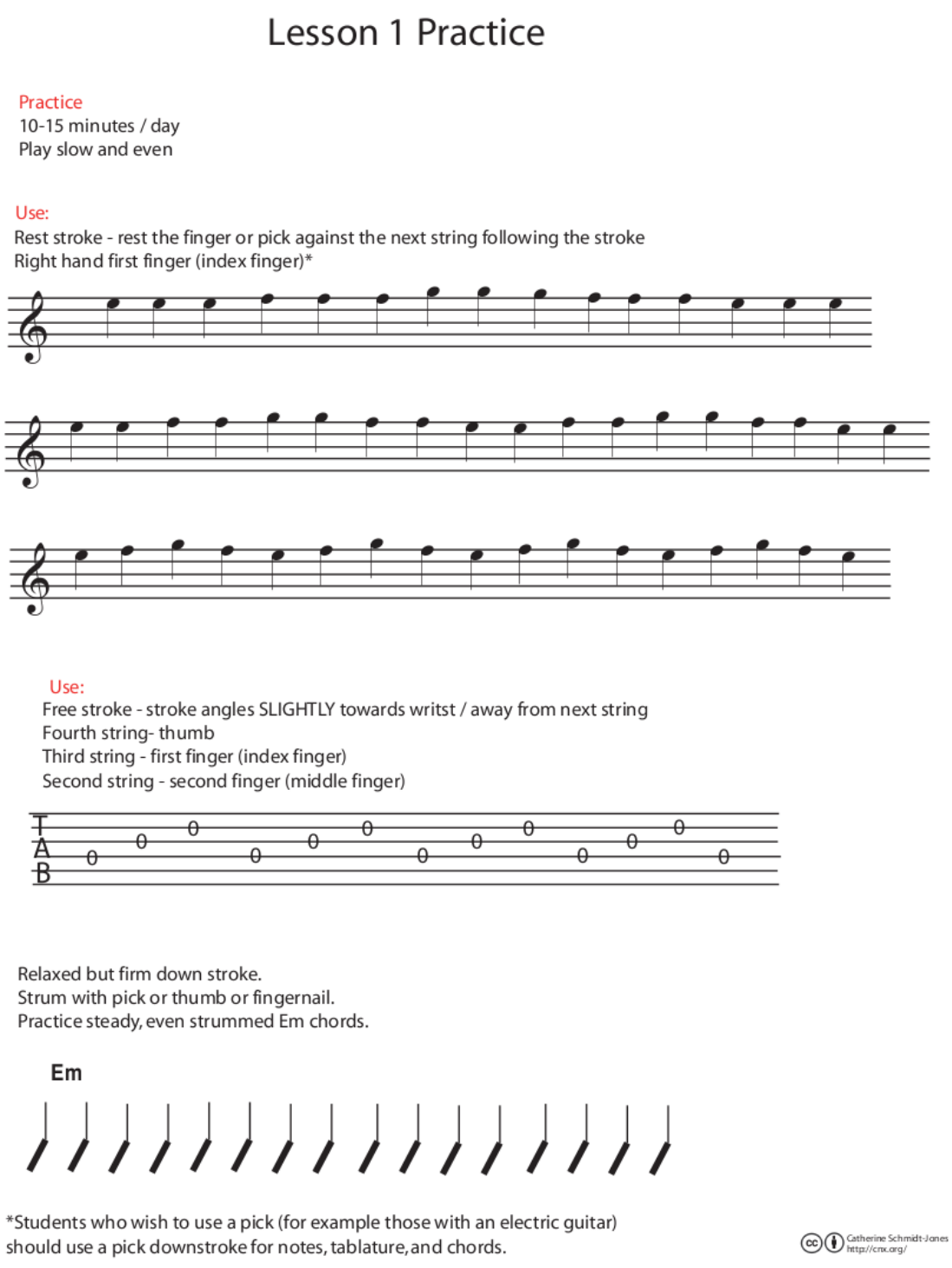
Lesson 1 Practice
Practice
10-15 minutes / day
Play slow and even
Use:
Rest stroke - rest the finger or pick against the next string following the stroke
Right hand first finger (index finger)*
Use:
Free stroke - stroke angles SLIGHTLY towards writst / away from next string
Fourth string- thumb
Third string - first finger (index finger)
Second string - second finger (middle finger)
T
A
B
Relaxed but firm down stroke.
Strum with pick or thumb or fingernail.
Practice steady, even strummed Em chords.
Em
*Students who wish to use a pick (for example those with an electric guitar)
should use a pick downstroke for notes, tablature, and chords.
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Figure 1.2

1.2 Guitar Lesson 2: The B String, Measures, and Time Signature[6]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are individual PDF files of the Lesson Page[7] and the Home Practice Page[8]. Students who are eager to learn how to accompany themselves while singing can begin in this lesson with "Row, Row, Row Your Boat", on the First Chord Songs[9] page, or any other song which can be accompanied by only a single major chord (use E) or a single minor chord (Em). Many simple rounds fall into this no-chord-change category. Students who have no interest in accompanying singing can ignore the chord song sheets.

Learning to play in an ensemble with others is an important skill for guitarists. Beginning in this lesson, students may start to work on ensembles[10] . If students are in a guitar class, class members should learn both parts and take turns playing each part during class. Private students can learn both parts and play each, with the instructor playing the other part, during lessons. Students may begin working on an ensemble at any time after finishing the exercises for that lesson.

[6] This content is available online at <http://cnx.org/content/m12666/1.5/>.
[7] See the file at <http://cnx.org/content/m12666/latest/2Guitarlesson.pdf>
[8] See the file at <http://cnx.org/content/m12666/latest/2Guitarpractice.pdf>
[9] http://cnx.org/content/m12666/latest/ChordSongSheet.pdf
[10] http://cnx.org/content/m12666/latest/Ensemble1.pdf

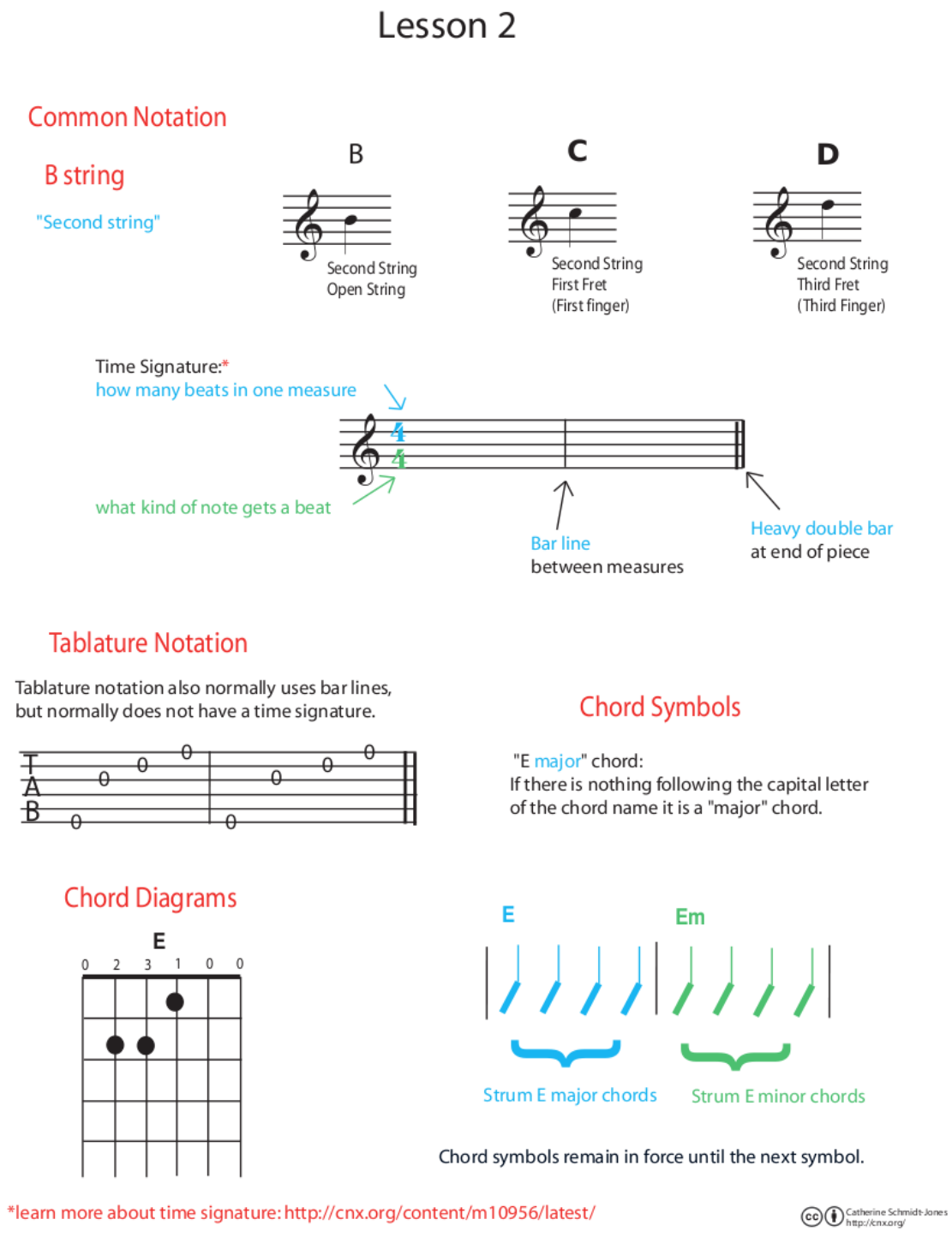
Lesson 2
Common Notation
B string
"Second string"
B
Second String
Open String
C
Second String
First Fret
(First finger)
D
Second String
Third Fret
(Third Finger)
Time Signature:*
how many beats in one measure
what kind of note gets a beat
Bar line
between measures
Heavy double bar
at end of piece
Tablature Notation
Tablature notation also normally uses bar lines,
but normally does not have a time signature.
T
A
B
Chord Symbols
"E major" chord:
If there is nothing following the capital letter
of the chord name it is a "major" chord.
Chord Diagrams
E
0 2 3 1 0 0
E
Em
Strum E major chords
Strum E minor chords
Chord symbols remain in force until the next symbol.
*learn more about time signature: http://cnx.org/content/m10956/latest/
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Figure 1.3

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Figure 1.4

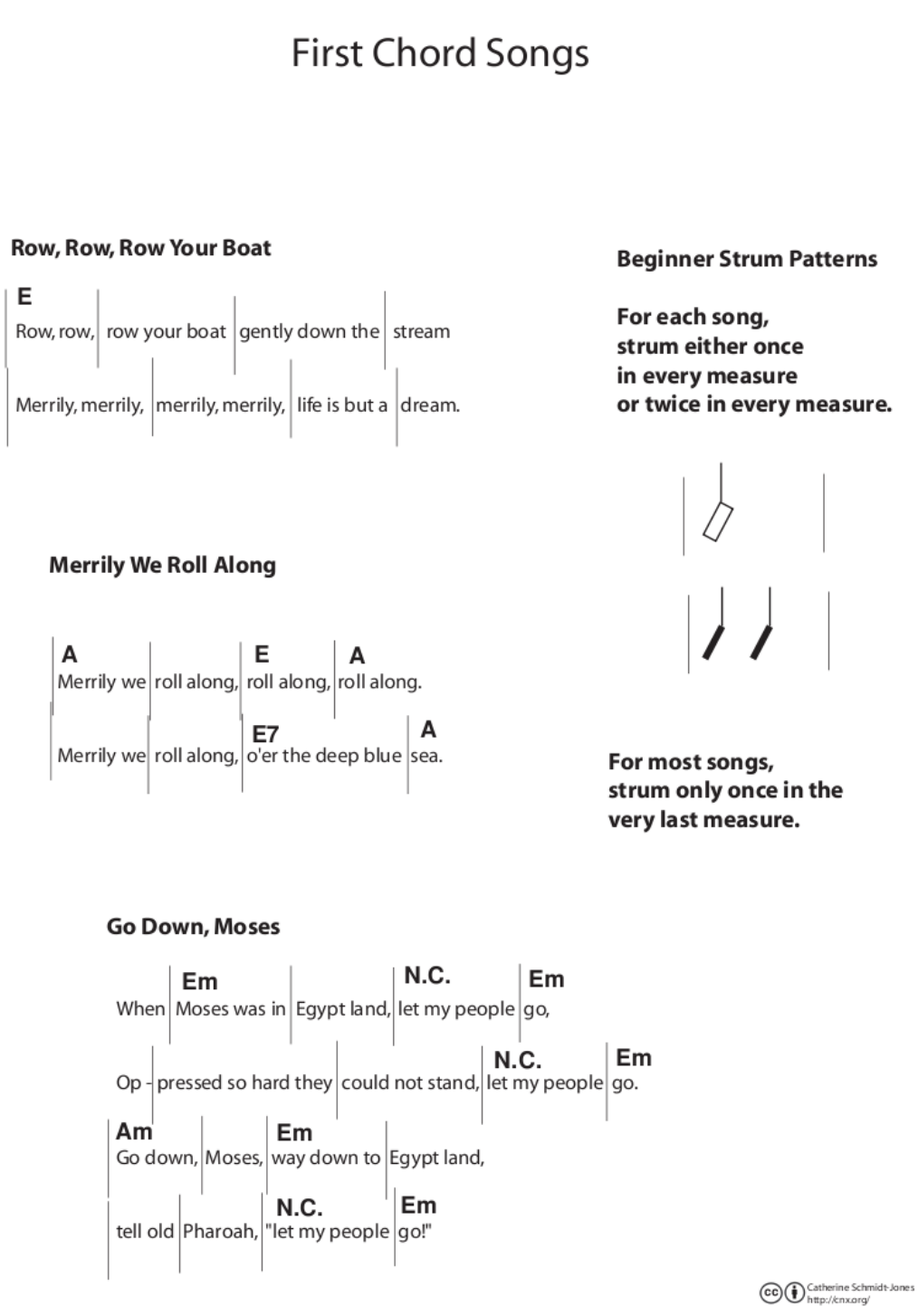
First Chord Songs
Row, Row, Row Your Boat
E
Row, row, row your boat gently down the stream
Merrily, merrily, merrily, merrily, life is but a dream.
Merrily We Roll Along
A
Merrily we roll along, E roll along, A roll along.
Merrily we roll along, E7 o'er the deep blue A sea.
Beginner Strum Patterns
For each song, strum either once in every measure or twice in every measure.
For most songs, strum only once in the very last measure.
Go Down, Moses
When Em Moses was in Egypt land, N.C. let my people Em go,
Op - pressed so hard they could not stand, N.C. let my people Em go.
Am Go down, Moses, Em way down to Egypt land,
tell old Pharoah, N.C. "let my people Em go!"
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Figure 1.5

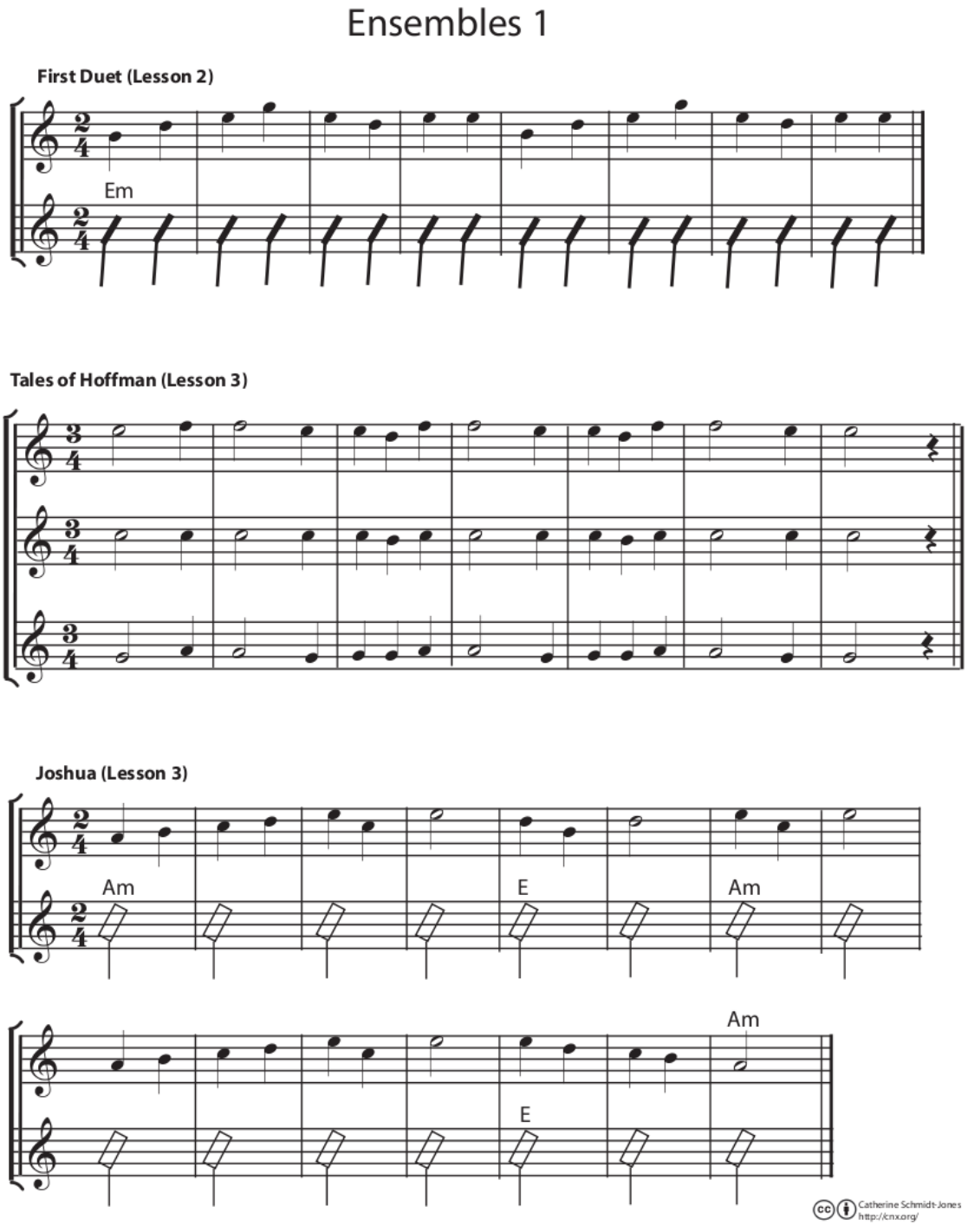
Ensembles 1
First Duet (Lesson 2)
Em
Tales of Hoffman (Lesson 3)
Joshua (Lesson 3)
Am
E
Am
Am
E
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Figure 1.6

1.3 Guitar Lesson 3: The G String, Half Notes, and Tablature Numbers[11]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[12], the Home Practice Page[13]. The ensembles[14] for this lesson are on the same page as the ensemble for lesson 2. If you cannot get the PDF files, you can use the figures below.

Also, beginning in this lesson, students are ready to learn some familiar tunes. As with ensembles, students may work on or perform song sheet[15] tunes at any time after they have mastered the skills for that lesson.

[11] This content is available online at <http://cnx.org/content/m12668/1.3/>.
[12] See the file at <http://cnx.org/content/m12668/latest/3Guitarlesson.pdf>
[13] See the file at <http://cnx.org/content/m12668/latest/3Guitarpractice.pdf>
[14] http://cnx.org/content/m12668/latest/Ensemble1.pdf
[15] http://cnx.org/content/m12668/latest/SongSheet1.pdf

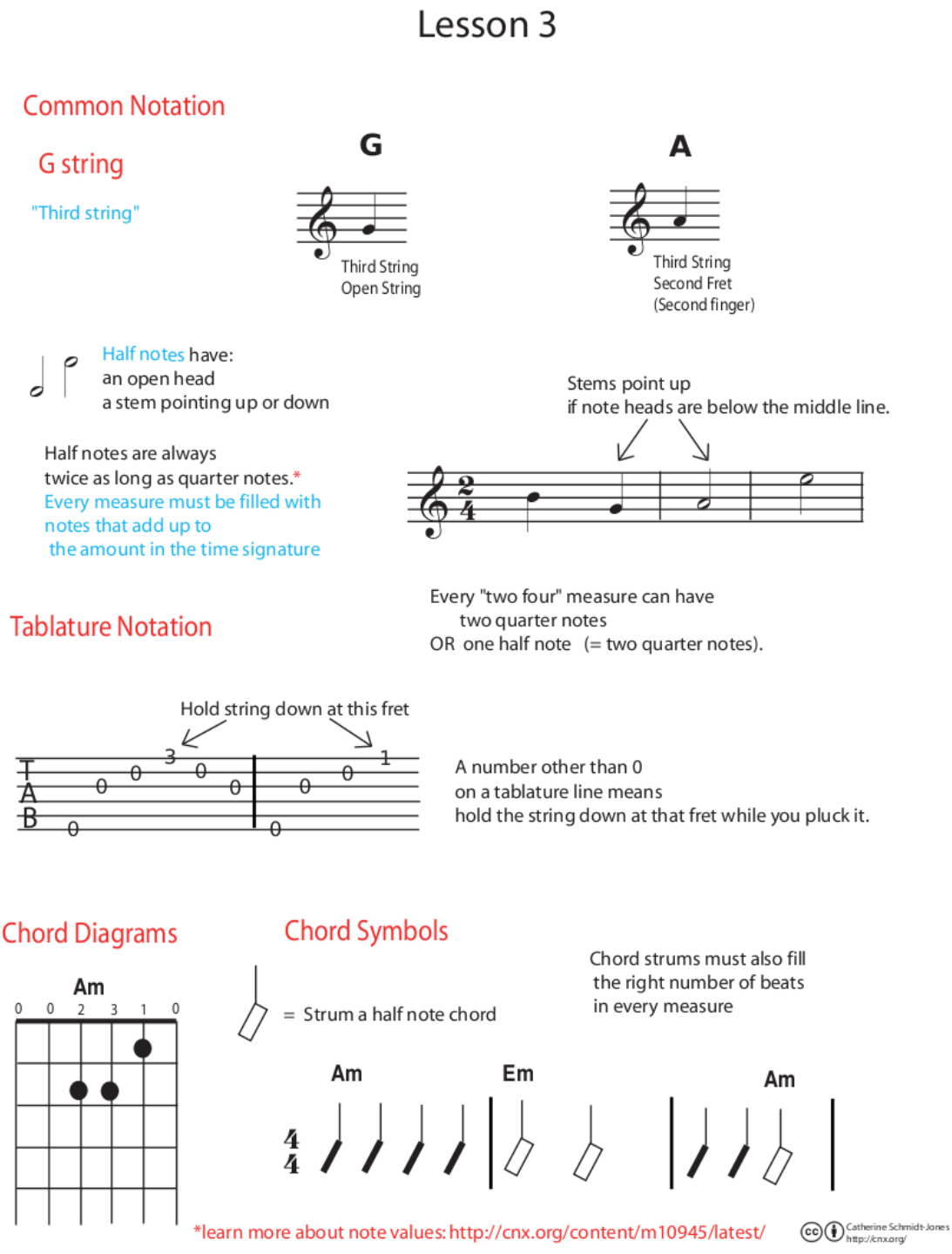
Lesson 3
Common Notation
G string
"Third string"
G
Third String
Open String
A
Third String
Second Fret
(Second finger)
Half notes have:
an open head
a stem pointing up or down
Half notes are always
twice as long as quarter notes.*
Every measure must be filled with
notes that add up to
the amount in the time signature
Stems point up
if note heads are below the middle line.
Every "two four" measure can have
two quarter notes
OR one half note (= two quarter notes).
Tablature Notation
Hold string down at this fret
A number other than 0
on a tablature line means
hold the string down at that fret while you pluck it.
Chord Diagrams
Am
0 0 2 3 1 0
Chord Symbols
= Strum a half note chord
Chord strums must also fill
the right number of beats
in every measure
Am
Em
Am
*learn more about note values: http://cnx.org/content/m10945/latest/
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Figure 1.7

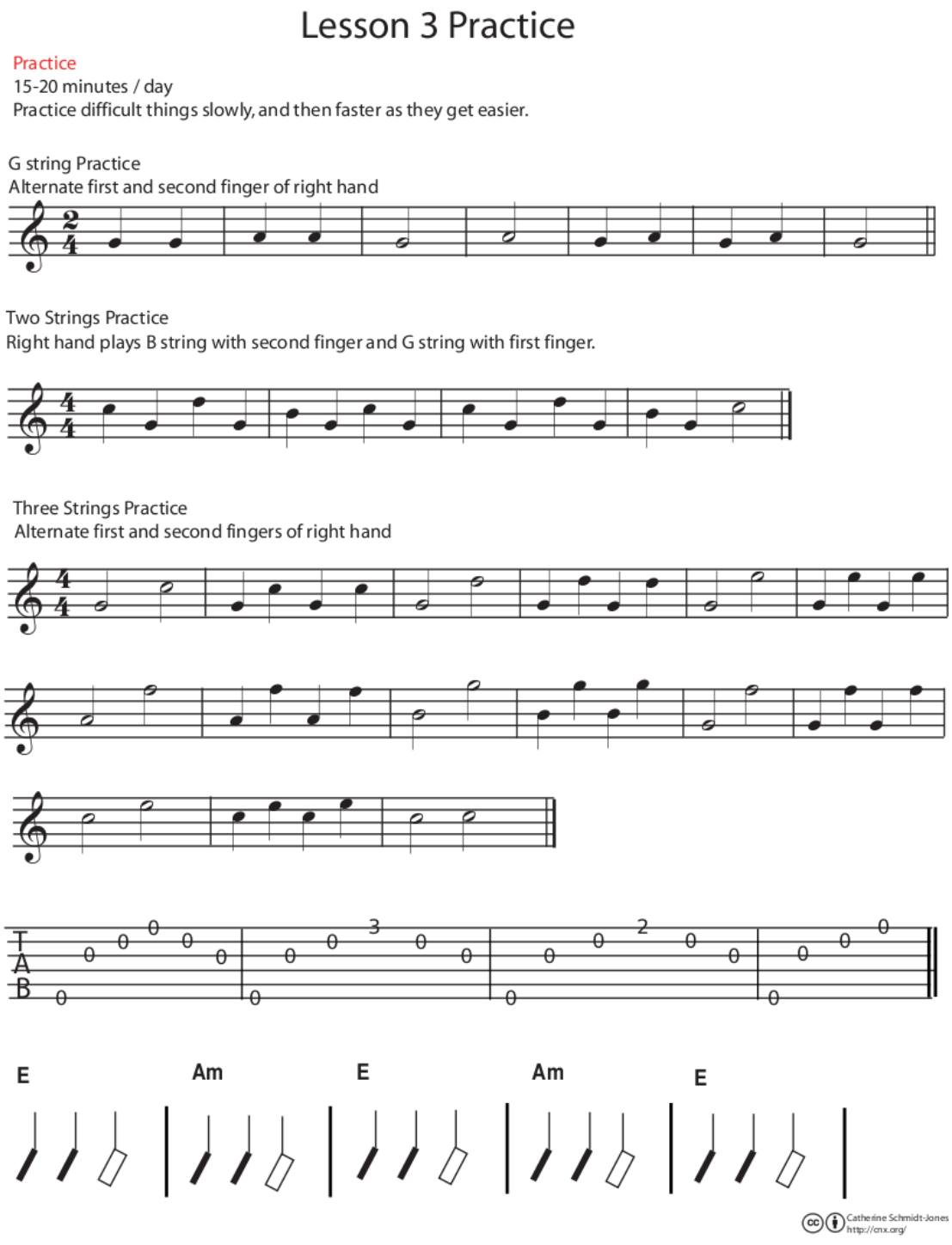
Lesson 3 Practice
Practice
15-20 minutes / day
Practice difficult things slowly, and then faster as they get easier.
G string Practice
Alternate first and second finger of right hand
Two Strings Practice
Right hand plays B string with second finger and G string with first finger.
Three Strings Practice
Alternate first and second fingers of right hand
T
A
B
E
Am
E
Am
E
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Figure 1.8

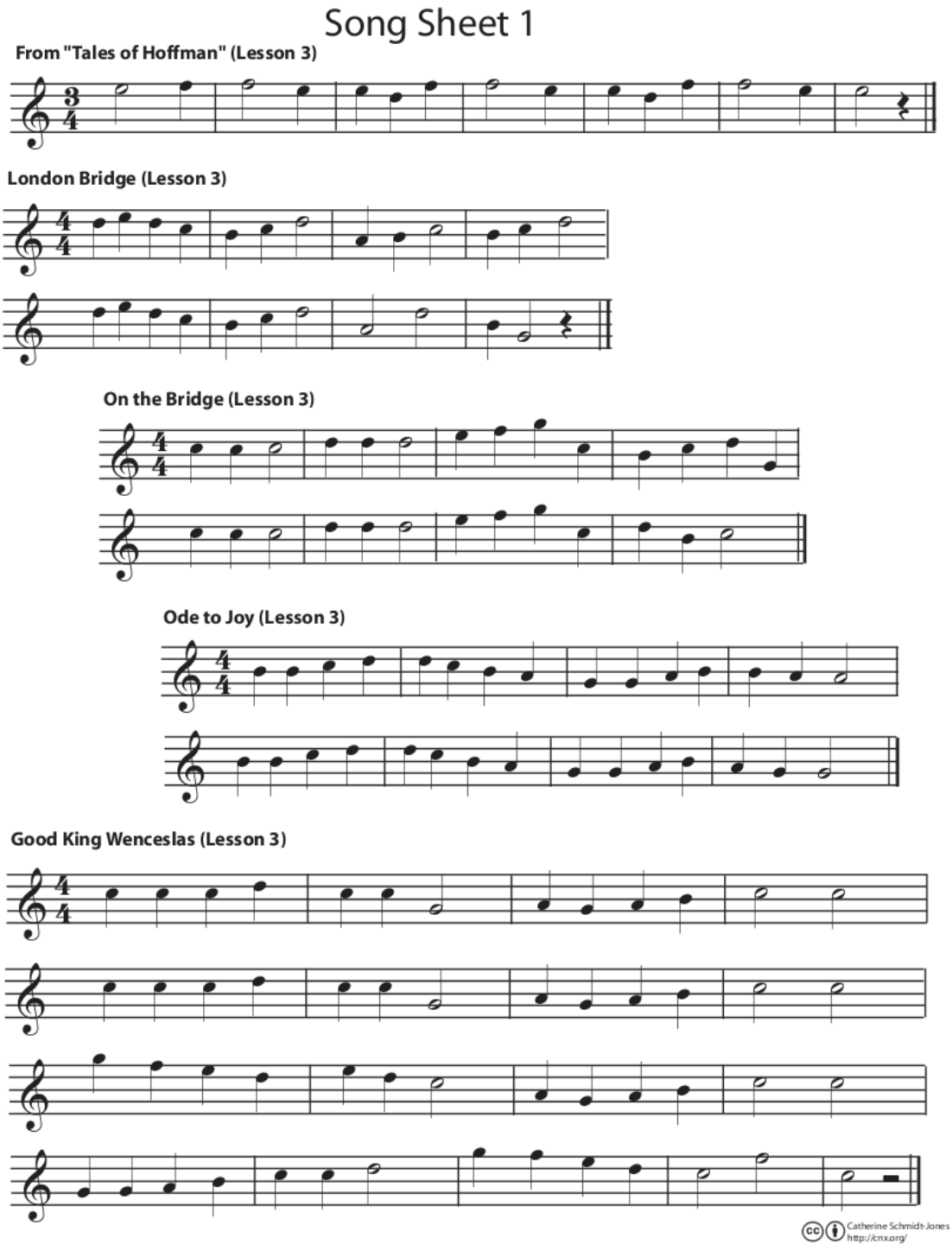
Song Sheet 1
From "Tales of Hoffman" (Lesson 3)
London Bridge (Lesson 3)
On the Bridge (Lesson 3)
Ode to Joy (Lesson 3)
Good King Wenceslas (Lesson 3)
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Figure 1.9

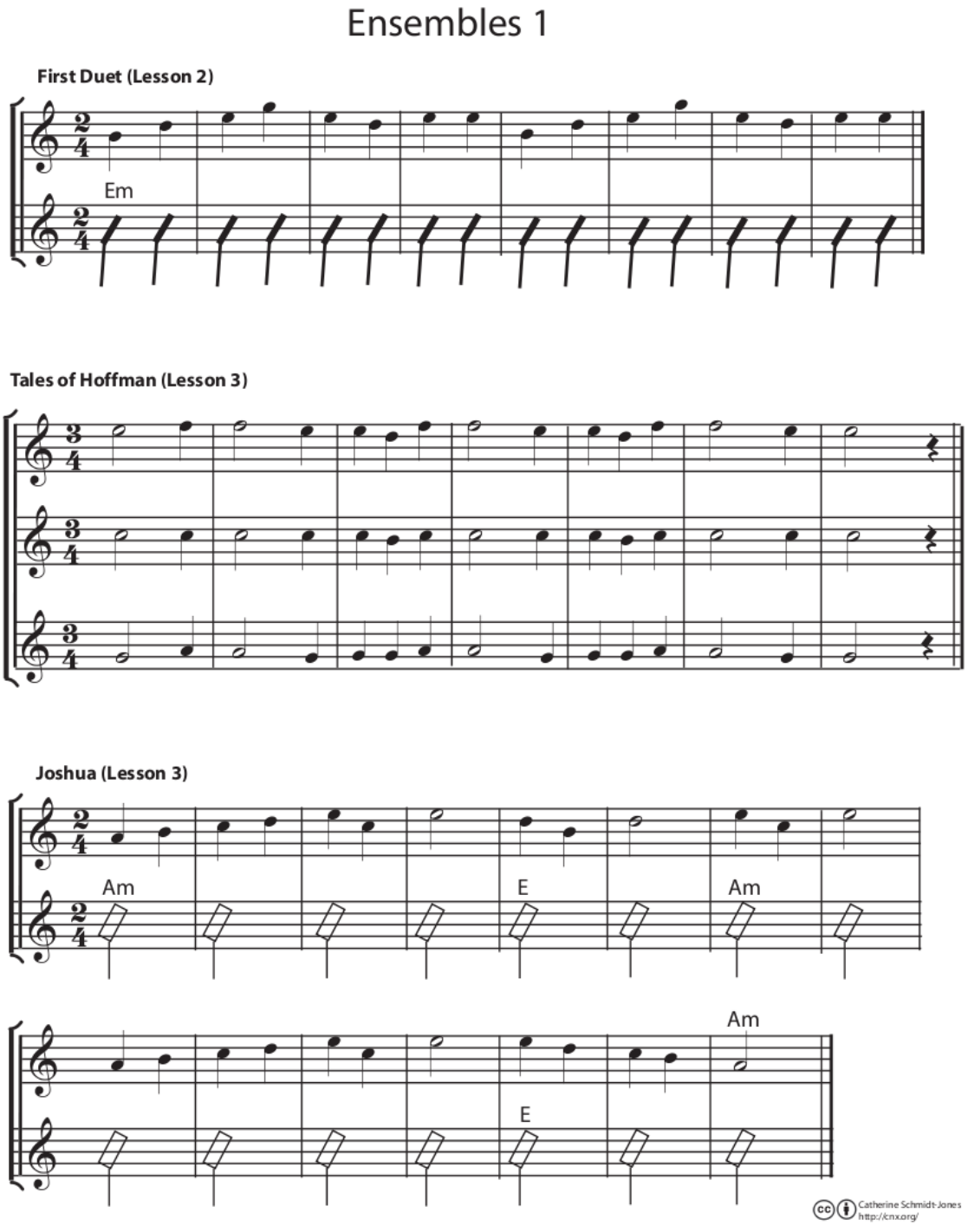
Ensembles 1
First Duet (Lesson 2)
Em
Tales of Hoffman (Lesson 3)
Joshua (Lesson 3)
Am
E
Am
Am
E
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Figure 1.10

1.4 Guitar Lesson 4: The D String, Rests, and Right Hand Symbols[16]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[17] and the Home Practice Page[18] . Students may also be ready to begin the Second Song Sheet[19] and Second Ensemble page[20] . If you cannot get the PDF files, you can use the figures below.

Also note that students who are interested in singing may be ready to work on "two-chord" songs that include only simple A or E (major or minor) chords, such as those on the First Chord Song Sheet[21] from lesson 2, and this second First Chord Songs[22] sheet.

[16] This content is available online at <http://cnx.org/content/m12669/1.5/>.
[17] http://cnx.org/content/m12669/latest/4Guitarlesson.pdf
[18] http://cnx.org/content/m12669/latest/4Guitarpractice.pdf
[19] http://cnx.org/content/m12669/latest/songsheet2.pdf
[20] http://cnx.org/content/m12669/latest/Ensemble2.pdf
[21] http://cnx.org/content/m12669/latest/ChordSongSheet.pdf
[22] http://cnx.org/content/m12669/latest/ChordSongSheet2.pdf

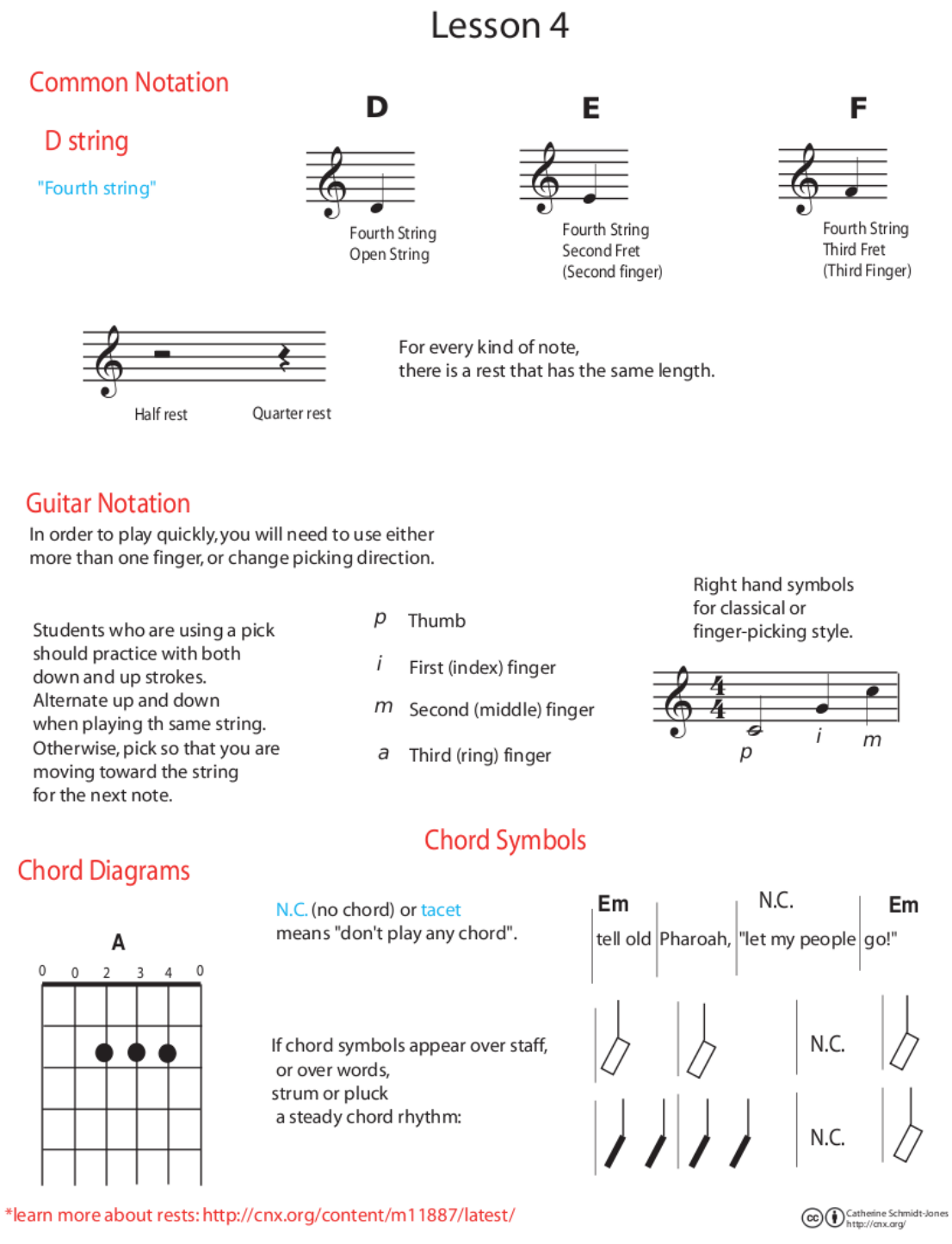
Lesson 4
Common Notation
D string
"Fourth string"
D
E
F
Fourth String
Open String
Fourth String
Second Fret
(Second finger)
Fourth String
Third Fret
(Third Finger)
Half rest
Quarter rest
For every kind of note,
there is a rest that has the same length.
Guitar Notation
In order to play quickly, you will need to use either
more than one finger, or change picking direction.
Students who are using a pick
should practice with both
down and up strokes.
Alternate up and down
when playing th same string.
Otherwise, pick so that you are
moving toward the string
for the next note.
p Thumb
i First (index) finger
m Second (middle) finger
a Third (ring) finger
Right hand symbols
for classical or
finger-picking style.
p
i
m
Chord Symbols
Chord Diagrams
A
0 0 2 3 4 0
N.C. (no chord) or tacet
means "don't play any chord".
Em
N.C.
Em
tell old
Pharoah,
"let my people
go!"
If chord symbols appear over staff,
or over words,
strum or pluck
a steady chord rhythm:
N.C.
N.C.
*learn more about rests: http://cnx.org/content/m11887/latest/
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Figure 1.11

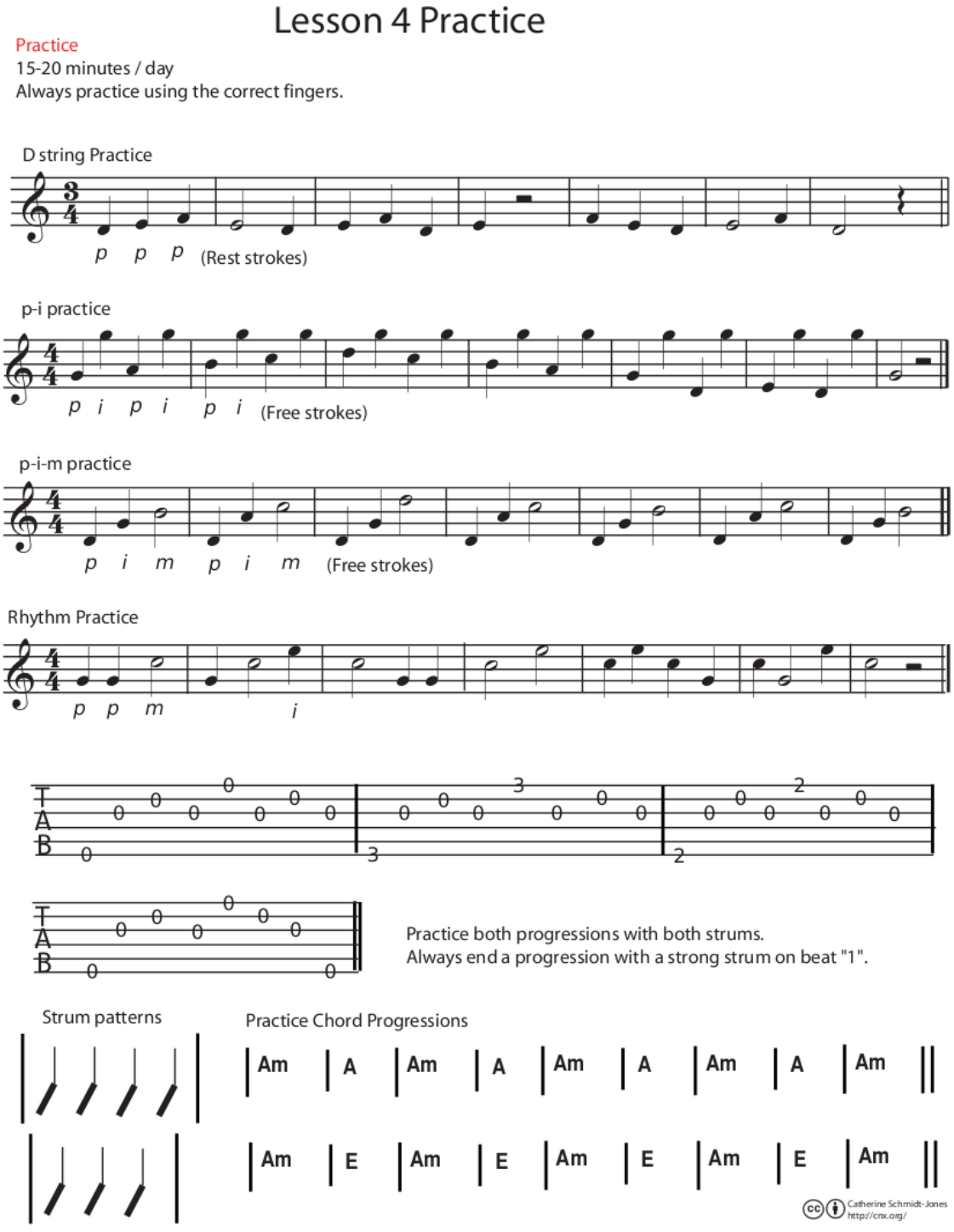
Lesson 4 Practice
Practice
15-20 minutes / day
Always practice using the correct fingers.
D string Practice
p p p (Rest strokes)
p-i practice
p i p i p i (Free strokes)
p-i-m practice
p i m p i m (Free strokes)
Rhythm Practice
p p m i
Practice both progressions with both strums.
Always end a progression with a strong strum on beat "1".
Strum patterns
Practice Chord Progressions
Am A Am A Am A Am A Am
Am E Am E Am E Am E Am
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Figure 1.12

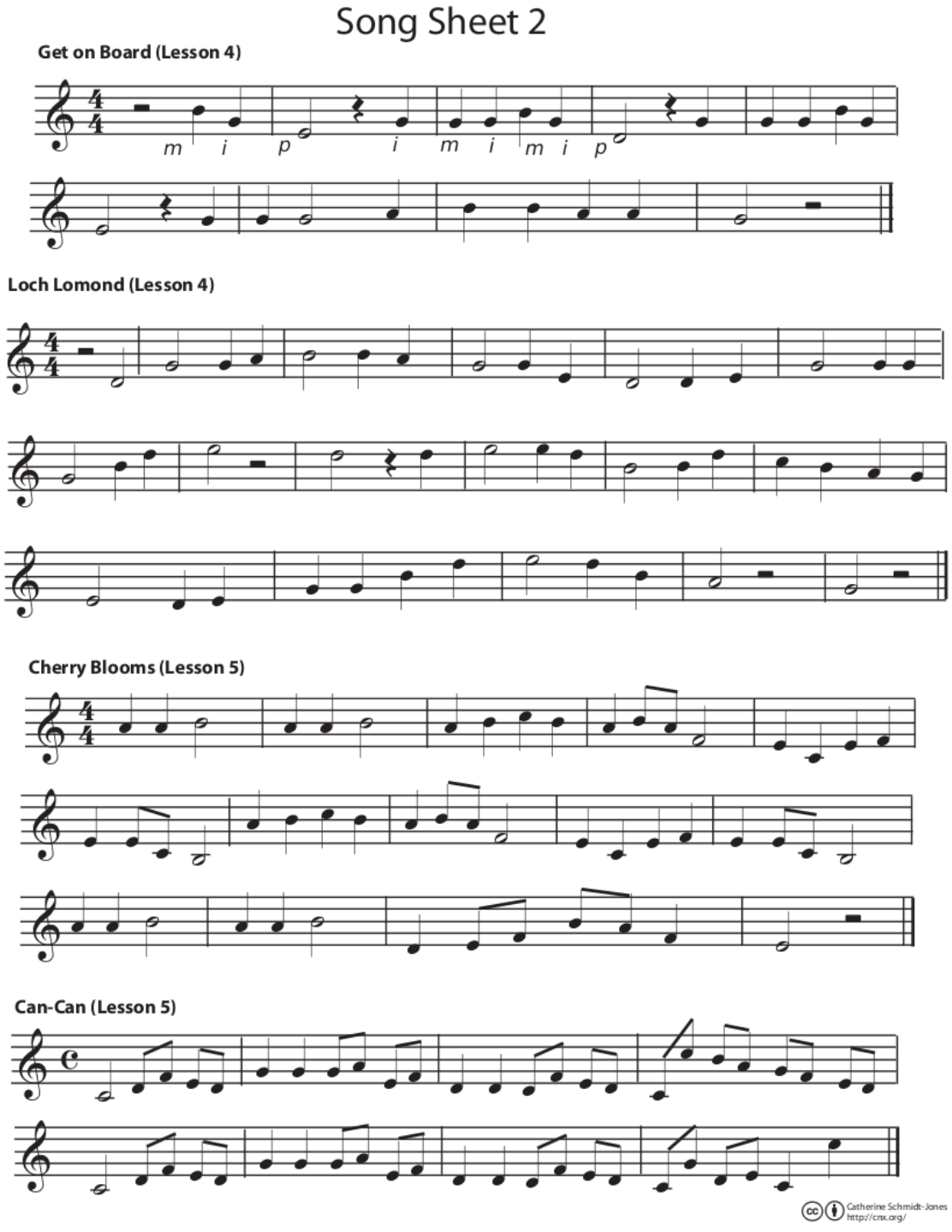
Song Sheet 2
Get on Board (Lesson 4)
m i p i m i m i p
Loch Lomond (Lesson 4)
Cherry Blooms (Lesson 5)
Can-Can (Lesson 5)
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Figure 1.13

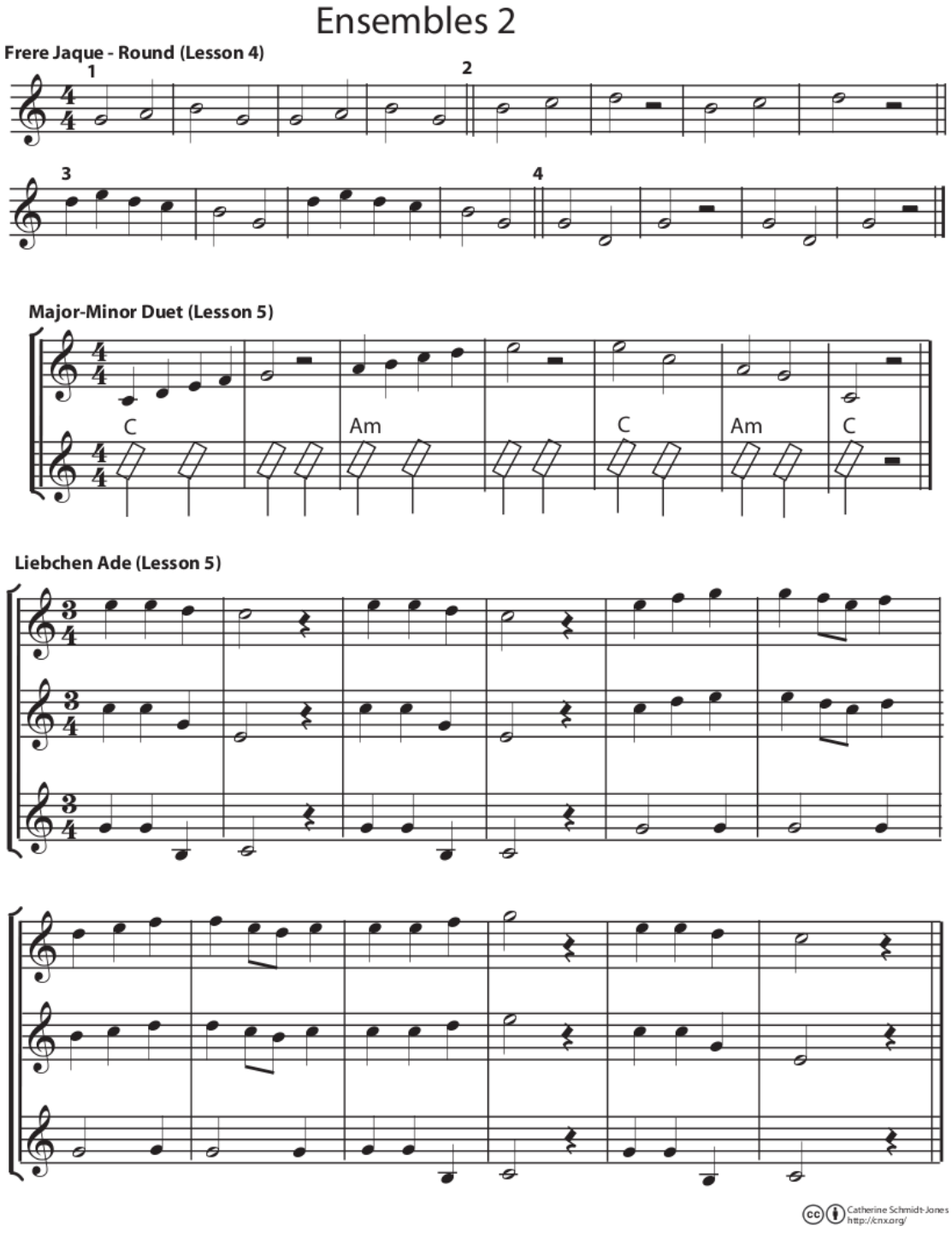
Ensembles 2
Frere Jaque - Round (Lesson 4)
1
2
3
4
Major-Minor Duet (Lesson 5)
C
Am
C
Am
C
Liebchen Ade (Lesson 5)
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Figure 1.14

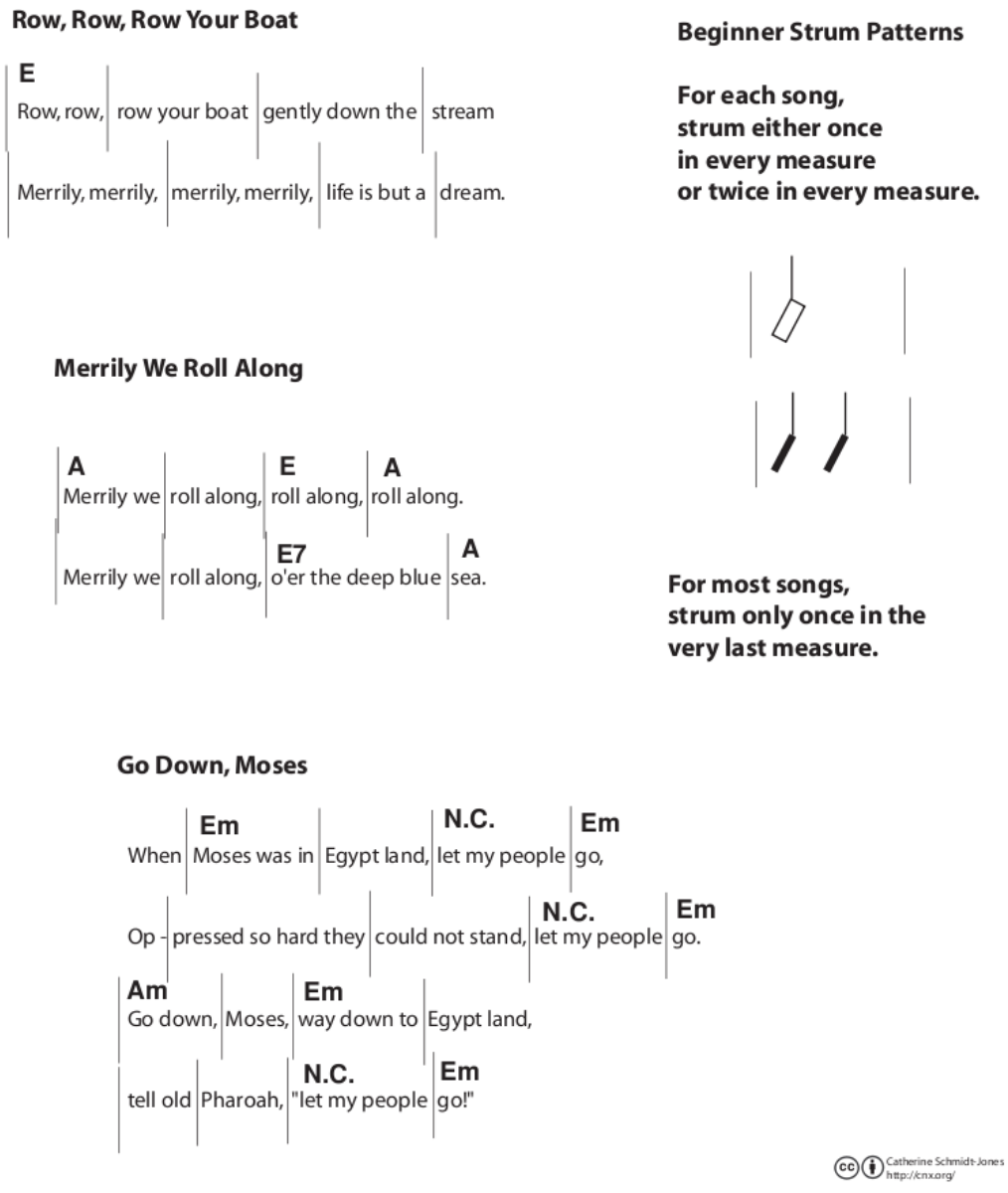
First Chord Songs
Row, Row, Row Your Boat
E
Row, row, | row your boat | gently down the | stream
Merrily, merrily, | merrily, merrily, | life is but a | dream.
Merrily We Roll Along
A
Merrily we | roll along, | E roll along, | A roll along.
Merrily we | roll along, | E7 o'er the deep blue | A sea.
Beginner Strum Patterns
For each song,
strum either once
in every measure
or twice in every measure.
For most songs,
strum only once in the
very last measure.
Go Down, Moses
When | Em Moses was in | Egypt land, | N.C. let my people | Em go,
Op - | pressed so hard they | could not stand, | N.C. let my people | Em go.
Am
Go down, | Moses, | Em way down to | Egypt land,
tell old | Pharoah, | N.C. "let my people | Em go!"
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Figure 1.15

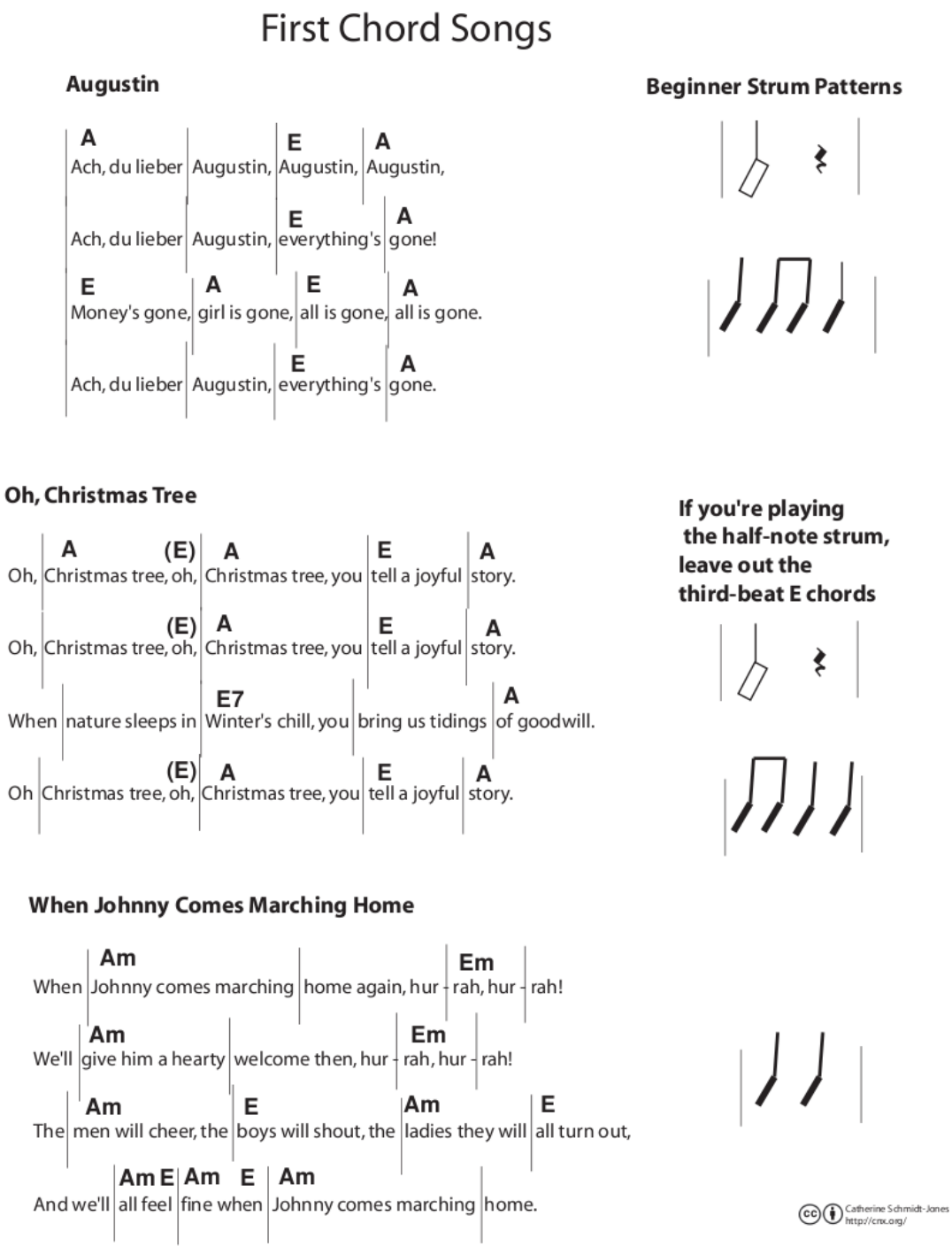
First Chord Songs
Augustin
A
Ach, du lieber
Augustin,
E
Augustin,
A
Augustin,
Ach, du lieber
Augustin,
E
everything's
A
gone!
E
Money's gone,
A
girl is gone,
E
all is gone,
A
all is gone.
Ach, du lieber
Augustin,
E
everything's
A
gone.
Beginner Strum Patterns
Oh, Christmas Tree
A
(E)
A
E
A
Oh,
Christmas tree, oh,
Christmas tree, you
tell a joyful
story.
(E)
A
E
A
Oh,
Christmas tree, oh,
Christmas tree, you
tell a joyful
story.
E7
A
When
nature sleeps in
Winter's chill, you
bring us tidings
of goodwill.
(E)
A
E
A
Oh
Christmas tree, oh,
Christmas tree, you
tell a joyful
story.
If you're playing the half-note strum, leave out the third-beat E chords
When Johnny Comes Marching Home
Am
Em
When
Johnny comes marching
home again, hur -
rah, hur -
rah!
Am
Em
We'll
give him a hearty
welcome then, hur -
rah, hur -
rah!
Am
E
Am
E
The
men will cheer, the
boys will shout, the
ladies they will
all turn out,
Am E
Am
E
Am
And we'll
all feel
fine when
Johnny comes marching
home.
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Figure 1.16

1.5 Guitar Lesson 5: The A String, Eighth Notes, and Pickup Measures[23]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[24] and the Home Practice Page[25]. The Song Sheet[26] and the Ensemble page[27] are the same as for Guitar Lesson 4 (Section 1.4).

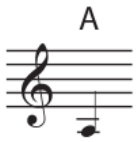
[23] This content is available online at <http://cnx.org/content/m12732/1.3/>.
[24] See the file at <http://cnx.org/content/m12732/latest/5Guitarlesson.pdf>
[25] See the file at <http://cnx.org/content/m12732/latest/5Guitarpractice.pdf>
[26] http://cnx.org/content/m12732/latest/songsheet2.pdf
[27] http://cnx.org/content/m12732/latest/Ensemble2.pdf

Lesson 5

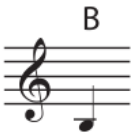
Common Notation

A string

"Fifth string"



Fifth String
Open String



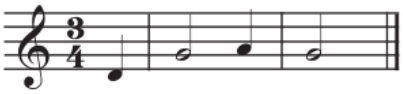
Fifth String
Second Fret
(Second finger)

Fifth String
Third Fret
(Third Finger)

Eighth notes have:
a solid head
a stem pointing up or down
one flag or one beam
at the end of the stem

Eighth notes are always
half as long as quarter notes.

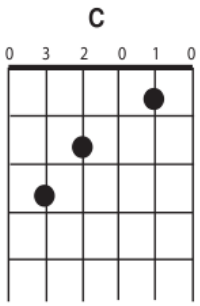
Eighth rest



The very first measure is allowed to be
less than a full measure.
This can be called a
pick-up measure, or pick-up notes.*
The very last measure plus the pickup measure
must equal a full measure.

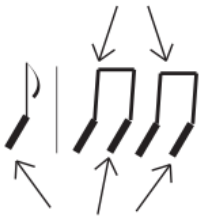
Common Time is 4/4 time.

Chord Diagrams



Chord strums
may also be written
with stems,
flags, or beams.

Strong down strum at beginning of beat.
Downbeat



Upbeat
Gentler up strum in middle of beat.

*learn more about pick-up notes: http://cnx.org/content/m12717/latest/

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Figure 1.17

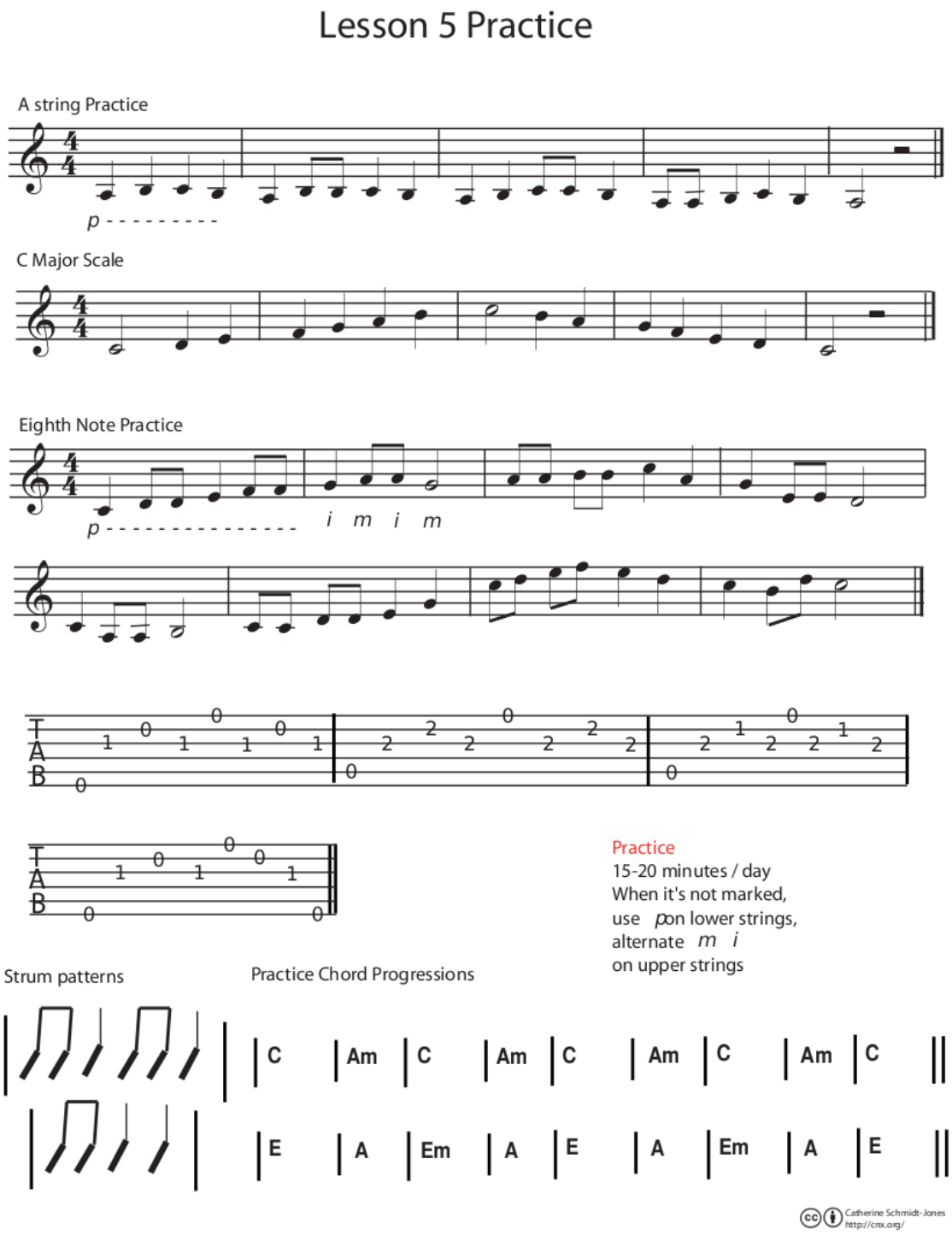
Lesson 5 Practice
A string Practice
p - - - - - - - - -
C Major Scale
Eighth Note Practice
p - - - - - - - - - - - - - - -
i m i m
Practice
15-20 minutes / day
When it's not marked,
use p on lower strings,
alternate m i
on upper strings
Strum patterns
Practice Chord Progressions
C Am C Am C Am C Am C
E A Em A E A Em A E
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Figure 1.18

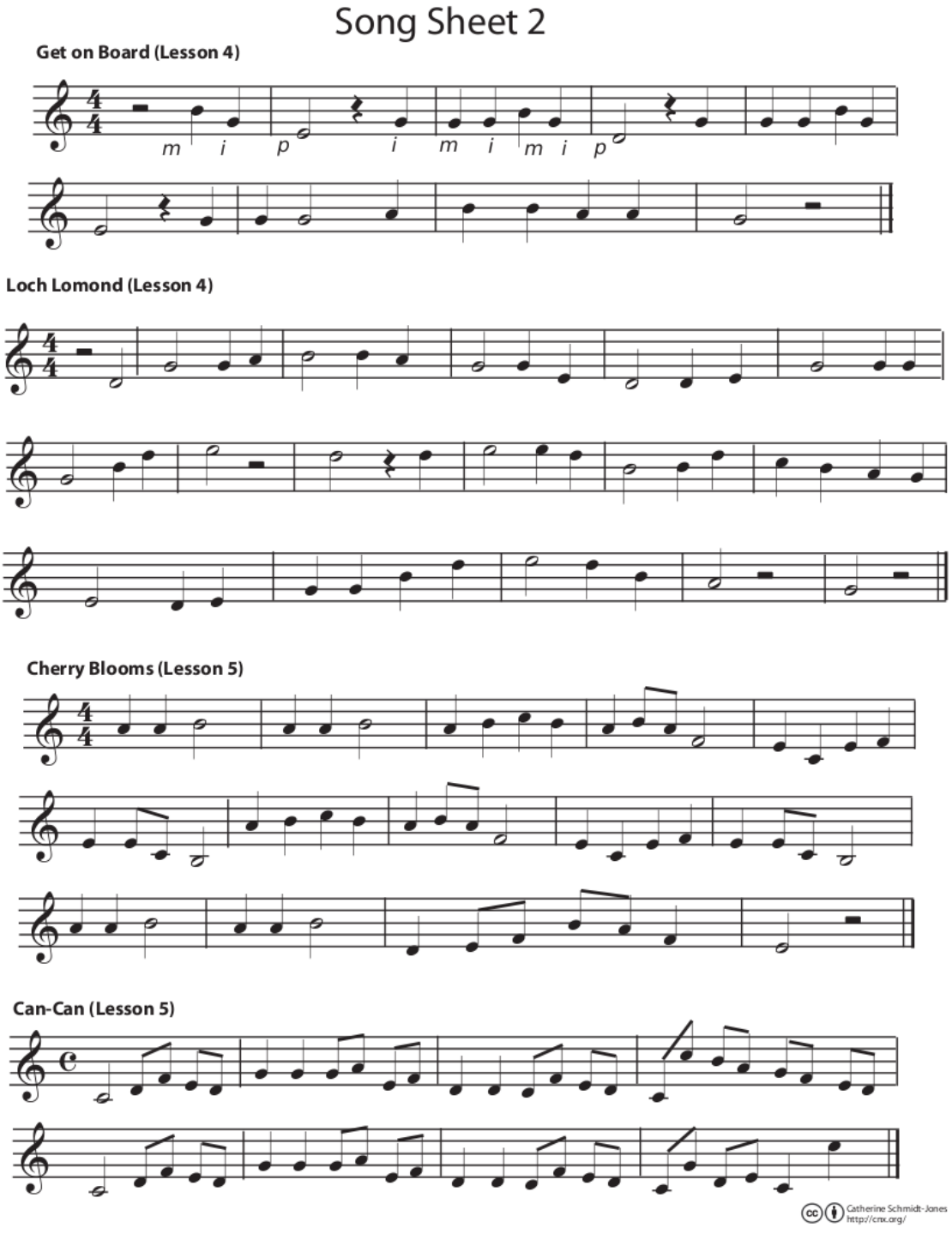
Song Sheet 2
Get on Board (Lesson 4)
m i p i m i m i p
Loch Lomond (Lesson 4)
Cherry Blooms (Lesson 5)
Can-Can (Lesson 5)
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Figure 1.19

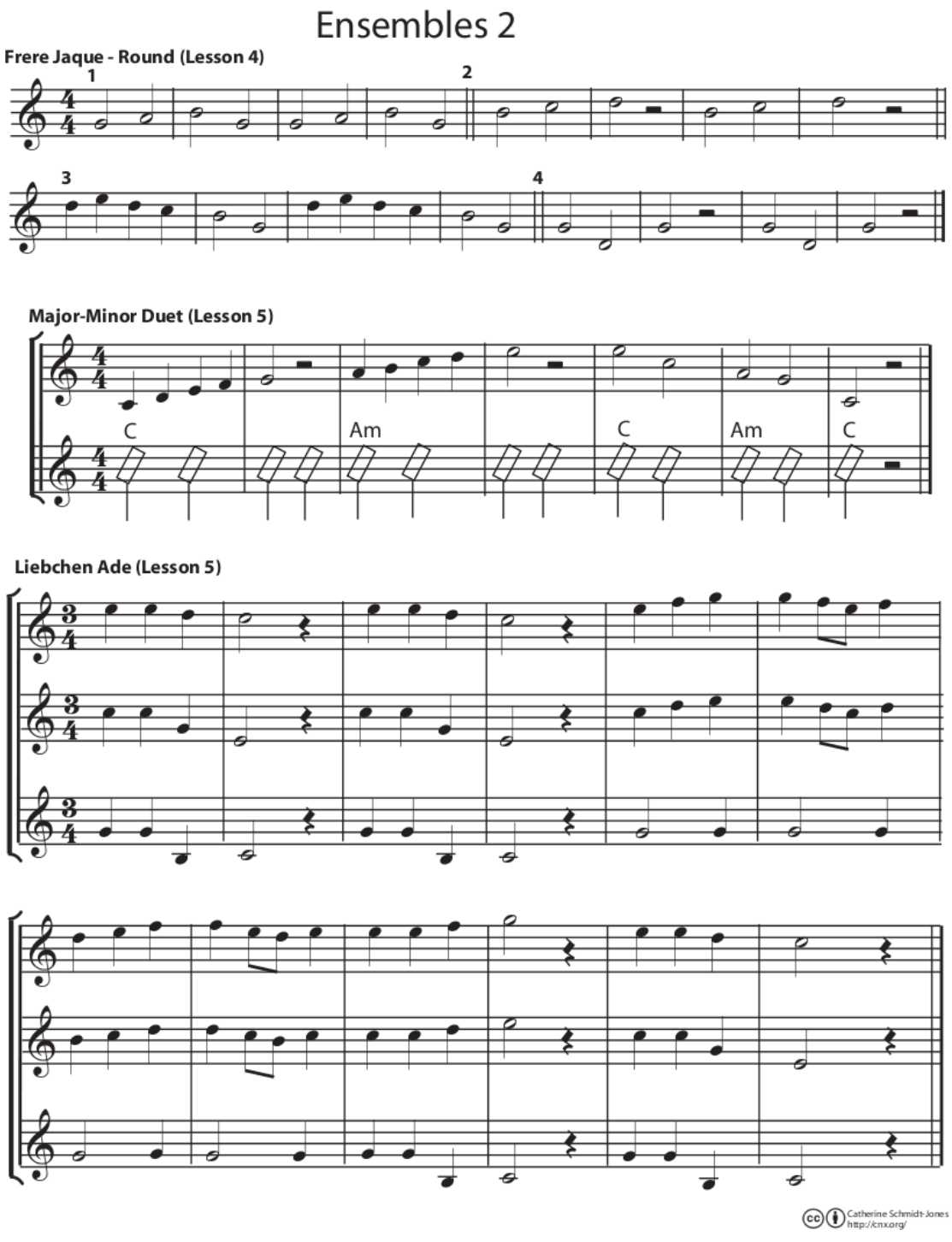
Ensembles 2
Frere Jaque - Round (Lesson 4)
1
2
3
4
Major-Minor Duet (Lesson 5)
C
Am
C
Am
C
Liebchen Ade (Lesson 5)
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Figure 1.20

1.6 Guitar Lesson 6: The Low E String, Sharps, and Left Hand Notation[28]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[29], the Home Practice Page[30], Song Sheet 3[31], and Ensemble Page[32] for Lesson 6. If you cannot get the PDF files, you can use the figures below.

For students who are interested in accompaniment, this is a good time to add a song to their home practice that can be played using A and E7 chords (I-V7). Besides the pieces on the First Chord Song (Section 1.4) pages, other possibilities include: "Clementine", "Polly Wolly Doodle", "Skip to my Lou", and "Down in the Valley".

Students who are enjoying reading common notation, and anxious to learn particular tunes, should at this point be able to work from any book designed for beginning guitarists. Music designed for beginners in other instruments may also be useful. Students who need extra practice, in order to solidify their reading skills, should also be encouraged to pick up an extra songbook for beginners, and work at these lessons at a slower pace while building confidence working on easy songs.

[28] This content is available online at <http://cnx.org/content/m12744/1.4/>.
[29] See the file at <http://cnx.org/content/m12744/latest/6guitarlesson.pdf>
[30] See the file at <http://cnx.org/content/m12744/latest/6Guitarpractice.pdf>
[31] See the file at <http://cnx.org/content/m12744/latest/SongSheet3.pdf>
[32] See the file at <http://cnx.org/content/m12744/latest/Ensemble3.pdf>

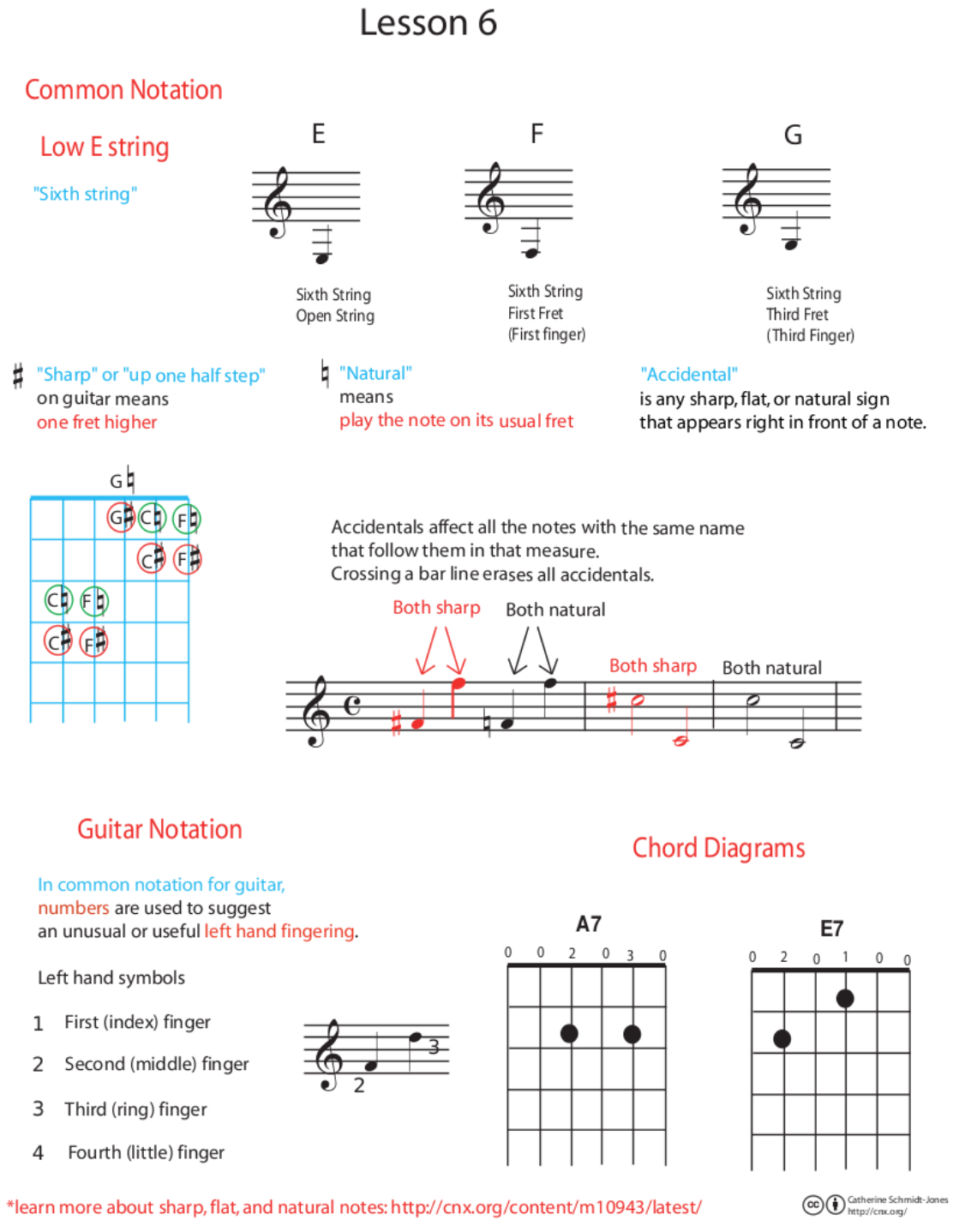
Lesson 6
Common Notation
Low E string
"Sixth string"
E
F
G
Sixth String
Open String
Sixth String
First Fret
(First finger)
Sixth String
Third Fret
(Third Finger)
"Sharp" or "up one half step"
on guitar means
one fret higher
"Natural"
means
play the note on its usual fret
"Accidental"
is any sharp, flat, or natural sign
that appears right in front of a note.
G
Accidentals affect all the notes with the same name
that follow them in that measure.
Crossing a bar line erases all accidentals.
Both sharp
Both natural
Both sharp
Both natural
Guitar Notation
In common notation for guitar,
numbers are used to suggest
an unusual or useful left hand fingering.
Left hand symbols
1 First (index) finger
2 Second (middle) finger
3 Third (ring) finger
4 Fourth (little) finger
Chord Diagrams
A7
0 0 2 0 3 0
E7
0 2 0 1 0 0
*learn more about sharp, flat, and natural notes: http://cnx.org/content/m10943/latest/
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.21

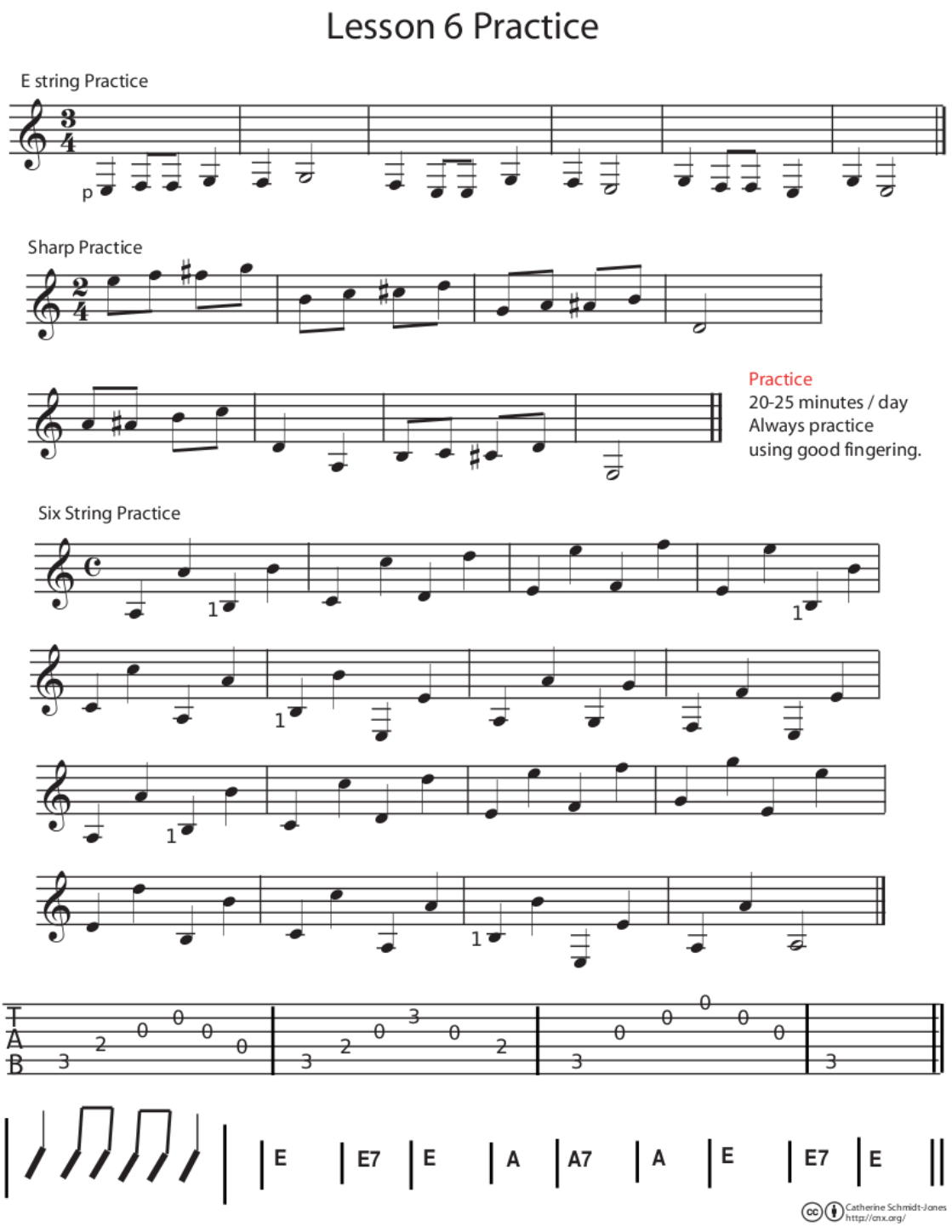
Lesson 6 Practice
E string Practice
p
Sharp Practice
Practice
20-25 minutes / day
Always practice
using good fingering.
Six String Practice
T
A
B
E
E7
E
A
A7
A
E
E7
E
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Figure 1.22

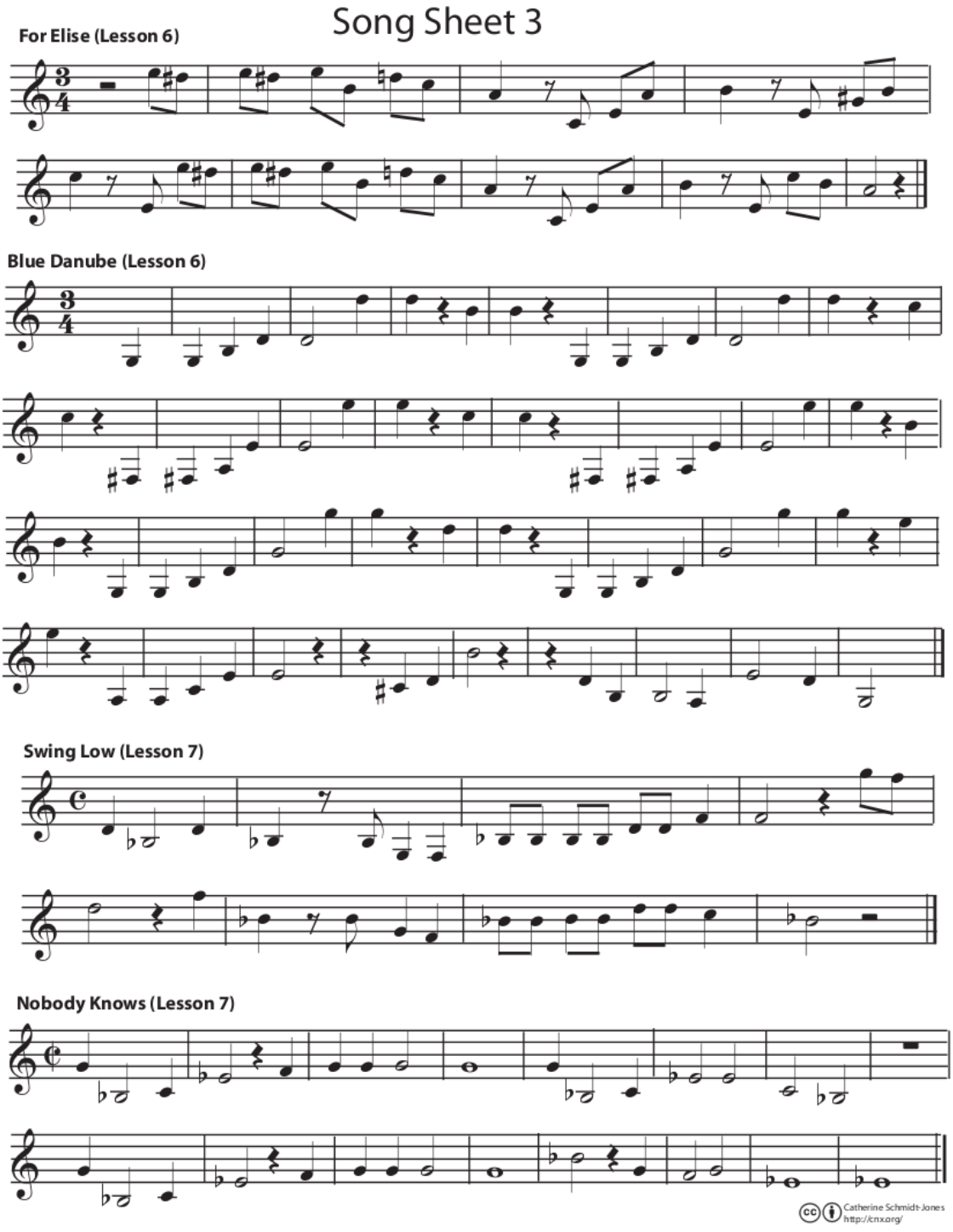
Song Sheet 3
For Elise (Lesson 6)
Blue Danube (Lesson 6)
Swing Low (Lesson 7)
Nobody Knows (Lesson 7)
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Figure 1.23

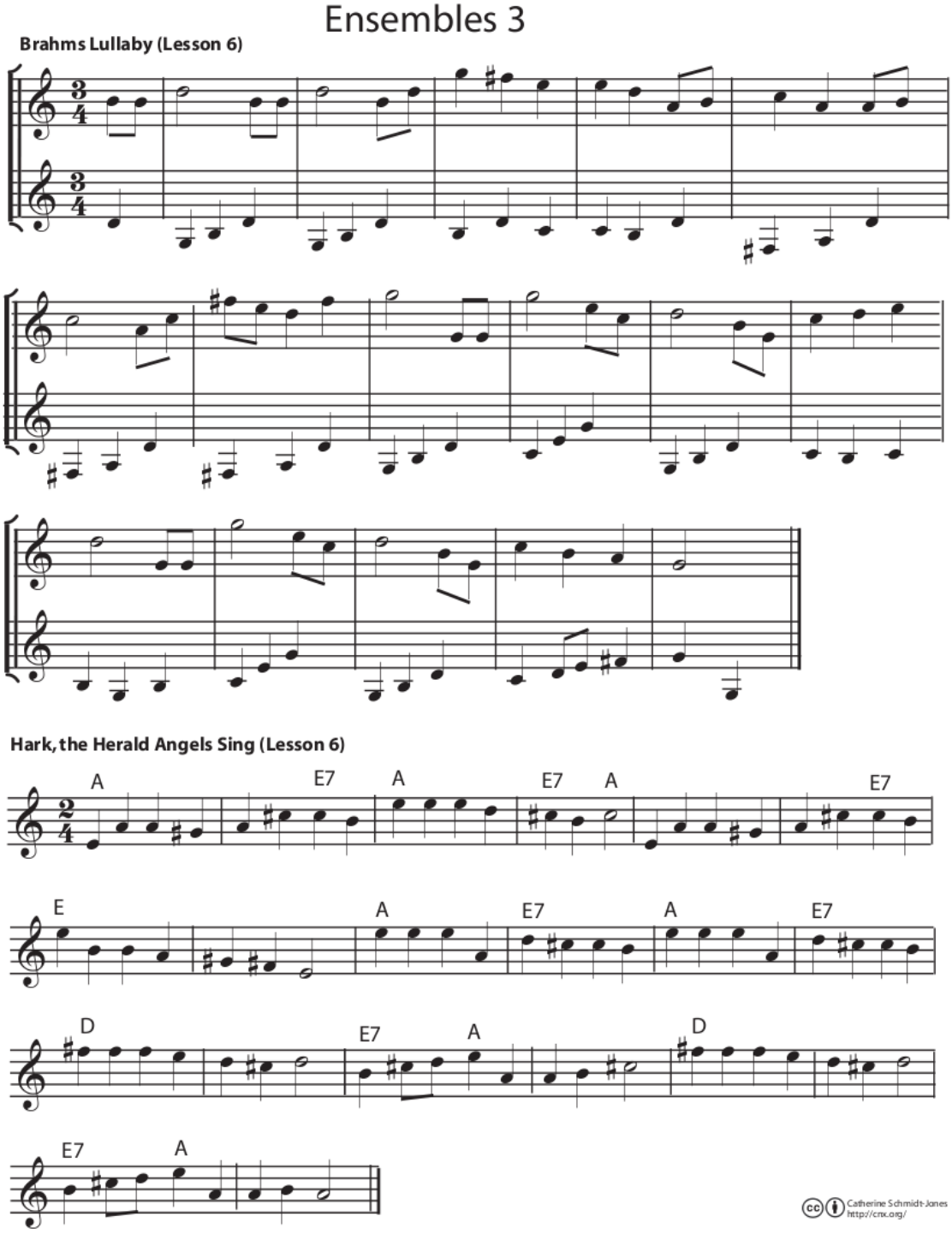
Ensembles 3
Brahms Lullaby (Lesson 6)
Hark, the Herald Angels Sing (Lesson 6)
A
E7
A
E7
A
E7
E
A
E7
A
E7
D
E7
A
D
E7
A
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Figure 1.24

1.7 Guitar Lesson 7: Flats, Alternate Fingerings, and Enharmonic Spelling[33]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson page[34], the Home Practice Page[35], and the Ensemble Page[36]. The Song Sheet[37] is the same as for Guitar Lesson 6 (Section 1.6).

Students interested in playing chords, to accompany singing, may begin playing any I-IV-V7 song (using A, D, and E7) as soon as they are comfortable with the D chord and switching chords quickly. Chord song sheets 3[38] and 4[39] include some widely-known 3-chord songs, but there are many, many others to choose from. If the student has a favorite 2 or 3 chord song in a different key, the teacher should help transpose it to the key of A so the student can learning it.

[33] This content is available online at <http://cnx.org/content/m12752/1.3/>.
[34] See the file at <http://cnx.org/content/m12752/latest/7Guitarlesson.pdf>
[35] See the file at <http://cnx.org/content/m12752/latest/7Guitarpractice.pdf>
[36] See the file at <http://cnx.org/content/m12752/latest/Ensemble4.pdf>
[37] See the file at <http://cnx.org/content/m12752/latest/SongSheet3.pdf>
[38] See the file at <http://cnx.org/content/m12752/latest/ChordSongSheet3.pdf>
[39] See the file at <http://cnx.org/content/m12752/latest/ChordSongSheet4.pdf>

Lesson 7

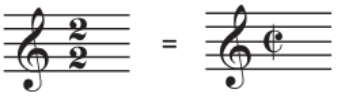
Common Notation

Whole notes have:
an open head
no stem

Whole notes are always
four times as long
as quarter notes.

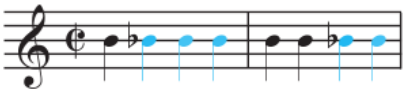
Whole rests
look a lot like half rest,
but they hang
below the fourth line

Half rests
sit on top
of the third line



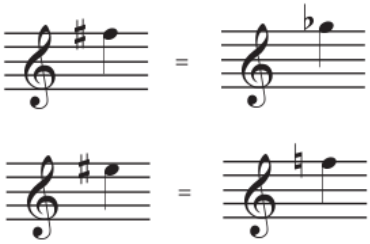
In 2/2 time, also called "cut time",
a half note gets one beat.

♭ "Flat" or "down one half step"
on guitar means
"one fret lower"



Remember,
Sharps, flats, and naturals
remain in effect
until the next bar line.

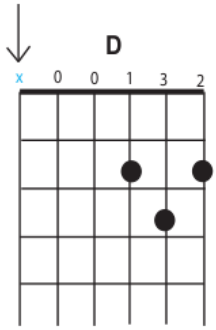
Enharmonic notes on the guitar
are different "spellings" for the same note,
on the same fret.
Scales and chords can also have
enharmonic spellings.*



F♯m = G♭m

Chord Diagrams

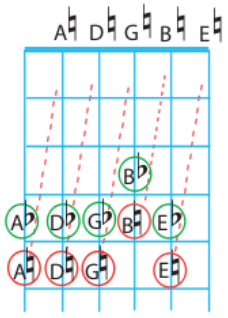
An " x " on a chord diagram means
"do not play this string".



= whole note strum

Music Theory for Guitar

You can't go down one fret
from an open string,
so you have to find the natural note
on the string below,
and go down one fret from there.



*learn more about enharmonic spelling: http://cnx.org/content/m11641/latest/

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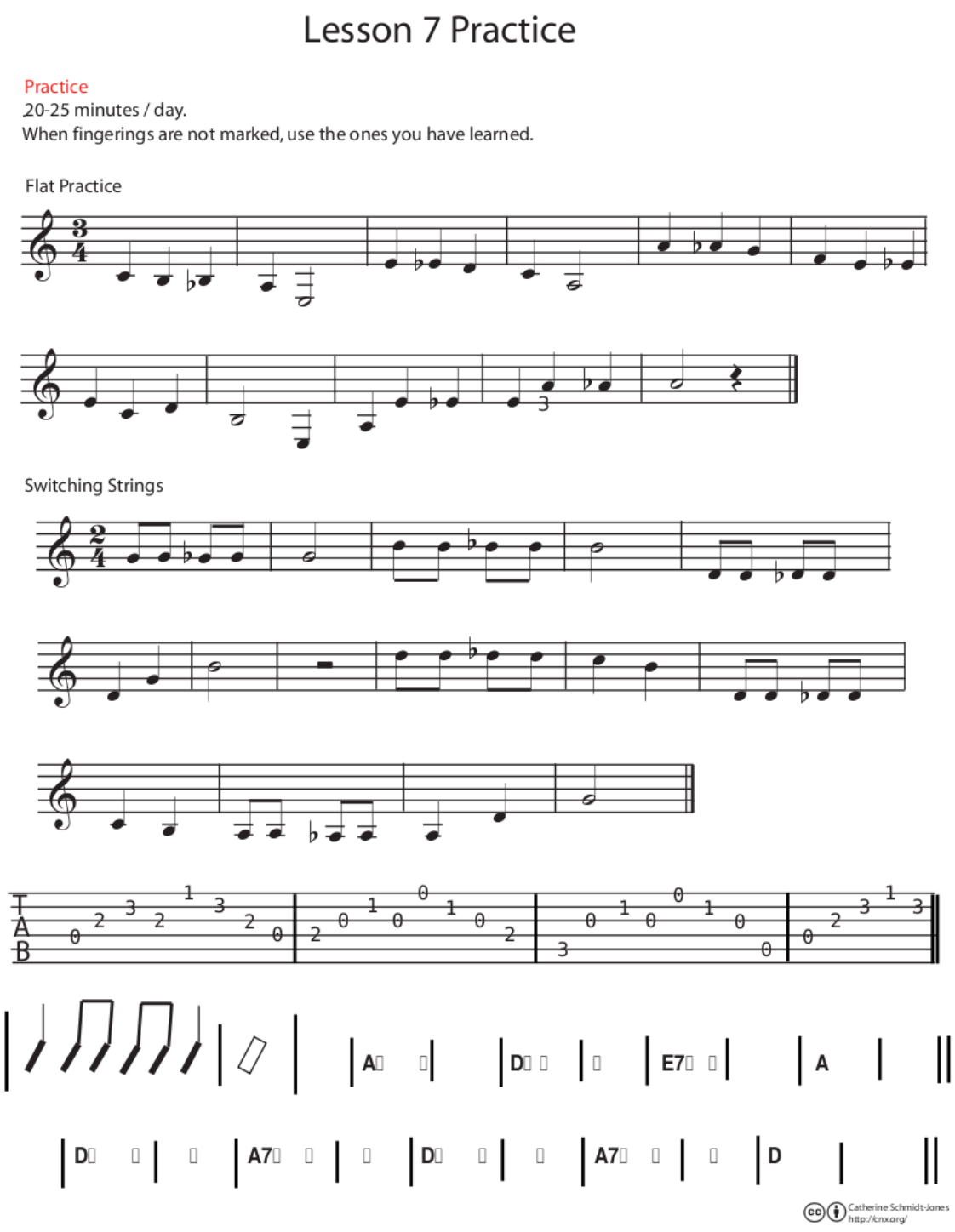
Figure 1.25


Lesson 7 Practice
Practice
20-25 minutes / day.
When fingerings are not marked, use the ones you have learned.
Flat Practice
Switching Strings
T
A
B
A
D
E7
A
D
A7
D
A7
D
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http://cnx.org/

Figure 1.26

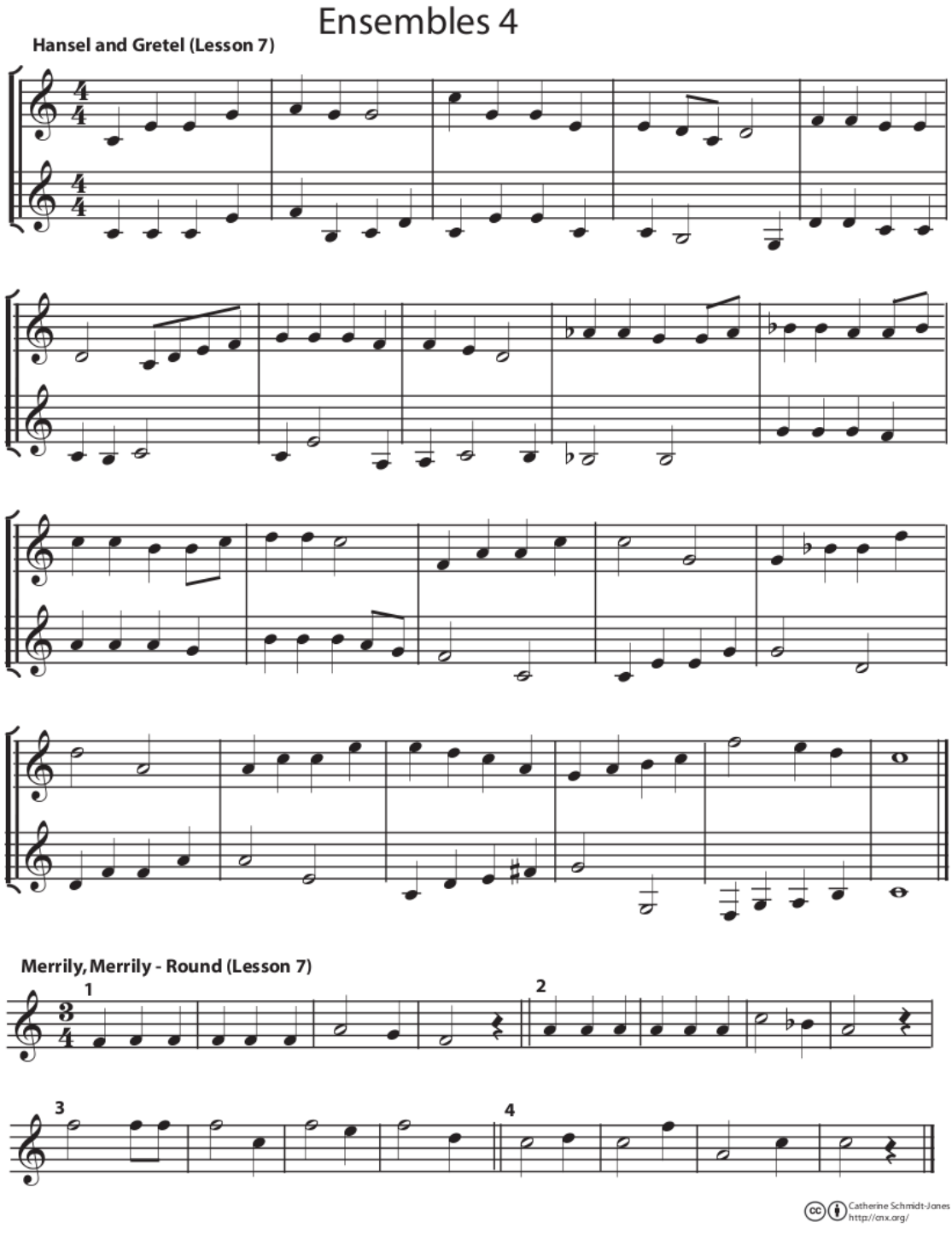
Ensembles 4
Hansel and Gretel (Lesson 7)
Merrily, Merrily - Round (Lesson 7)
1
2
3
4
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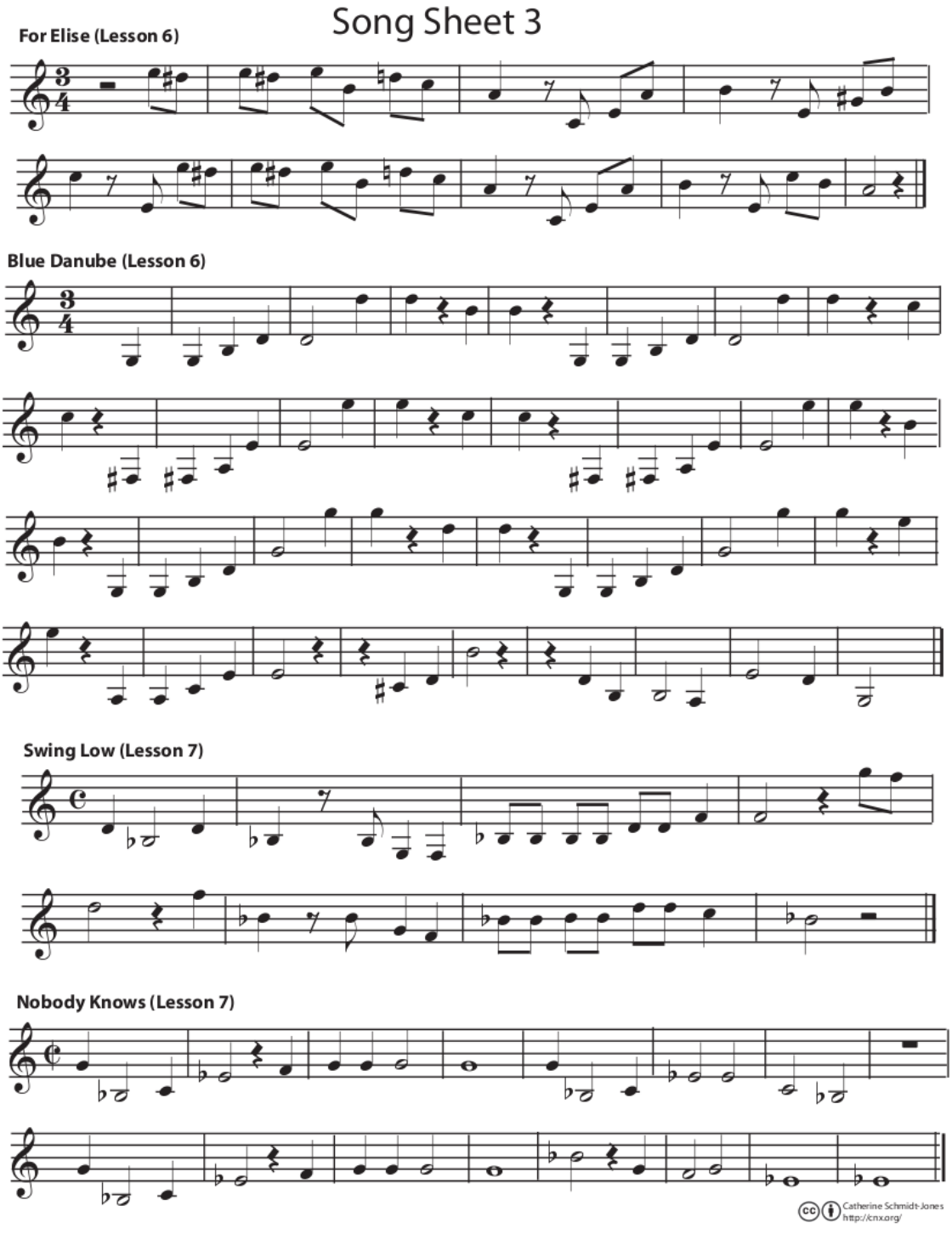
Figure 1.27


Song Sheet 3
For Elise (Lesson 6)
Blue Danube (Lesson 6)
Swing Low (Lesson 7)
Nobody Knows (Lesson 7)
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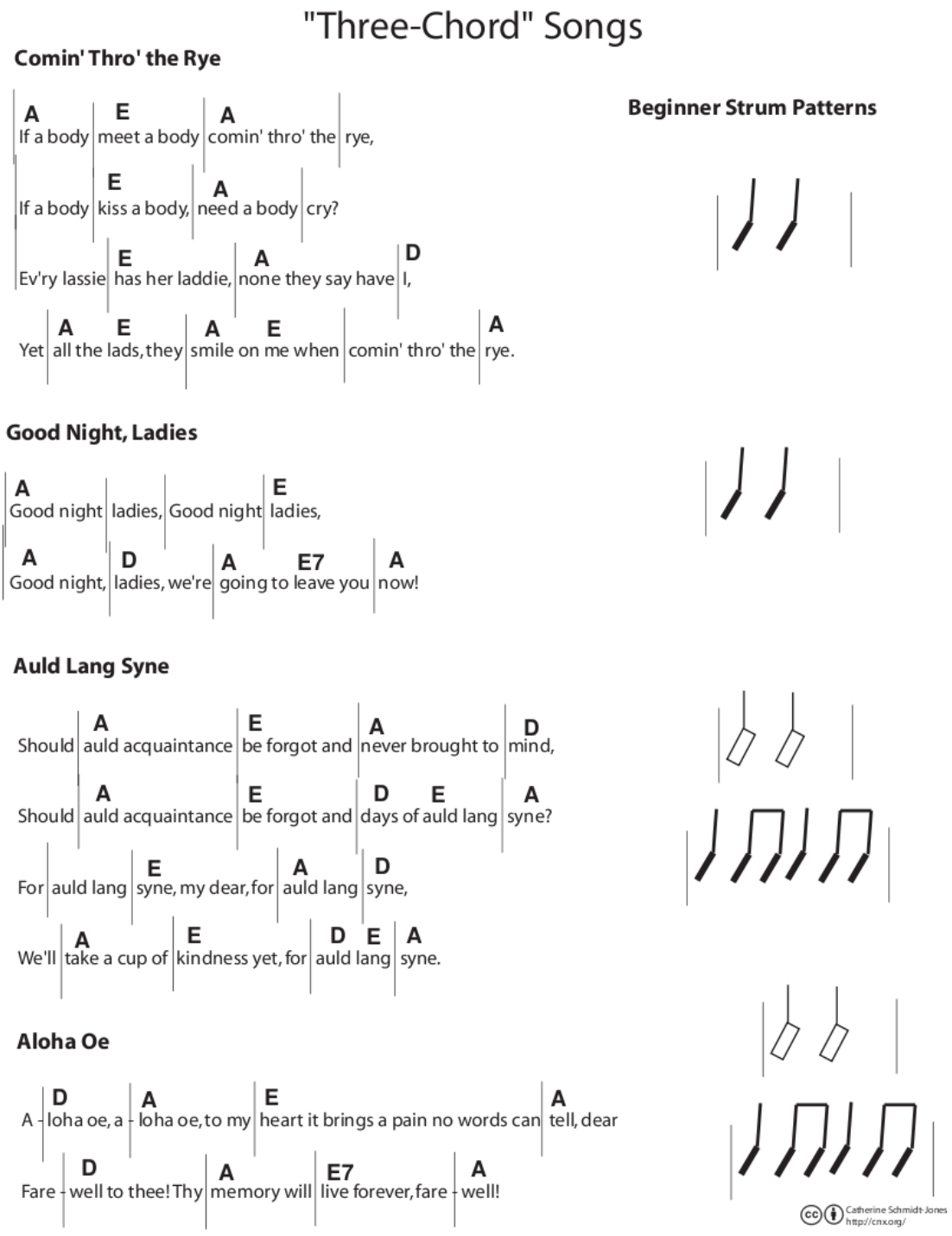
http://cnx.org/

Figure 1.28


"Three-Chord" Songs
Comin' Thro' the Rye
A If a body E meet a body A comin' thro' the rye,
If a body E kiss a body, A need a body cry?
Ev'ry lassie E has her laddie, A none they say have D I,
Yet A all the lads, they E A smile on me when E comin' thro' the A rye.
Beginner Strum Patterns
Good Night, Ladies
A Good night ladies, Good night E ladies,
A Good night, D ladies, we're A going to E7 leave you A now!
Auld Lang Syne
Should A auld acquaintance E be forgot and A never brought to D mind,
Should A auld acquaintance E be forgot and D days of E auld lang A syne?
For auld lang E syne, my dear, for A auld lang D syne,
We'll A take a cup of E kindness yet, for D auld E lang A syne.
Aloha Oe
A - D loha oe, a - A loha oe, to my E heart it brings a pain no words can A tell, dear
Fare - D well to thee! Thy A memory will E7 live forever, fare - A well!
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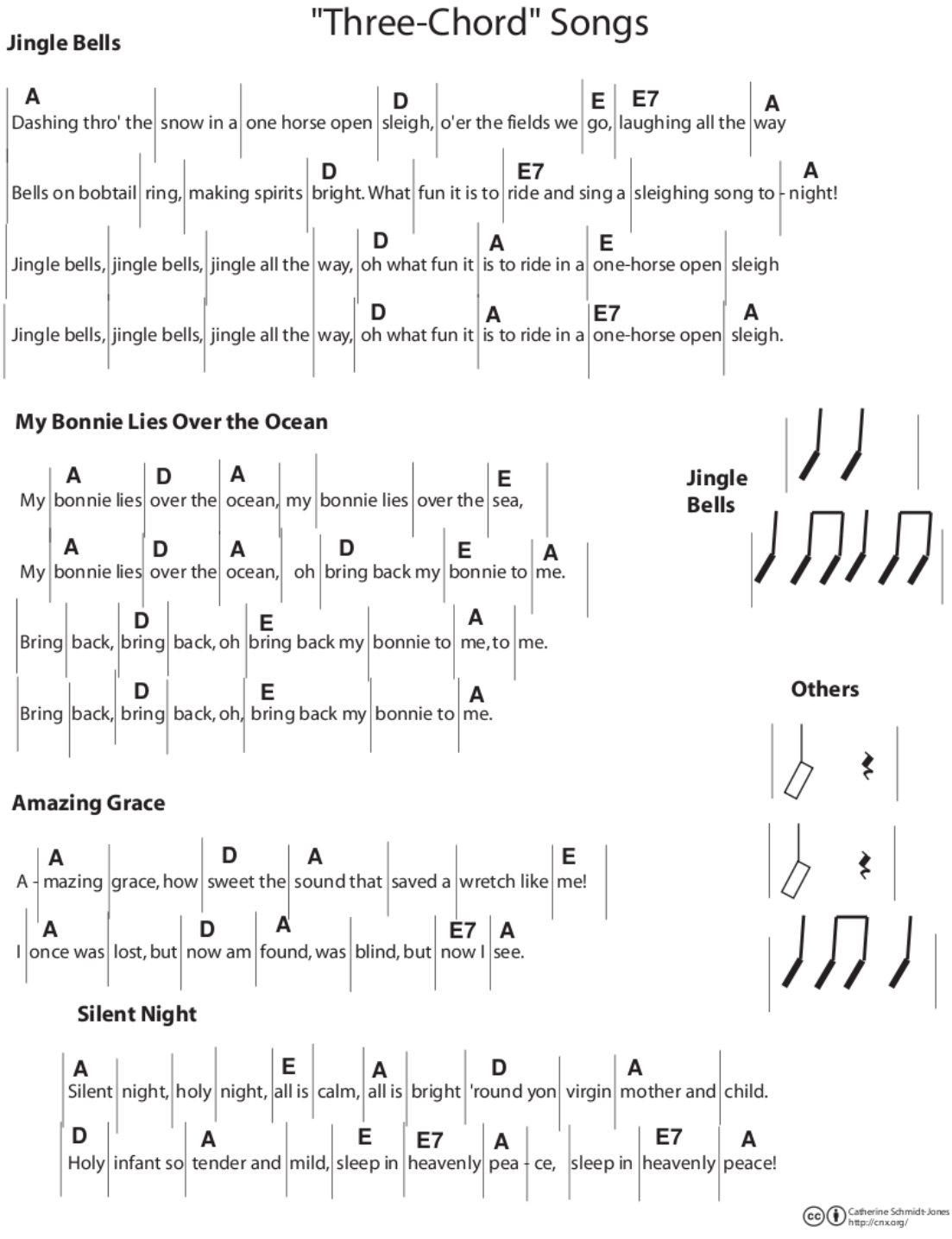
http://cnx.org/

Figure 1.29


"Three-Chord" Songs
Jingle Bells
A Dashing thro' the snow in a one horse open D sleigh, o'er the fields we E go, E7 laughing all the A way
Bells on bobtail ring, making spirits D bright. What fun it is to E7 ride and sing a sleighing song to A night!
Jingle bells, jingle bells, jingle all the way, D oh what fun it A is to ride in a E one-horse open sleigh
Jingle bells, jingle bells, jingle all the way, D oh what fun it A is to ride in a E7 one-horse open A sleigh.
My Bonnie Lies Over the Ocean
My A bonnie lies D over the A ocean, my bonnie lies over the E sea,
My A bonnie lies D over the A ocean, oh D bring back my E bonnie to A me.
Bring back, D bring back, oh E bring back my bonnie to A me, to me.
Bring back, D bring back, oh, E bring back my bonnie to A me.
Jingle Bells
Others
Amazing Grace
A - A mazing grace, how D sweet the A sound that saved a wretch like E me!
I A once was lost, but D now am A found, was blind, but E7 now I A see.
Silent Night
A Silent night, holy night, E all is calm, A all is bright D 'round yon virgin A mother and child.
D Holy infant so A tender and mild, E sleep in E7 heavenly A pea - ce, sleep in E7 heavenly A peace!
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http://cnx.org/

Figure 1.30

1.8 Guitar Lesson 8: Tuning the Guitar, and Dotted Rhythms[40]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[41], the Home Practice Page[42], Song Sheet 4[43], and Ensemble Page 5[44].

Young students may not be ready to tune their own guitars yet. This should not be considered a problem, although it is a good idea for them to understand why the guitar can be tuned using this method, and to begin to listen carefully to distinguish sounds as being "in tune", "too high", or "too low". With very young students, this kind of practice can be turned into a game. Older students may be i8nterested in reading about other methods for tuning the guitar (Section 3.4)

If students who are interested in singing are having trouble singing a favorite 3-chord song in the key of A, the teacher can help them transpose the chords to the key of D (using chords D, G, and A7 as I, IV, and V7). They can practice singing and playing in both keys before deciding which works best for them.

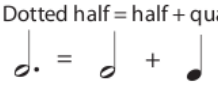
[40] This content is available online at <http://cnx.org/content/m12753/1.6/>.
[41] See the file at <http://cnx.org/content/m12753/latest/8Guitarlesson.pdf>
[42] See the file at <http://cnx.org/content/m12753/latest/8Guitarpractice.pdf>
[43] See the file at <http://cnx.org/content/m12753/latest/SongSheet4.pdf>
[44] See the file at <http://cnx.org/content/m12753/latest/Ensemble5.pdf>

Lesson 8

Common Notation

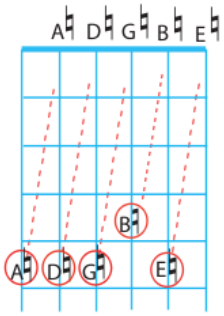
A dot right after a note means:
add another half
of the original length of the note:

Dotted half = half + quarter



Dotted quarter= quarter + eighth

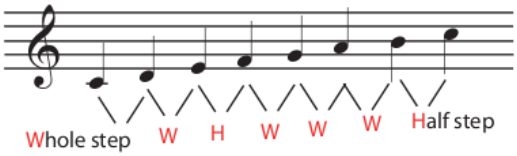
Music Theory for Guitar: Tuning



Remember that you can find the open string notes at a fret on a lower string.
You can use this to tune your guitar.
Tune the lowest string to E.
Then tune each string to the string below it at the fifth (or fourth) fret.*

The tuning fret is different for the B string
because of differences in the spacings between
the natural notes:
some have two frets (a whole step) in between them,
some have only one fret (a half step) in between them.^

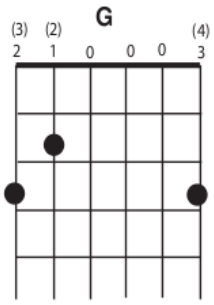
Natural Notes = C Major Scale



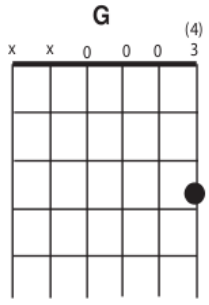
Playing only the natural notes from C to C gives a C major scale. Notice the pattern of whole steps and half steps.

Chord Diagrams

There are many different ways to play
every chord.
Which G chord
is right for you right now?



Full Chord



"Easy G"

*learn more about tuning your guitar: http://cnx.org/content/m11641/latest/
^learn more about half steps and whole steps: http://cnx.org/content/m10866/latest/

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Figure 1.31

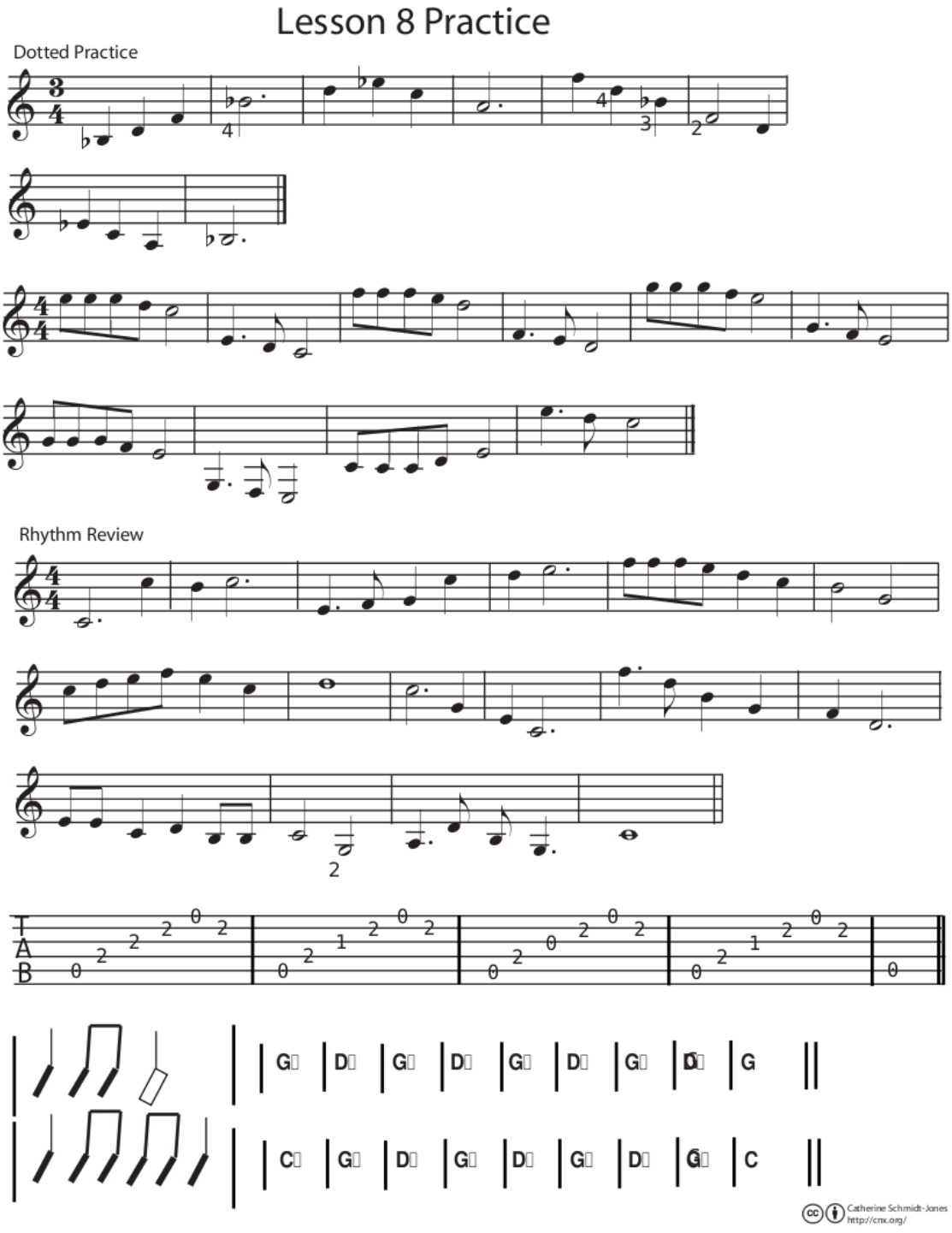
Lesson 8 Practice
Dotted Practice
Rhythm Review
Catherine Schmidt-Jones
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Figure 1.32

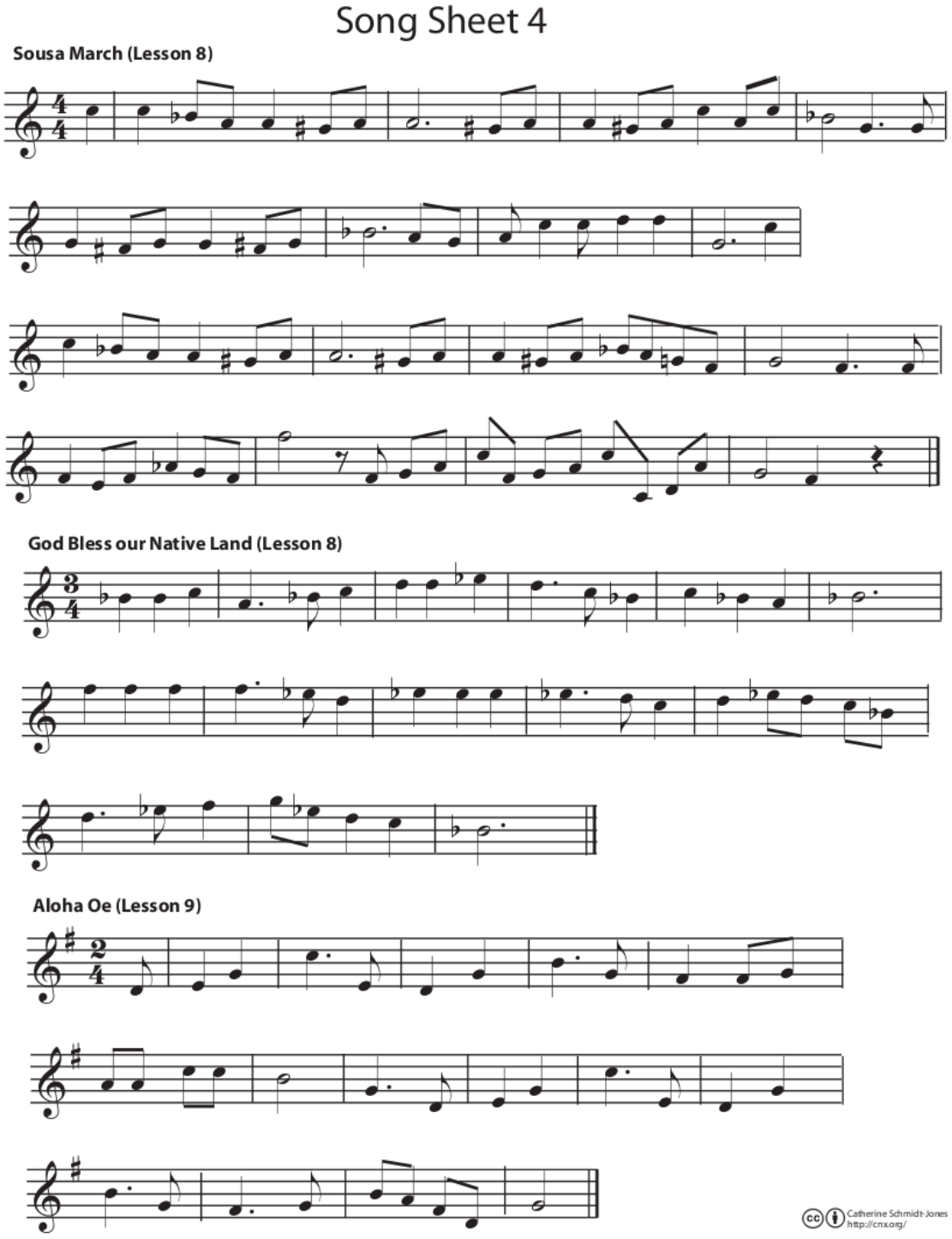
Song Sheet 4
Sousa March (Lesson 8)
God Bless our Native Land (Lesson 8)
Aloha Oe (Lesson 9)
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.33

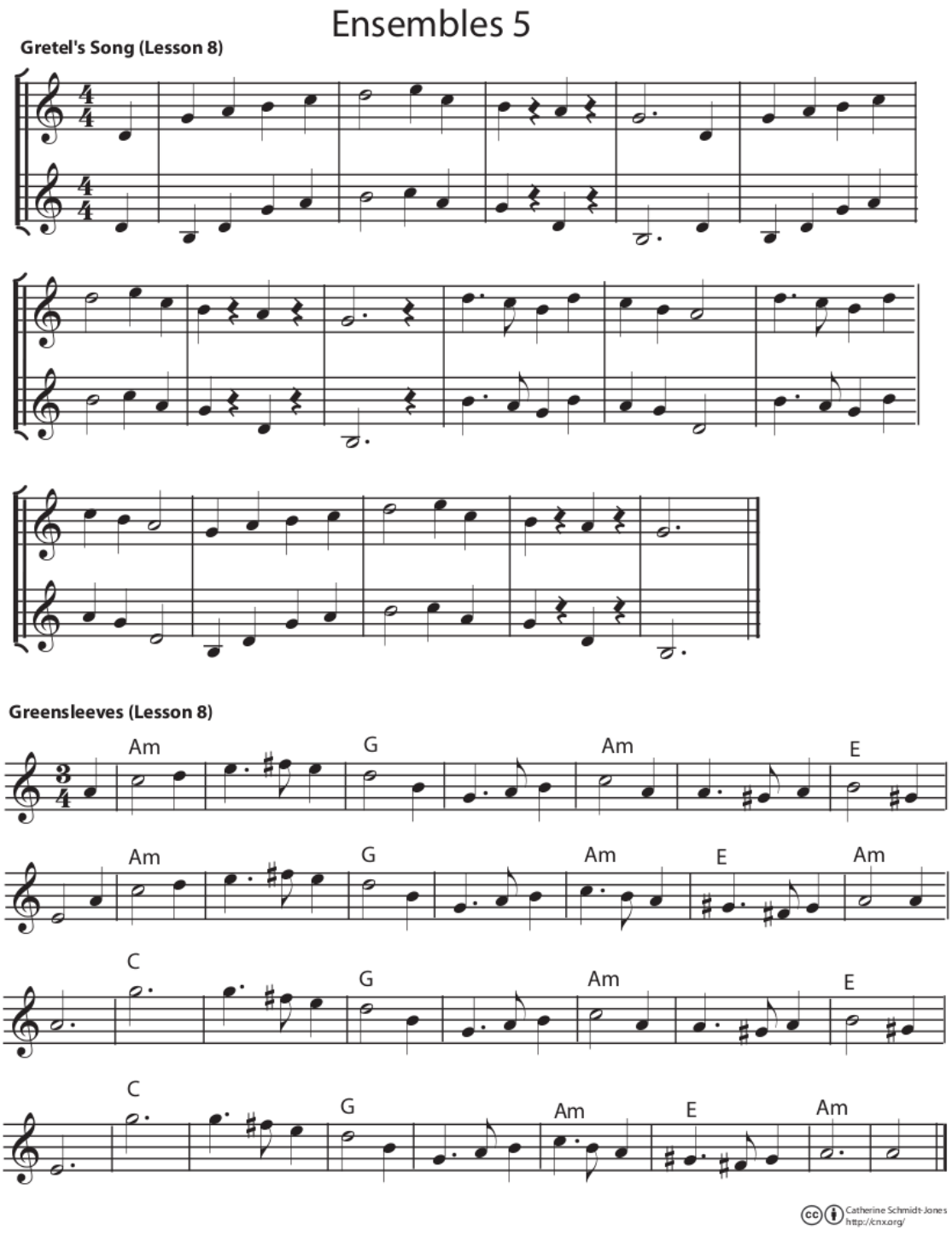
Ensembles 5
Gretel's Song (Lesson 8)
Greensleeves (Lesson 8)
Am
G
Am
E
Am
G
Am
E
Am
C
G
Am
E
C
G
Am
E
Am
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Figure 1.34

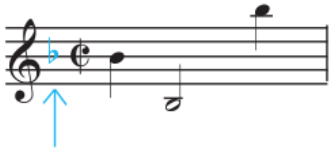
1.9 Guitar Lesson 9: Key Signatures and Major Scales[45]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[46], the Home Practice Page[47], and the Ensemble Page[48] for this lesson. The Song Sheet[49] is the same as for Guitar Lesson 8 (Section 1.8).

[45] This content is available online at <http://cnx.org/content/m12769/1.4/>.
[46] See the file at <http://cnx.org/content/m12769/latest/9Guitarlesson.pdf>
[47] See the file at <http://cnx.org/content/m12769/latest/9Guitarpractice.pdf>
[48] See the file at <http://cnx.org/content/m12769/latest/Ensemble6.pdf>
[49] See the file at <http://cnx.org/content/m12769/latest/SongSheet4.pdf>

Lesson 9

Common Notation and Music Theory

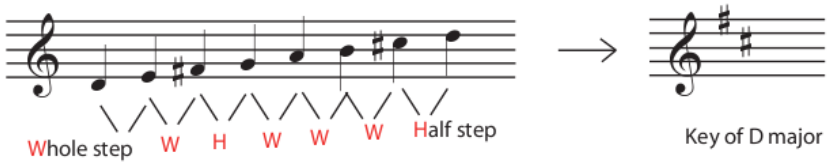


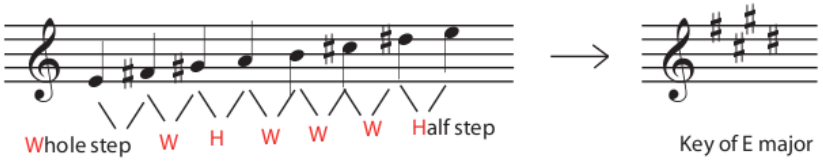
All of these B's are flat
because of the key signature.

The Key Signature* is the sharps and flats that appear at the beginning of each staff. They apply to all notes with that name unless there is an accidental. The key signature tells you what scale and key you are using for this piece.

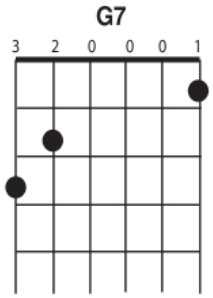
Remember that all the natural notes in a row is the C major scale.
Any row with that same pattern of half steps and whole steps is also a major scale,^ but each has a different set of notes.

Many pieces are in a major key; they tend to use the notes of a particularly major scale.

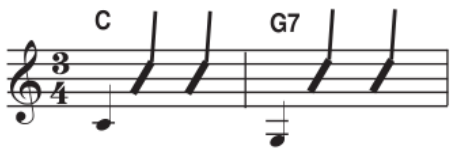




Playing Chords



When playing a bass note-strum accompaniment:
The first bass note you should pick is the one that names the chord.



*learn more about key signature: http://cnx.org/content/m10881/latest/
^learn more about major keys and scales: http://cnx.org/content/m10851/latest/

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Figure 1.35

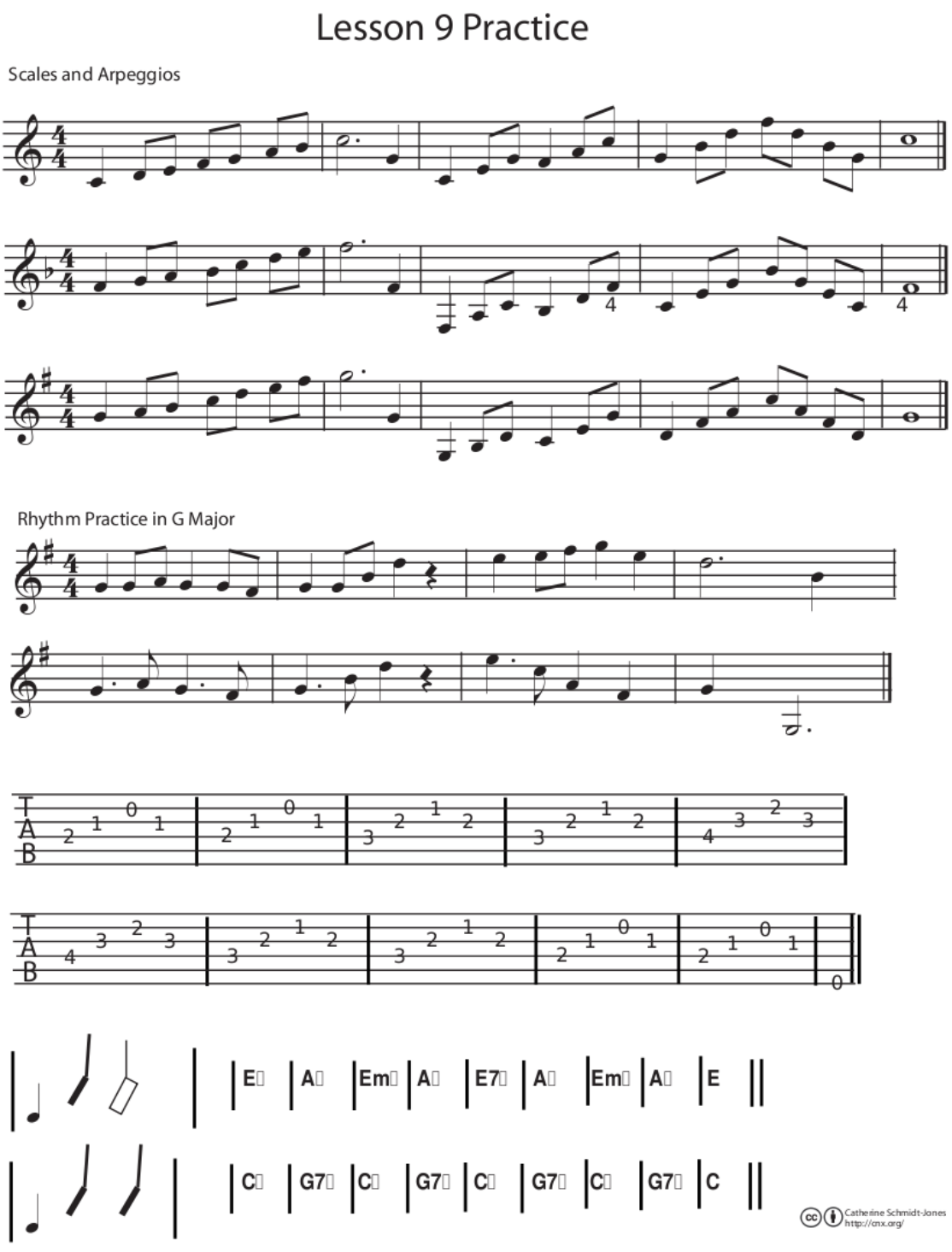
Lesson 9 Practice
Scales and Arpeggios
Rhythm Practice in G Major
E
A
Em
A
E7
A
Em
A
E
C
G7
C
G7
C
G7
C
G7
C
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Figure 1.36

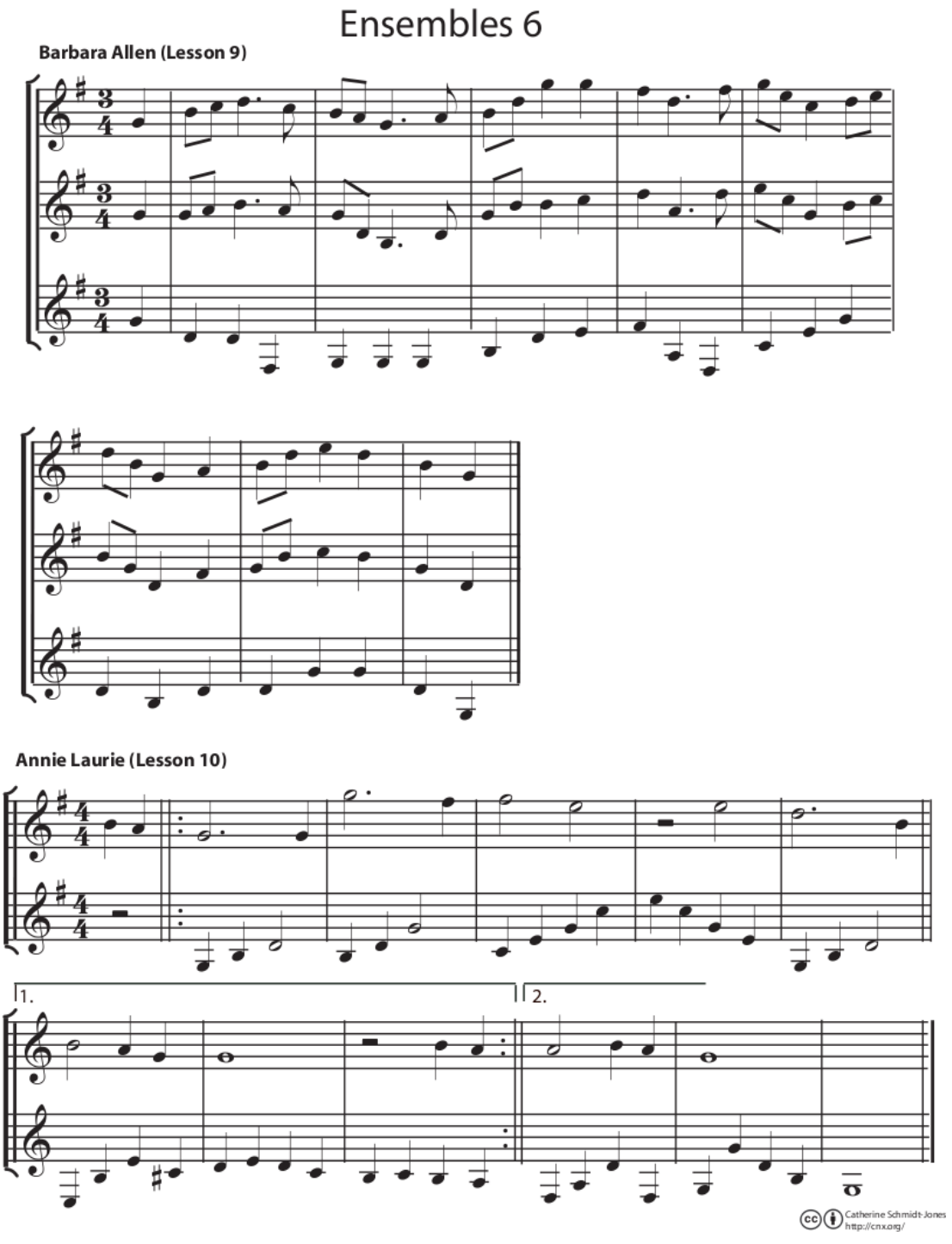
Ensembles 6
Barbara Allen (Lesson 9)
Annie Laurie (Lesson 10)
1.
2.
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.37

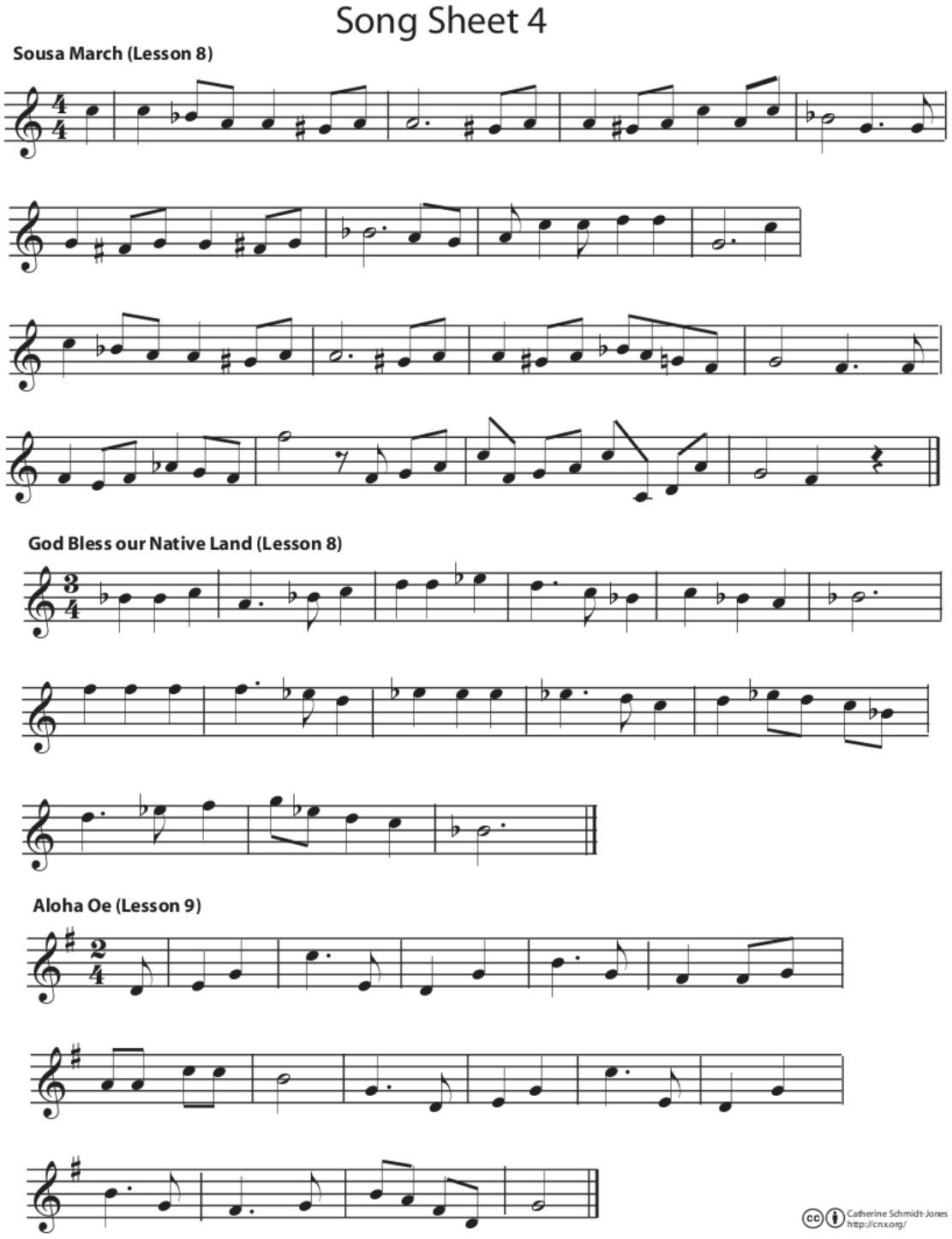
Song Sheet 4
Sousa March (Lesson 8)
God Bless our Native Land (Lesson 8)
Aloha Oe (Lesson 9)
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Figure 1.38

1.10 Guitar Lesson 10: Repeating Measures and Sections[50]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[51], the Home Practice Page[52], and Song Sheet 5[53]. The Ensemble Page[54] for this lesson is the same as for Guitar Lesson 9 (Section 1.9) .

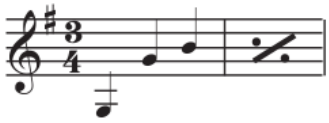
[50] This content is available online at <http://cnx.org/content/m12772/1.3/>.
[51] See the file at <http://cnx.org/content/m12772/latest/10Guitarlesson.pdf>
[52] See the file at <http://cnx.org/content/m12772/latest/10Guitarpractice.pdf>
[53] See the file at <http://cnx.org/content/m12772/latest/Songsheet5.pdf>
[54] See the file at <http://cnx.org/content/m12772/latest/Ensemble6.pdf>

Lesson 10

Common Notation

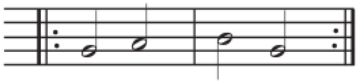
Various symbols tell you where to go next * in the music. Here are some of the most common.

D.C. (da capo)	Go back to the very beginning
D.S. (dal segno)	Go back to the 𝄋 (sign)
al ---	Play to the --- (usually fine or coda)
⊕	Coda (final section)
fine	On the last time through, stop here

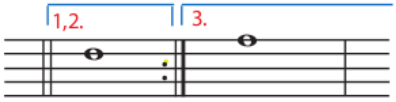


Repeat the previous measure.

Go all the way back to the beginning and repeat once.

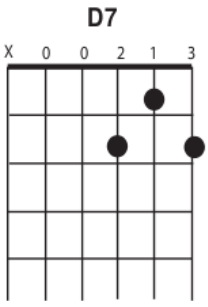


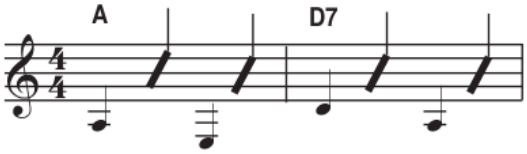
Repeat (once) only the measures in between the repeat dots.



Each time through, play the ending for that time, skipping all other endings and following the directions in that ending.

Playing Chords





When playing a bass-note-strum accompaniment,
If you play more than one bass note for the same chord,
choose a different bass note for the second one.
Any lower string note that's in the chord wil do.
(Make sure it's not on a silent - X - string.)

*learn more about repeat symbols: http://cnx.org/content/m12805/latest/

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Figure 1.39

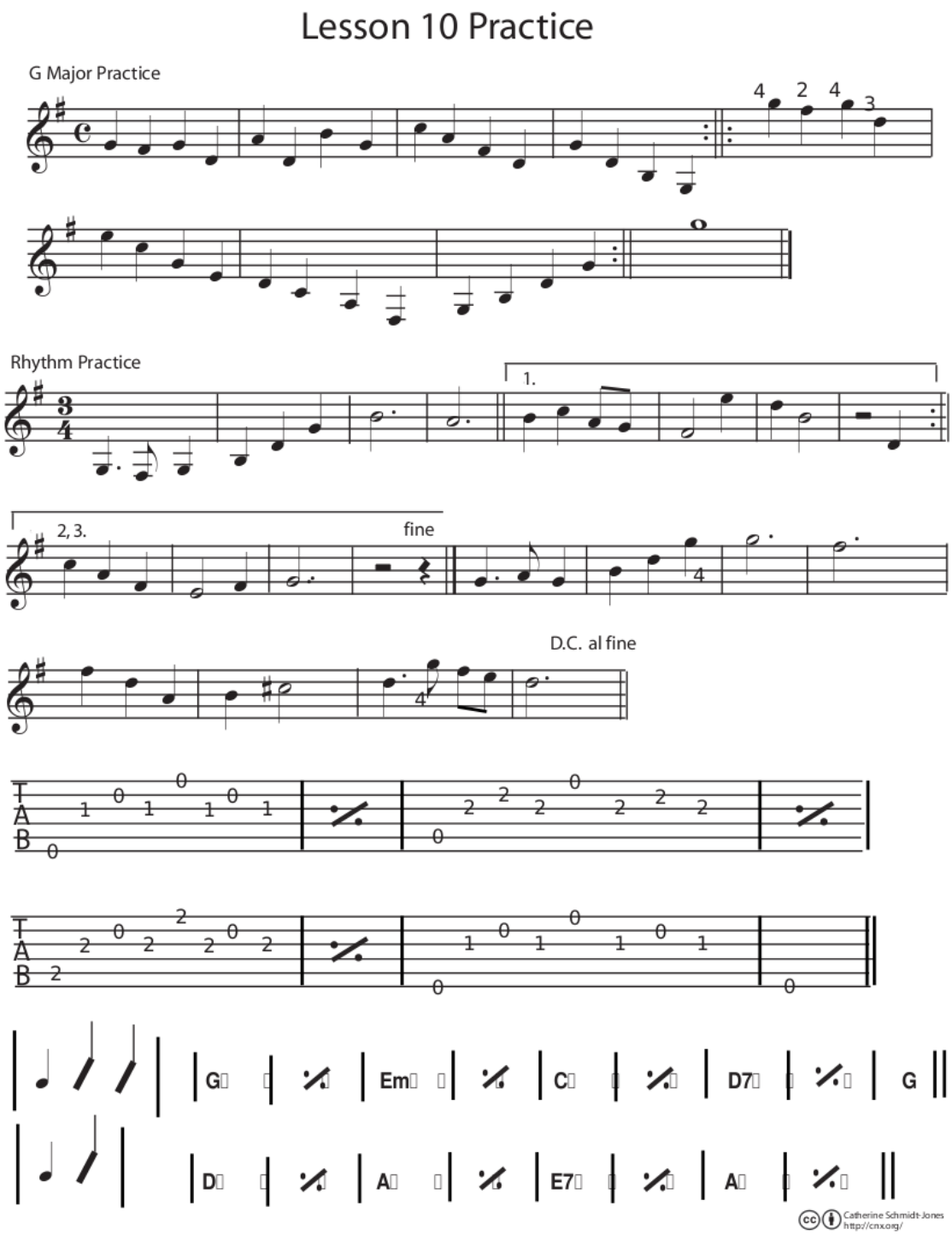
Lesson 10 Practice
G Major Practice
Rhythm Practice
1.
2, 3.
fine
D.C. al fine
G
Em
C
D7
G
D
A
E7
A
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.40

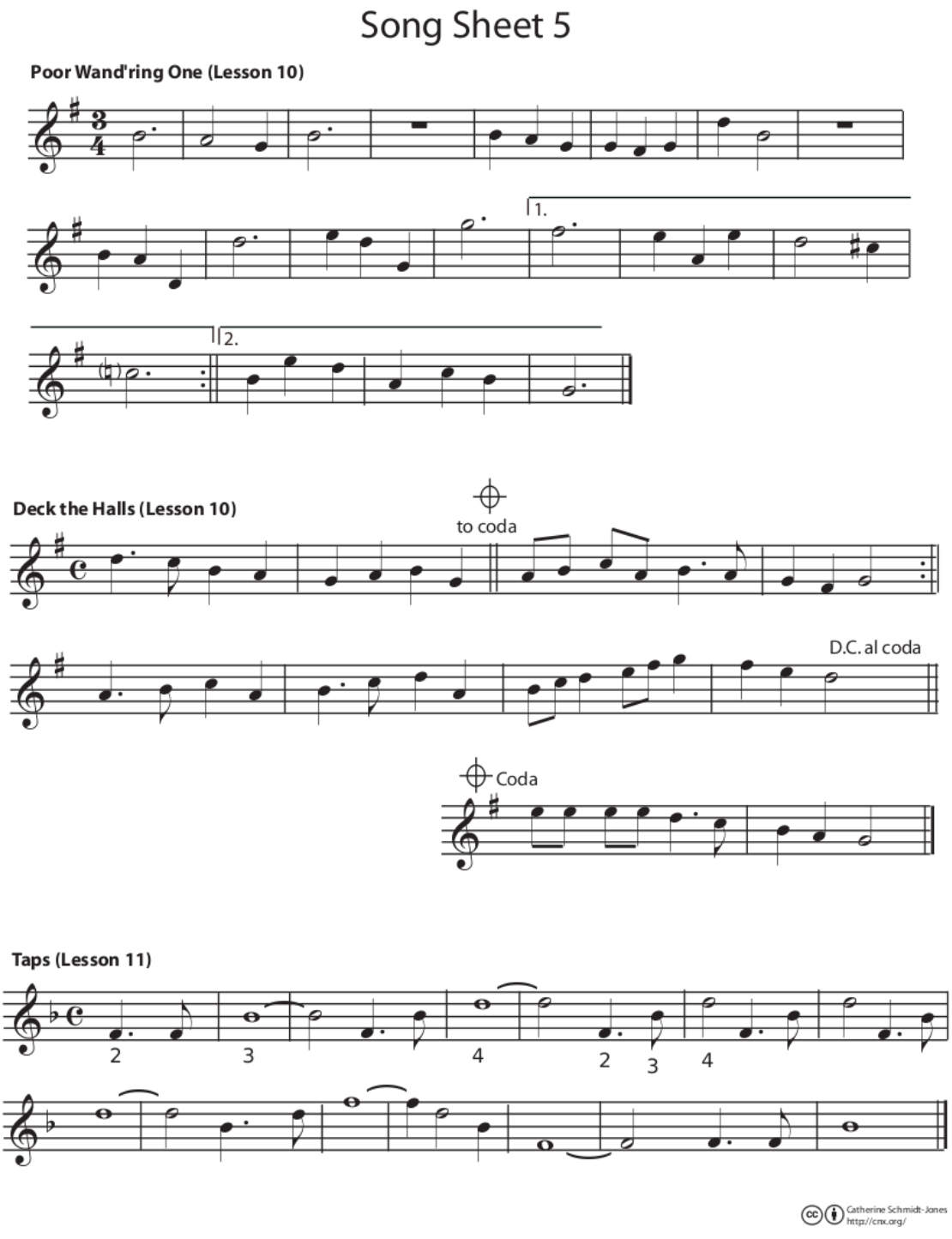
Song Sheet 5
Poor Wand'ring One (Lesson 10)
1.
2.
Deck the Halls (Lesson 10)
to coda
D.C. al coda
Coda
Taps (Lesson 11)
2
3
4
2
3
4
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.41

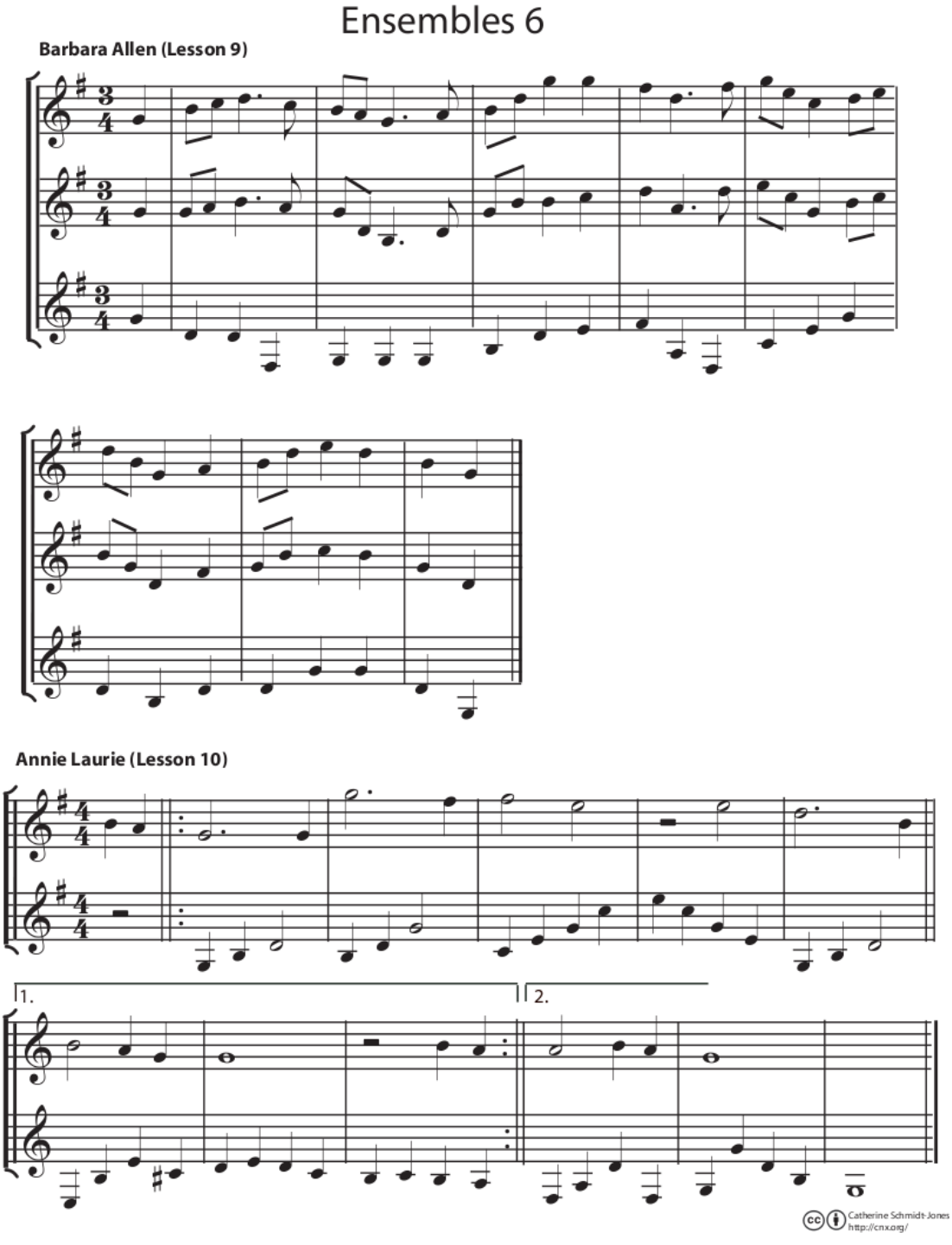
Ensembles 6
Barbara Allen (Lesson 9)
Annie Laurie (Lesson 10)
1.
2.
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Figure 1.42

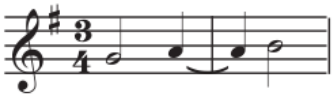
1.11 Guitar Lesson 11: Tied Notes and Barre Chords[55]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[56], the Home Practice Page[57], and the Ensemble Page[58]. One of the songs for this lesson is on Song Sheet 5[59], along with the Guitar Lesson 10 (Section 1.10) songs; the other is on Song Sheet 6[60].

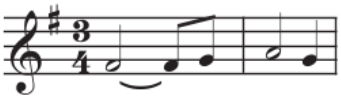
[55] This content is available online at <http://cnx.org/content/m12804/1.3/>.
[56] See the file at <http://cnx.org/content/m12804/latest/11Guitarlesson.pdf>
[57] See the file at <http://cnx.org/content/m12804/latest/11Guitarpractice.pdf>
[58] See the file at <http://cnx.org/content/m12804/latest/Ensemble7.pdf>
[59] See the file at <http://cnx.org/content/m12804/latest/Songsheet5.pdf>
[60] See the file at <http://cnx.org/content/m12804/latest/SongSheet6.pdf>

Lesson 11

Common Notation



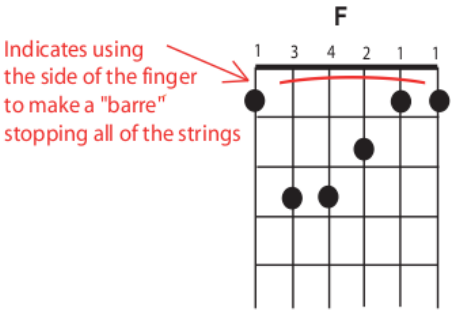
Tied notes are notes on the same pitch
connected by a curved line.
Play them as if they are a single note
that has the same length
as both notes added together.*



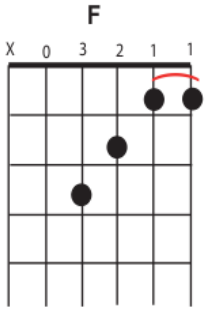
Tied notes are used to write rhythms
that can't be written using a single note.

Playing Chords

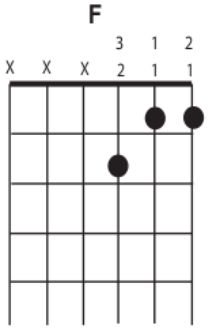
Barre´ Chords can be difficult for beginners to master.
They can be very useful, however, so start practicing them now.
Full barre´ chords use the full length of the index finger to stop all the strings at a fret.
Then other fingers may be used on some of the strings to form chords.
Half barre´ or partial barre chords only stop some of the strings with one finger.
Again, the other fingers may hold down some of the same strings, or different strings.



Full barré chord F
Keep practicing this one
even if it is too difficult
to use right now.



Partial barré chord F
Recommended
for present use
if the full barré chord
is too difficult.



Easy F
Not recommended.
Use only if you
must play an F chord
and simply cannot
play a barre´ chord.
Be careful;
if you play the open D string,
you're playing a Dm7, not F.

*learn more about dotted and tied notes: http://cnx.org/content/m11888/latest/

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Figure 1.43

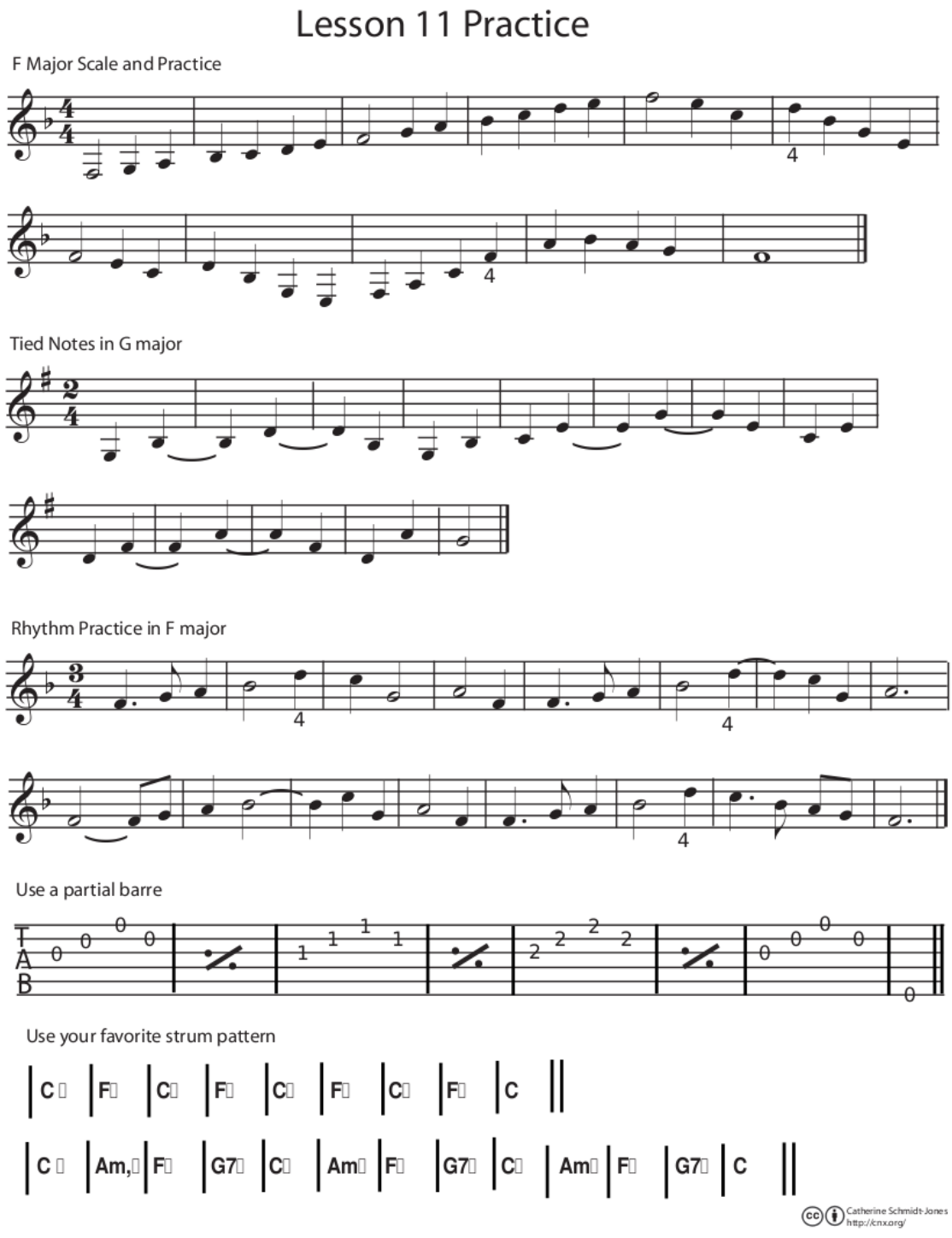
Lesson 11 Practice
F Major Scale and Practice
Tied Notes in G major
Rhythm Practice in F major
Use a partial barre
Use your favorite strum pattern
C F C F C F C F C
C Am, F G7 C Am F G7 C Am F G7 C
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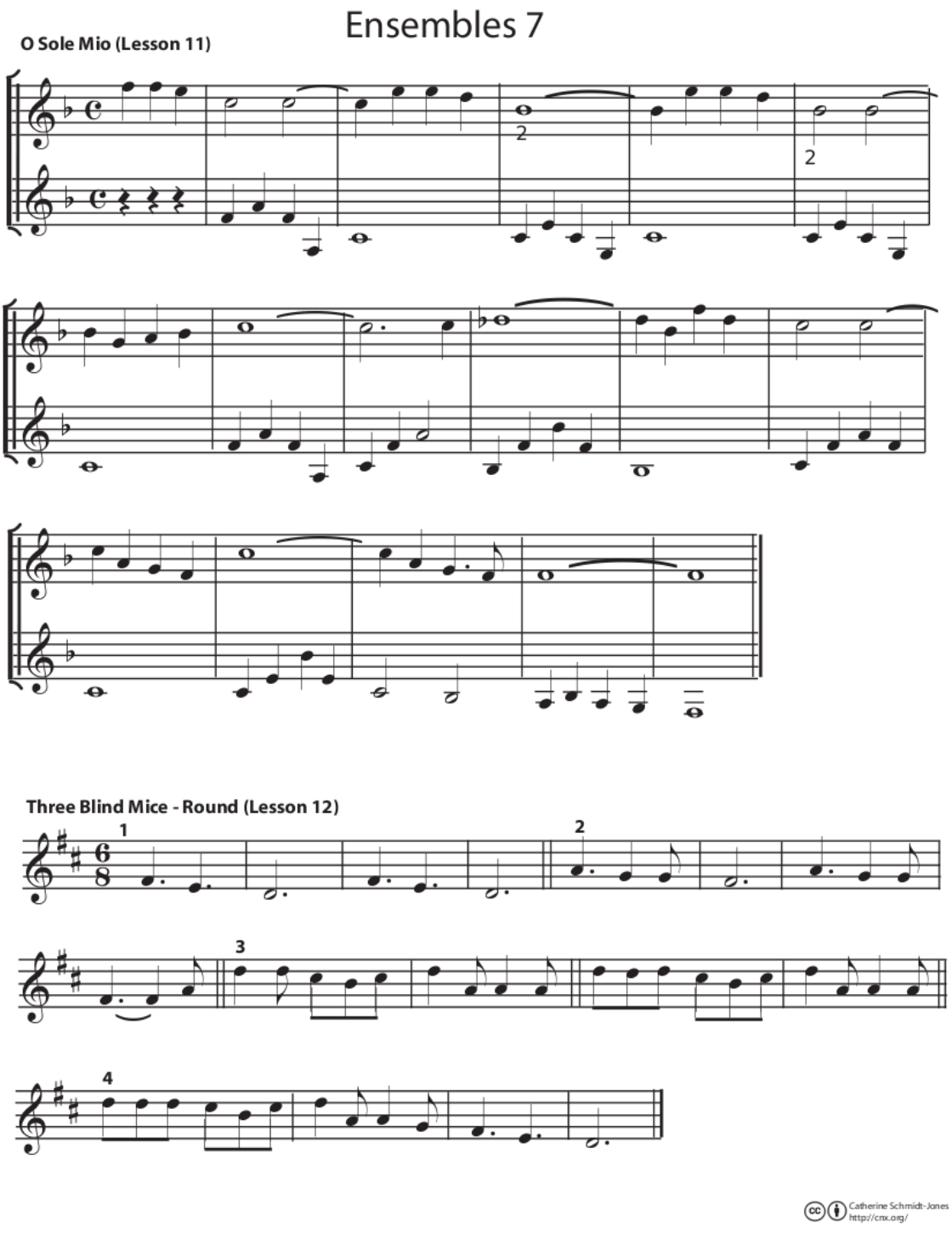
Figure 1.44


Ensembles 7
O Sole Mio (Lesson 11)
2
2
Three Blind Mice - Round (Lesson 12)
1
2
3
4
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http://cnx.org/

Figure 1.45

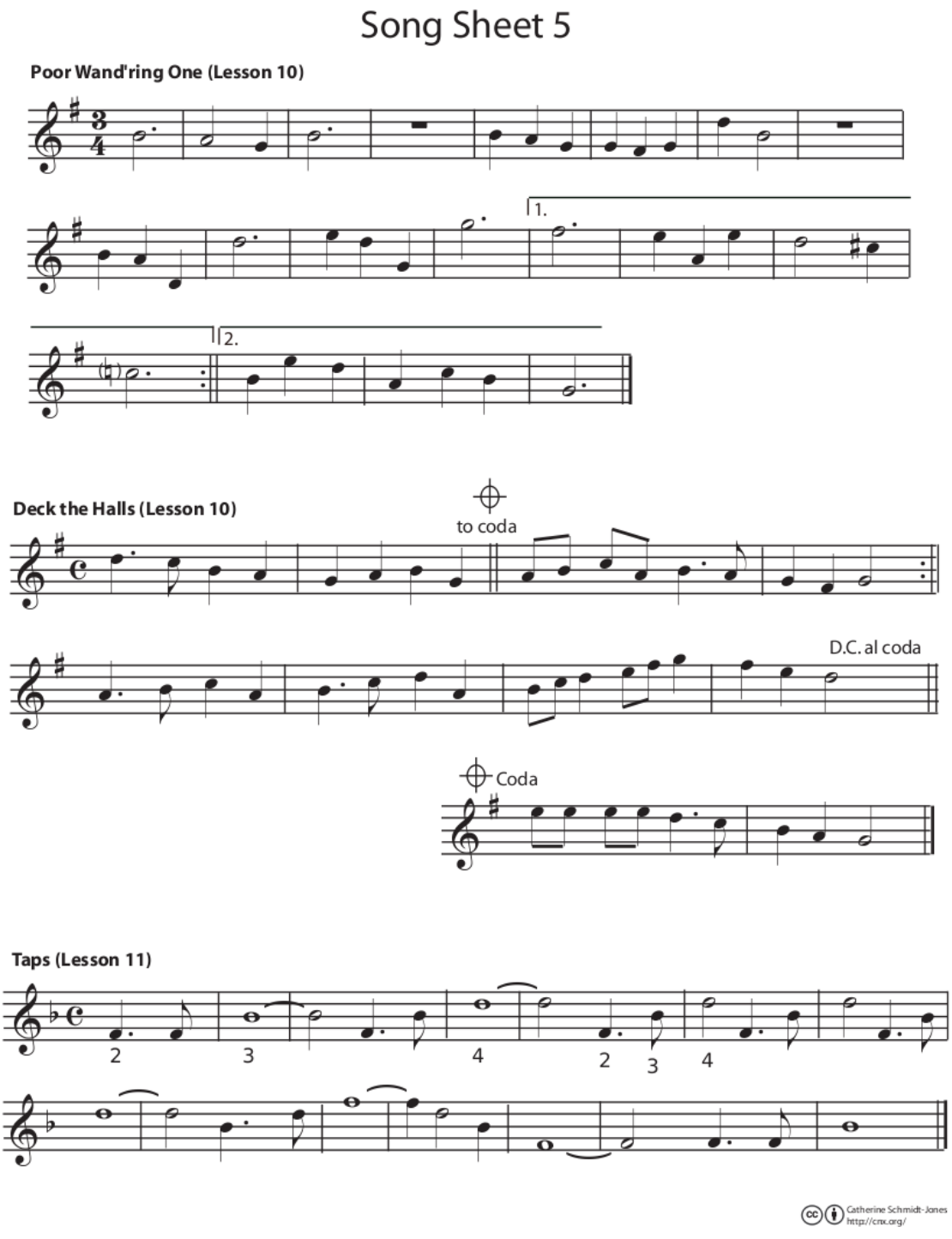
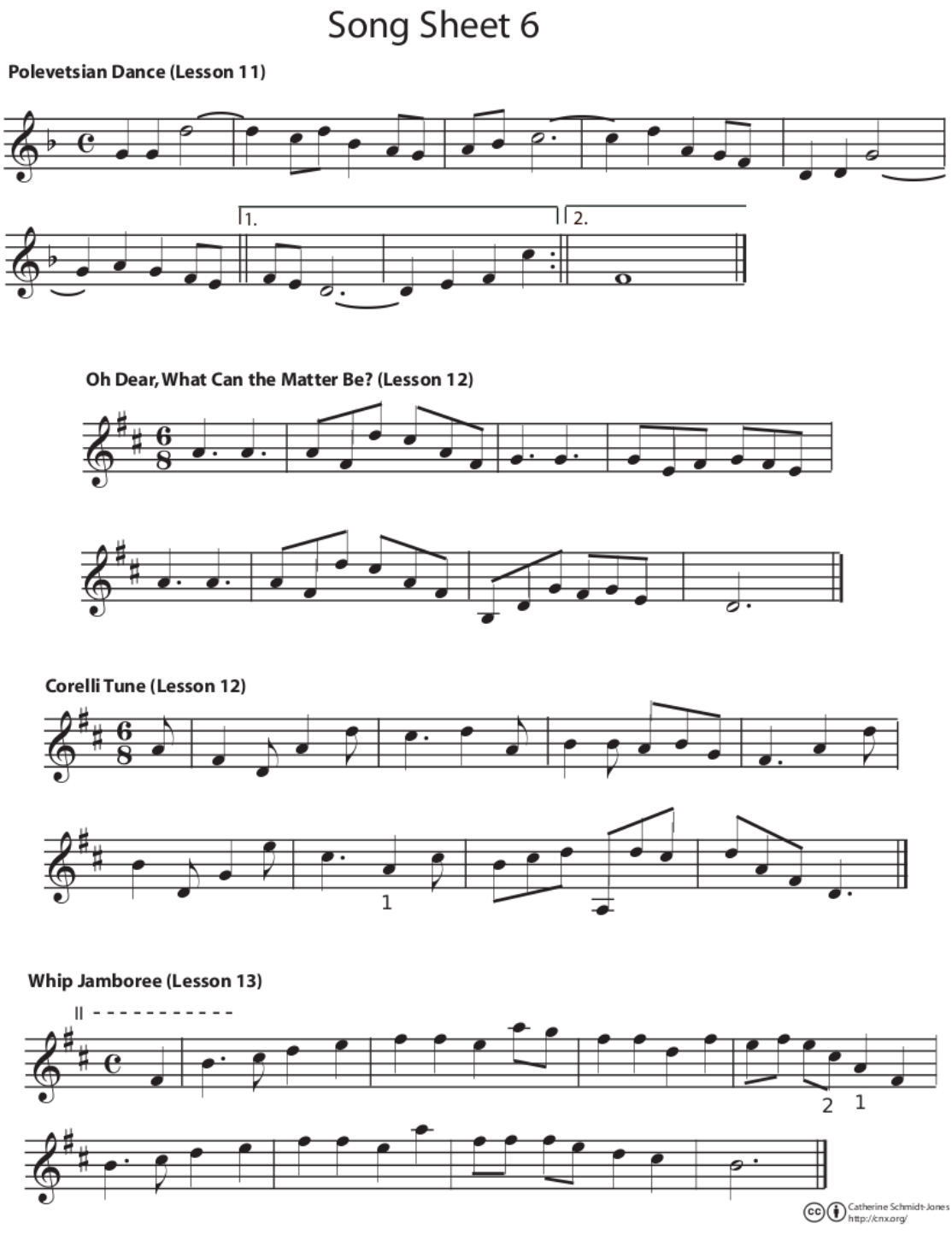

Song Sheet 5
Poor Wand'ring One (Lesson 10)
1.
2.
Deck the Halls (Lesson 10)
to coda
D.C. al coda
Coda
Taps (Lesson 11)
2
3
4
2
3
4
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.46


Song Sheet 6
Polevetsian Dance (Lesson 11)
1.
2.
Oh Dear, What Can the Matter Be? (Lesson 12)
Corelli Tune (Lesson 12)
1
Whip Jamboree (Lesson 13)
2 1
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http://cnx.org/

Figure 1.47

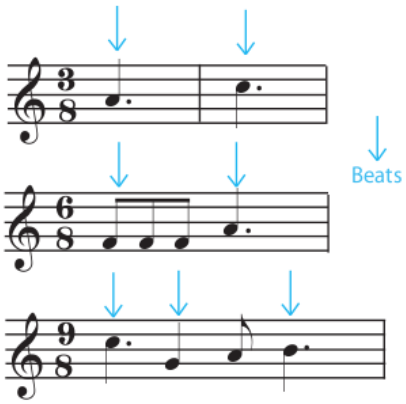
1.12 Guitar Lesson 12: Strumming and Reading Common Notation for Compound Meters[61]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[62], the Home Practice Page[63], and Song Sheet 6[64], which you may already have from Guitar Lesson 11 (Section 1.11). There are quite a few ensembles that the student may work on following this lesson. You may already have Ensemble Page 7[65] from lesson 11.Ensemble Page 8[66] and Ensemble Page 9[67] also go with this lesson.

[61] This content is available online at <http://cnx.org/content/m12839/1.3/>.
[62] See the file at <http://cnx.org/content/m12839/latest/12GuitarLesson.pdf>
[63] See the file at <http://cnx.org/content/m12839/latest/12GuitarPractice.pdf>
[64] See the file at <http://cnx.org/content/m12839/latest/SongSheet6.pdf>
[65] See the file at <http://cnx.org/content/m12839/latest/Ensemble7.pdf>
[66] See the file at <http://cnx.org/content/m12839/latest/Ensemble8.pdf>
[67] See the file at <http://cnx.org/content/m12839/latest/Ensemble9.pdf>

Lesson 12

Common Notation

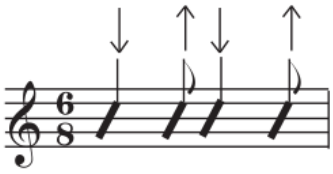


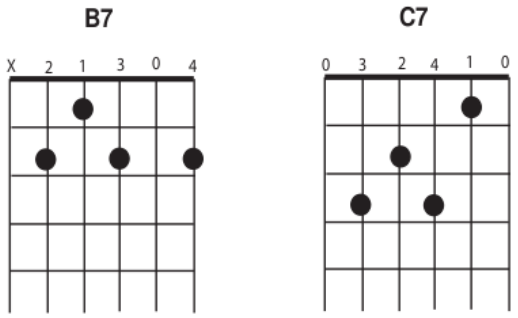
In 3/8, 6/8 and 9/8 time,
you may give each eightht note a beat.

If the music is fast, a dotted quarter
will feel like one beat divided into
three eighth notes instead of two.

Playing Chords

When playing chords in 3/8, 6/8 and 9/8 time,
you won't want to play two-eighth-note beats
against the three-eighth-note meter.*
Practice an uneven strum that goes
down on the first eight note
up on the third eighth note.





*learn more about meter: http://cnx.org/content/m12405/latest/

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Figure 1.48

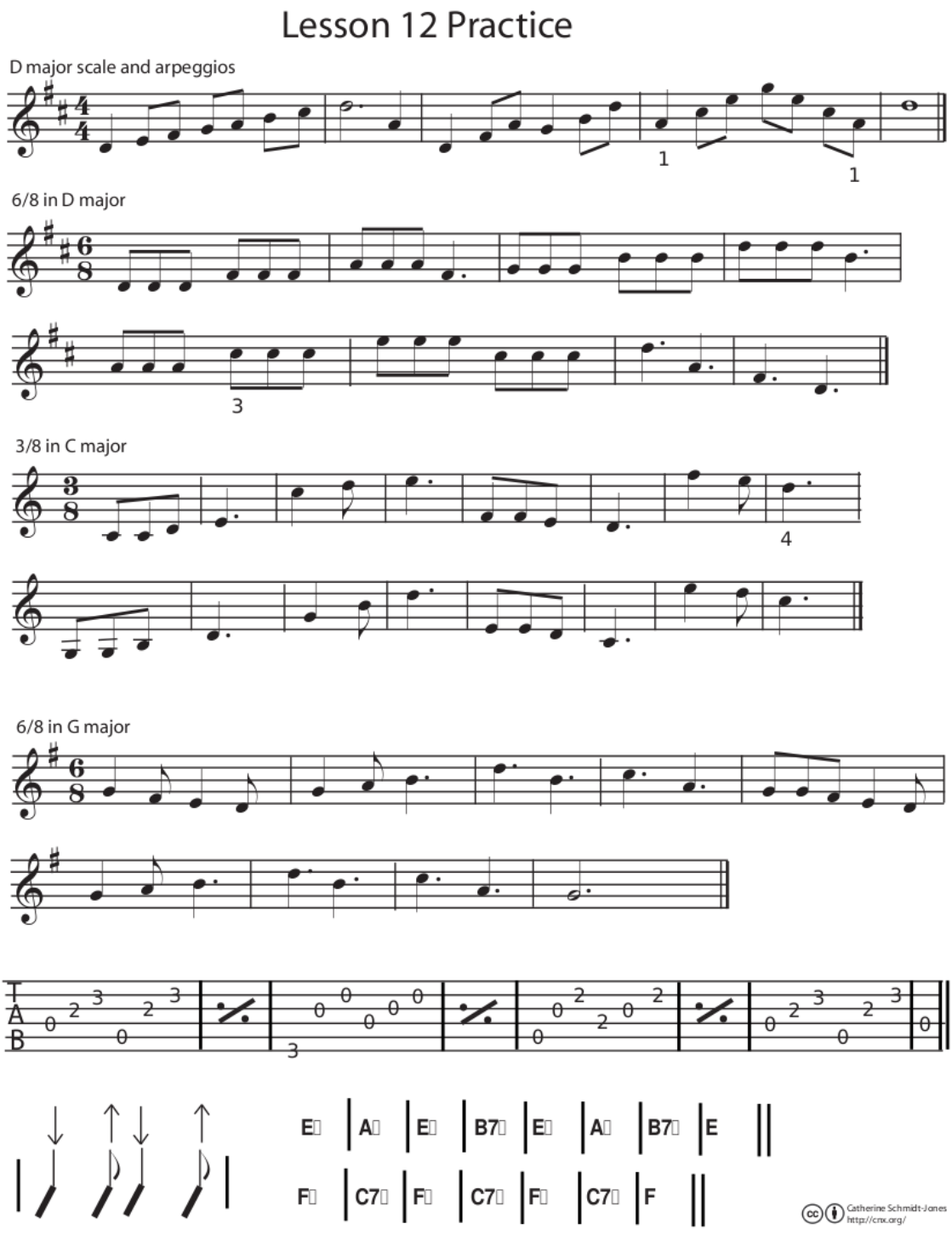
Lesson 12 Practice
D major scale and arpeggios
6/8 in D major
3/8 in C major
6/8 in G major
E
A
E
B7
E
A
B7
E
F
C7
F
C7
F
C7
F
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.49

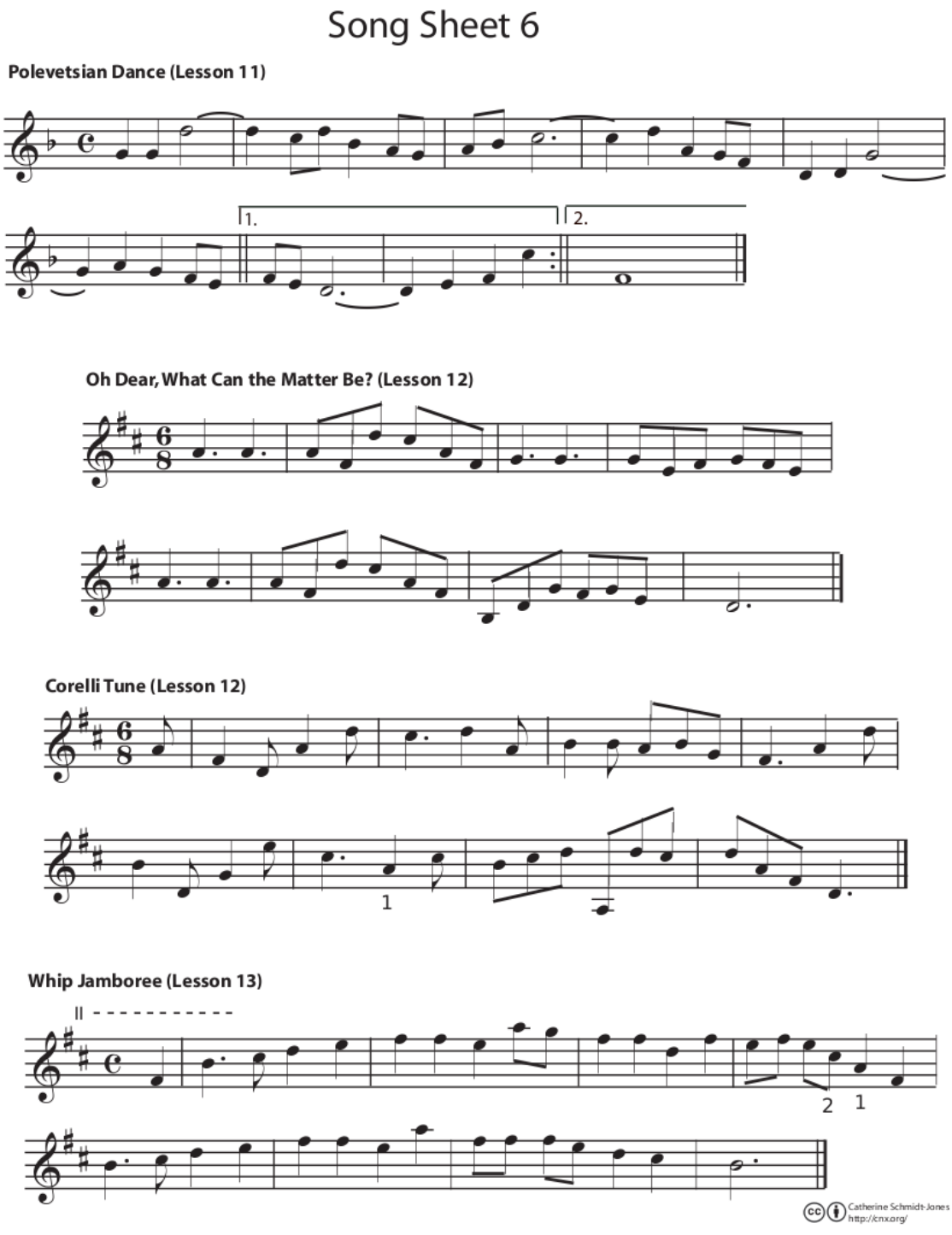
Song Sheet 6
Polevetsian Dance (Lesson 11)
1.
2.
Oh Dear, What Can the Matter Be? (Lesson 12)
Corelli Tune (Lesson 12)
1
Whip Jamboree (Lesson 13)
2 1
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.50

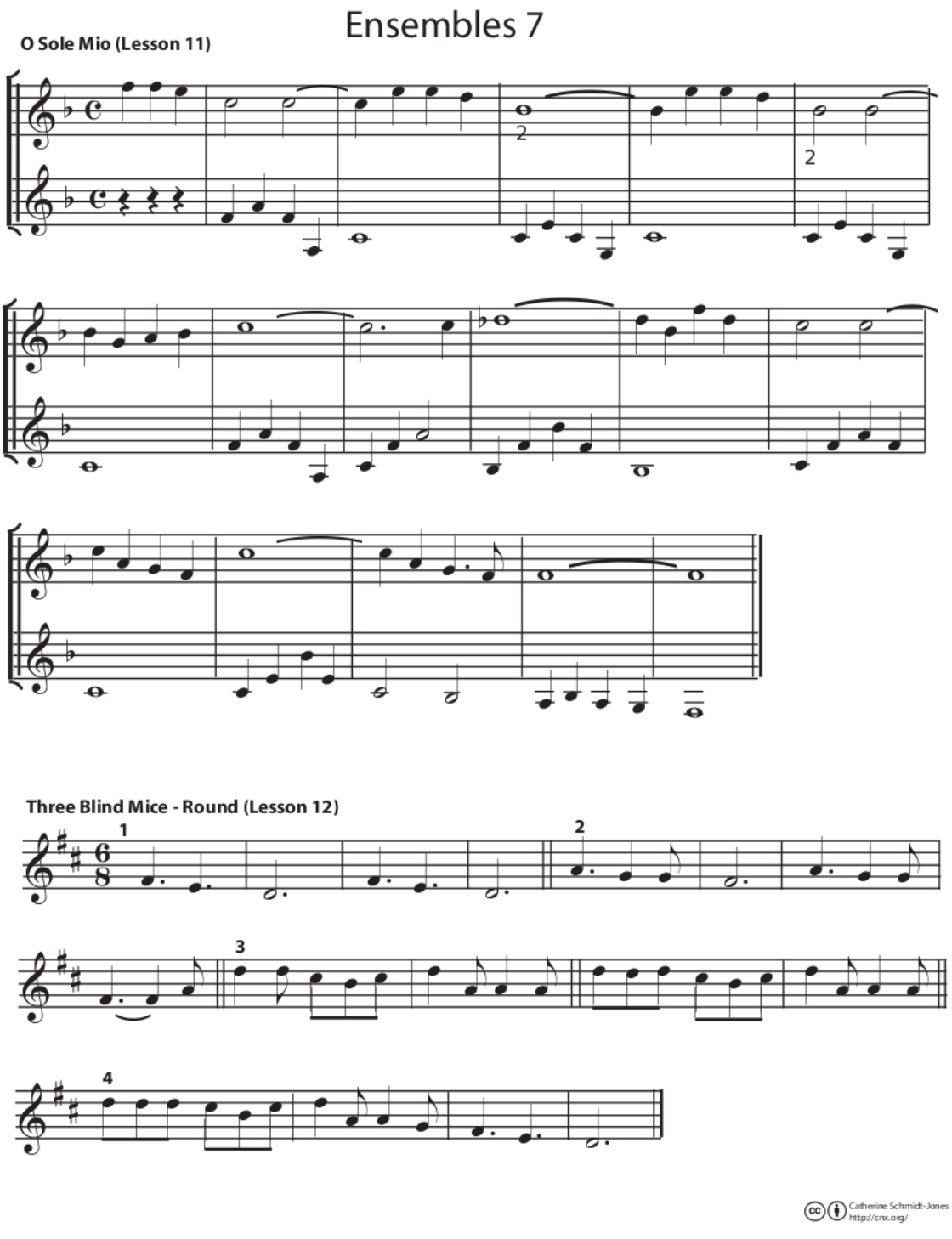
Ensembles 7
O Sole Mio (Lesson 11)
Three Blind Mice - Round (Lesson 12)
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Figure 1.51

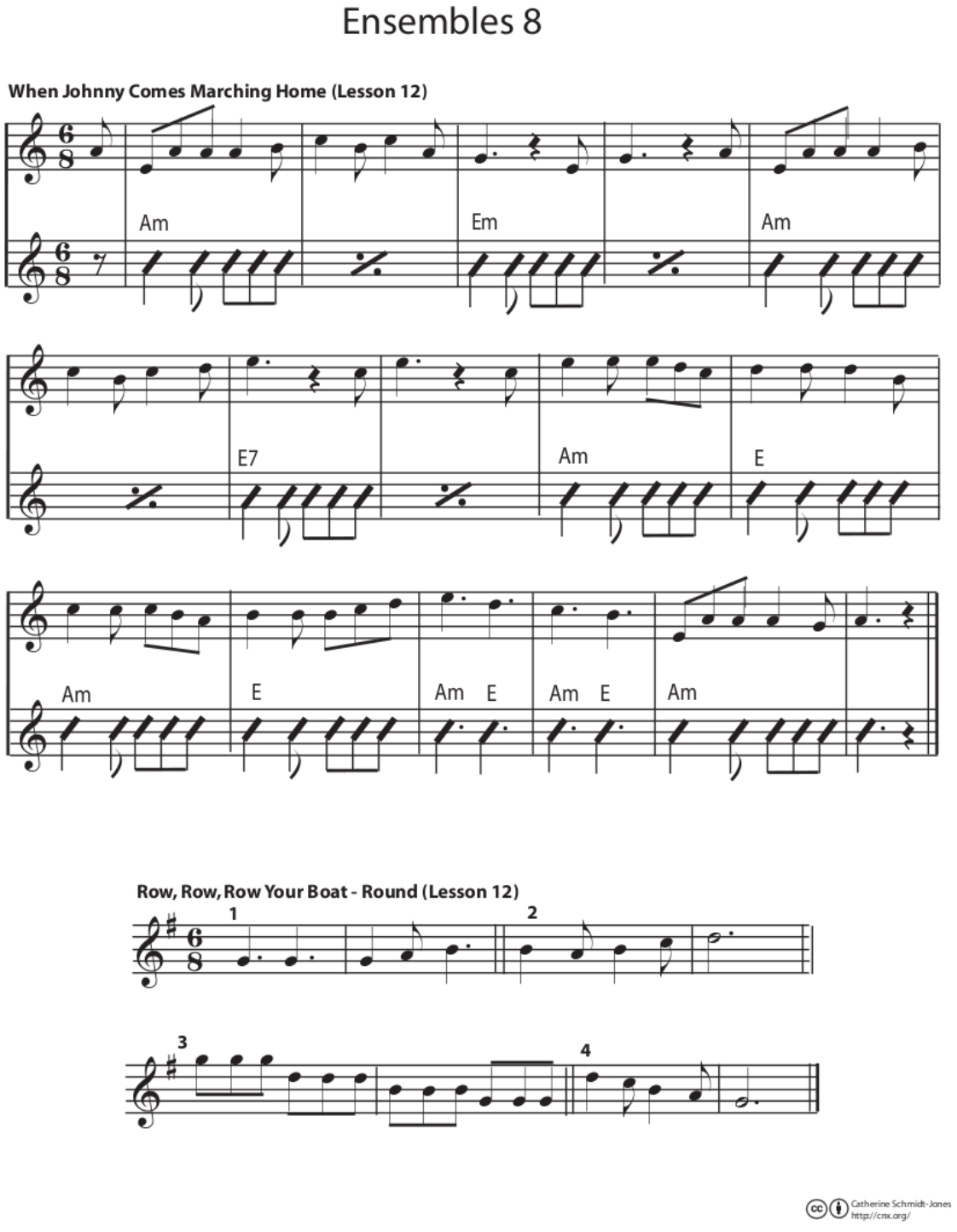
Ensembles 8
When Johnny Comes Marching Home (Lesson 12)
Am
Em
Am
E7
Am
E
Am
E
Am E
Am E
Am
Row, Row, Row Your Boat - Round (Lesson 12)
1
2
3
4
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Figure 1.52

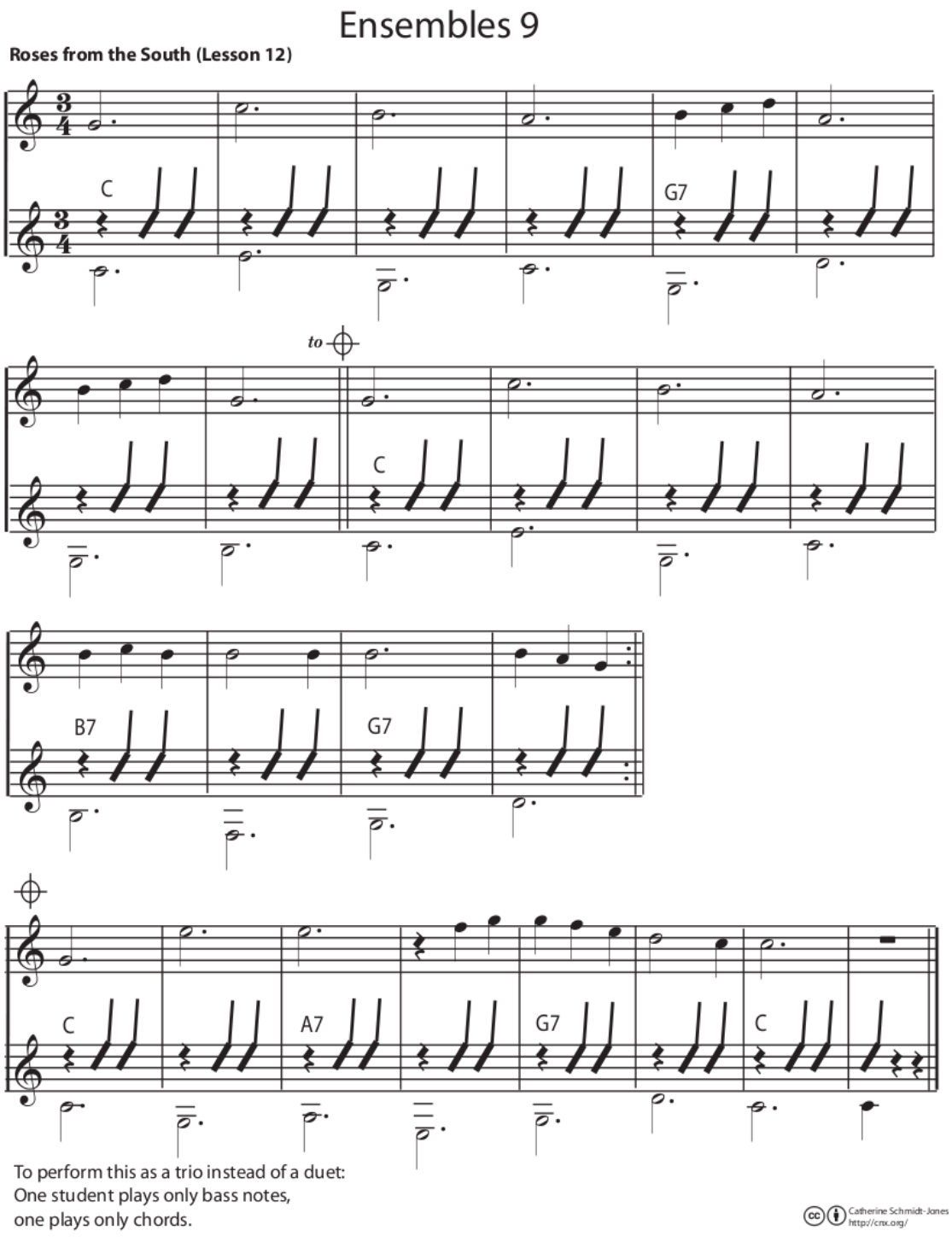
Ensembles 9
Roses from the South (Lesson 12)
C
G7
to
C
B7
G7
C
A7
G7
C
To perform this as a trio instead of a duet:
One student plays only bass notes,
one plays only chords.
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Figure 1.53

1.13 Guitar Lesson 13: Changing the Left Hand Position, and Moveable Chord Shapes[68]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[69], the Home Practice Page[70], and the Ensemble Sheet[71]. The Song Sheet[72] is the same as for Guitar Lesson 12 (Section 1.12).

[68] This content is available online at <http://cnx.org/content/m12972/1.3/>.
[69] See the file at <http://cnx.org/content/m12972/latest/13GuitarLesson.pdf>
[70] See the file at <http://cnx.org/content/m12972/latest/13Guitarpractice.pdf>
[71] See the file at <http://cnx.org/content/m12972/latest/Ensemble10.pdf>
[72] See the file at <http://cnx.org/content/m12972/latest/SongSheet6.pdf>

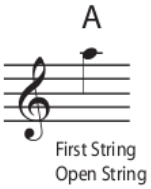
Lesson 13

Guitar Notation

So far, you have been playing mostly in first position.
First position = first finger at first fret
second finger at second fret
third finger at third fret
fourth finger at fourth fret

First String Notes

Highest string
"First string"
"High E string"

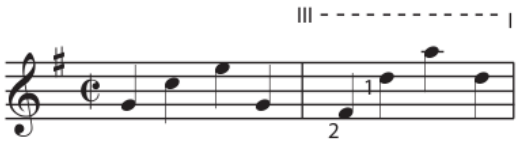


Sometimes you will want to move your left hand to a different position, for example:

Second position = first finger at second fret
second finger at third fret
third finger at fourth fret
fourth finger at fifth fret

Third position = first finger at third fret
second finger at fourth fret
third finger at fifth fret
fourth finger at sixth fret

Roman Numerals
on a guitar part tell you which fret your left hand first finger should be playing.
This is your position.
A dotted line may be there
to tell you how long
to stay in that position.
Sometimes
left hand fingering numbers
are also included.



One reason
to play in a higher position is to play high notes on the high E string.
Another
is to reach some notes more easily (like the F sharp in the example).

Chord Diagrams

Notice that a B chord is just a B flat chord moved up to second position.
What chord do you get if you move a full B flat "down" one fret?

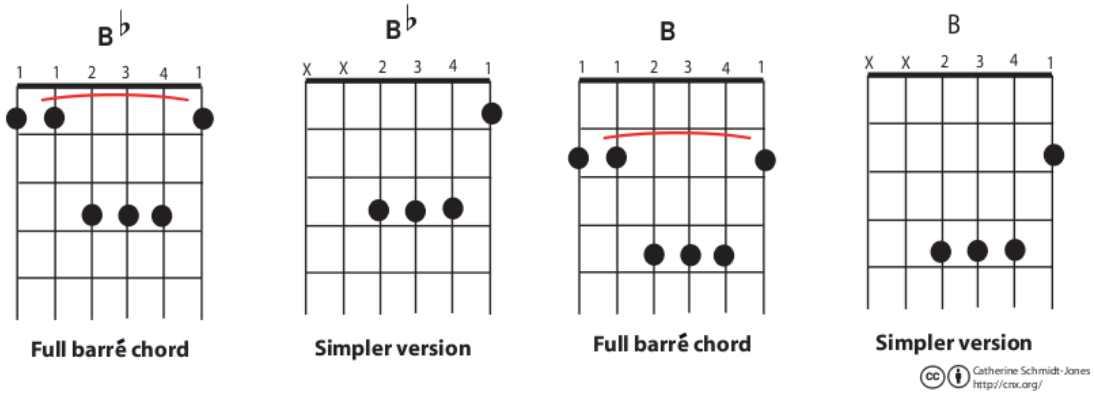


Figure 1.54

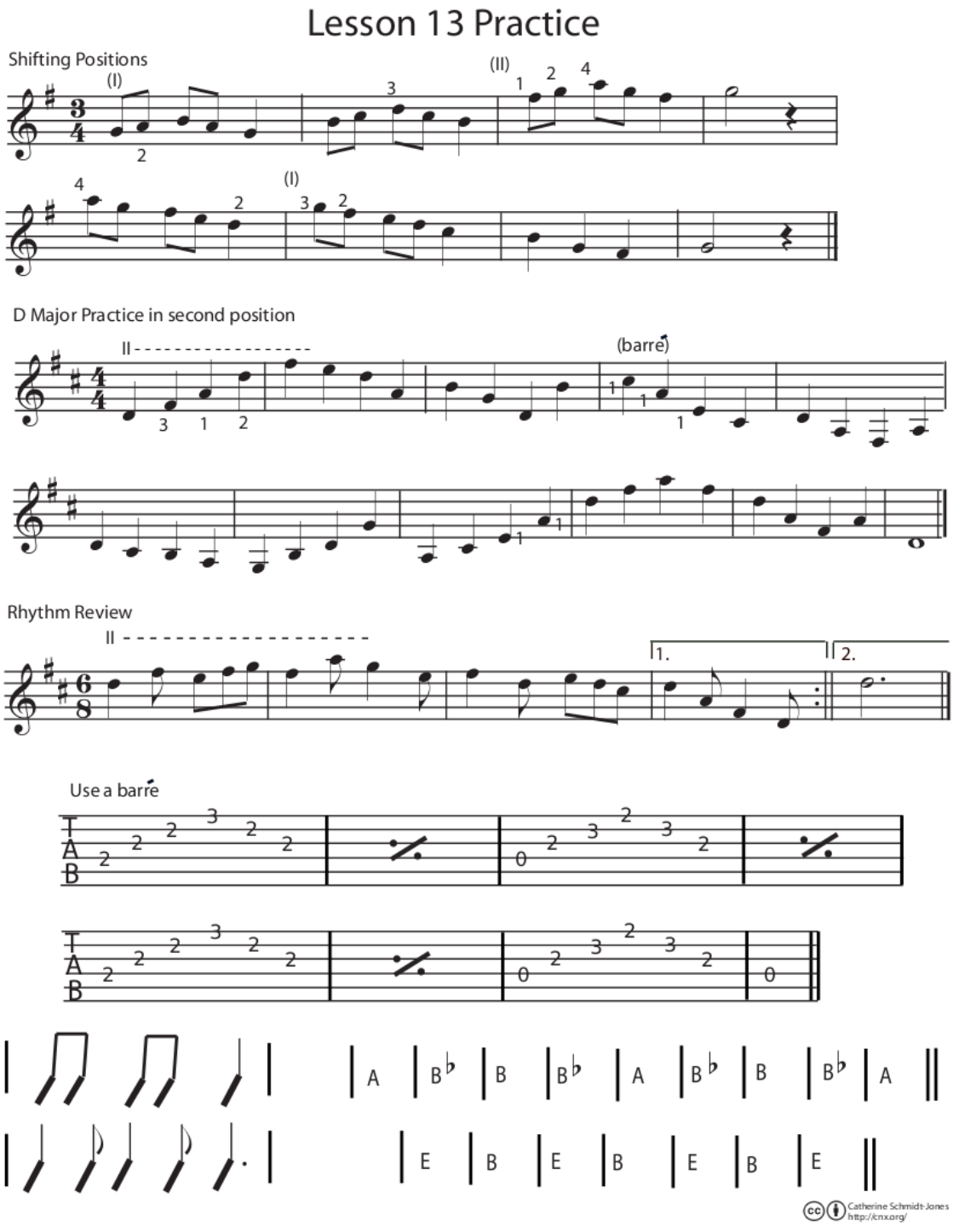

Lesson 13 Practice
Shifting Positions
D Major Practice in second position
Rhythm Review
Use a barré
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Figure 1.55

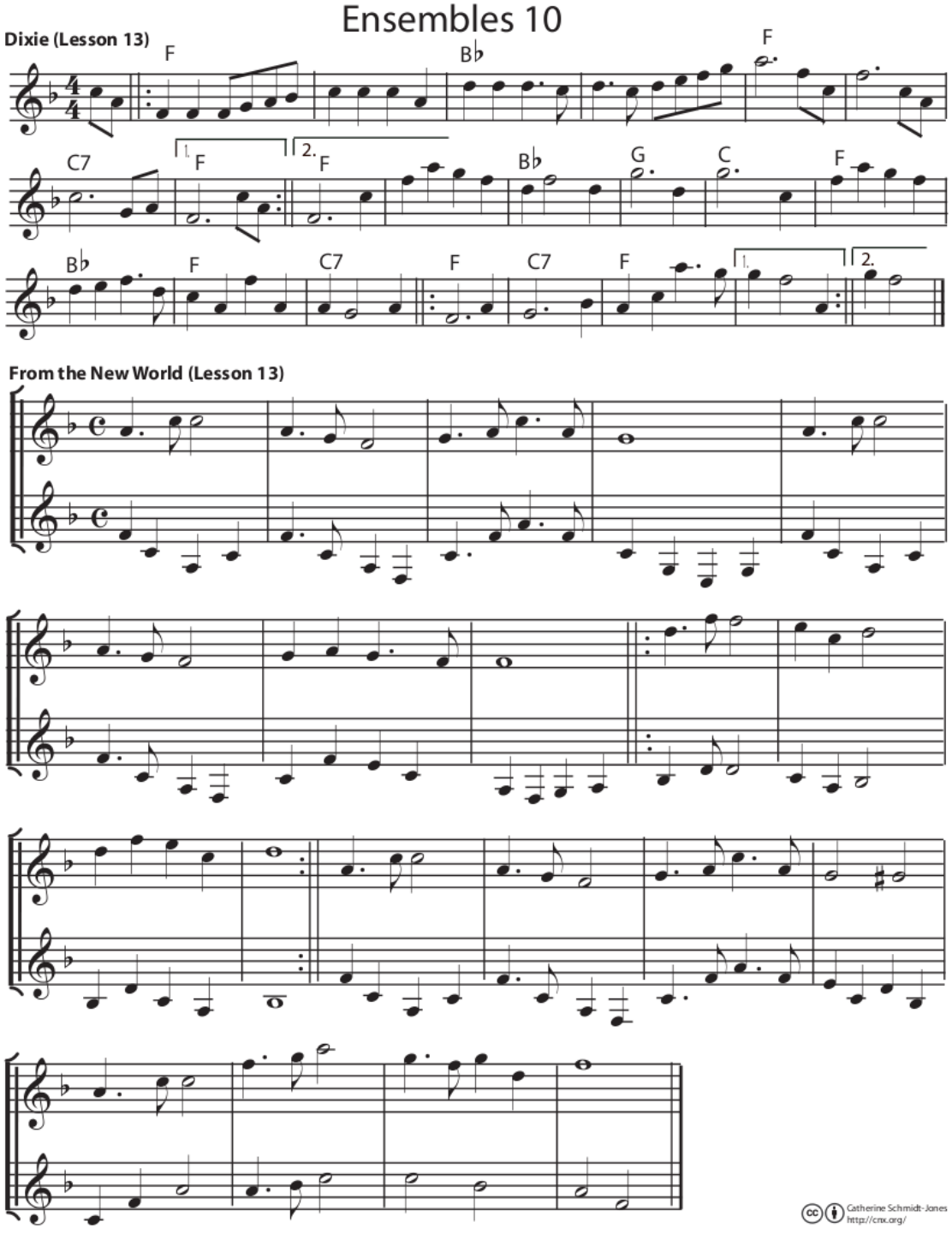
Ensembles 10
Dixie (Lesson 13)
From the New World (Lesson 13)
Catherine Schmidt-Jones
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Figure 1.56

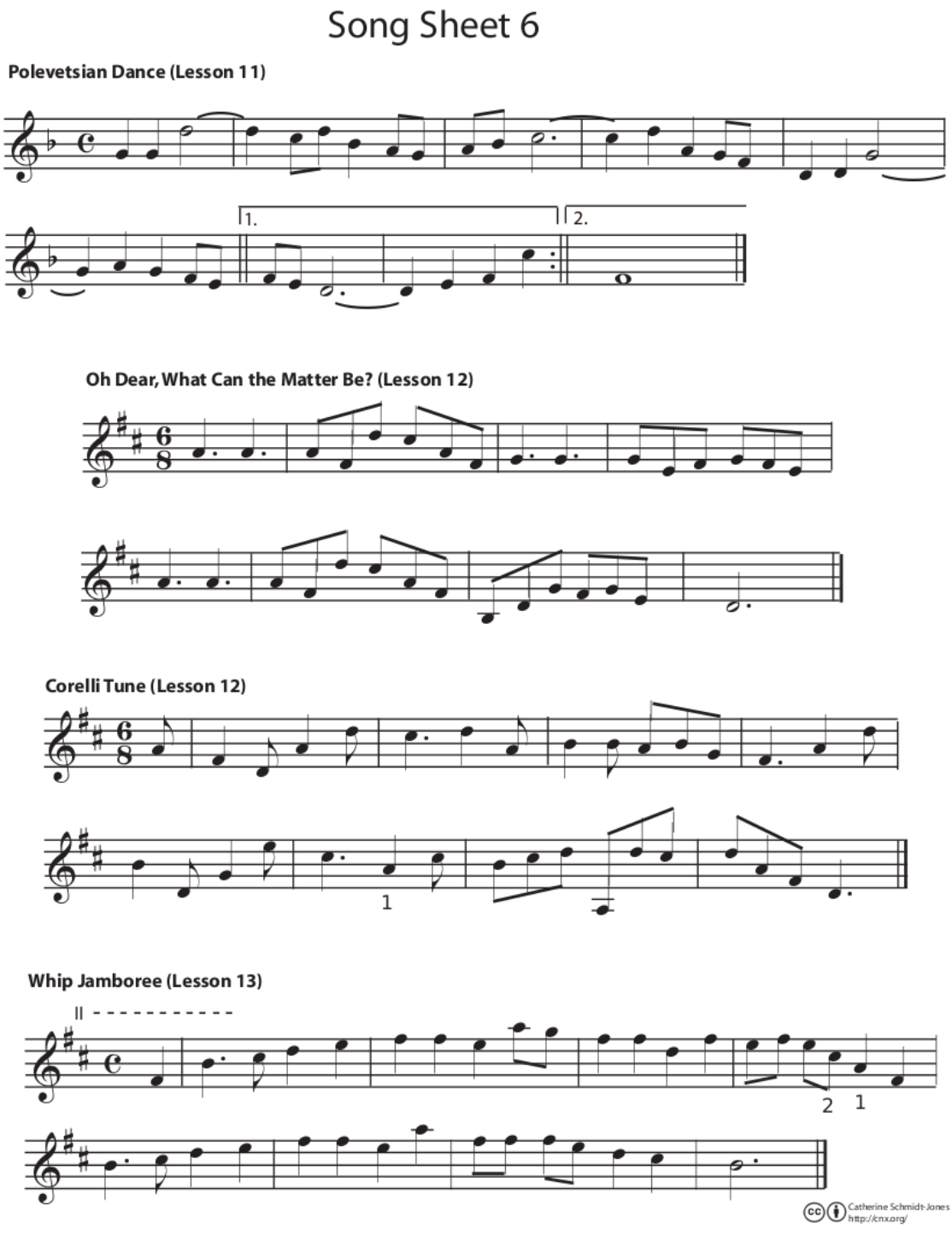
Song Sheet 6
Polevetsian Dance (Lesson 11)
1.
2.
Oh Dear, What Can the Matter Be? (Lesson 12)
Corelli Tune (Lesson 12)
1
Whip Jamboree (Lesson 13)
2 1
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Figure 1.57

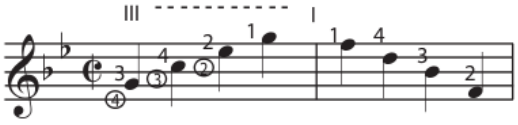
1.14 Guitar Lesson 14: Alternative Fingerings, Notation, and Avoiding Open Strings[73]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[74], the Home Practice Page[75], Song Sheet[76] and Ensemble Page[77] for this lesson.

[73] This content is available online at <http://cnx.org/content/m13023/1.3/>.
[74] See the file at <http://cnx.org/content/m13023/latest/14GuitarLesson.pdf>
[75] See the file at <http://cnx.org/content/m13023/latest/14GuitarPractice.pdf>
[76] See the file at <http://cnx.org/content/m13023/latest/SongSheet7.pdf>
[77] See the file at <http://cnx.org/content/m13023/latest/SongSheet7.pdf>

Lesson 14

Guitar Notation



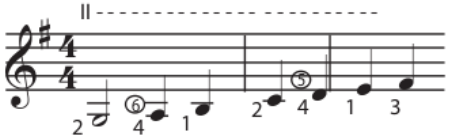
Circled Numbers
tell you what string to play a note on,
if it's a different string than usual.

Music Theory for Guitar

Another reason
to play in a higher position is to
avoid playing any open strings.

You can change the key
of any scale, chord, or melody
simply by playing it in a different position,
as long as it has no open strings.
As always, moving anything up by one fret
moves it up one half step.

G Major Scale



If you memorize a no-open-strings fingering
for the G major scale,
you can play an F♯major scale, G♯major scale,
A major scale, and so on, simply by
moving the fingering pattern
to a different position.
Rock, jazz, and classical guitarists,
all find this very useful.

Chord Diagrams

Compare these chords to your **Am**.
Then play the following chords
by playing your favorite **Bm** fingering
in different positions.
All of these chords are the
same shape.

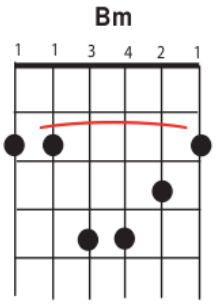
Playing new chords simply by moving a barre chord
or any chord shape that uses no open strings
is also very useful.

I A♯m or B♭m

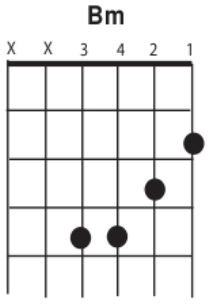
II Bm

III Cm

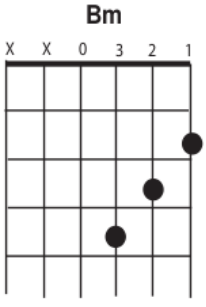
IV C♯m or D♭m



Full barre chord Bm



Easier Moveable Bm



Make-do Bm

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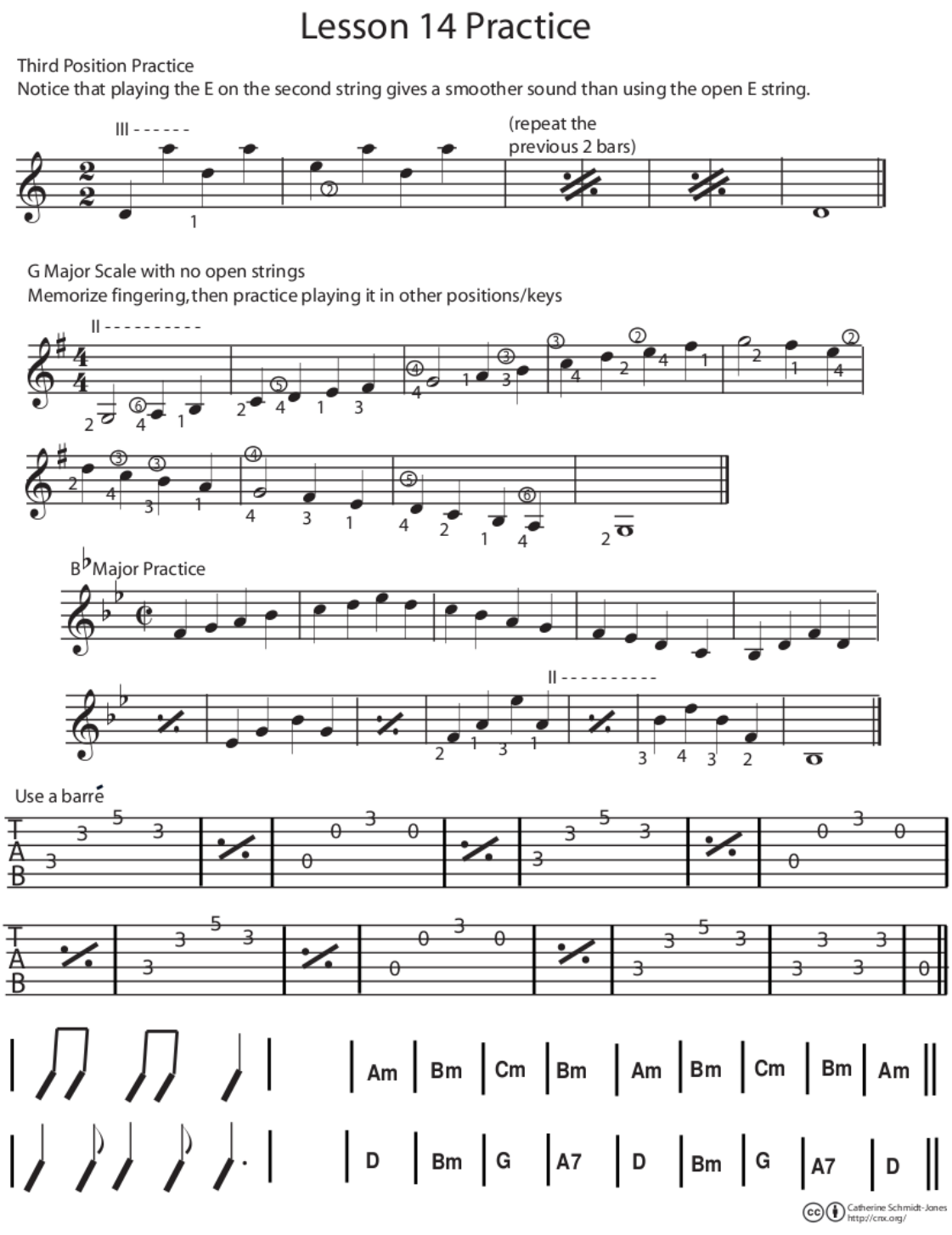
Figure 1.58


Lesson 14 Practice
Third Position Practice
Notice that playing the E on the second string gives a smoother sound than using the open E string.
III - - - - - -
(repeat the
previous 2 bars)
G Major Scale with no open strings
Memorize fingering,then practice playing it in other positions/keys
II - - - - - - - - - -
B♭Major Practice
II - - - - - - - - - -
Use a barré
T
A
B
Am Bm Cm Bm Am Bm Cm Bm Am
D Bm G A7 D Bm G A7 D
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http://cnx.org/

Figure 1.59

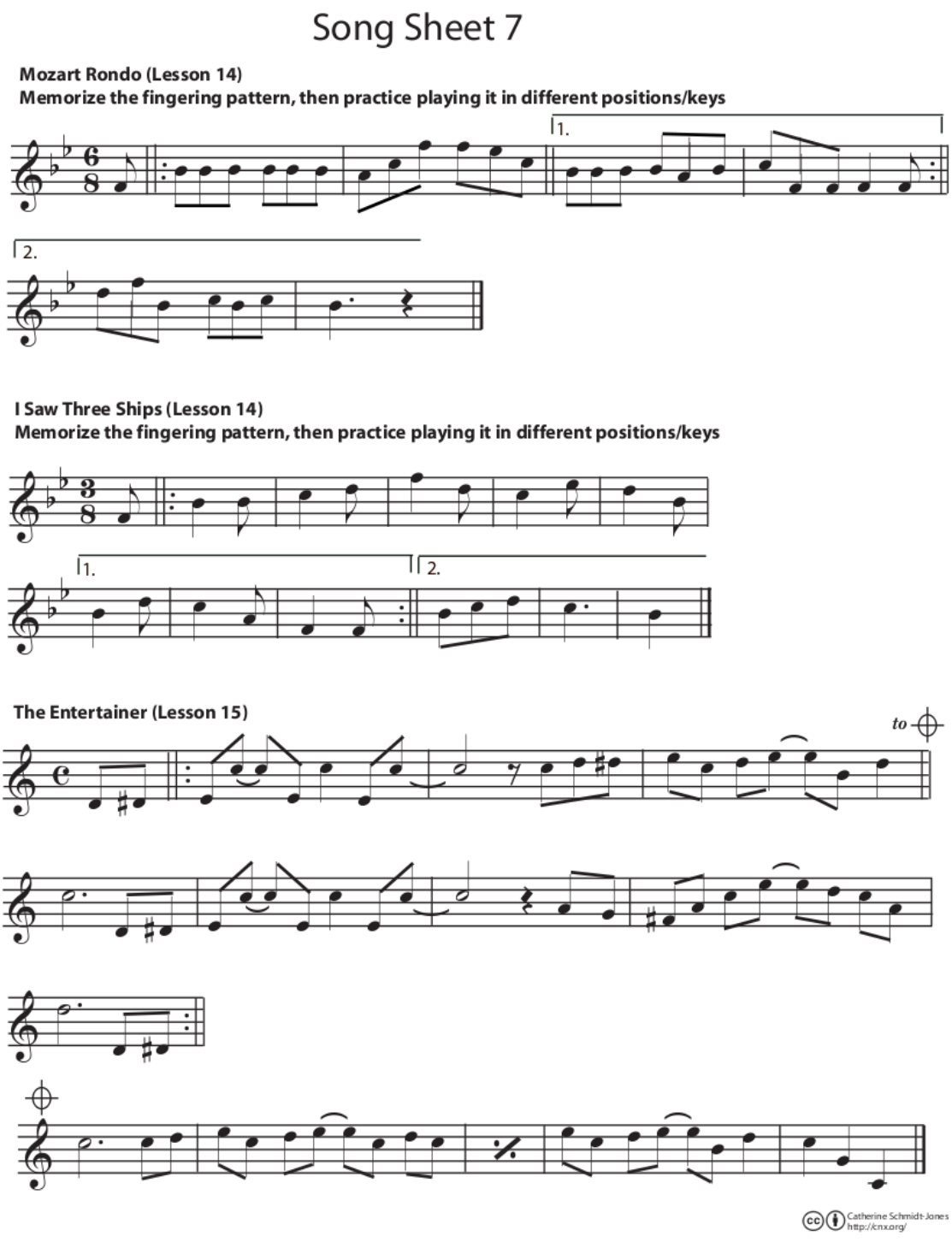
Song Sheet 7
Mozart Rondo (Lesson 14)
Memorize the fingering pattern, then practice playing it in different positions/keys
1.
2.
I Saw Three Ships (Lesson 14)
Memorize the fingering pattern, then practice playing it in different positions/keys
1.
2.
The Entertainer (Lesson 15)
to
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.60

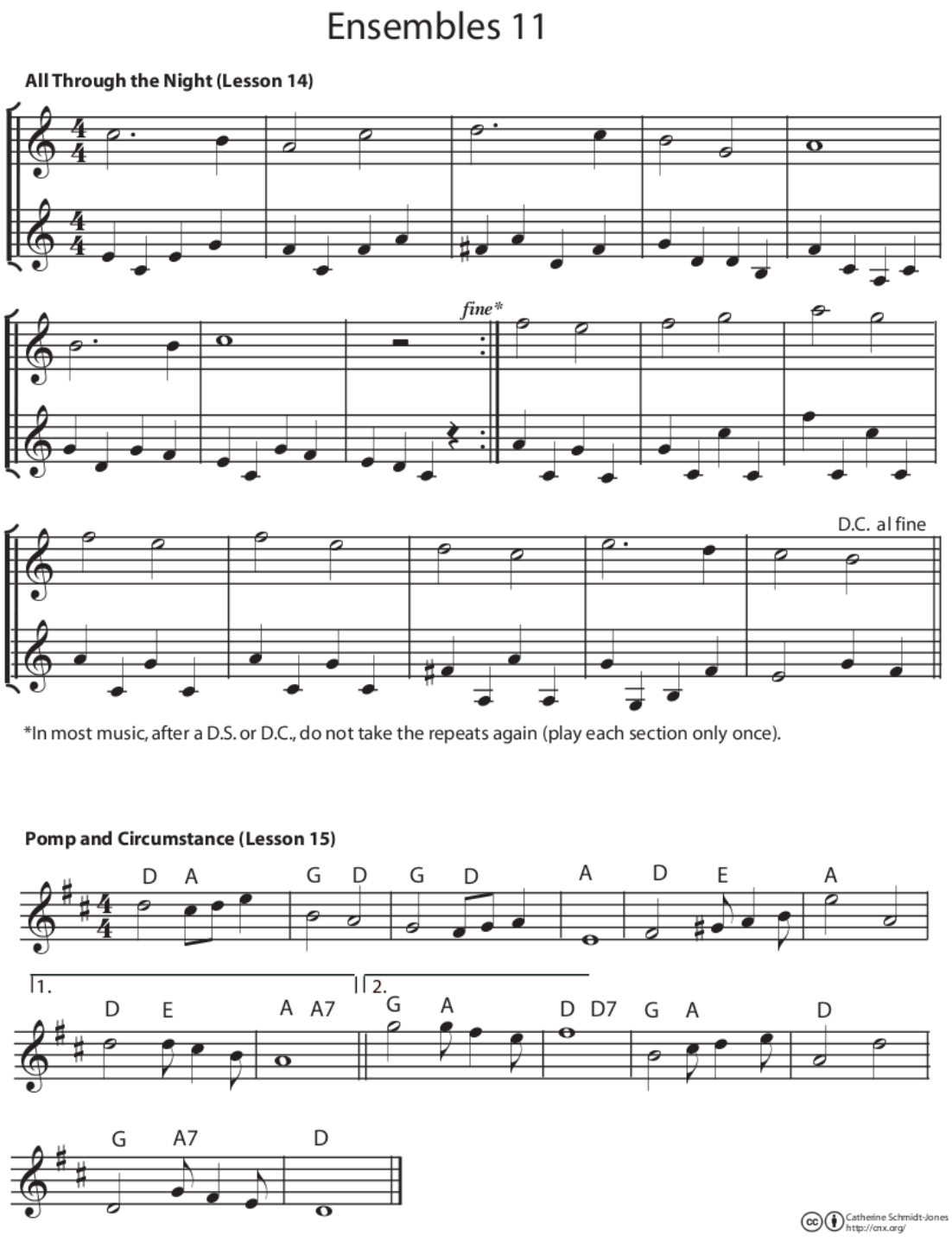
Ensembles 11
All Through the Night (Lesson 14)
fine*
D.C. al fine
*In most music, after a D.S. or D.C., do not take the repeats again (play each section only once).
Pomp and Circumstance (Lesson 15)
D A G D G D A D E A
1.
2.
D E A A7 G A D D7 G A D
G A7 D
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Figure 1.61

1.15 Guitar Lesson 15: Syncopated Rhythms, Improvisation, and Chord Function[78]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[79], and Home Practice Page[80] for this lesson. You may already have Song Sheet 7[81], and Ensemble Page 11[82] from Guitar Lesson 14 (Section 1.14). Song Sheet 8[83] and Ensemble Page 12[84] may also be started during this lesson.

[78] This content is available online at <http://cnx.org/content/m13027/1.4/>.
[79] See the file at <http://cnx.org/content/m13027/latest/15GuitarLesson.pdf>
[80] See the file at <http://cnx.org/content/m13027/latest/15GuitarPractice.pdf>
[81] See the file at <http://cnx.org/content/m13027/latest/SongSheet7.pdf>
[82] See the file at <http://cnx.org/content/m13027/latest/Ensemble11.pdf>
[83] See the file at <http://cnx.org/content/m13027/latest/SongSheet8.pdf>
[84] See the file at <http://cnx.org/content/m13027/latest/Ensemble12.pdf>

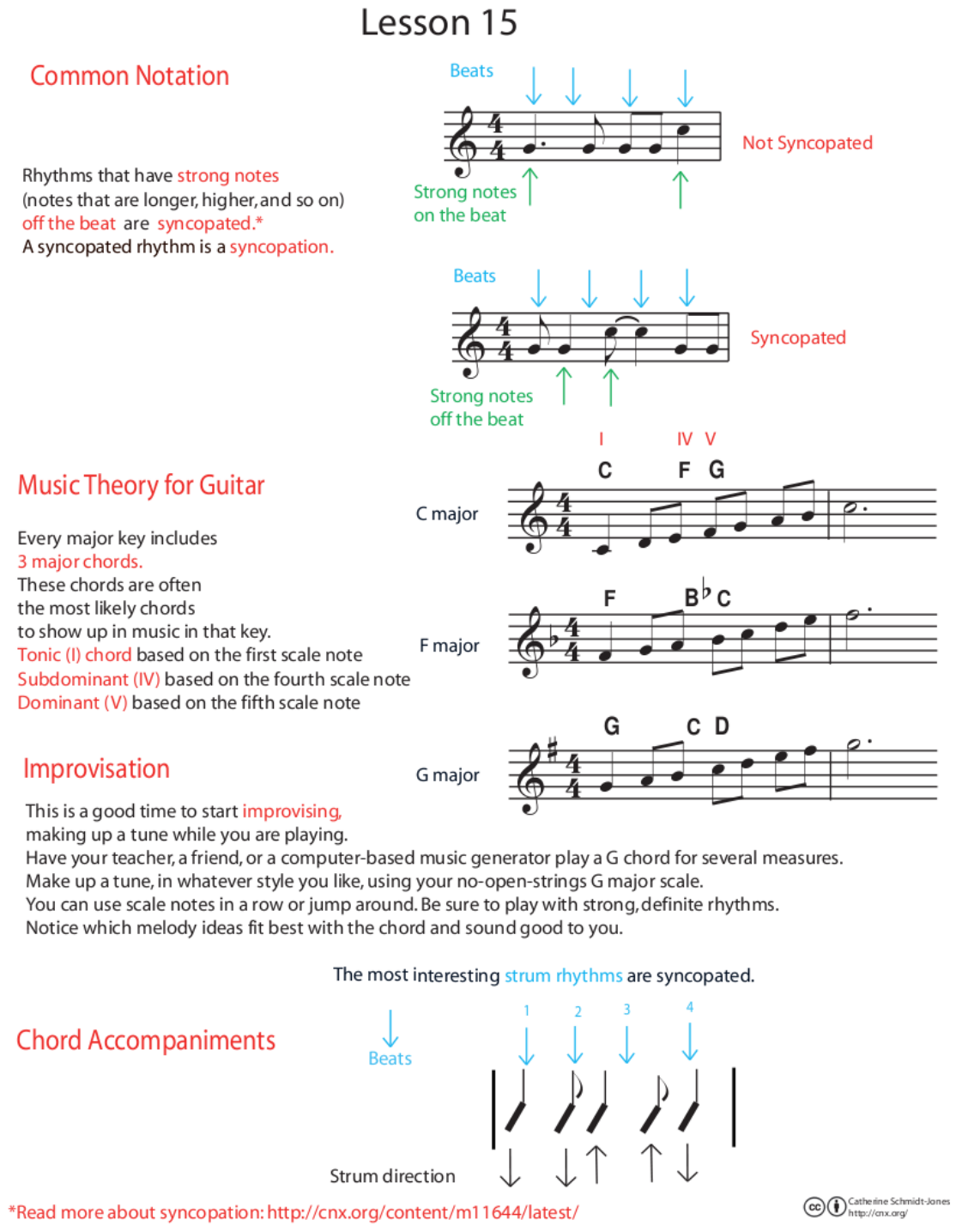
Lesson 15
Common Notation
Rhythms that have strong notes
(notes that are longer, higher, and so on)
off the beat are syncopated.*
A syncopated rhythm is a syncopation.
Beats
Not Syncopated
Strong notes
on the beat
Beats
Syncopated
Strong notes
off the beat
Music Theory for Guitar
Every major key includes
3 major chords.
These chords are often
the most likely chords
to show up in music in that key.
Tonic (I) chord based on the first scale note
Subdominant (IV) based on the fourth scale note
Dominant (V) based on the fifth scale note
I IV V
C F G
C major
F B♭ C
F major
G C D
G major
Improvisation
This is a good time to start improvising,
making up a tune while you are playing.
Have your teacher, a friend, or a computer-based music generator play a G chord for several measures.
Make up a tune, in whatever style you like, using your no-open-strings G major scale.
You can use scale notes in a row or jump around. Be sure to play with strong, definite rhythms.
Notice which melody ideas fit best with the chord and sound good to you.
The most interesting strum rhythms are syncopated.
Chord Accompaniments
Beats
1 2 3 4
Strum direction
*Read more about syncopation: http://cnx.org/content/m11644/latest/
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Figure 1.62

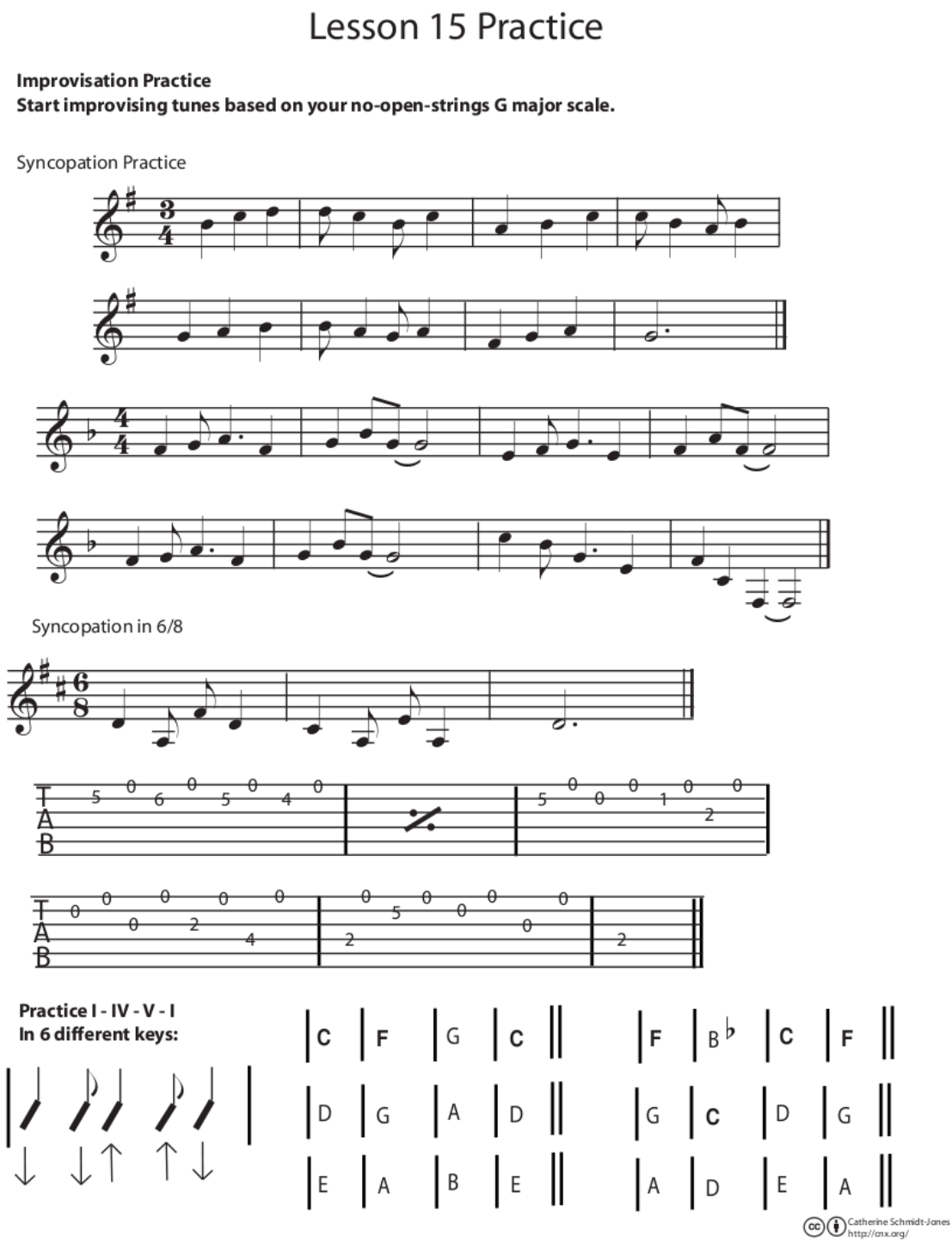
Lesson 15 Practice
Improvisation Practice
Start improvising tunes based on your no-open-strings G major scale.
Syncopation Practice
Syncopation in 6/8
Practice I - IV - V - I
In 6 different keys:
C F G C
D G A D
E A B E
F B♭ C F
G C D G
A D E A
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Figure 1.63

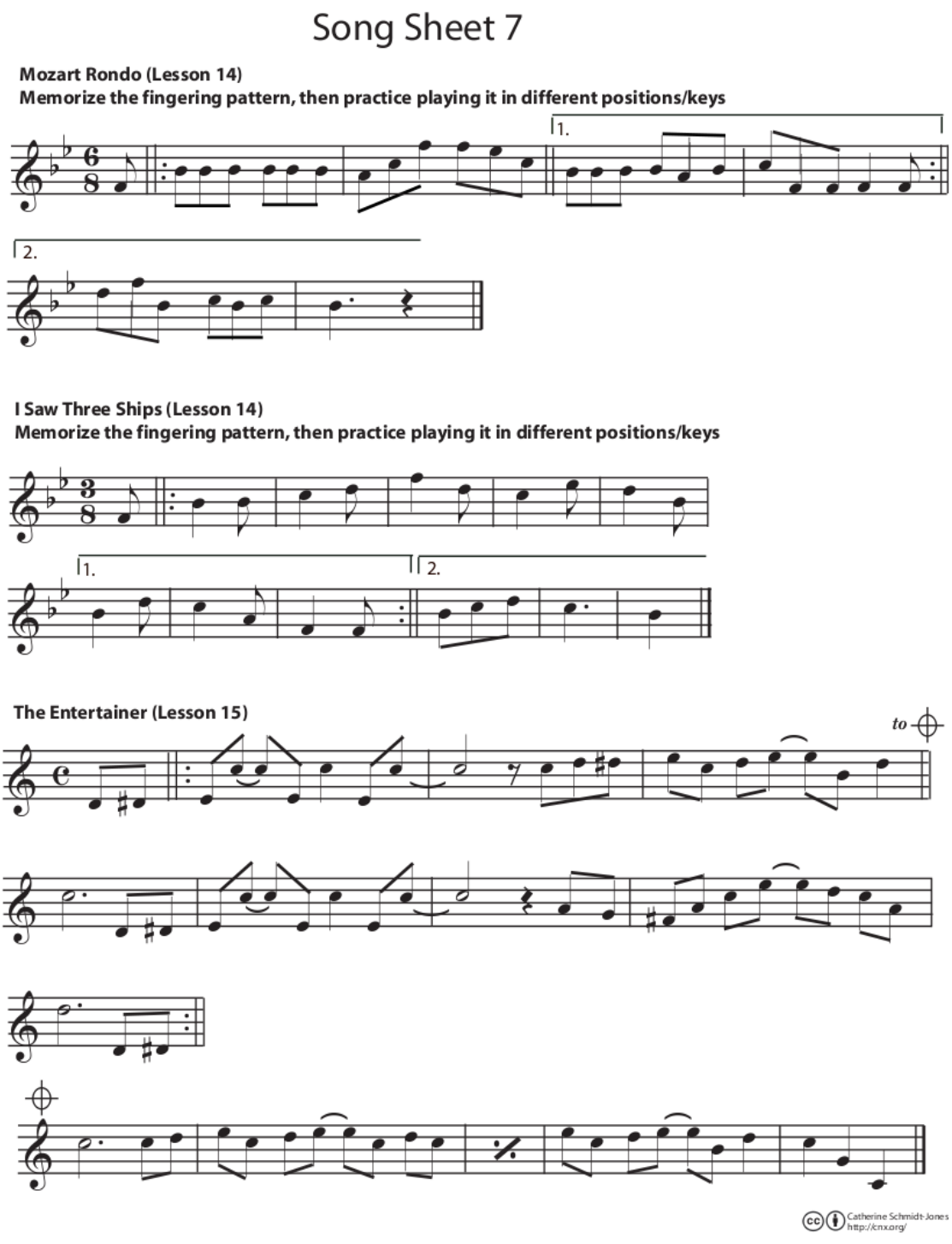
Song Sheet 7
Mozart Rondo (Lesson 14)
Memorize the fingering pattern, then practice playing it in different positions/keys
1.
2.
I Saw Three Ships (Lesson 14)
Memorize the fingering pattern, then practice playing it in different positions/keys
1.
2.
The Entertainer (Lesson 15)
to
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Figure 1.64

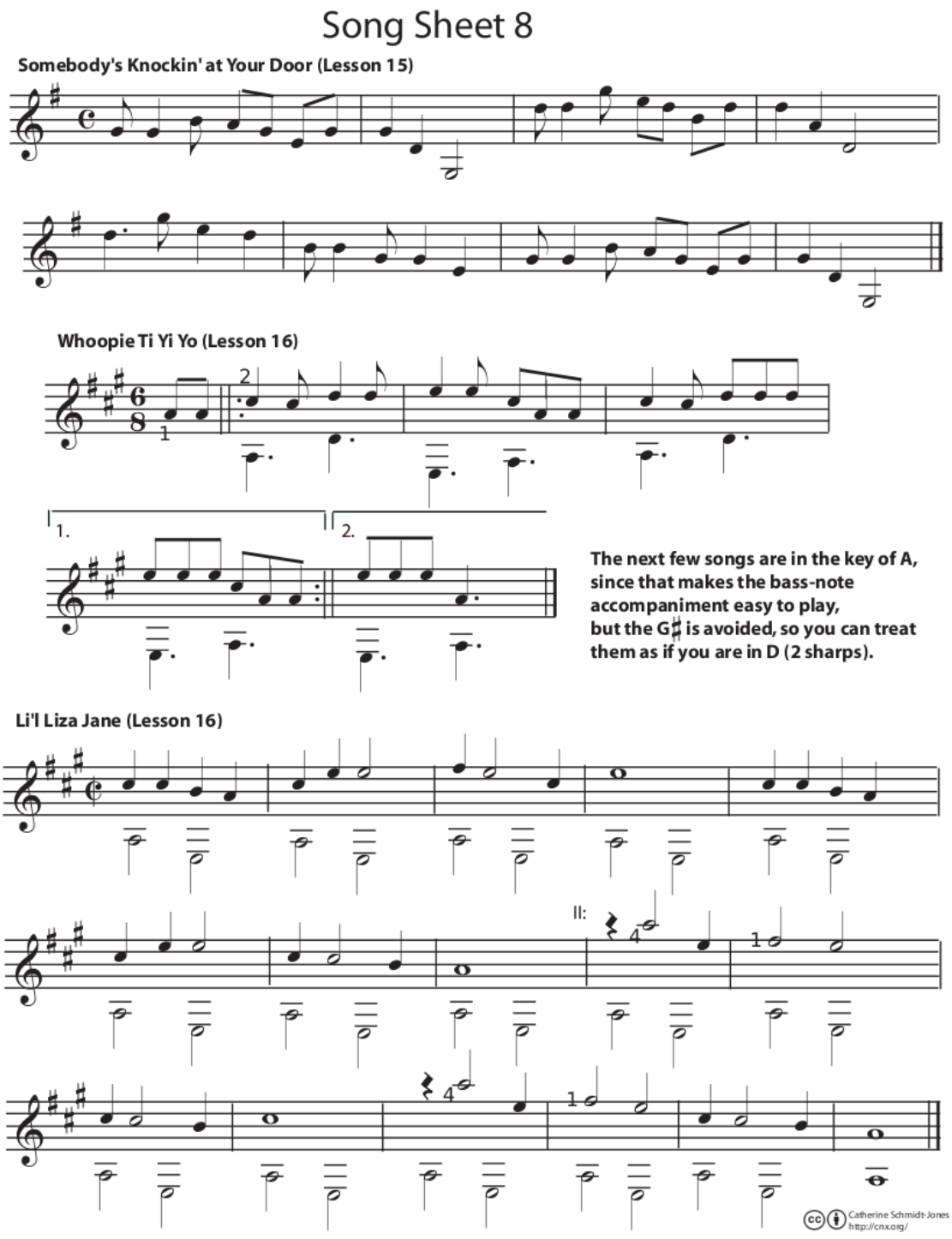
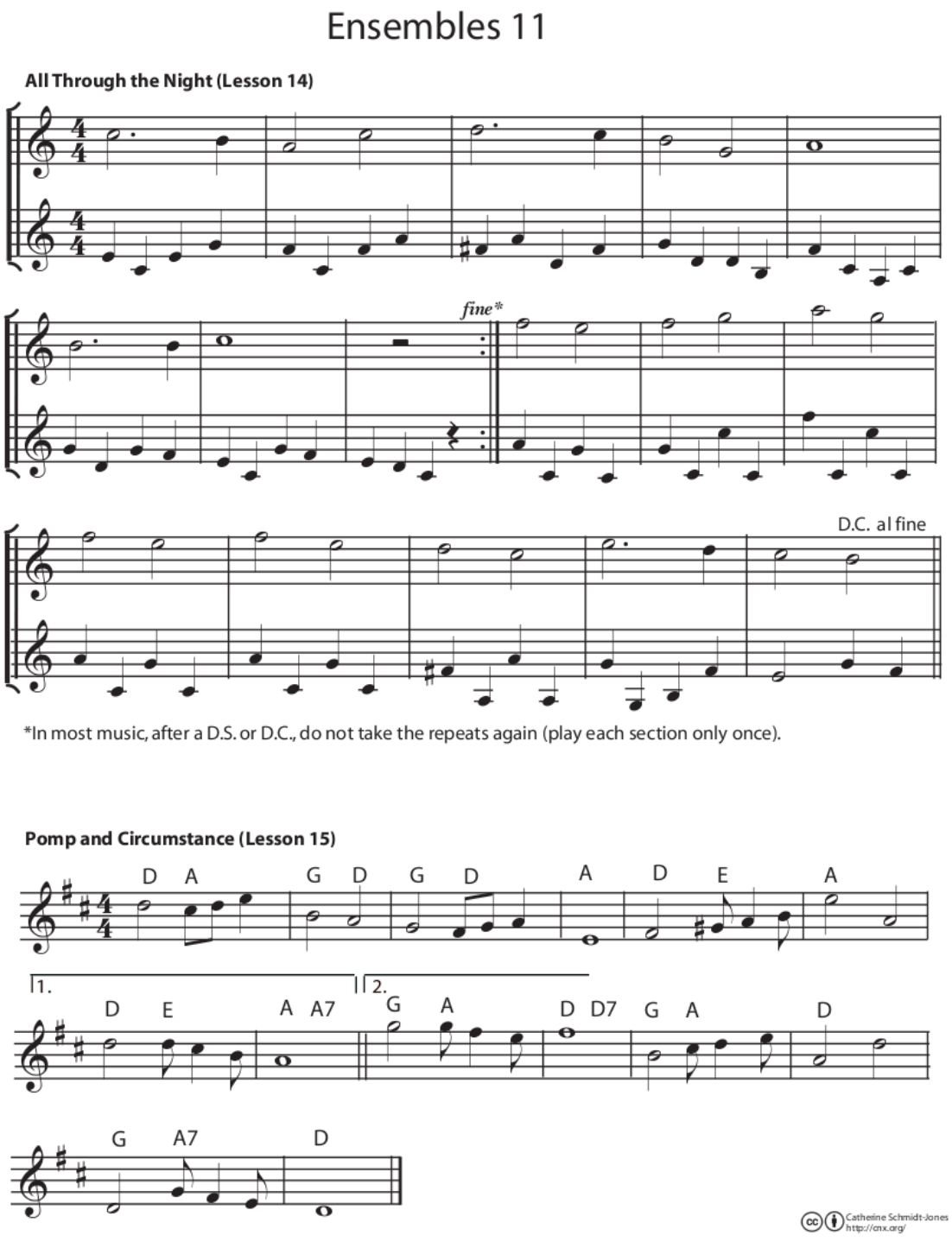

Song Sheet 8
Somebody's Knockin' at Your Door (Lesson 15)
Whoopie Ti Yi Yo (Lesson 16)
1.
2.
The next few songs are in the key of A, since that makes the bass-note accompaniment easy to play, but the G♯ is avoided, so you can treat them as if you are in D (2 sharps).
Li'l Liza Jane (Lesson 16)
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.65


Ensembles 11
All Through the Night (Lesson 14)
fine*
D.C. al fine
*In most music, after a D.S. or D.C., do not take the repeats again (play each section only once).
Pomp and Circumstance (Lesson 15)
D A G D G D A D E A
1.
2.
D E A A7 G A D D7 G A D
G A7 D
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http://cnx.org/

Figure 1.66

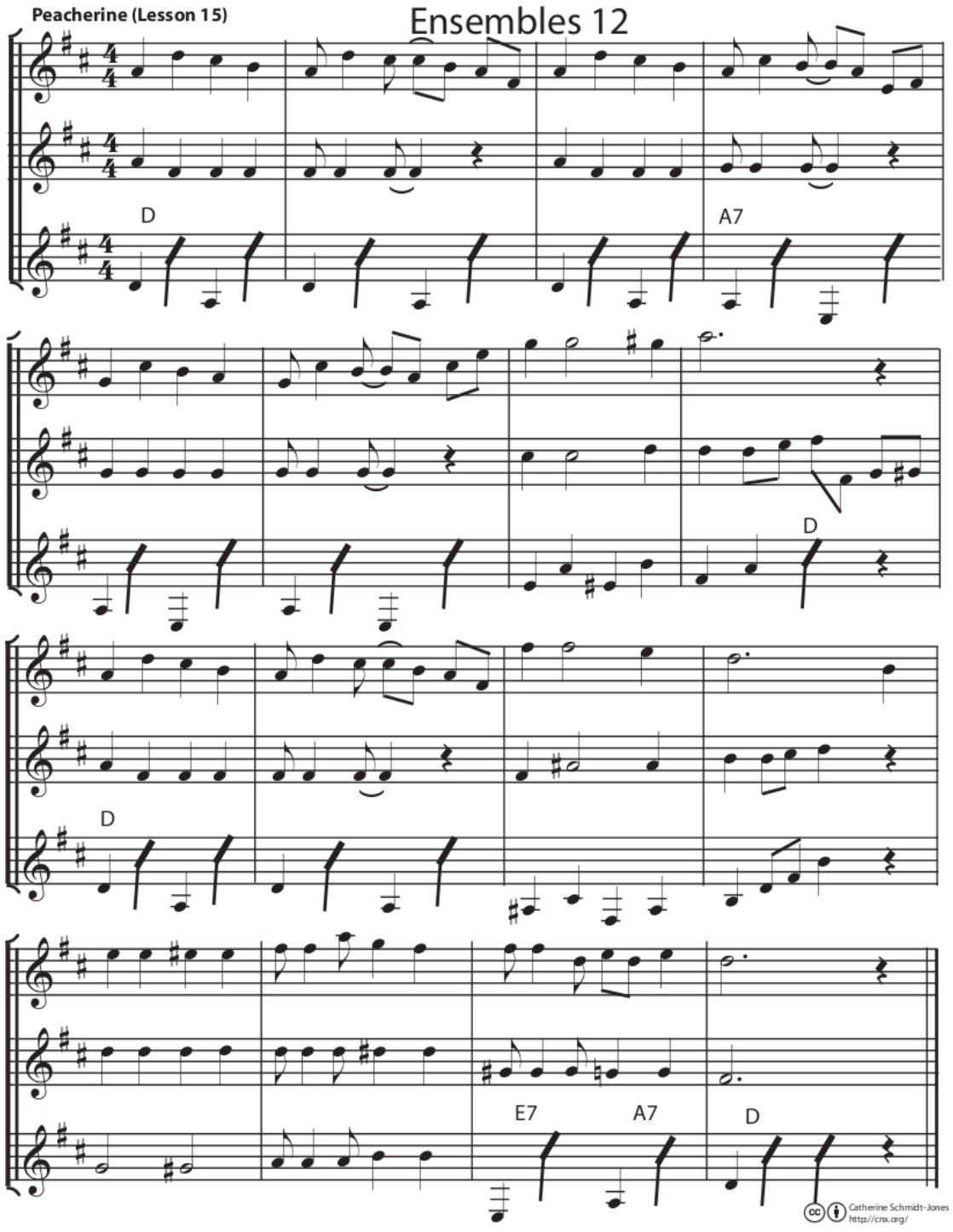
Peacherine (Lesson 15)
Ensembles 12
D
A7
D
D
E7
A7
D
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Figure 1.67

1.16 Guitar Lesson 16: Reading and Playing Plucked Chords and Accompaniments[85]

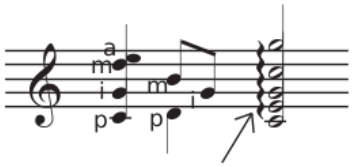
Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[86], the Home Practice Page[87], and Ensemble page[88] page for this lesson. The Song Sheet[89] is the same as for Guitar Lesson 15 (Section 1.15).

At this point, most students will be ready for any intermediate-level guitar book or sheet music, whether common notation, chords, or tablature. Students who have not yet expressed interest in learning anything other than lesson music, should be strongly encouraged to listen to a variety of guitar music and choose a genre, style, or specific pieces that interest them.

[85] This content is available online at <http://cnx.org/content/m13041/1.3/>.
[86] See the file at <http://cnx.org/content/m13041/latest/16GuitarLesson.pdf>
[87] See the file at <http://cnx.org/content/m13041/latest/16GuitarPractice.pdf>
[88] See the file at <http://cnx.org/content/m13041/latest/Ensemble13.pdf>
[89] See the file at <http://cnx.org/content/m13041/latest/SongSheet8.pdf>

Lesson 16

Common Notation



Notes lined up vertically
or sharing a stem
are played at the same time.

This symbol means "strum the chord".

Tablature

Notes lined up vertically
are played at the same time.

Music Theory for Guitar

The final chord of a song
is usually the
Tonic (I) chord.*
You can change the key
of a chord progression
to make it
easier to play or
easier to sing.
Just change the
old tonic chord to the new tonic chord,
the old dominant to the new dominant,
and so on. This is called transposing the music,
or transposition. (i.e. "changing the position!")

	I	IV	I	V7	I
A major	**A**	**D**	**A**	**E7**	**A**
	Good night,	ladies, we're	going to	leave you	now!
E major	**E**	**A**	**E**	**B7**	**E**
	Good night,	ladies, we're	going to	leave you	now!
C major	**C**	**F**	**C**	**G7**	**C**
	Good night,	ladies, we're	going to	leave you	now!

Another chord that is very common
in major keys is the V7.
Just transpose the letter name,
and keep the "7".

Chord Accompaniments

For quiet songs, you may want to
pick rather than a strum the chord accompaniment.
Use the same right hand picking pattern for each measure.

p Thumb on bass note (same rules as pick-strum bass notes)

i First finger on third string

m Second finger on second string

a Third finger on first string

Picking Pattern 1:

When you use the thumb only once
in the picking pattern,
play the note that names the chord.

*learn more about chord function in harmony: http://cnx.org/content/m11643/latest/

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http://cnx.org/

Figure 1.68

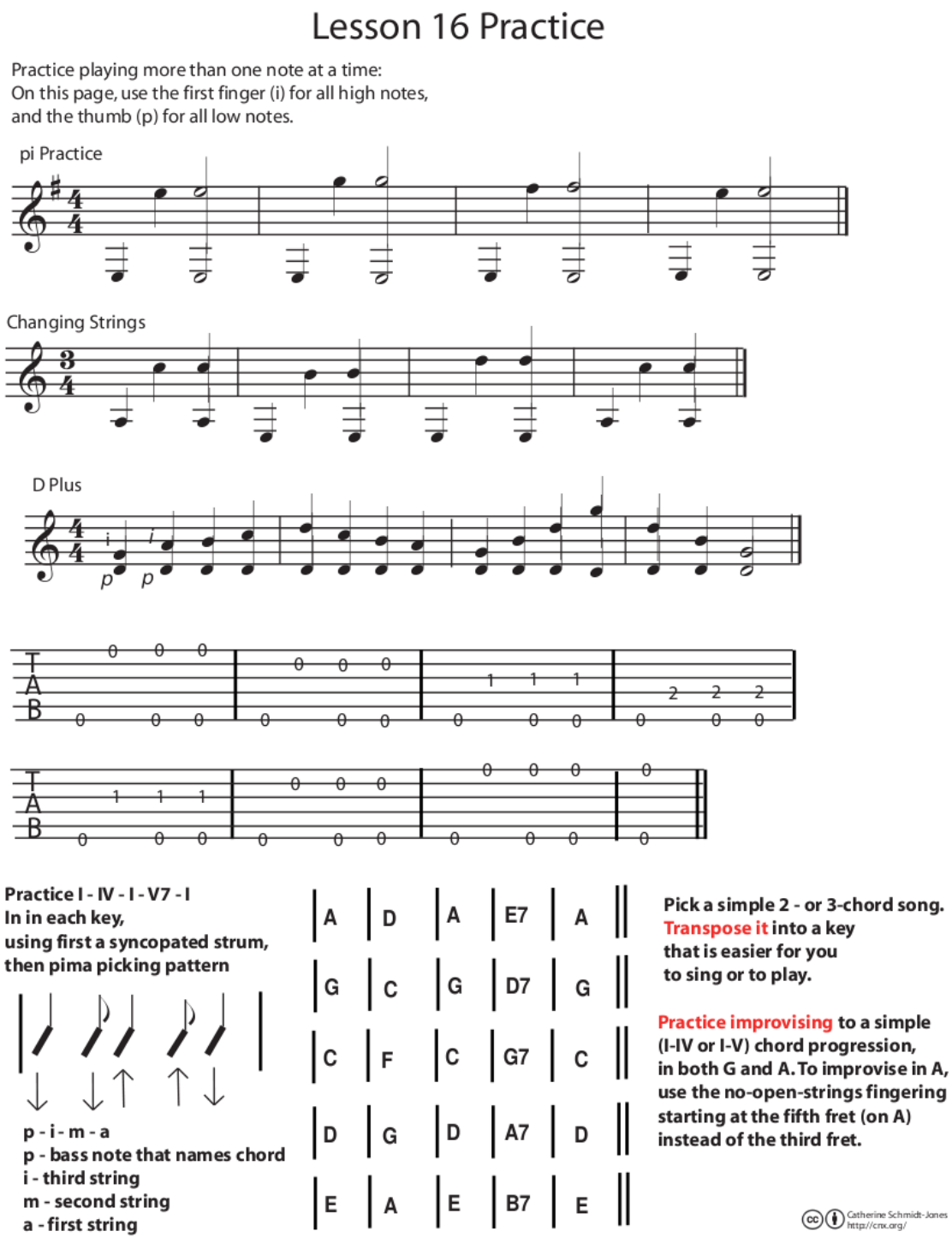
Lesson 16 Practice
Practice playing more than one note at a time:
On this page, use the first finger (i) for all high notes,
and the thumb (p) for all low notes.
pi Practice
Changing Strings
D Plus
Practice I - IV - I - V7 - I
In in each key,
using first a syncopated strum,
then pima picking pattern
p - i - m - a
p - bass note that names chord
i - third string
m - second string
a - first string
A D A E7 A
G C G D7 G
C F C G7 C
D G D A7 D
E A E B7 E
Pick a simple 2 - or 3-chord song.
Transpose it into a key
that is easier for you
to sing or to play.
Practice improvising to a simple
(I-IV or I-V) chord progression,
in both G and A. To improvise in A,
use the no-open-strings fingering
starting at the fifth fret (on A)
instead of the third fret.
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Figure 1.69

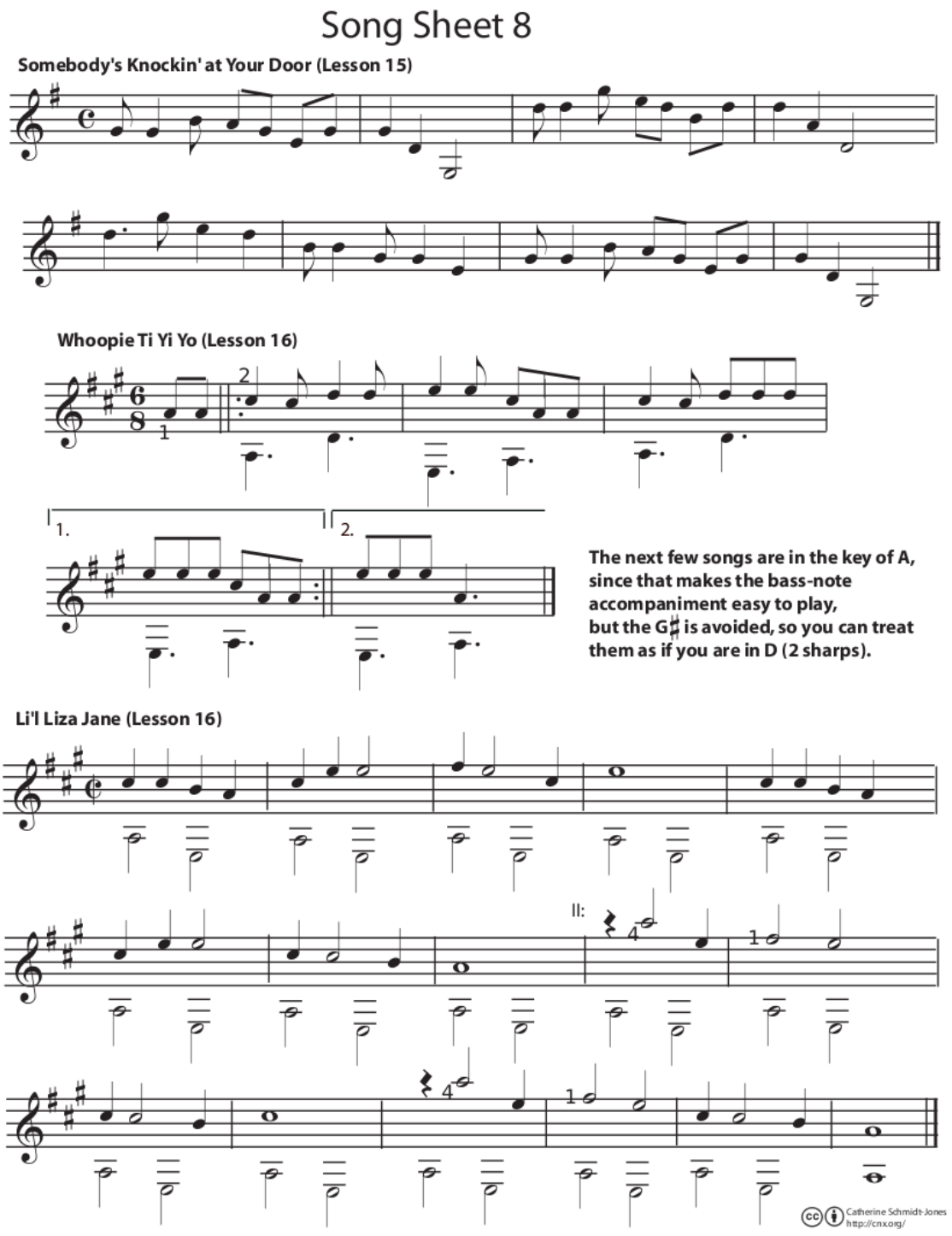
Song Sheet 8
Somebody's Knockin' at Your Door (Lesson 15)
Whoopie Ti Yi Yo (Lesson 16)
1.
2.
The next few songs are in the key of A, since that makes the bass-note accompaniment easy to play, but the G♯ is avoided, so you can treat them as if you are in D (2 sharps).
Li'l Liza Jane (Lesson 16)
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.70

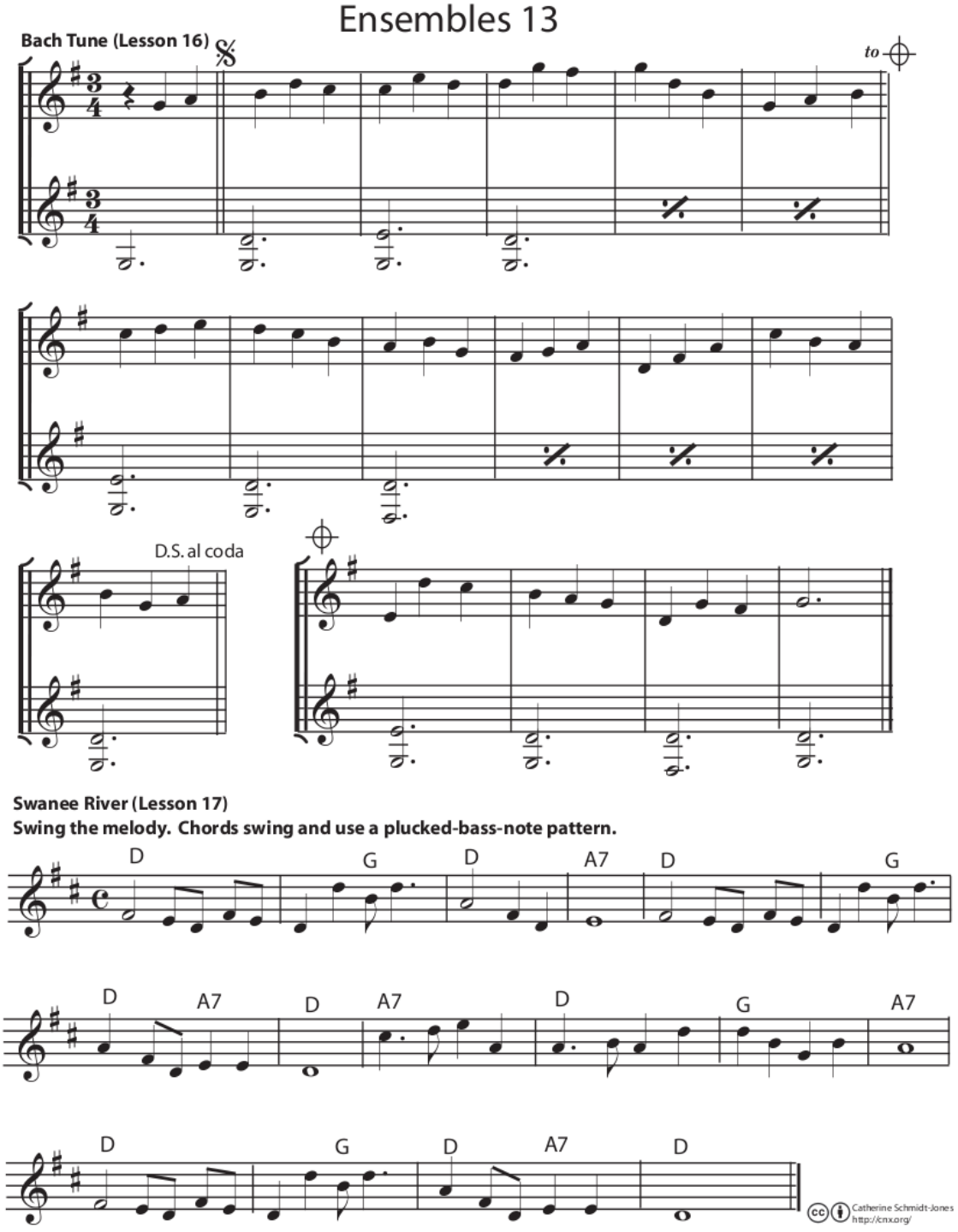
Ensembles 13
Bach Tune (Lesson 16)
to
D.S. al coda
Swanee River (Lesson 17)
Swing the melody. Chords swing and use a plucked-bass-note pattern.
D
G
D
A7
D
G
D
A7
D
A7
D
G
A7
D
G
D
A7
D
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Figure 1.71

1.17 Guitar Lesson 17: Swing Rhythm, and the Construction of Major Chords[90]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[91], the Home Practice Page[92], Song Sheet [93]. The Ensemble[94] page is the same as for Guitar Lesson 16 (Section 1.16).

[90] This content is available online at <http://cnx.org/content/m13042/1.3/>.
[91] See the file at <http://cnx.org/content/m13042/latest/17GuitarLesson.pdf>
[92] See the file at <http://cnx.org/content/m13042/latest/17GuitarPractice.pdf>
[93] See the file at <http://cnx.org/content/m13042/latest/SongSheet9.pdf>
[94] See the file at <http://cnx.org/content/m13042/latest/Ensemble13.pdf>

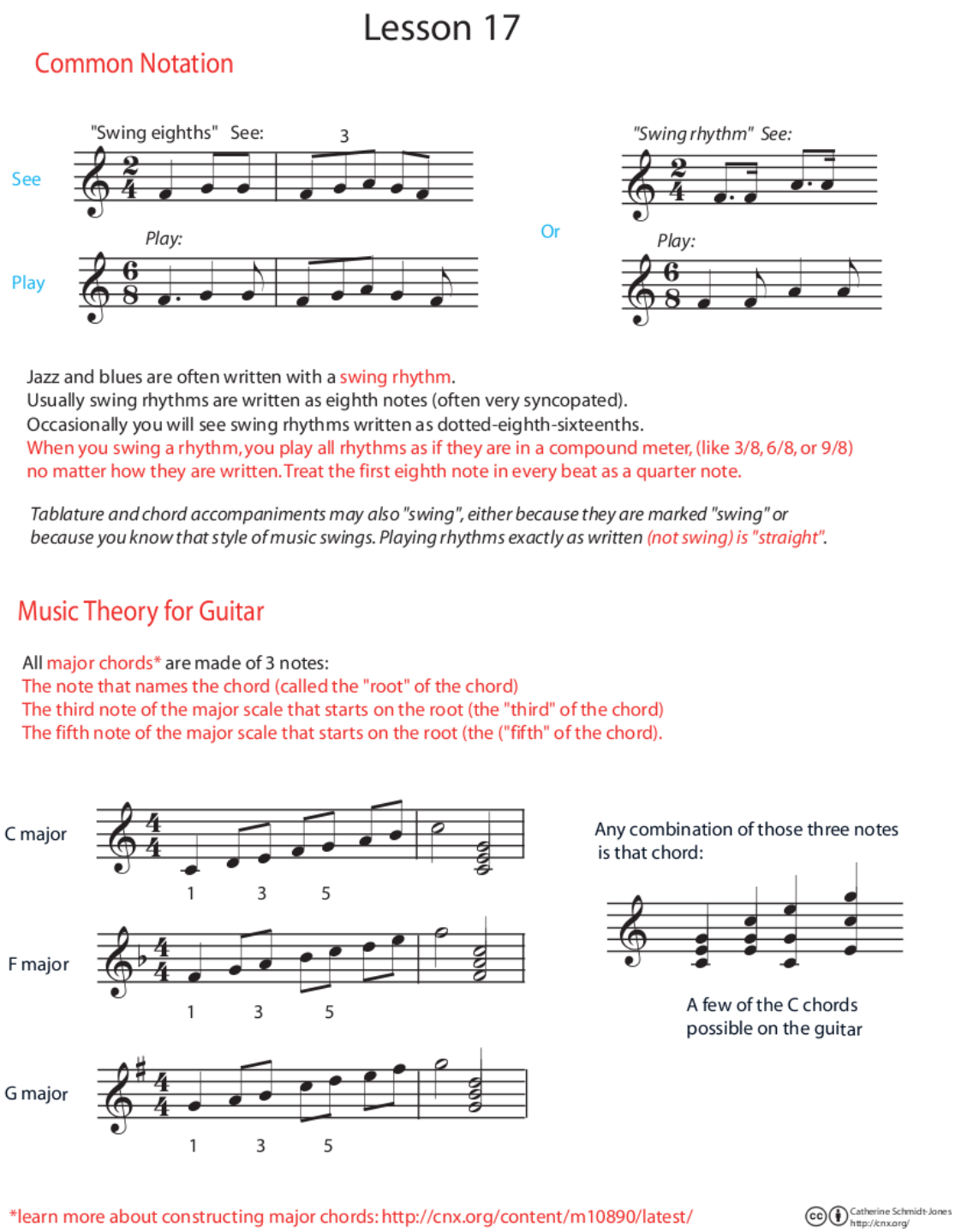
Lesson 17
Common Notation
"Swing eighths" See:
3
See
Play:
Play
Or
"Swing rhythm" See:
Play:
Jazz and blues are often written with a swing rhythm.
Usually swing rhythms are written as eighth notes (often very syncopated).
Occasionally you will see swing rhythms written as dotted-eighth-sixteenths.
When you swing a rhythm, you play all rhythms as if they are in a compound meter, (like 3/8, 6/8, or 9/8)
no matter how they are written. Treat the first eighth note in every beat as a quarter note.
Tablature and chord accompaniments may also "swing", either because they are marked "swing" or
because you know that style of music swings. Playing rhythms exactly as written (not swing) is "straight".
Music Theory for Guitar
All major chords* are made of 3 notes:
The note that names the chord (called the "root" of the chord)
The third note of the major scale that starts on the root (the "third" of the chord)
The fifth note of the major scale that starts on the root (the ("fifth" of the chord).
C major
1 3 5
F major
1 3 5
G major
1 3 5
Any combination of those three notes
is that chord:
A few of the C chords
possible on the guitar
*learn more about constructing major chords: http://cnx.org/content/m10890/latest/
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Figure 1.72

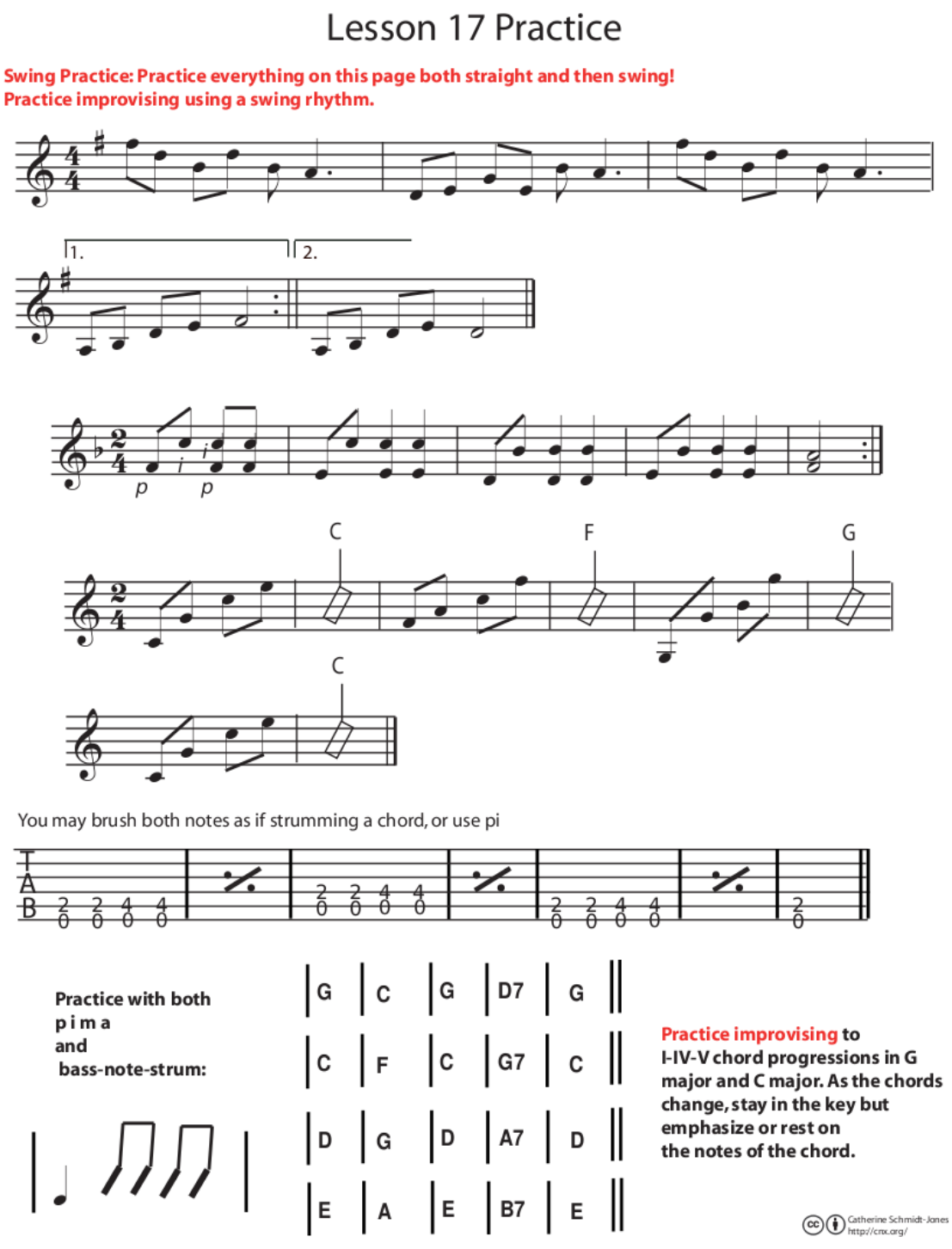
Lesson 17 Practice
Swing Practice: Practice everything on this page both straight and then swing!
Practice improvising using a swing rhythm.
1.
2.
p
i
i
p
C
F
G
C
You may brush both notes as if strumming a chord, or use pi
T
A
B
Practice with both
p i m a
and
bass-note-strum:
G C G D7 G
C F C G7 C
D G D A7 D
E A E B7 E
Practice improvising to
I-IV-V chord progressions in G
major and C major. As the chords
change, stay in the key but
emphasize or rest on
the notes of the chord.
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Figure 1.73

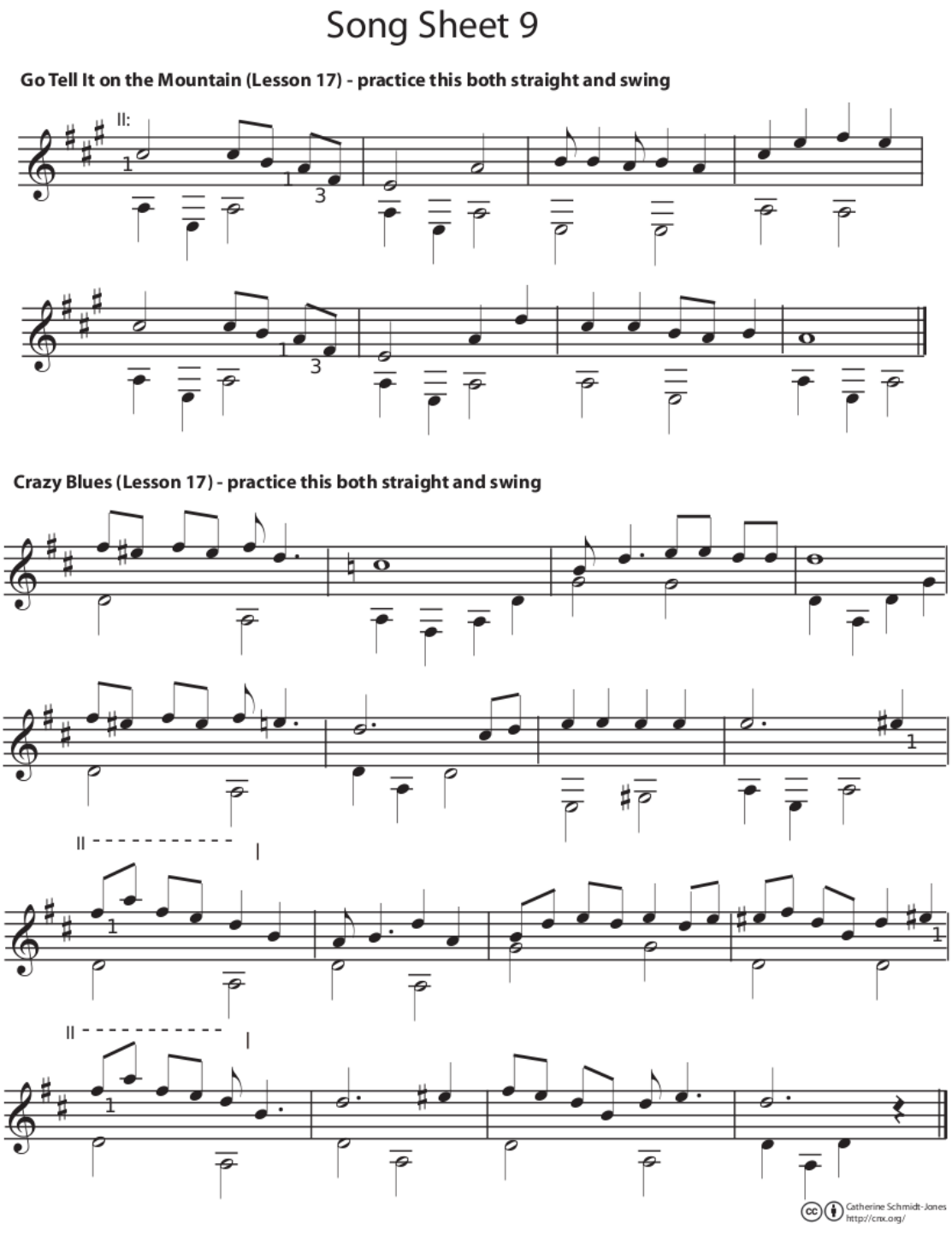
Song Sheet 9
Go Tell It on the Mountain (Lesson 17) - practice this both straight and swing
Crazy Blues (Lesson 17) - practice this both straight and swing
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Figure 1.74

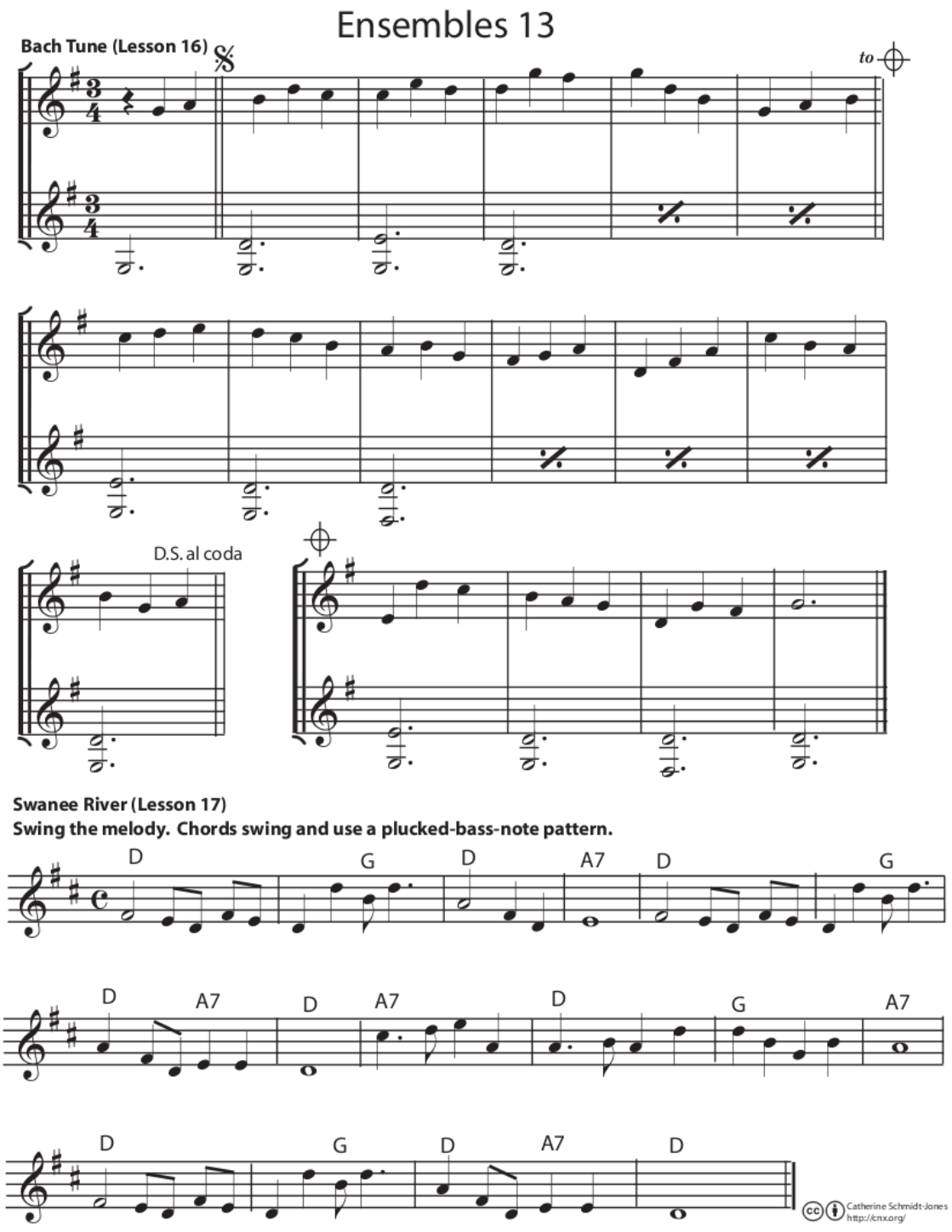
Ensembles 13
Bach Tune (Lesson 16)
to
D.S. al coda
Swanee River (Lesson 17)
Swing the melody. Chords swing and use a plucked-bass-note pattern.
D
G
D
A7
D
G
D
A7
D
A7
D
G
A7
D
G
D
A7
D
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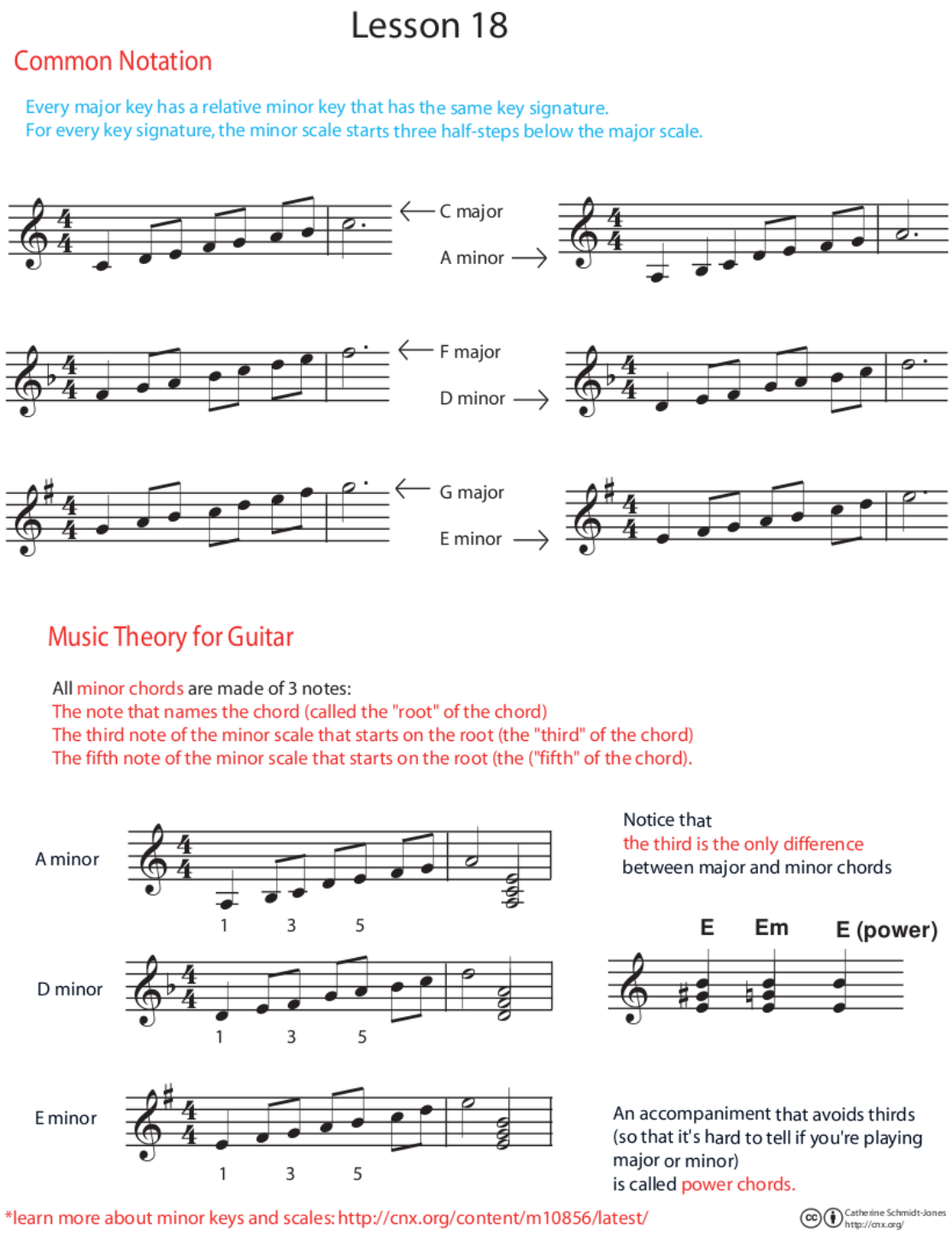
Figure 1.75

1.18 Guitar Lesson 18: Minor Keys and Scales, and the Construction of Minor Chords and Power Chords[95]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[96], the Home Practice Page[97], the Song Sheet[98] and Ensemble Page[99] for this lesson.

[95] This content is available online at <http://cnx.org/content/m13089/1.3/>.
[96] See the file at <http://cnx.org/content/m13089/latest/18GuitarLesson.pdf>
[97] See the file at <http://cnx.org/content/m13089/latest/18GuitarPractice.pdf>
[98] See the file at <http://cnx.org/content/m13089/latest/SongSheet10.pdf>
[99] See the file at <http://cnx.org/content/m13089/latest/Ensemble14.pdf>


Lesson 18
Common Notation
Every major key has a relative minor key that has the same key signature.
For every key signature, the minor scale starts three half-steps below the major scale.
C major
A minor
F major
D minor
G major
E minor
Music Theory for Guitar
All minor chords are made of 3 notes:
The note that names the chord (called the "root" of the chord)
The third note of the minor scale that starts on the root (the "third" of the chord)
The fifth note of the minor scale that starts on the root (the ("fifth" of the chord).
A minor
D minor
E minor
1 3 5
Notice that
the third is the only difference
between major and minor chords
E
Em
E (power)
An accompaniment that avoids thirds
(so that it's hard to tell if you're playing
major or minor)
is called power chords.
*learn more about minor keys and scales: http://cnx.org/content/m10856/latest/
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http://cnx.org/

Figure 1.76

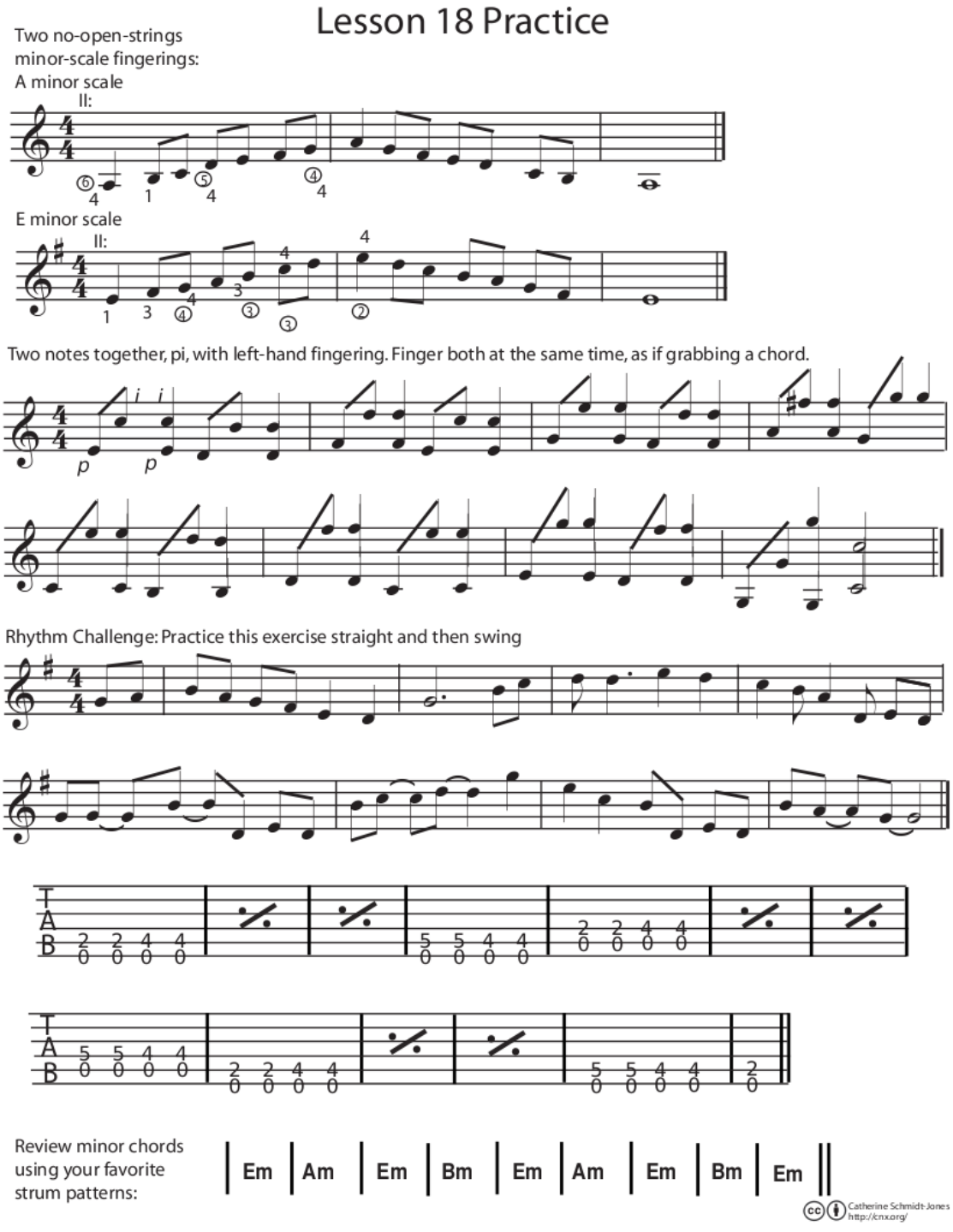
Lesson 18 Practice
Two no-open-strings
minor-scale fingerings:
A minor scale
E minor scale
Two notes together, pi, with left-hand fingering. Finger both at the same time, as if grabbing a chord.
Rhythm Challenge: Practice this exercise straight and then swing
Review minor chords
using your favorite
strum patterns:
Em Am Em Bm Em Am Em Bm Em
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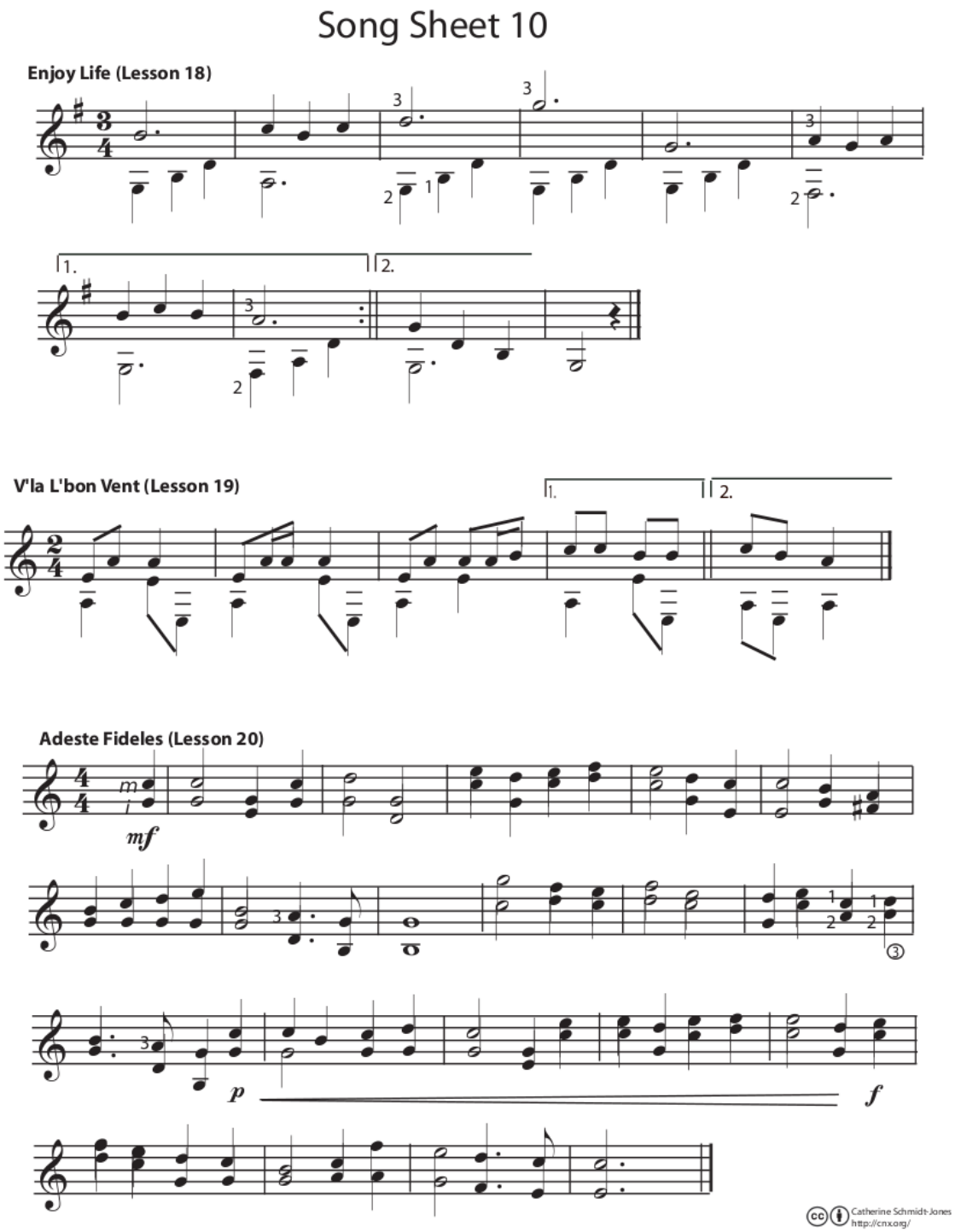
Figure 1.77


Song Sheet 10
Enjoy Life (Lesson 18)
V'la L'bon Vent (Lesson 19)
Adeste Fideles (Lesson 20)
mf
p
f
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http://cnx.org/

Figure 1.78

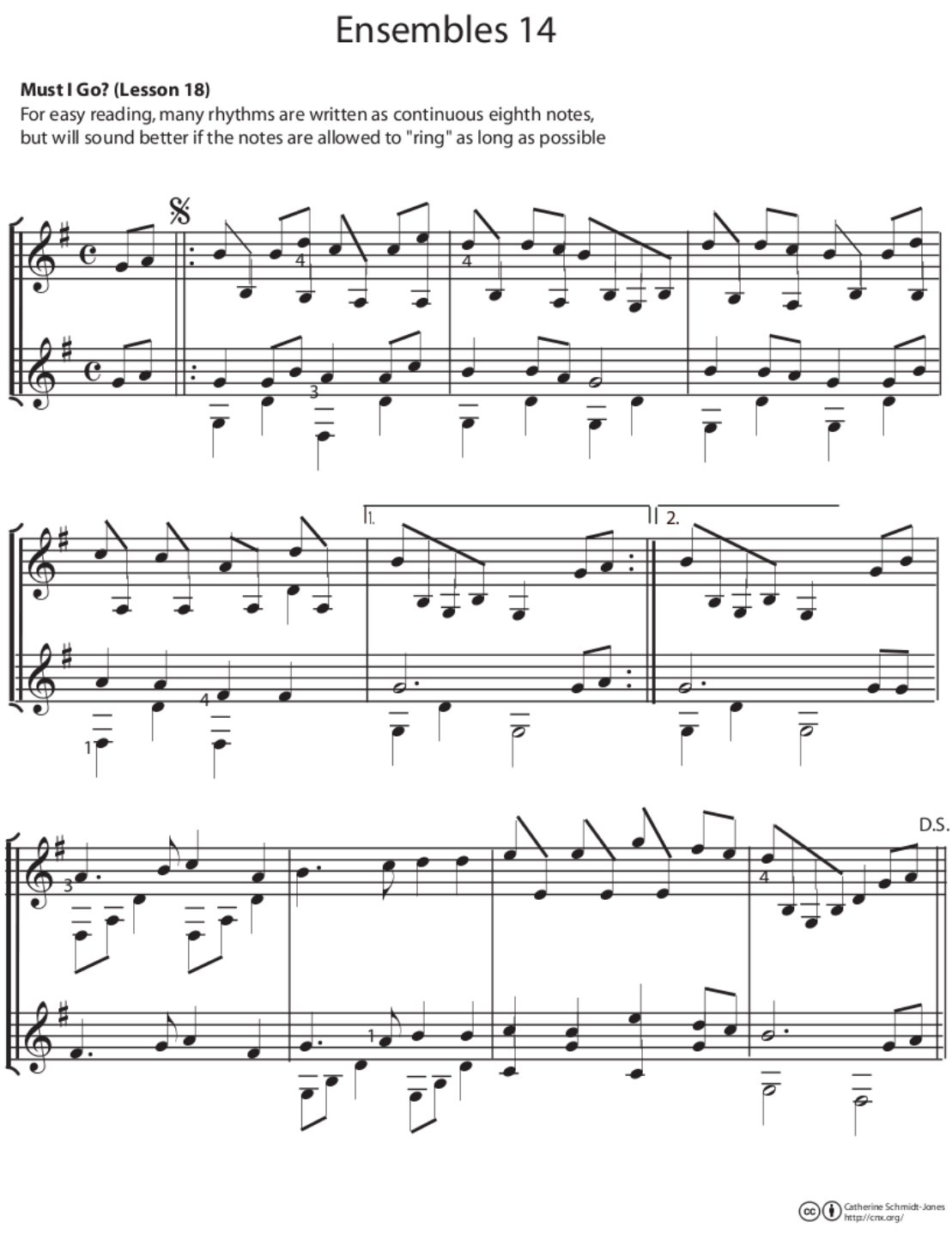
Ensembles 14
Must I Go? (Lesson 18)
For easy reading, many rhythms are written as continuous eighth notes,
but will sound better if the notes are allowed to "ring" as long as possible
1.
2.
D.S.
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Figure 1.79

1.19 Guitar Lesson 19: Sixteenth Notes, and Chord Function in Major and Minor Keys[100]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[101], the Home Practice Page[102], and Ensemble Page[103] for this lesson. The Song Sheet[104] is the same as for Guitar Lesson 18 (Section 1.18).

[100] This content is available online at <http://cnx.org/content/m13090/1.3/>.
[101] See the file at <http://cnx.org/content/m13090/latest/19GuitarLesson.pdf>
[102] See the file at <http://cnx.org/content/m13090/latest/19GuitarPractice.pdf>
[103] See the file at <http://cnx.org/content/m13090/latest/Ensemble15.pdf>
[104] See the file at <http://cnx.org/content/m13090/latest/SongSheet10.pdf>

Lesson 19

Common Notation

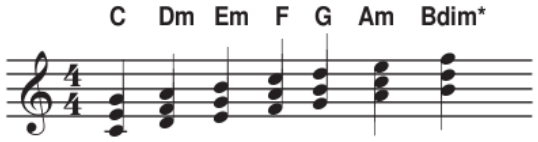
Sixteenth notes have:
a solid head
a stem pointing up or down
two flags or two beams

Sixteenth rests also have two flags

Music Theory for Guitar

Even though major and minor keys use the same key signatures,
they sound different
because they tend to use different chords and notes.
One clue that you are in a minor key is lots of minor chords,
and particularly ending on the minor chord.

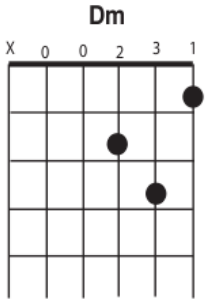
Basic (three-note) chords you can make
using a "no sharps or flats" key signature:



C major I IV V are all major chords
A minor iv v i are all minor chords

*This chord is neither major or minor, because
the fifth note of a B scale is F♯.
Since the chord uses F♮ instead, it is a diminished chord*,
Diminished chords aren't used much
in most major or minor pieces.
You haven't learned any "diminished" chords yet.

Chords



Picking Pattern 2: p i m a m i

Since there are six notes in every pattern,

this is a good pattern to use for $\frac{3}{4}$ or $\frac{6}{8}$

*learn more about perfect, diminished, and augmented fifths: http://cnx.org/content/m10867/latest/

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Figure 1.80

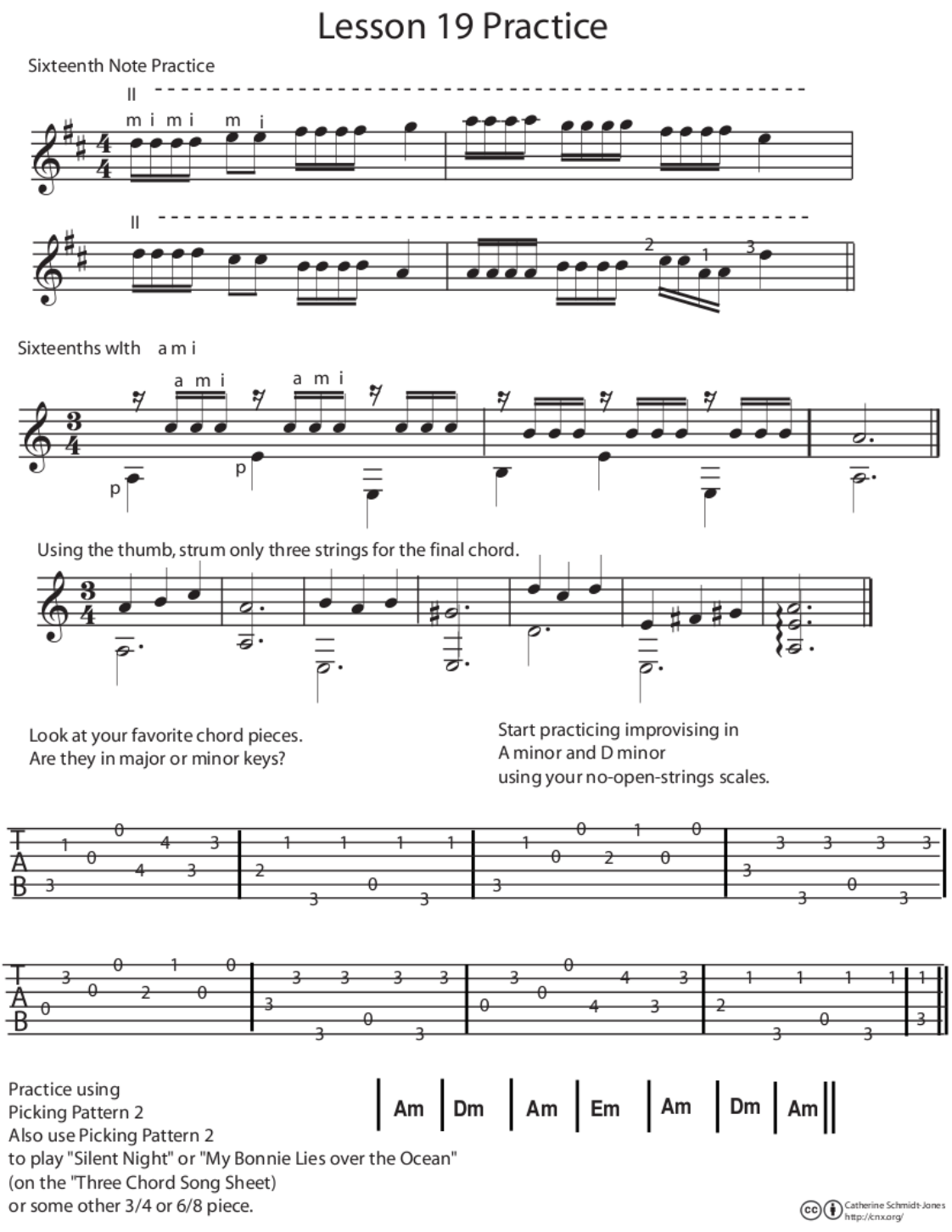
Lesson 19 Practice
Sixteenth Note Practice
m i m i m i
Sixteenths wIth a m i
a m i
a m i
p
p
Using the thumb, strum only three strings for the final chord.
Look at your favorite chord pieces.
Are they in major or minor keys?
Start practicing improvising in
A minor and D minor
using your no-open-strings scales.
Practice using
Picking Pattern 2
Also use Picking Pattern 2
to play "Silent Night" or "My Bonnie Lies over the Ocean"
(on the "Three Chord Song Sheet)
or some other 3/4 or 6/8 piece.
Am
Dm
Am
Em
Am
Dm
Am
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Figure 1.81

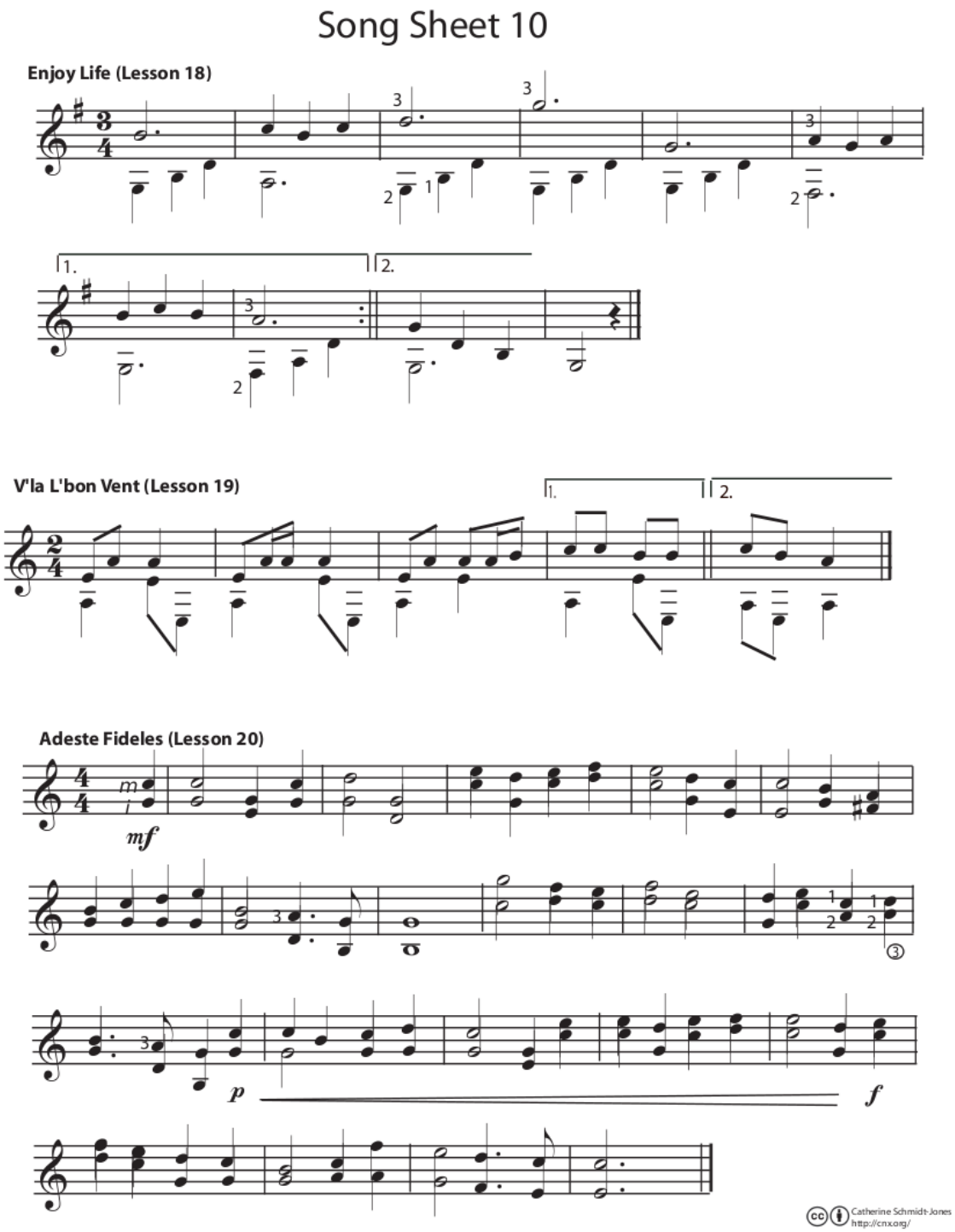
Song Sheet 10
Enjoy Life (Lesson 18)
V'la L'bon Vent (Lesson 19)
Adeste Fideles (Lesson 20)
mf
p
f
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Figure 1.82

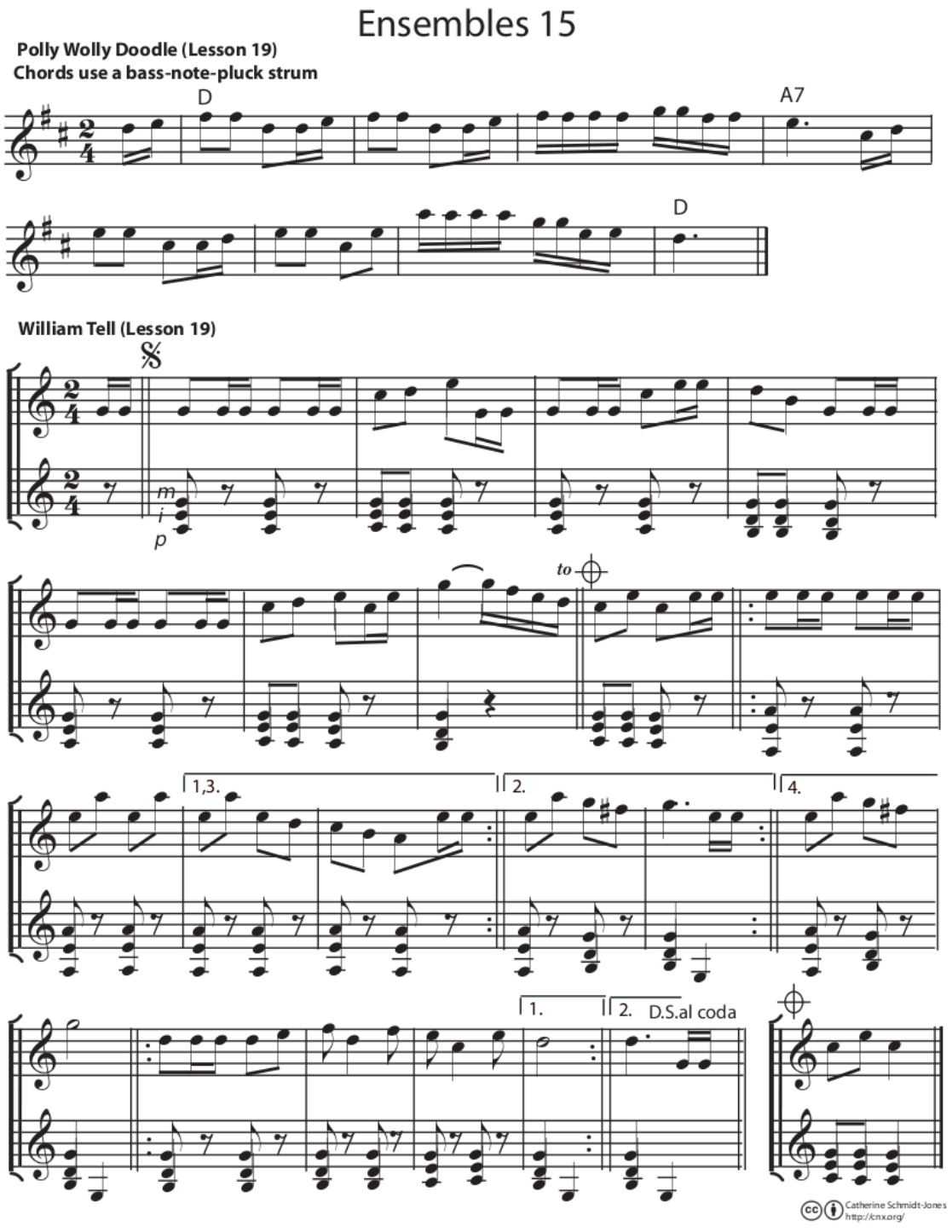
Ensembles 15
Polly Wolly Doodle (Lesson 19)
Chords use a bass-note-pluck strum
D
A7
D
William Tell (Lesson 19)
m
i
p
to
1,3.
2.
4.
1.
2.
D.S.al coda
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Figure 1.83

1.20 Guitar Lesson 20: Dynamics, Rhythm Notation in Tablature, and Harmonic Minor[105]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[106], the Home Practice Page[107], and the Ensemble Page[108] for this lesson. The Song Sheet[109] is the same as for lessons 18 and 19.

[105] This content is available online at <http://cnx.org/content/m13091/1.3/>.
[106] See the file at <http://cnx.org/content/m13091/latest/20GuitarLesson.pdf>
[107] See the file at <http://cnx.org/content/m13091/latest/20GuitarPractice.pdf>
[108] See the file at <http://cnx.org/content/m13091/latest/Ensemble16.pdf>
[109] See the file at <http://cnx.org/content/m13091/latest/SongSheet10.pdf>

Lesson 20

Common Notation

Dynamic markings tell you how loudly or softly to play.
Dynamics are often not marked in guitar parts,
but you should start practicing playing loudly and softly
as appropriate in your music.

or cresc. ("crescendo") gradually louder

or dim. ("diminuendo") gradually softer

ff ("fortissimo") very loud

f ("forte") loud

mf ("mezzoforte") medium loud

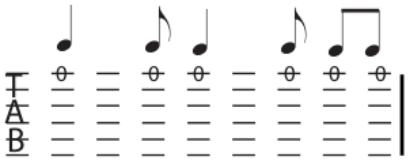
mp ("mezzopiano") medium soft

p ("piano") soft

pp ("pianissimo") very soft

Tablature

Some tablature notations use dashed lines to
help indicate more complex rhythms.
You can usually read these by assuming
that each dash represents an eighth note.

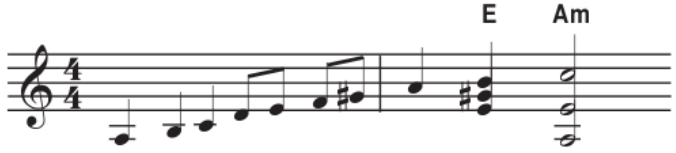


Music Theory for Guitar

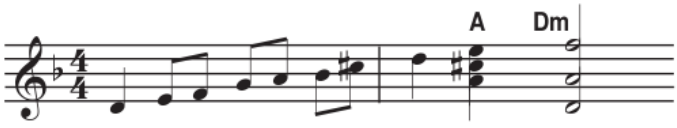
Because it has a strong feeling of being "in the key" and of "leading to the i chord",
the major V and V7 chords are very common in both major and minor keys.
In minor keys, this requires an accidental, on the seventh note of the scale.
Because it is so useful for harmony,
this version of the minor scale is called the harmonic minor.
This particular accidental is another clue that a piece is in the minor key.

(V - i)

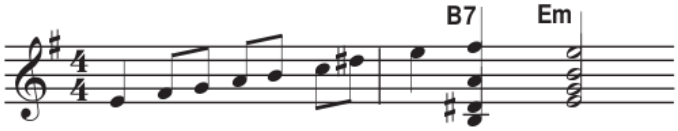
A harmonic minor
scale and chords



D harmonic minor
scale and chords



E harmonic minor
scale and chords



*learn more about dynamics: http://cnx.org/content/m11649/latest/

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Figure 1.84

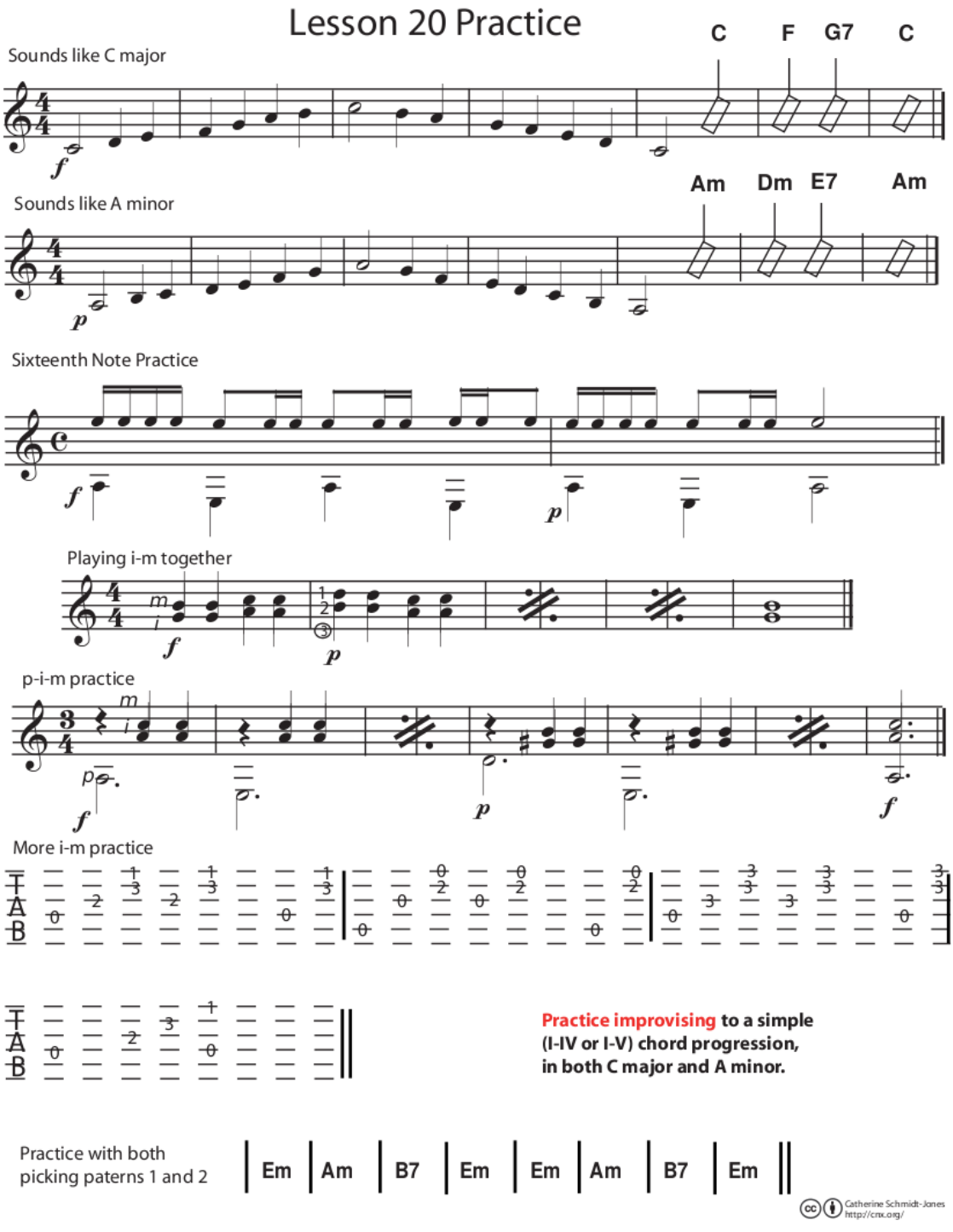
Lesson 20 Practice
Sounds like C major
C F G7 C
Sounds like A minor
Am Dm E7 Am
Sixteenth Note Practice
Playing i-m together
p-i-m practice
More i-m practice
Practice improvising to a simple
(I-IV or I-V) chord progression,
in both C major and A minor.
Practice with both
picking paterns 1 and 2
Em Am B7 Em Em Am B7 Em
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.85

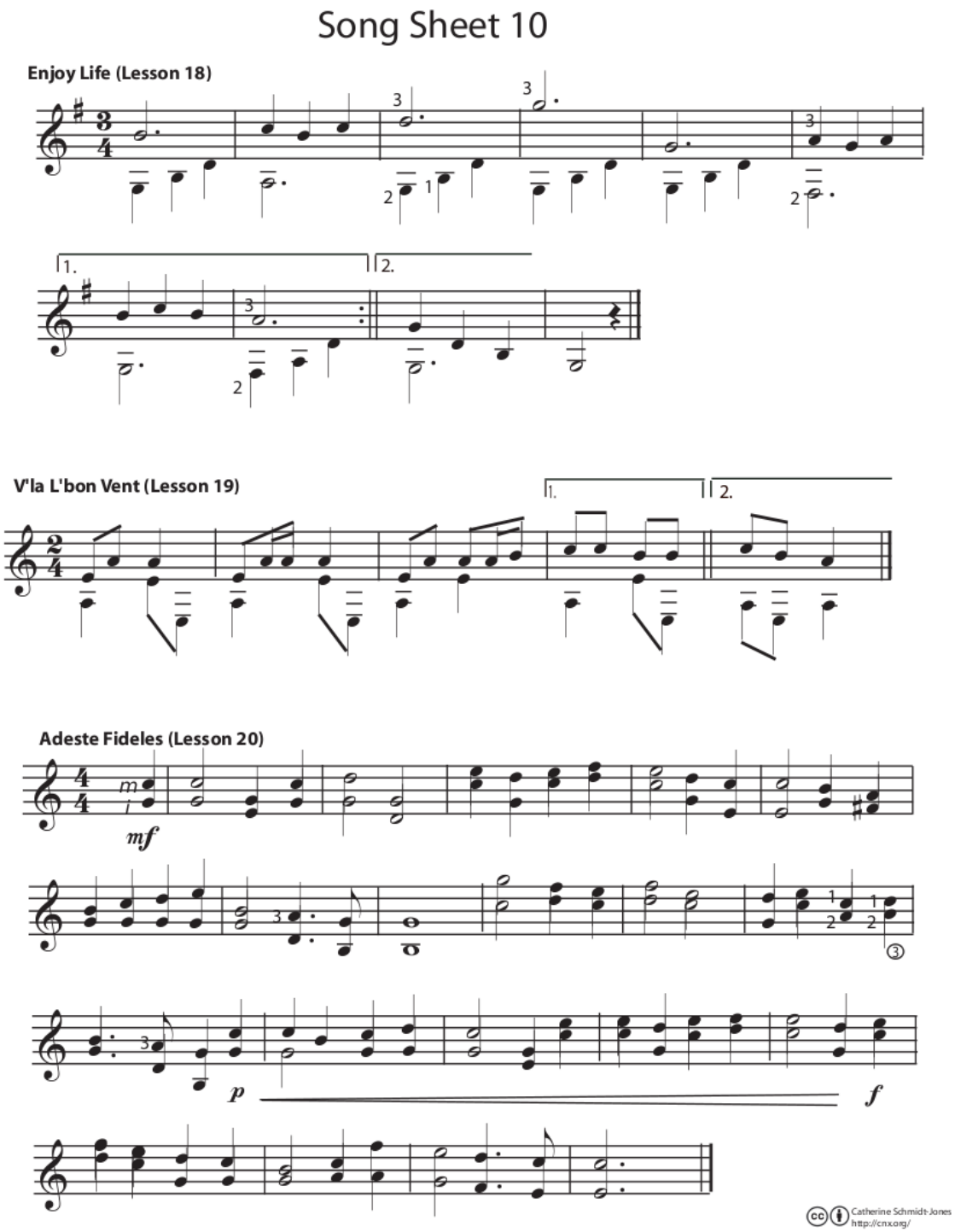
Song Sheet 10
Enjoy Life (Lesson 18)
V'la L'bon Vent (Lesson 19)
Adeste Fideles (Lesson 20)
mf
p
f
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.86

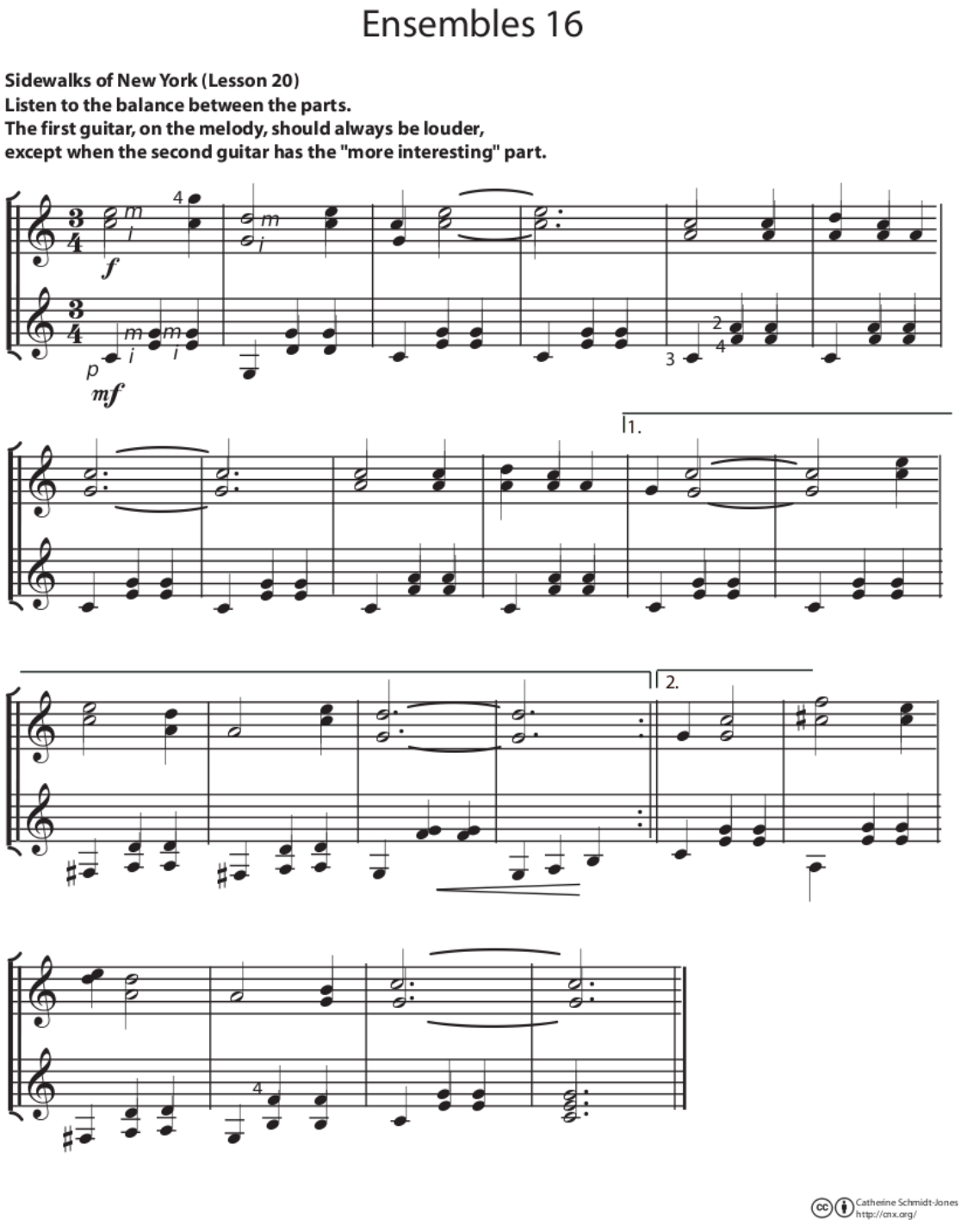
Ensembles 16
Sidewalks of New York (Lesson 20)
Listen to the balance between the parts.
The first guitar, on the melody, should always be louder,
except when the second guitar has the "more interesting" part.
1.
2.
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Figure 1.87

1.21 Guitar Lesson 21: High Notes on the E String, and The Blues Scale[110]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[111], the Home Practice Page[112], and the Song Sheet[113] for this lesson. There are ensembles for this lesson on both Ensemble Page 17[114] and Ensemble Page 18[115]

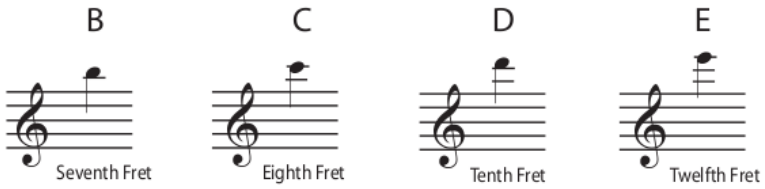
The final ten lessons in this course include introductions to more advanced techniques and skills. The main goal here is to give students a taste of the variety of possibilities, so that they can decide what skills they would like to master. Many students will already be working through these lessons somewhat slowly, while simultaneously working on other music. Even those who have been moving along quickly may want to slow down at this point, or may want to pick and choose skills to master as they become wanted or useful.

[110] This content is available online at <http://cnx.org/content/m13092/1.3/>.
[111] See the file at <http://cnx.org/content/m13092/latest/21GuitarLesson.pdf>
[112] See the file at <http://cnx.org/content/m13092/latest/21GuitarPractice.pdf>
[113] See the file at <http://cnx.org/content/m13092/latest/SongSheet11.pdf>
[114] See the file at <http://cnx.org/content/m13092/latest/Ensemble17.pdf>
[115] See the file at <http://cnx.org/content/m13092/latest/Ensemble18.pdf>

Lesson 21

High E String Notes

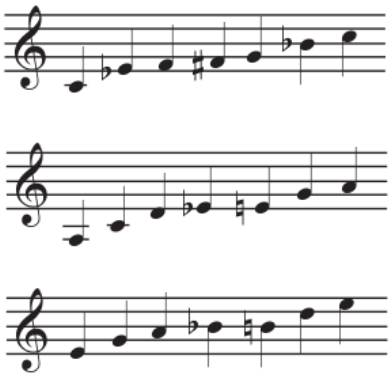
High Notes on the E string
You can play notes higher than a g on the E string by moving to higher positions.



Music Theory for Guitar

Different modes use different patterns of intervals (pitch spacing) between the notes, like the differences between major and minor scales. Another popular mode, commonly used in blues, jazz, rock and many other popular genres, is the blues. In many standard blues pieces, all of the chords will work with the same blues scale, making improvisation very straightforward.

A common "blues scale" for beginners:
uses a minor third and seventh
skips the second and sixth
adds the note between the fourth and fifth



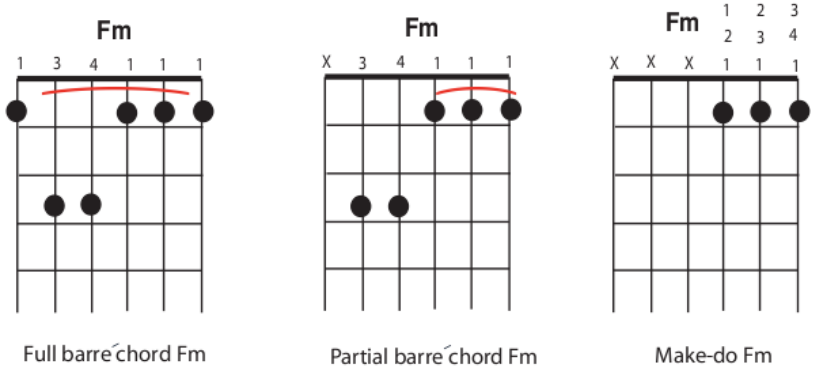
When written in common notation,
blues pieces are given a standard (major or minor) key signature,
and indicated with lots of accidentals.

Chords

Compare these chords to the fingering for Em.
Then play the following chords
by playing your favorite Fm fingering
in different positions:

II F♯m or G♭m
III Gm
IV G♯m or A♭m
V Am

Compare the sound
of the fifth-fret **Am** to
your other fingering for **Am**



Full barre chord Fm
Partial barre chord Fm
Make-do Fm

*learn more about modes:http://cnx.org/content/m11633/latest/

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http://cnx.org/

Figure 1.88

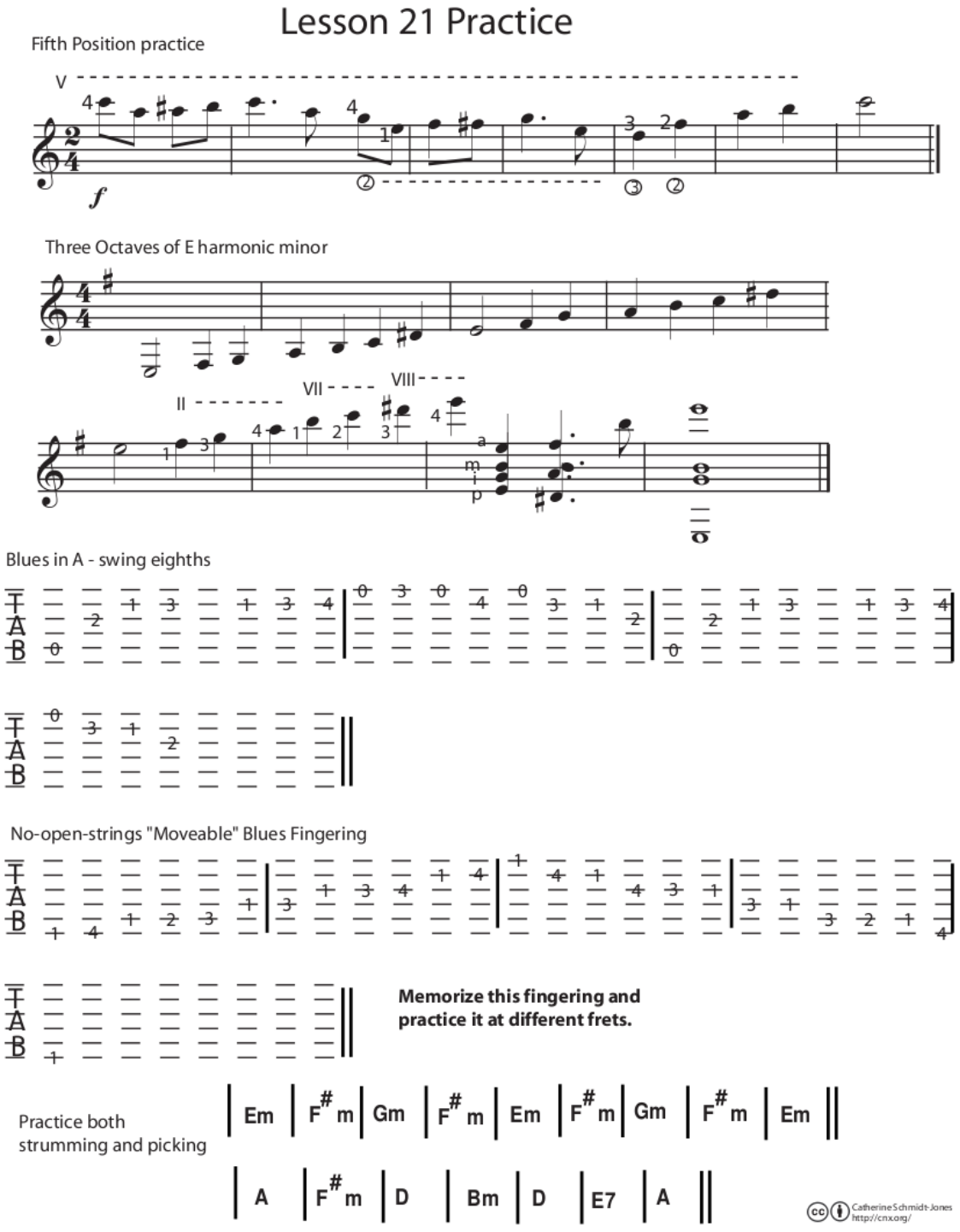
Lesson 21 Practice
Fifth Position practice
Three Octaves of E harmonic minor
Blues in A - swing eighths
No-open-strings "Moveable" Blues Fingering
Memorize this fingering and practice it at different frets.
Practice both strumming and picking
Em F#m Gm F#m Em F#m Gm F#m Em
A F#m D Bm D E7 A
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Figure 1.89

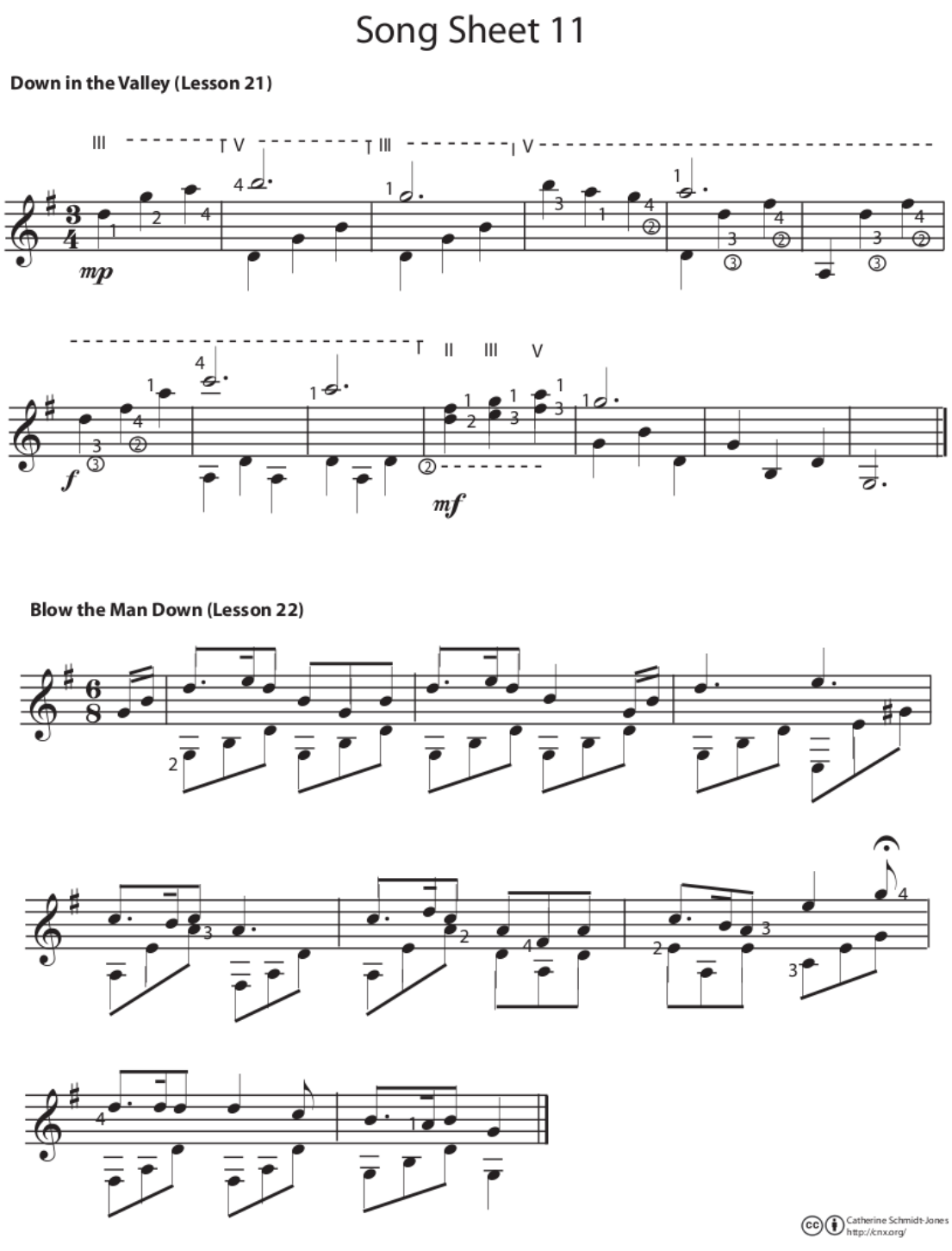
Song Sheet 11
Down in the Valley (Lesson 21)
mp
f
mf
Blow the Man Down (Lesson 22)
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Figure 1.90

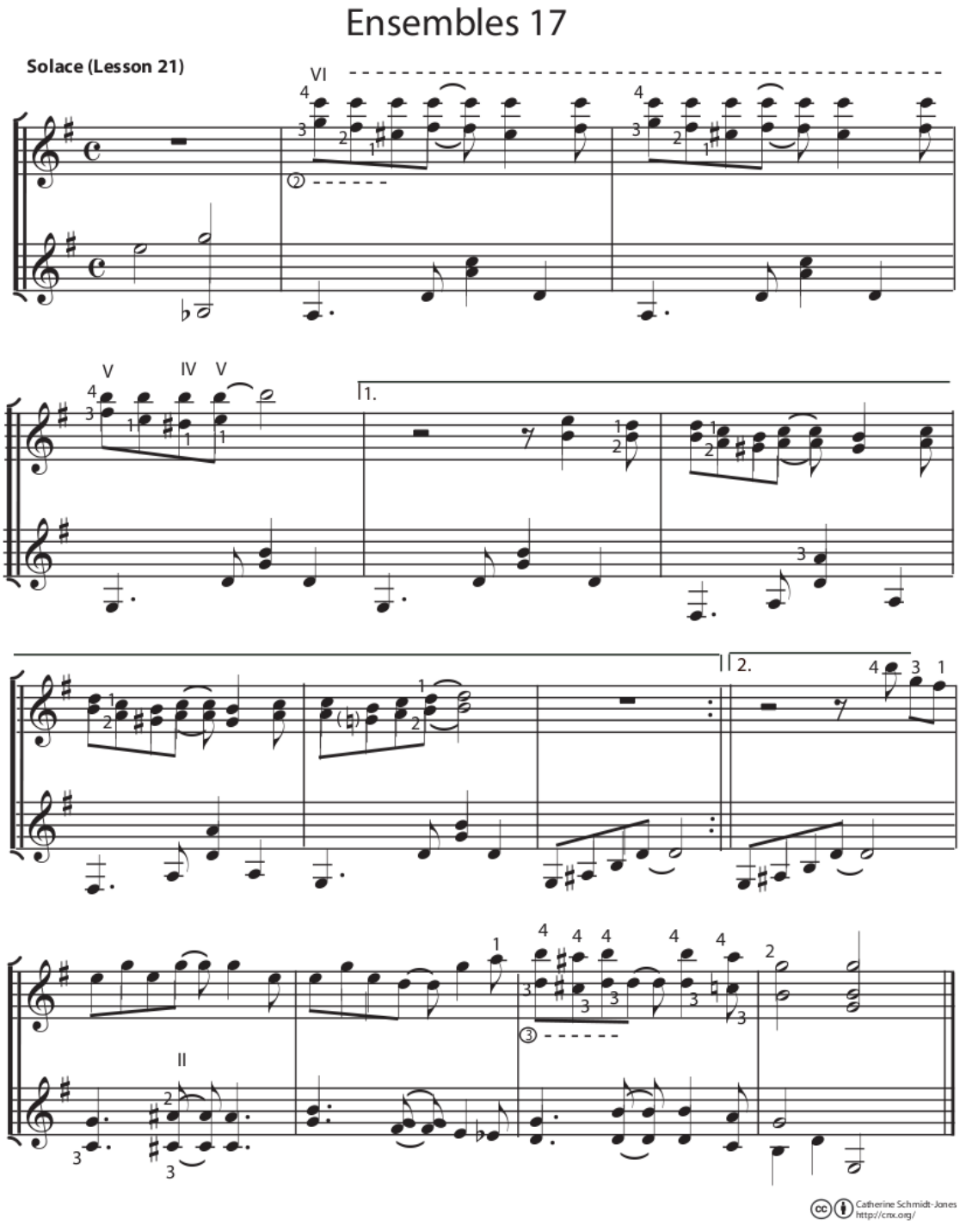
Ensembles 17
Solace (Lesson 21)
VI
V
IV
V
1.
2.
II
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Figure 1.91

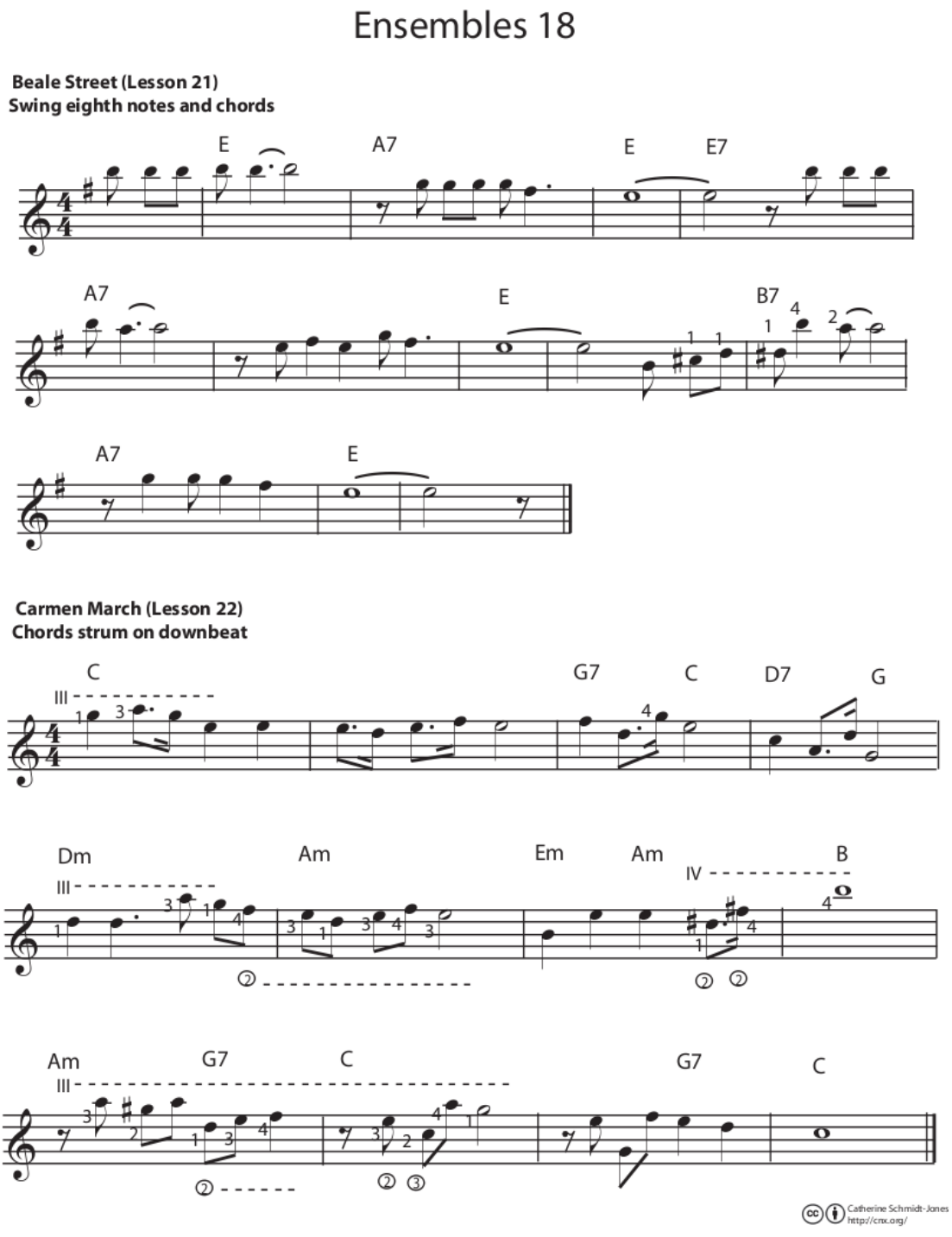
Ensembles 18
Beale Street (Lesson 21)
Swing eighth notes and chords
E
A7
E
E7
A7
E
B7
A7
E
Carmen March (Lesson 22)
Chords strum on downbeat
C
G7
C
D7
G
Dm
Am
Em
Am
B
Am
G7
C
G7
C
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Figure 1.92

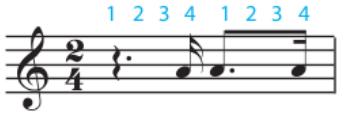
1.22 Guitar Lesson 22: Major Seventh Chords, and the Dotted-Eighth-Sixteenth Rhythm[116]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[117], the Home Practice Page[118], and thefor this lesson. Both the Song Sheet[119] and the Ensemble Page[120] are the same as for Guitar Lesson 21 (Section 1.21).

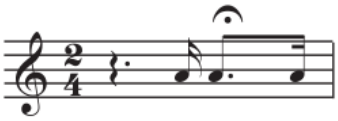
[116]This content is available online at <http://cnx.org/content/m31399/1.1/>.
[117]See the file at <http://cnx.org/content/m31399/latest/22GuitarLesson.pdf>
[118]See the file at <http://cnx.org/content/m31399/latest/22GuitarPractice.pdf>
[119]See the file at <http://cnx.org/content/m31399/latest/SongSheet11.pdf>
[120]See the file at <http://cnx.org/content/m31399/latest/Ensemble18.pdf>

Lesson 22

Common Notation



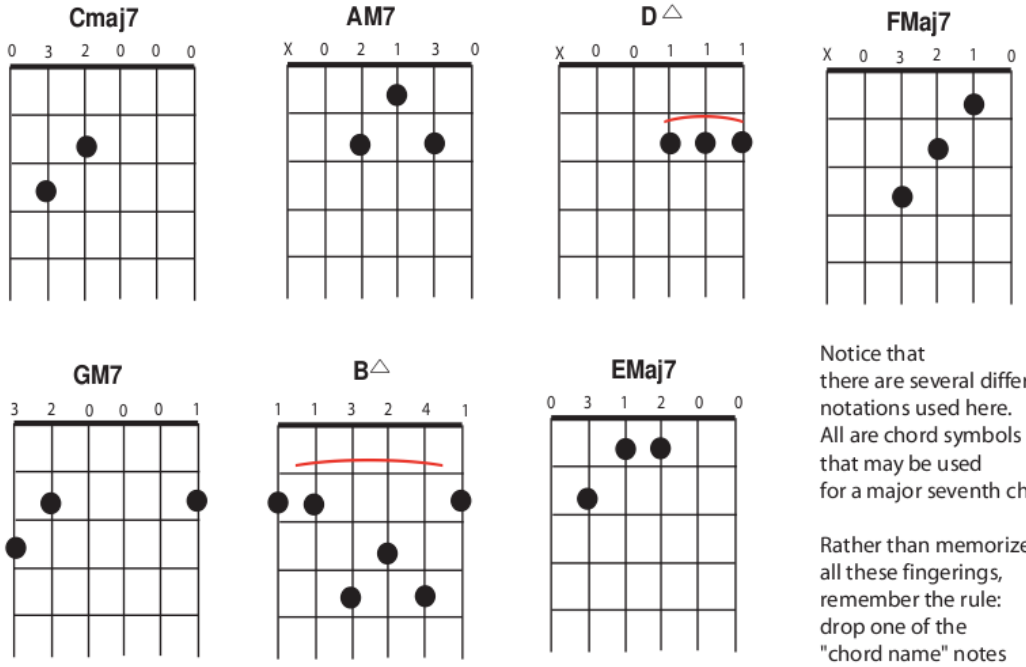
A dotted eighth plus a sixteenth note
is the same length as one quarter note
(usually one beat).
Make sure that the sixteenth is late enough and fast enough
that it doesn't sound like a 6/8 quarter-eighth rhythm.



A fermata means
"hold this note longer than
its rhythm indicates."

Music Theory for Guitar

All the 7 chords that you have learned so far are dominant 7 chords*.
Remember, this kind of chord gives a strong feeling of being the V chord (also called the "dominant").
This is because, in a dominant 7, the 7 is not the seventh note in the scale of that chord!
It is, instead, the note belonging to the key in which the chord is V7.
Adding the seventh note in the major scale to a major chord gives a major 7 chord.



Notice that
there are several different
notations used here.
All are chord symbols
that may be used
for a major seventh chord.

Rather than memorize
all these fingerings,
remember the rule:
drop one of the
"chord name" notes
down one fret
to the major seventh.

Picking Pattern 3: p i m i a i m i

*learn more about seventh chords:http://cnx.org/content/m11995/latest/

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Figure 1.93

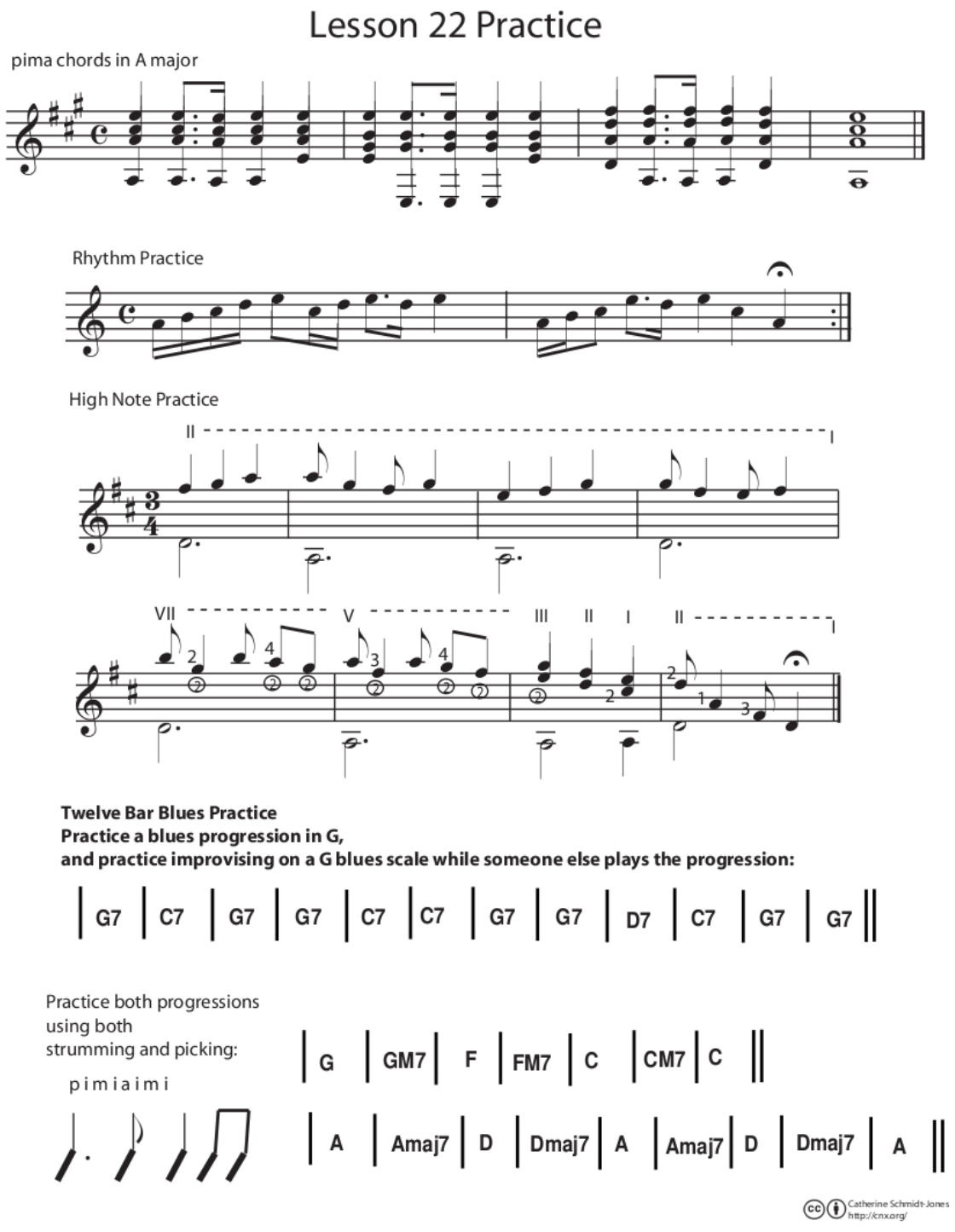
Lesson 22 Practice
pima chords in A major
Rhythm Practice
High Note Practice
Twelve Bar Blues Practice
Practice a blues progression in G,
and practice improvising on a G blues scale while someone else plays the progression:
G7 C7 G7 G7 C7 C7 G7 G7 D7 C7 G7 G7
Practice both progressions
using both
strumming and picking:
p i m i a i m i
G GM7 F FM7 C CM7 C
A Amaj7 D Dmaj7 A Amaj7 D Dmaj7 A
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Figure 1.94

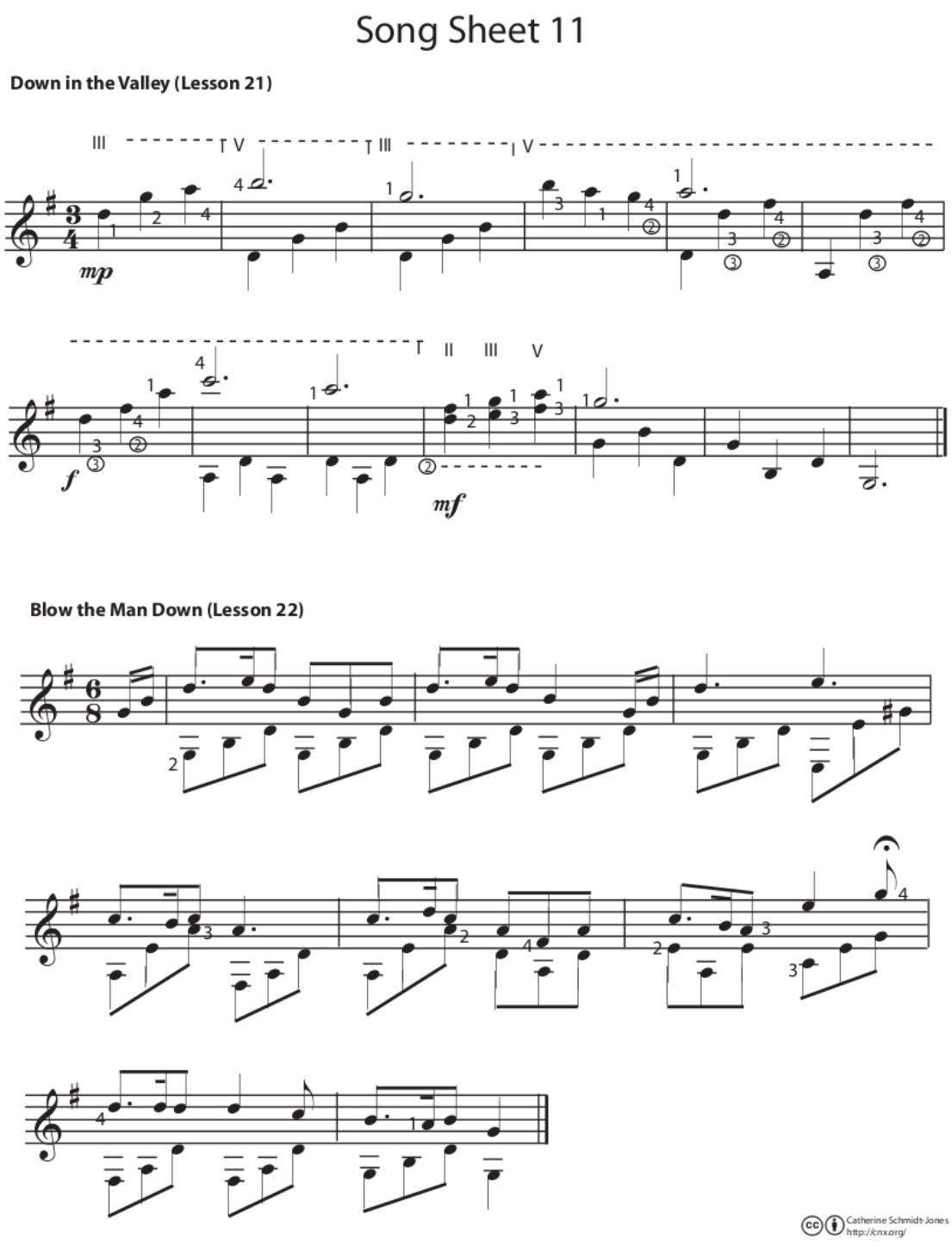
Song Sheet 11
Down in the Valley (Lesson 21)
mp
f
mf
Blow the Man Down (Lesson 22)
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.95

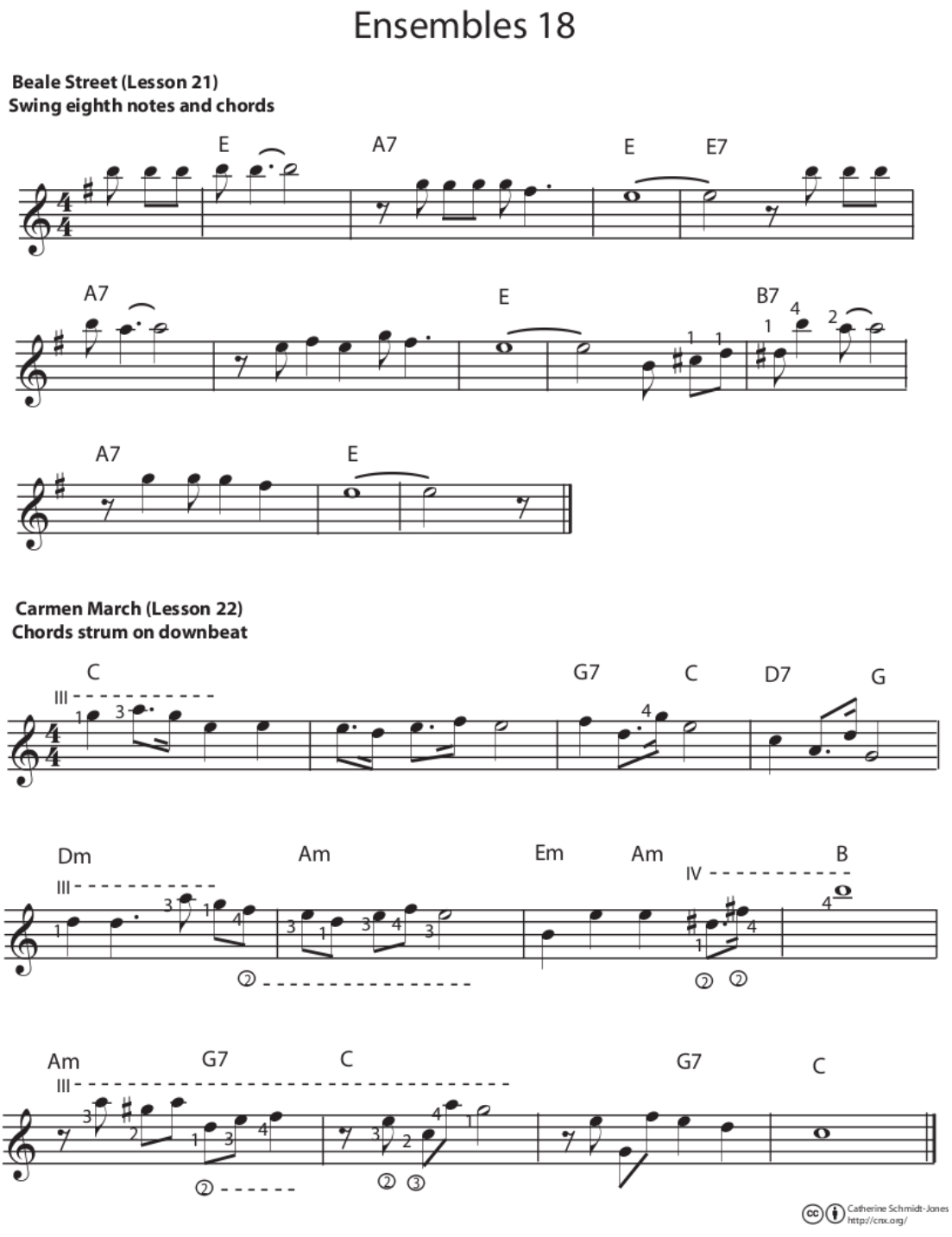
Ensembles 18
Beale Street (Lesson 21)
Swing eighth notes and chords
E
A7
E
E7
A7
E
B7
A7
E
Carmen March (Lesson 22)
Chords strum on downbeat
C
G7
C
D7
G
Dm
Am
Em
Am
B
Am
G7
C
G7
C
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Figure 1.96

1.23 Guitar Lesson 23: Portamento, Triplets, and Minor Seventh Chords[121]

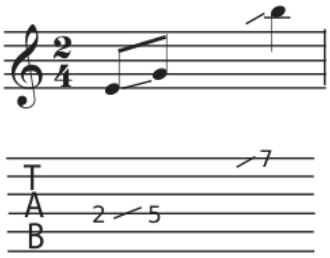
Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[122], the Home Practice Page[123], the Song Sheet[124], and the Ensemble Page[125] for this lesson.

[121] This content is available online at <http://cnx.org/content/m31402/1.1/>.
[122] See the file at <http://cnx.org/content/m31402/latest/23GuitarLesson.pdf>
[123] See the file at <http://cnx.org/content/m31402/latest/23GuitarPractice.pdf>
[124] See the file at <http://cnx.org/content/m31402/latest/SongSheet12.pdf>
[125] See the file at <http://cnx.org/content/m31402/latest/Ensemble19.pdf>

Lesson 23

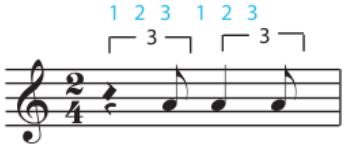
Guitar Techniques

The rest of these lessons introduce some standard playing techniques.
These are not techniques that a beginner is expected to master, but they do require plenty of practice,
so you may want to start working on them now. Many of these techniques are not featured
in every style of guitar playing, so you may not need all of them.
Some techniques may be easier on some strings, or at some frets, or on some guitars, or some types of guitars.



A straight line marks a portamento*, an audible slide.
A portamento is played by sliding the finger of the left hand
up or down the string between the marked notes.
If only one note is marked, the other end of the portamento
should be a fast slide that does not hold any particular note.

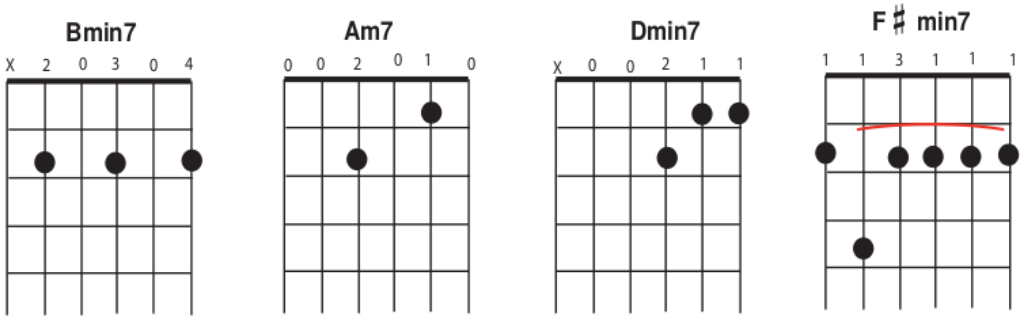
Common Notation



If a beat is normally divided into two eighth notes,
it can be divided into three eighth notes instead
by writing triplets.
This is an example of a borrowed division,
because the triplet beats look and sound like
they have been "borrowed" from a piece in 6/8.
Triplets are the most common borrowed division,
but there are many others.

Music Theory for Guitar

Adding the seventh note in the natural minor scale to a minor chord gives a minor 7 chord.
At some point, you may want to know the key signatures for every key; but for now
find the notes of a scale by memorizing
the sounds, or
the no-open-strings fingering, or
the half-step / whole-step pattern
for major and natural minor scales.
This will help you learn and remember new chords.



*learn more about articulation: http://cnx.org/content/m11884/latest/

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Figure 1.97

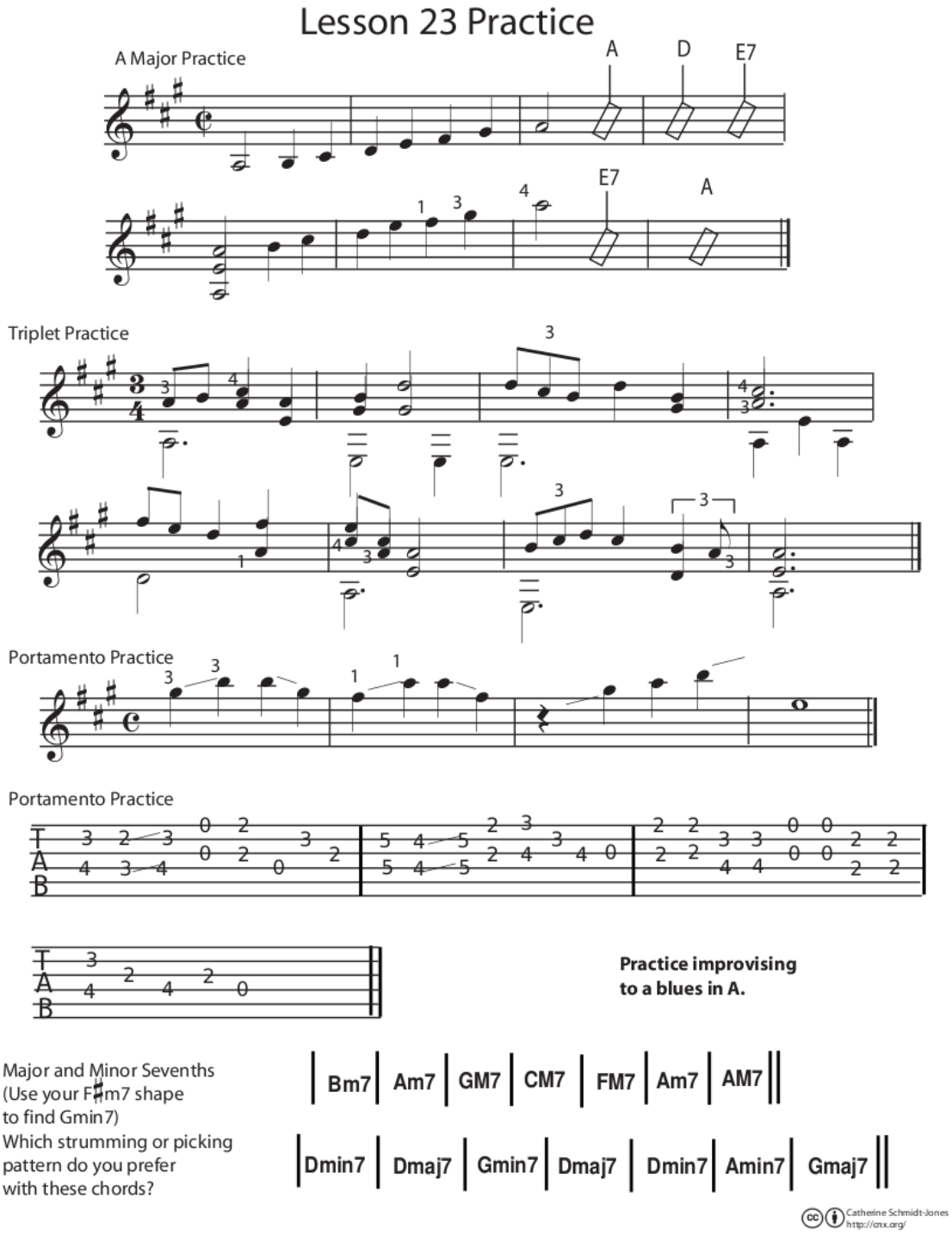
Lesson 23 Practice
A Major Practice
A
D
E7
E7
A
Triplet Practice
Portamento Practice
Portamento Practice
T
A
B
Practice improvising
to a blues in A.
Major and Minor Sevenths
(Use your F♯m7 shape
to find Gmin7)
Which strumming or picking
pattern do you prefer
with these chords?
Bm7 Am7 GM7 CM7 FM7 Am7 AM7
Dmin7 Dmaj7 Gmin7 Dmaj7 Dmin7 Amin7 Gmaj7
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Figure 1.98

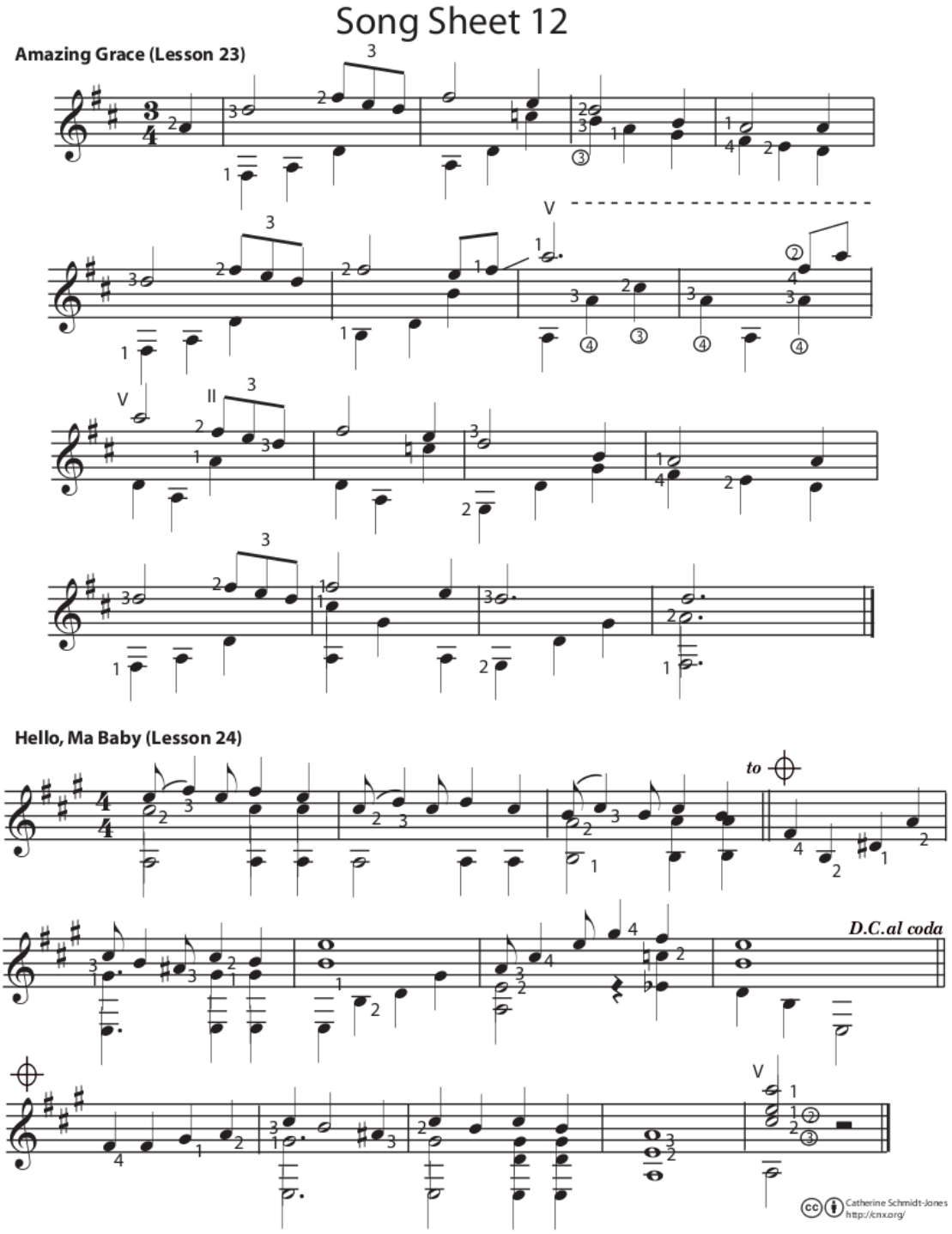
Song Sheet 12
Amazing Grace (Lesson 23)
Hello, Ma Baby (Lesson 24)
to
D.C.al coda
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.99

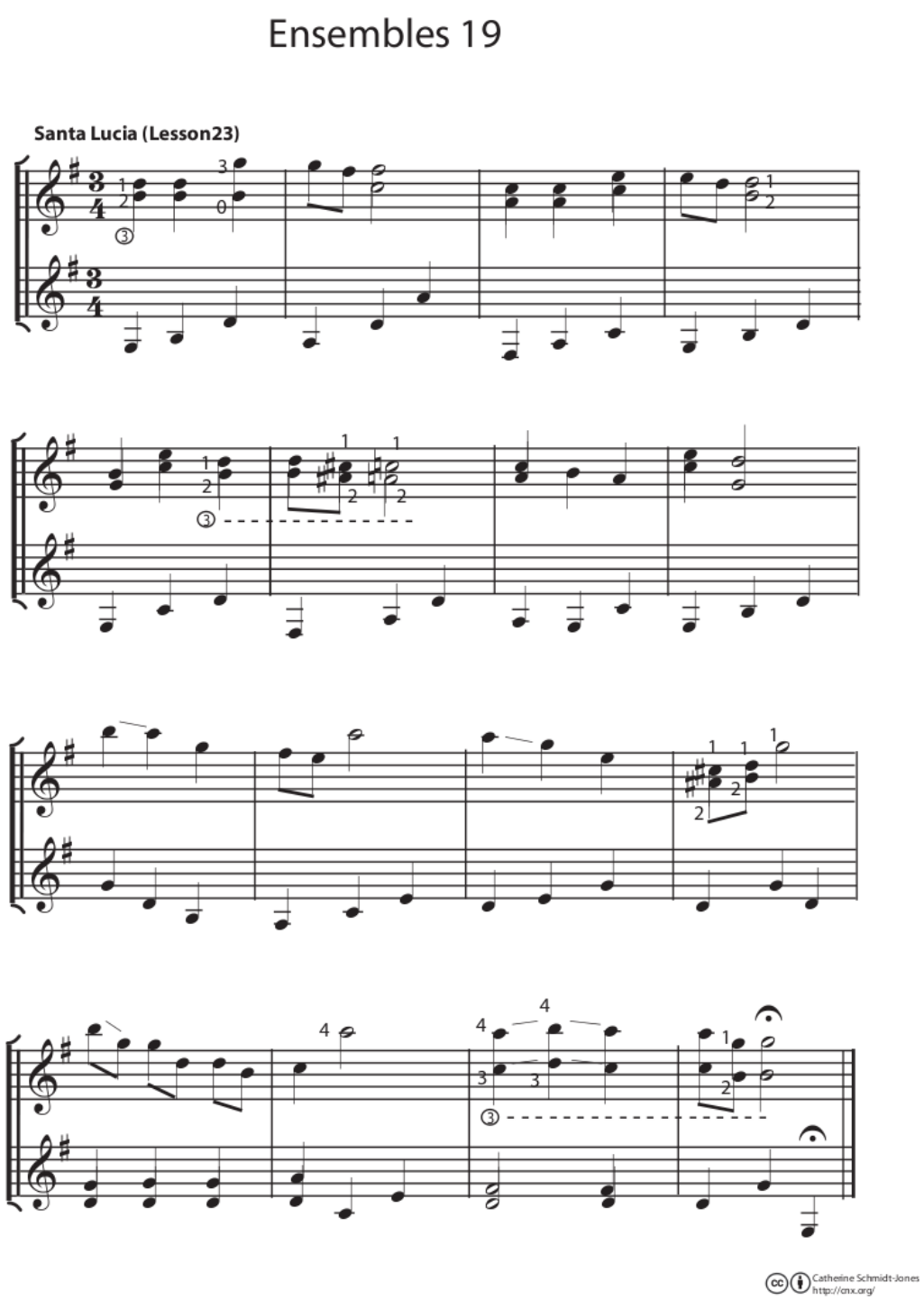
Ensembles 19
Santa Lucia (Lesson23)
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Figure 1.100

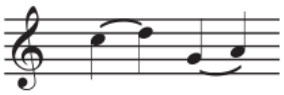
1.24 Guitar Lesson 24: Up-Slurs, Bass Note Notation, and Choosing Chords[126]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[127], the Home Practice Page[128], and the Ensemble Page[129] for this lesson. The Song Sheet[130] is the same as for lesson 23.

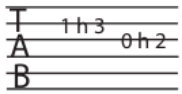
[126] This content is available online at <http://cnx.org/content/m31408/1.1/>.
[127] See the file at <http://cnx.org/content/m31408/latest/24GuitarLesson.pdf>
[128] See the file at <http://cnx.org/content/m31408/latest/24GuitarPractice.pdf>
[129] See the file at <http://cnx.org/content/m31408/latest/Ensemble20.pdf>
[130] See the file at <http://cnx.org/content/m31408/latest/SongSheet12.pdf>

Lesson 24

Guitar Techniques



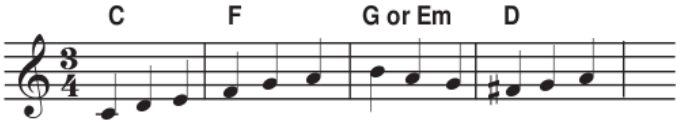
A curved line connecting notes of different pitch is called a slur.
Slur upward by placing a differentleft-hand finger
(not the same finger, as in a portamento)
on the new note very quickly and firmly.

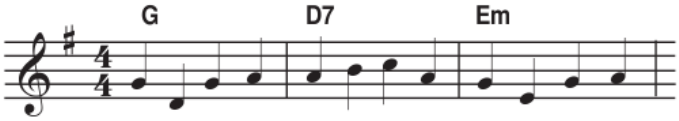


In some styles of guitar-playing,
a very aggressive upward slur is called a hammer-on.
In tablature it is notated "h".

Music Theory for Guitar

When choosing chords
to acompany a melody,
look for chords that include
a lot of the notes in the melody.
Unless there are accidentals,
you should be able to choose
from chords in the key.



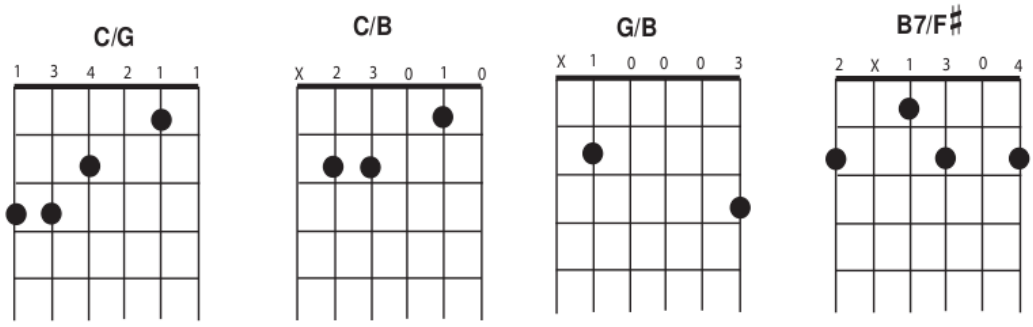


Chords

Sometimes a good bass line calls for the lowest note
in a chord to be something other than the root of the chord*.
Often marked in a chord symbol following a slash mark,
the bass note may or may not be a note
that is normally in the chord.

Picking Pattern 4: $\begin{matrix} a \\ p \end{matrix}$ i m i $\begin{matrix} a \\ p \end{matrix}$ i m i

Practice plucking p and a at the same time.



*learn more about chords in which the bass is not the root: http://cnx.org/content/m10877/latest/

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Figure 1.101

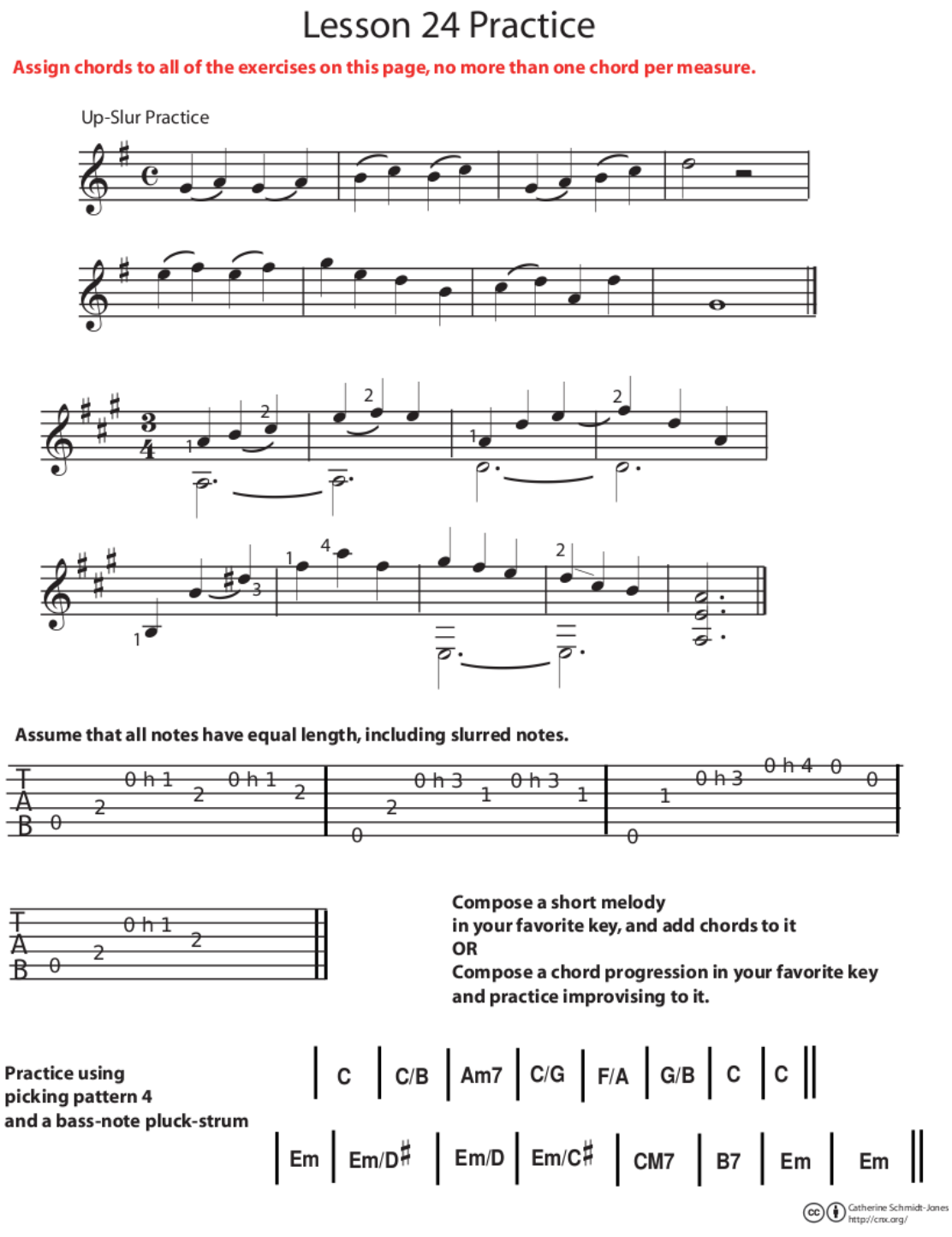
Lesson 24 Practice
Assign chords to all of the exercises on this page, no more than one chord per measure.
Up-Slur Practice
Assume that all notes have equal length, including slurred notes.
Compose a short melody
in your favorite key, and add chords to it
OR
Compose a chord progression in your favorite key
and practice improvising to it.
Practice using
picking pattern 4
and a bass-note pluck-strum
C
C/B
Am7
C/G
F/A
G/B
C
C
Em
Em/D♯
Em/D
Em/C♯
CM7
B7
Em
Em
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Figure 1.102

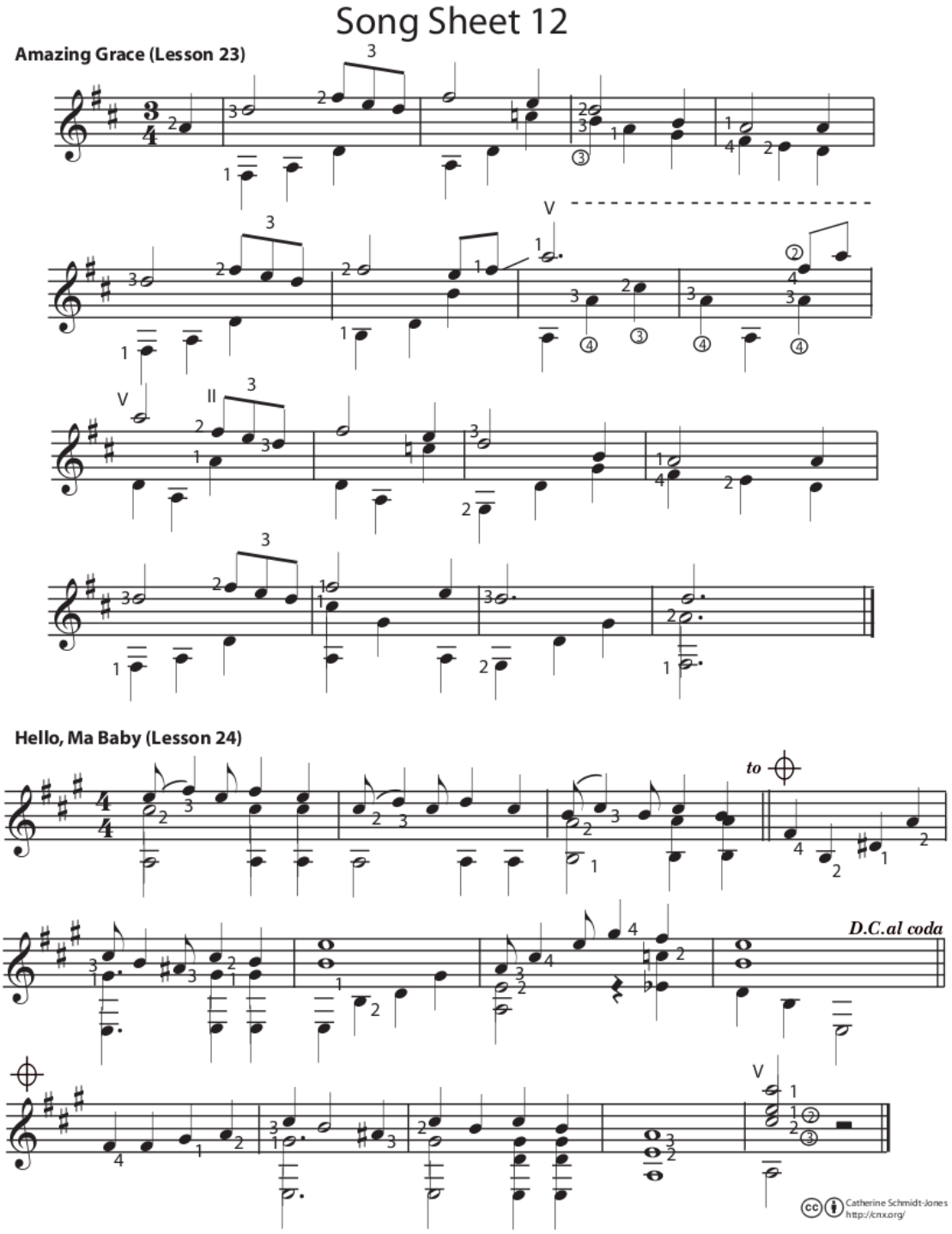
Song Sheet 12
Amazing Grace (Lesson 23)
Hello, Ma Baby (Lesson 24)
to
D.C.al coda
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.103

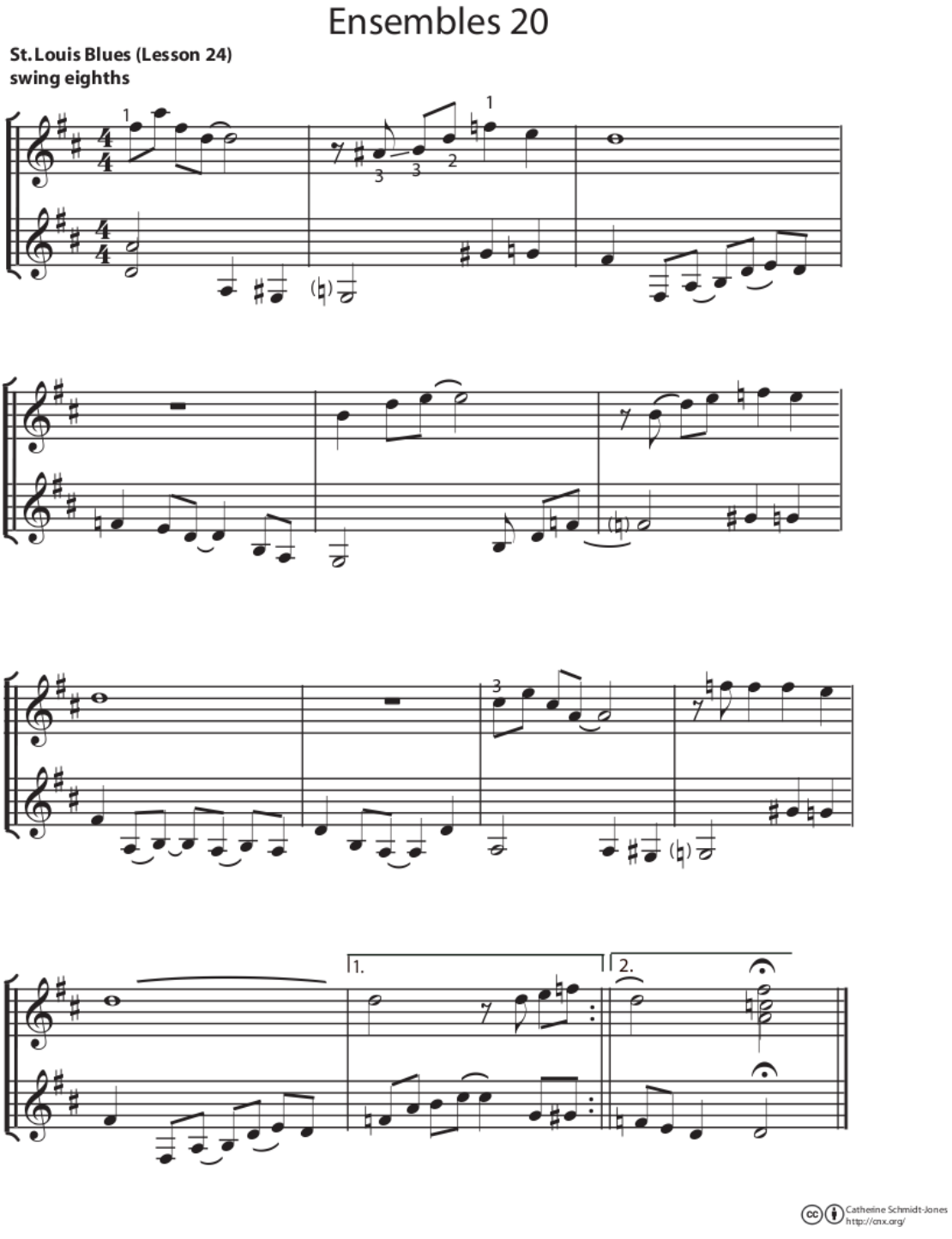
Ensembles 20
St. Louis Blues (Lesson 24)
swing eighths
1.
2.
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Figure 1.104

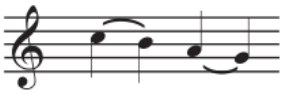
1.25 Guitar Lesson 25: Down-Slurs, and Transposition[131]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[132], the Home Practice Page[133], The Song Sheet[134], the Ensemble Page[135] for this lesson.

[131] This content is available online at <http://cnx.org/content/m31422/1.1/>.
[132] See the file at <http://cnx.org/content/m31422/latest/25GuitarLesson.pdf>
[133] See the file at <http://cnx.org/content/m31422/latest/25GuitarPractice.pdf>
[134] See the file at <http://cnx.org/content/m31422/latest/Songsheet13.pdf>
[135] See the file at <http://cnx.org/content/m31422/latest/Ensemble21.pdf>

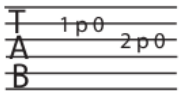
Lesson 25

Guitar Techniques



To slur downward, pull the string to the side a little with the left hand finger as it lifts off.

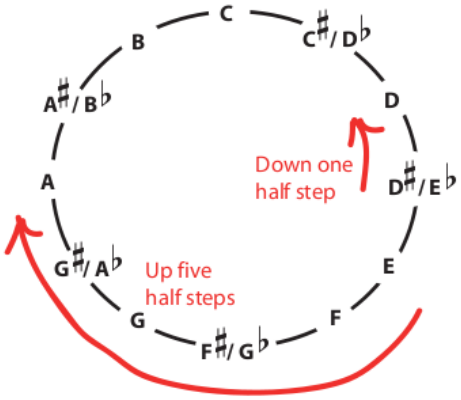
In tablature, a downward slur is called a pull-off. and is notated "p".



Music Theory for Guitar

Many guitarists often find themselves wanting to change the key of a piece of music, usually in order to make it easier to sing or play.
Changing the key is called transposition*.
If you like playing in the written key, you can transpose using a capo.
For example, putting a capo at the third fret will raise the sound by three half-steps
You can also change keys easily if you are playing no-open-strings chords and melodies.
Writing out the melody in a new key is a difficult task for beginning guitarists, but changing the chord progression to a new key is usually pretty easy:

1. Decide on the new, more singable or playable key.
2. Figure out how many half-steps up or down the new key is from the old one.
3. Change all the note-information in the chord names by that amount.
4. All other information, such as "minor" or "seventh", stays the same.
5. If moving to a playable key makes singing difficult, transpose chords down and use a capo to raise the music back to the original key.



Example 1: Don't want to play in E♭ major.
Move everything down one half-step to D major:

Start with:	E♭	A♭ / D♭	Cm	B♭7	E♭
Change to:	D	G / C	Bm	A7	D

Example 2: Key of E minor is far too low for voice.
Move everything up five half-steps to A minor:

Start with:	Em	Am7	G / B	B7	Em
Change to:	Am	Dm7	C / E	E7	Am

*learn more about transposition: http://cnx.org/content/m10668/latest/

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http://cnx.org/

Figure 1.105

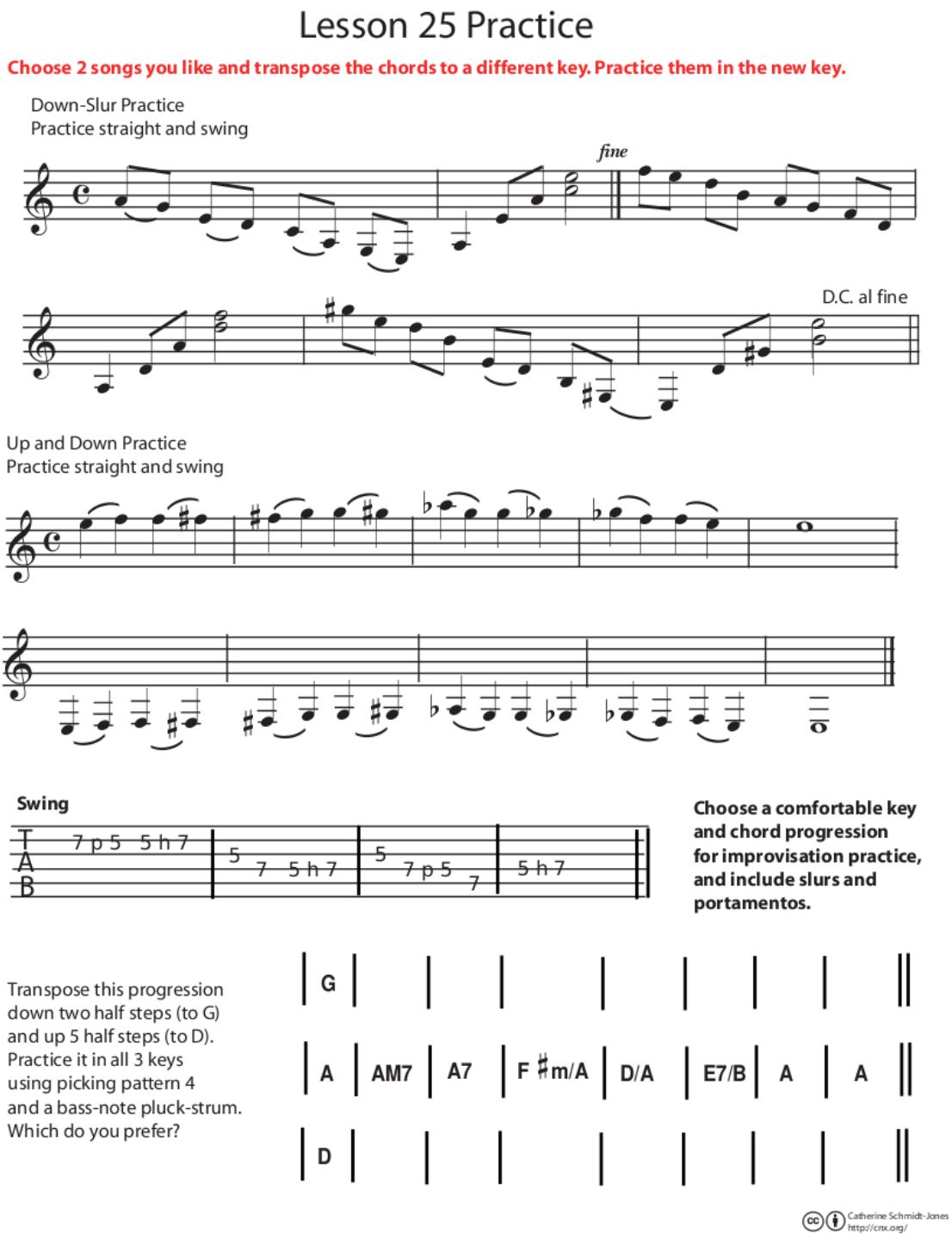
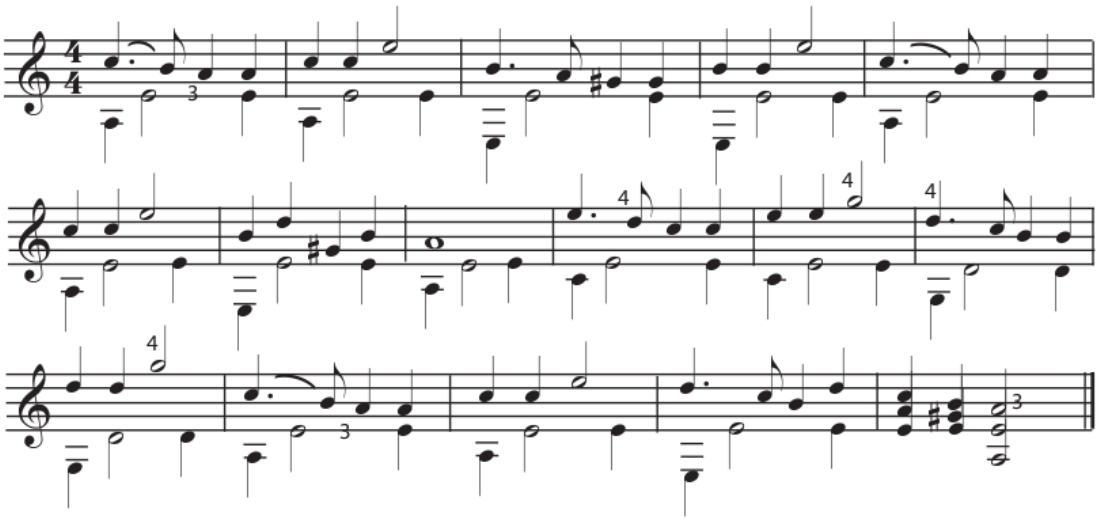

Lesson 25 Practice
Choose 2 songs you like and transpose the chords to a different key. Practice them in the new key.
Down-Slur Practice
Practice straight and swing
fine
D.C. al fine
Up and Down Practice
Practice straight and swing
Swing
7 p 5 5 h 7
5 7 5 h 7
5 7 p 5 7
5 h 7
Choose a comfortable key and chord progression for improvisation practice, and include slurs and portamentos.
Transpose this progression down two half steps (to G) and up 5 half steps (to D). Practice it in all 3 keys using picking pattern 4 and a bass-note pluck-strum. Which do you prefer?
G
A
AM7
A7
F♯m/A
D/A
E7/B
A
A
D
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.106

Song Sheet 13

Poor Mam'zelle Zizi (Lesson 25)



Sometimes I Feel Like a Motherless Child (Lesson 26)
Experiment with bending the single notes in between the phrases.
Triplet quarters evenly divide the time of a half note, just as triplet eights divide the time of a quarter note.

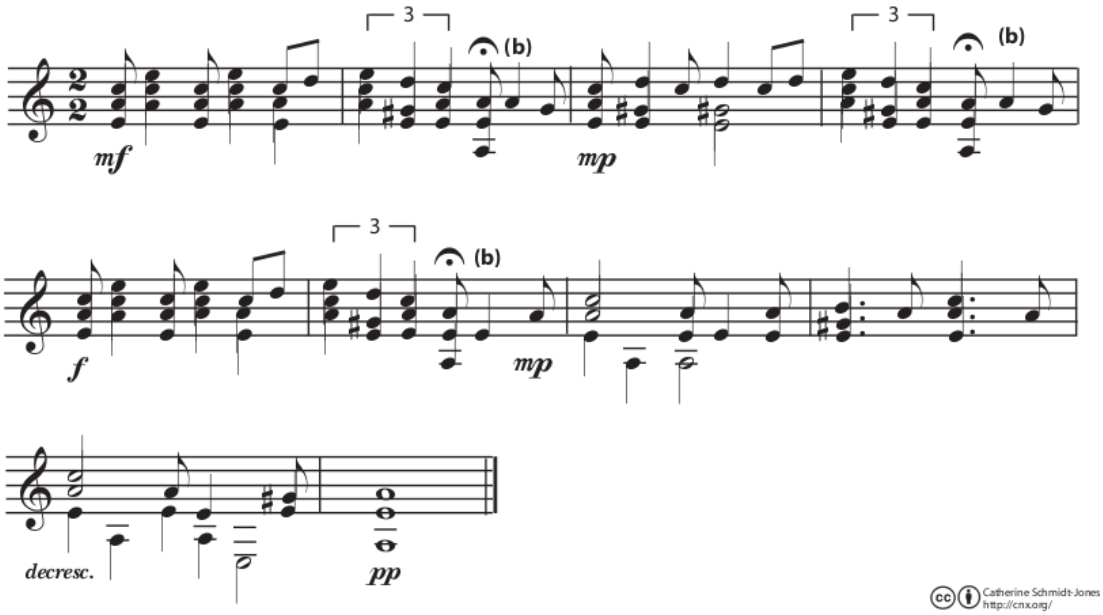


Figure 1.107

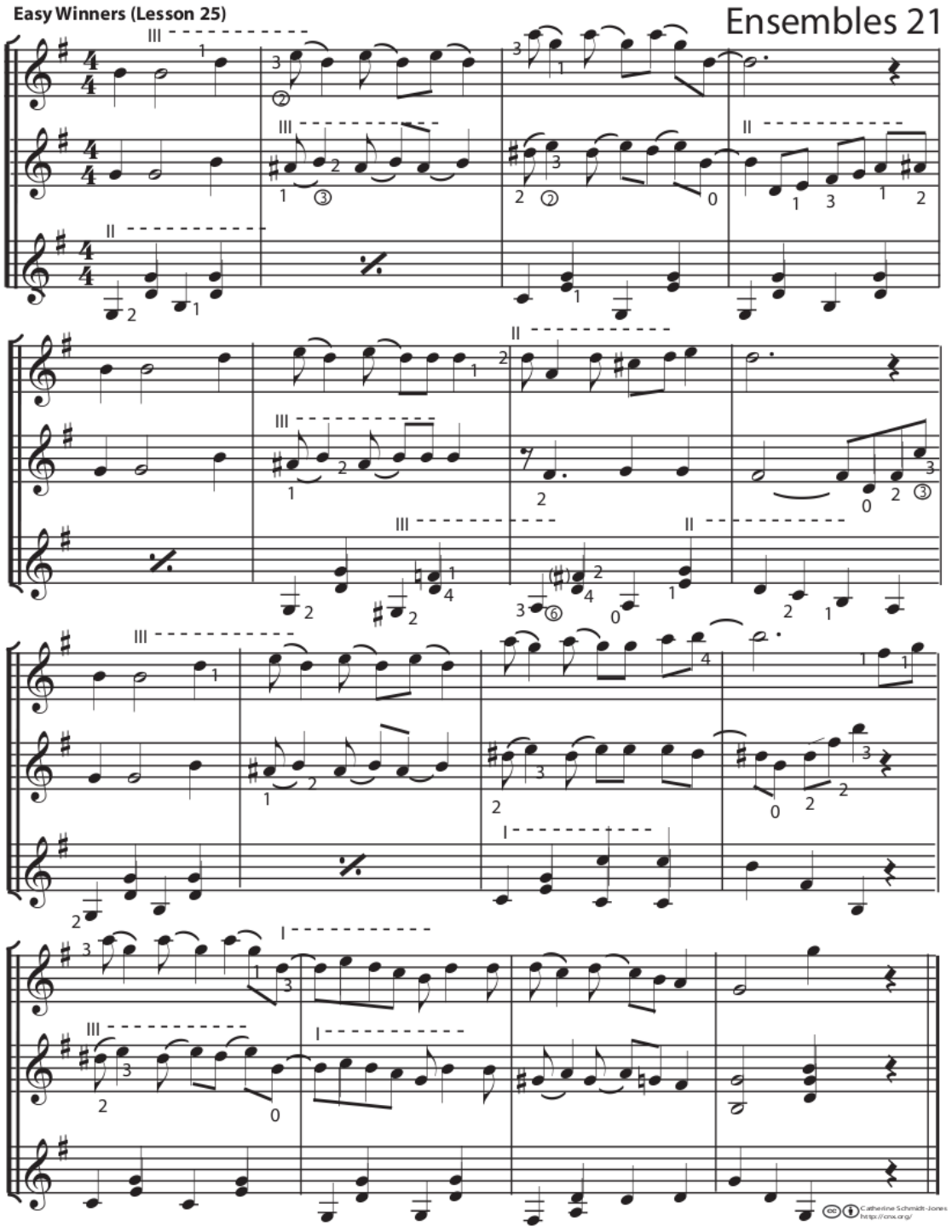


Figure 1.108

1.26 Guitar Lesson 26: Pitch Bending, Vibrato, and Suspensions[136]

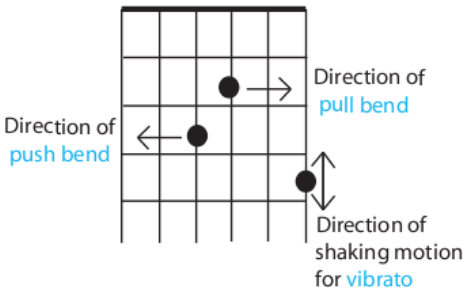
Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[137], the Home Practice Page[138], and the Ensemble Page[139] for this lesson. The Song Sheet[140] is the same as for Guitar Lesson 25 (Section 1.25).

[136] This content is available online at <http://cnx.org/content/m31423/1.1/>.
[137] See the file at <http://cnx.org/content/m31423/latest/26GuitarLesson.pdf>
[138] See the file at <http://cnx.org/content/m31423/latest/26GuitarPractice.pdf>
[139] See the file at <http://cnx.org/content/m31423/latest/Ensemble22.pdf>
[140] See the file at <http://cnx.org/content/m31423/latest/Songsheet13.pdf>

Guitar Techniques

Lesson 26

Some styles of guitar playing, particulaarly blues and rock,
often bend the pitch of a note
by pulling or pushing the string to the side
with the left hand finger while playing it.
The motion for bending is perpendicular to the string.



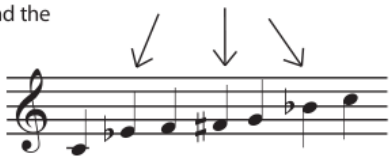
Some styles, particularly classical, add vibrato to the note
by shaking the left hand rapidly while playing the note.
The motion for vibrato is in the same direction as the string.

There are many styles of bending and ways to notate it, depending on the genre of the music.
Vibrato is normally not notated, just added as the performer likes.

Music Theory for Guitar

Bends are often used with blues, and blues-influenced genres such as rock.
The blues originated with African traditions brought to the U.S.
These traditions used different scales and tuning
than the European major-minor-equal-half-step
tradition associated with common notation. So blues musicians often bend the
"blue" notes (for example, a third that is in between the major and minor)
in order to get a more authentic blues sound.
To get accustomed to this tuning and technique,
watch famous blues guitarists, and listen to
good blues musicians on any instrument (including voice).

Blue Notes
use a specific
non-equal-temperament
tuning*

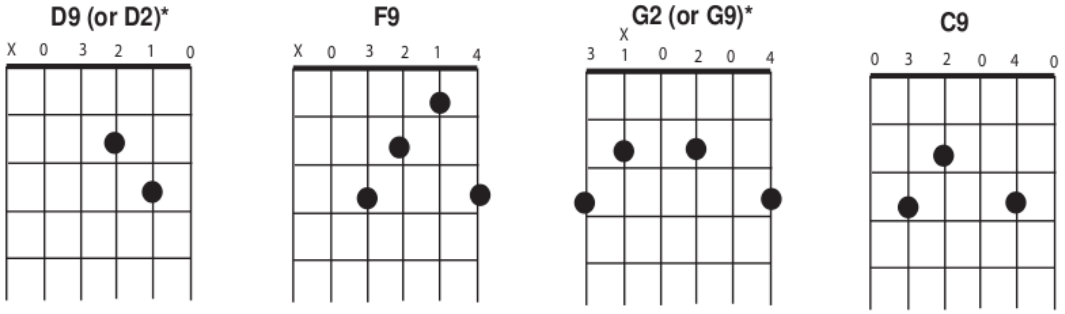


Chords

When the second note of the scale is added to the chord
(the note that's two half steps higher than the chord root),
the number 2 or 9 is added to the chord symbol.
As much as possible, a "2" should be added lower in the chord than a "9",
but should not replace the root bass..
Both may be labelled a suspension (sus), which means the note
should be resolved downward (2 followed by 1, 9 followed by 8).

Picking pattern 5: p i m p a m i m

The first p should be the chord root,
the second a different string.



*A lower 2 would interfere
too much with the bass/root D.

*If you're picking,
you can make this chord easier
by leaving out the fifth string.

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*learn more about different tuning systems: http://cnx.org/content/m11639/latest/

Figure 1.109

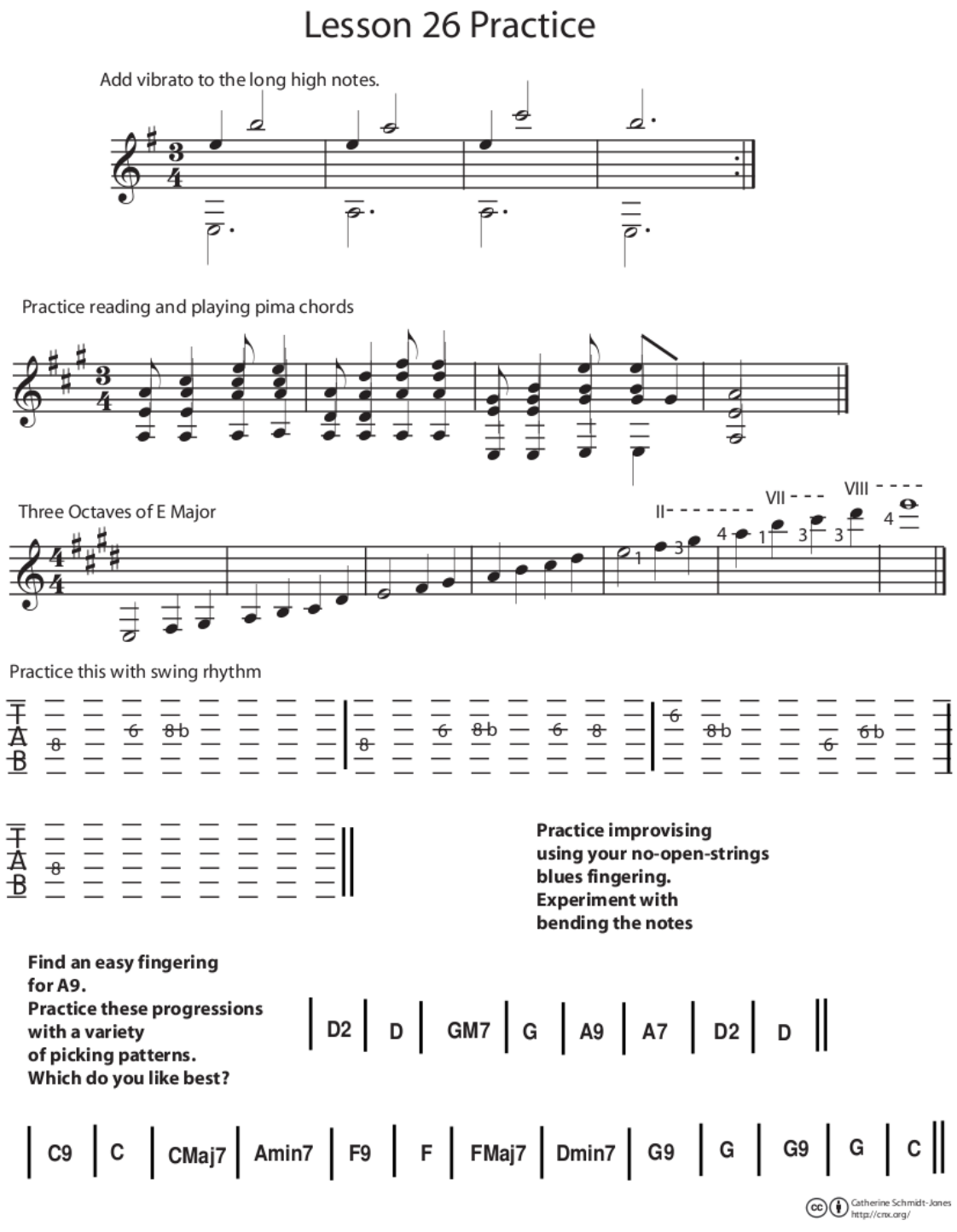
Lesson 26 Practice
Add vibrato to the long high notes.
Practice reading and playing pima chords
Three Octaves of E Major
Practice this with swing rhythm
Practice improvising
using your no-open-strings
blues fingering.
Experiment with
bending the notes
Find an easy fingering
for A9.
Practice these progressions
with a variety
of picking patterns.
Which do you like best?
D2 D GM7 G A9 A7 D2 D
C9 C CMaj7 Amin7 F9 F FMaj7 Dmin7 G9 G G9 G C
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Figure 1.110

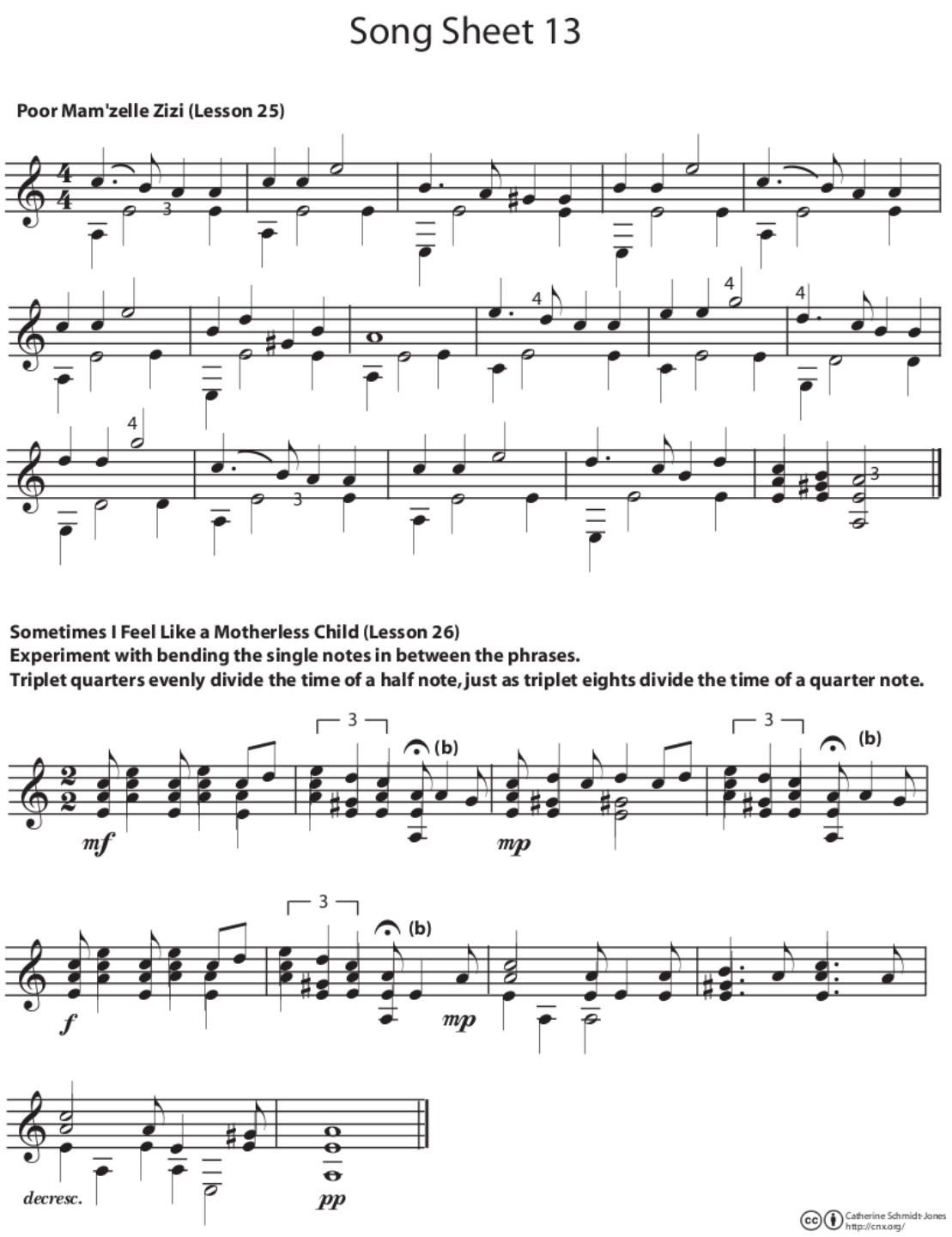
Song Sheet 13
Poor Mam'zelle Zizi (Lesson 25)
Sometimes I Feel Like a Motherless Child (Lesson 26)
Experiment with bending the single notes in between the phrases.
Triplet quarters evenly divide the time of a half note, just as triplet eights divide the time of a quarter note.
mf
mp
f
mp
decresc.
pp
(b)
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Figure 1.111

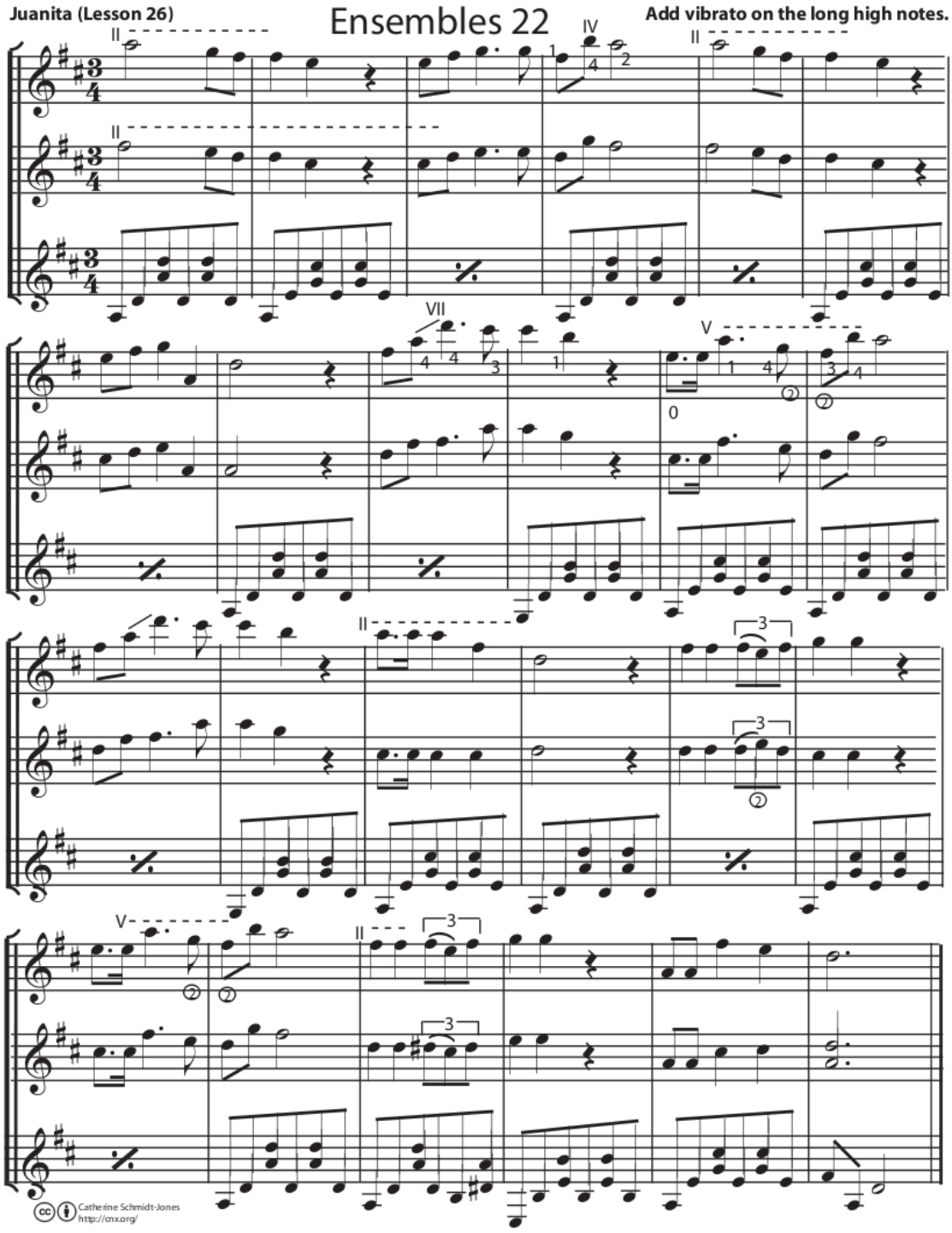
Juanita (Lesson 26)
Ensembles 22
Add vibrato on the long high notes.
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Figure 1.112

1.27 Guitar Lesson 27: Tempo, Accents, and Added-Note Chords[141]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[142], the Home Practice Page[143], the Song Sheet[144], and the Ensemble Page[145] for this lesson.

[141] This content is available online at <http://cnx.org/content/m31425/1.1/>.
[142] See the file at <http://cnx.org/content/m31425/latest/27GuitarLesson.pdf>
[143] See the file at <http://cnx.org/content/m31425/latest/27GuitarPractice.pdf>
[144] See the file at <http://cnx.org/content/m31425/latest/Songsheet14.pdf>
[145] See the file at <http://cnx.org/content/m31425/latest/Ensemble23.pdf>

Lesson 27

Common Notation

Tempo defines how fast the music is being played.
Most tempo markings do not refer to a specific speed,
but to how fast the music feels.
Sometimes a specifc tempo is defined by a
metronome marking,
which gives the beats per minute.
Much guitar music has no tempo marking,
or defines the tempo in English,
for example "Lively" or "Not too fast"
More formal scores
may give the terms in Italian.

Some Common Tempo Markings

Allegro	Fast
Andante	Walking tempo
Moderato	Medium
Adagio	Slow
rit.	Slower
accel.	Gradually faster
Tempo I	Back to the original tempo

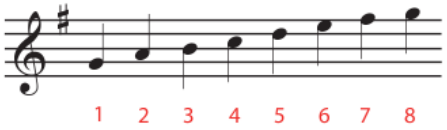
Guitar Technique

Articulation defines the beginning and end of each note. A slur is one type of articulation.
Again, much guitar music is informal and doesn't include many articulation marks,
but, particularly in classical music, you may see markings such as acents.

Common Accent Markings

Play an accented note
louder and stronger
than the other notes around it.
(A strong rest stroke
can give a good accent.)

G Major Scale

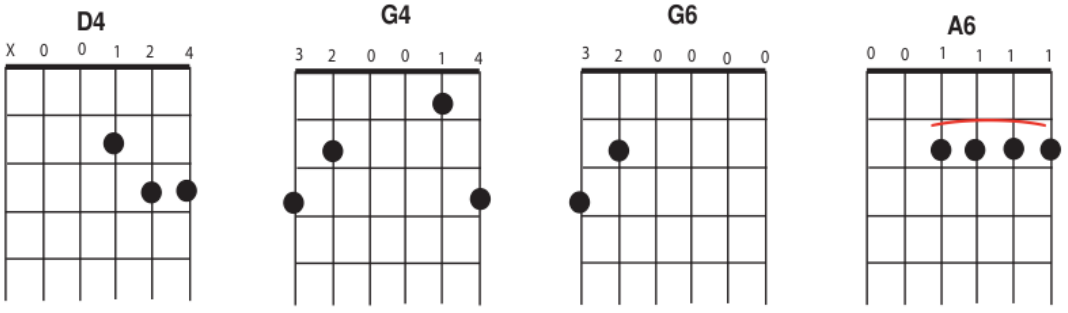


Chords

The fourth or sixth note of the scale
can also be added to the chord.
A 4 is often labelled a suspension (sus),
which means it temporarily
replaces 3 and should be resolved downward
(4 followed by 3).

When a number is added to a chord symbol,
find the added note using the scale associated
with the chord.

If you don't know the scale yet,
use your no-open-strings scale
fingerings to find the correct notes.



*learn more about suspensions and their resolutions: http://cnx.org/content/m11953/latest/

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Figure 1.113

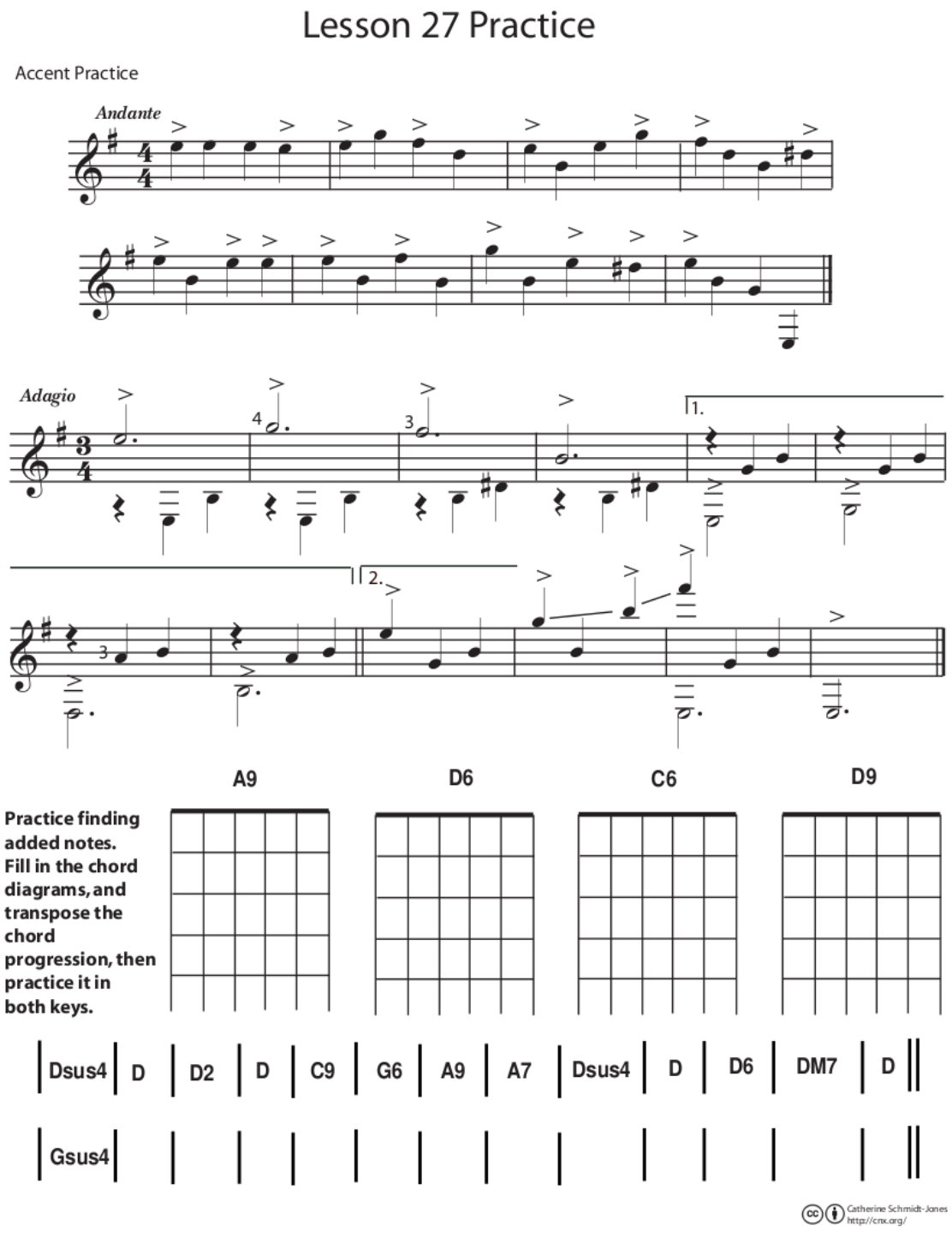
Lesson 27 Practice
Accent Practice
Andante
Adagio
1.
2.
A9
D6
C6
D9
Practice finding added notes. Fill in the chord diagrams, and transpose the chord progression, then practice it in both keys.
Dsus4 D D2 D C9 G6 A9 A7 Dsus4 D D6 DM7 D
Gsus4
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Figure 1.114

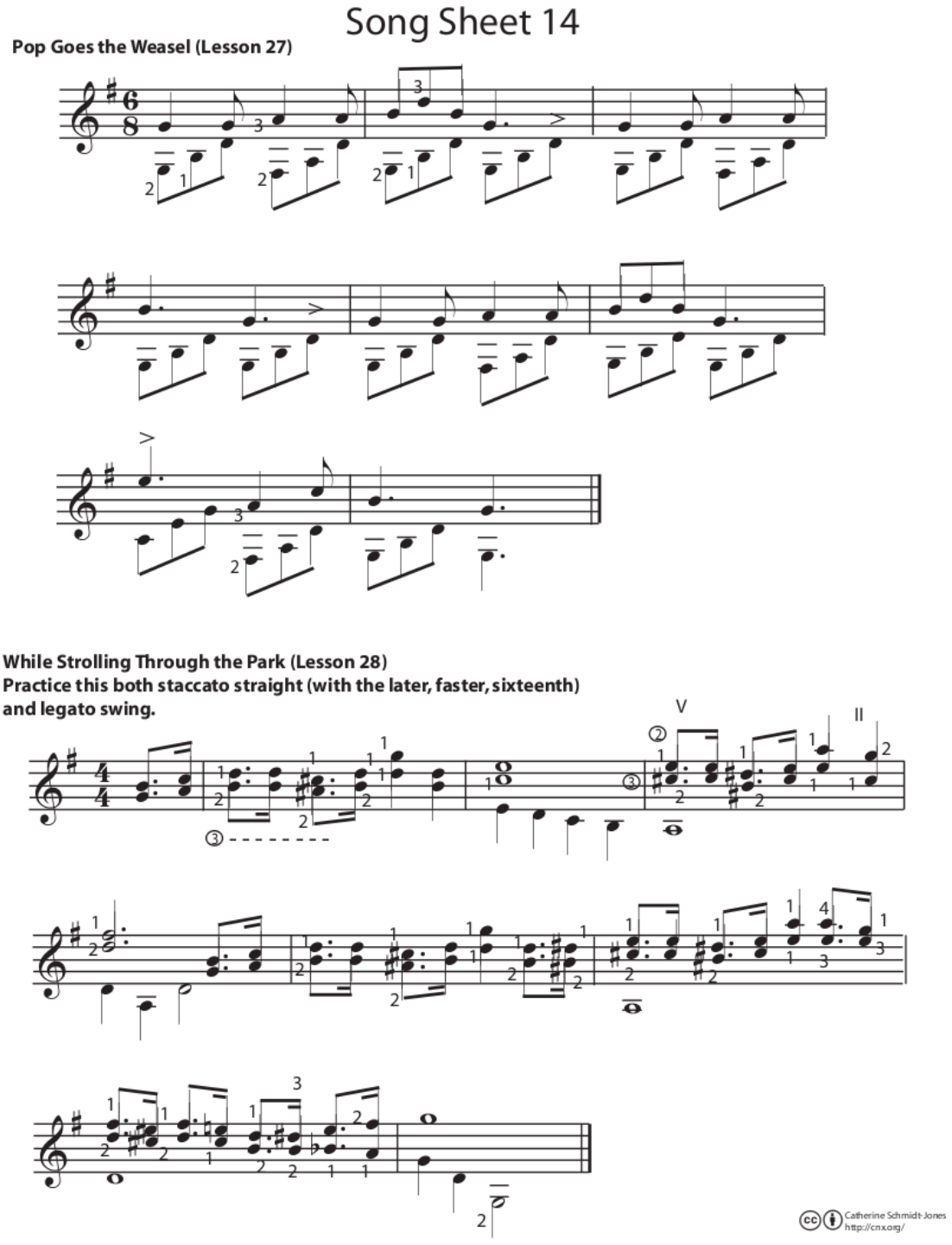
Song Sheet 14
Pop Goes the Weasel (Lesson 27)
While Strolling Through the Park (Lesson 28)
Practice this both staccato straight (with the later, faster, sixteenth)
and legato swing.
V
II
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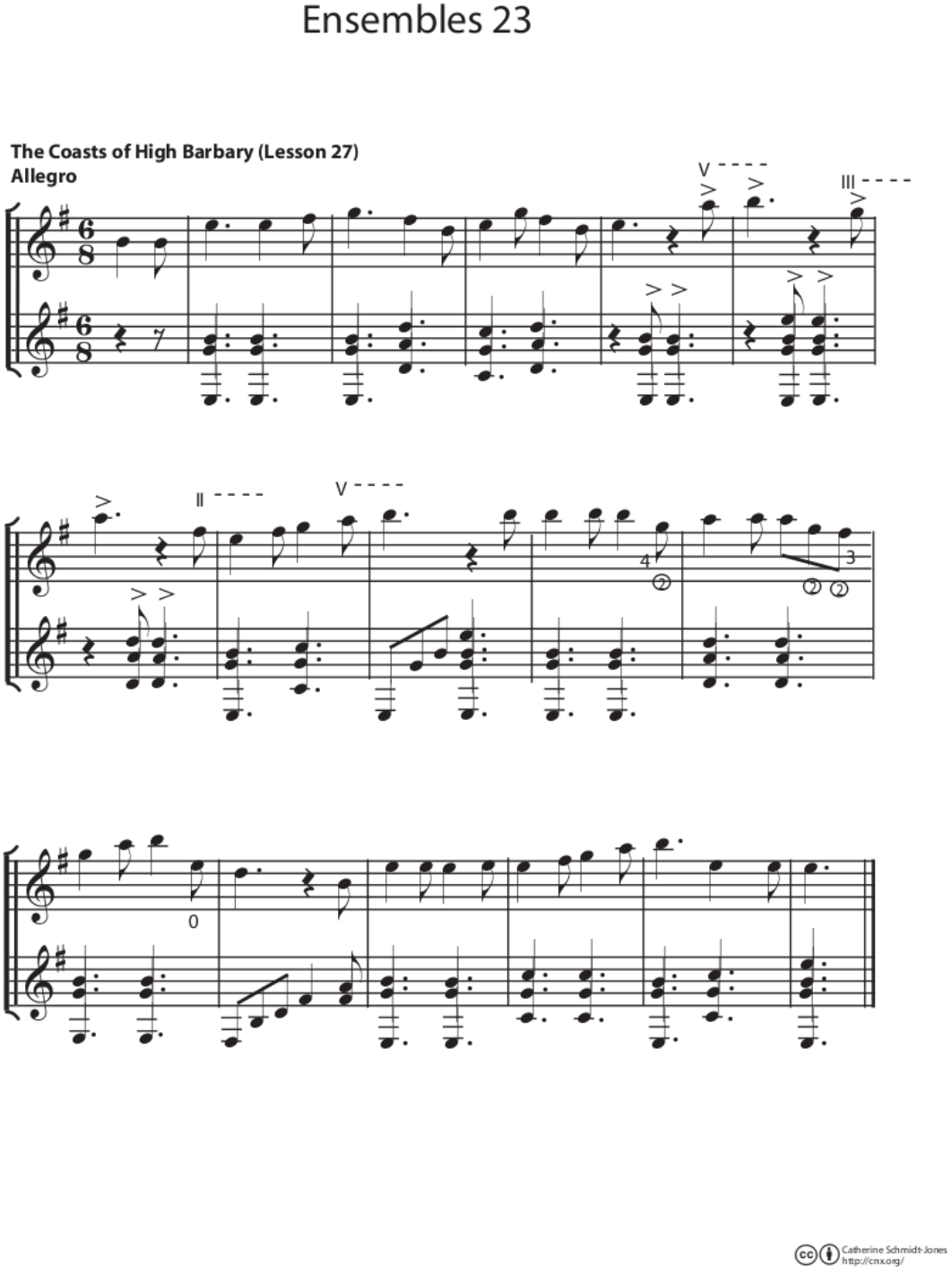
Figure 1.115


Ensembles 23
The Coasts of High Barbary (Lesson 27)
Allegro
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http://cnx.org/

Figure 1.116

1.28 Guitar Lesson 28: Staccato and Legato, and Diminished and Augmented Chords[146]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[147], the Home Practice Page[148], and the Ensemble Page[149] for this lesson. The Song Sheet[150] is the same as for Guitar Lesson 27 (Section 1.27).

[146] This content is available online at <http://cnx.org/content/m31426/1.1/>.
[147] See the file at <http://cnx.org/content/m31426/latest/28GuitarLesson.pdf>
[148] See the file at <http://cnx.org/content/m31426/latest/28GuitarPractice.pdf>
[149] See the file at <http://cnx.org/content/m31426/latest/Ensemble24.pdf>
[150] See the file at <http://cnx.org/content/m31426/latest/Songsheet14.pdf>

Lesson 28

Guitar Technique

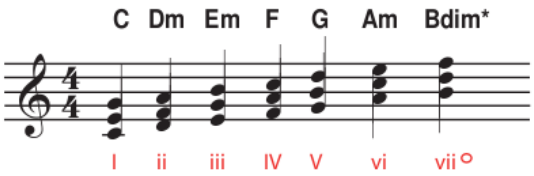
Here are some other articulation markings that you might see,
particularly in classical guitar music.
Even if you don't see the markings,
you will want to develop the control over note length;
no matter what the genre,
some music calls for a crisp cut-off staccato sound;
and other pieces want a smooth, flowing legato sound.
Play staccato by lifting the left hand finger slightly after playing;
play legato by leaving the finger in place as long as possible.

Staccato - put a short silence between the notes

Legato - play very smoothly, with no silence between the notes

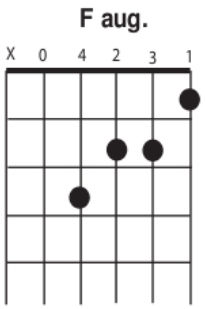
Chords

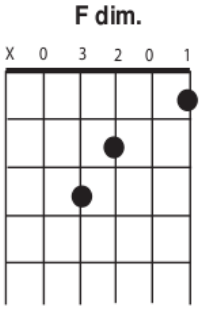
The fifth note of a major or minor scale,
used in both major and minor chords,
is called the perfect fifth.
A diminished chord
uses a diminished fifth (a half step lower).
An augmented chord uses an
augmented fifth, (a half step higher).

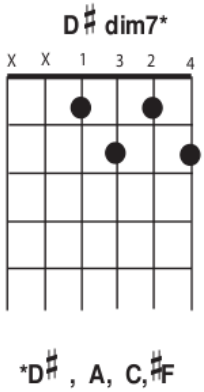


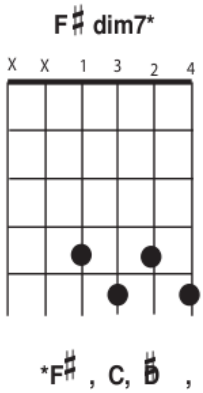
The chord in the key
on the seventh scale note
is a diminished chord.
Augmented chords always include
at least one accidental.

There is a variety of chord symbols commonly used
for diminished and augmented chords.
Some notations use dim. and aug.
Some use + and - (but some use - for minor, so be careful).
Some use o for diminished, some use it for diminished seventh.









The diminished chord often includes the seventh.
Diminished seventh chords have an interesting characteristic;
rearrange the order of the notes,
and you have another diminished seventh chord.

*learn more about tempo markings: http://cnx.org/content/m11648/latest/

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Figure 1.117

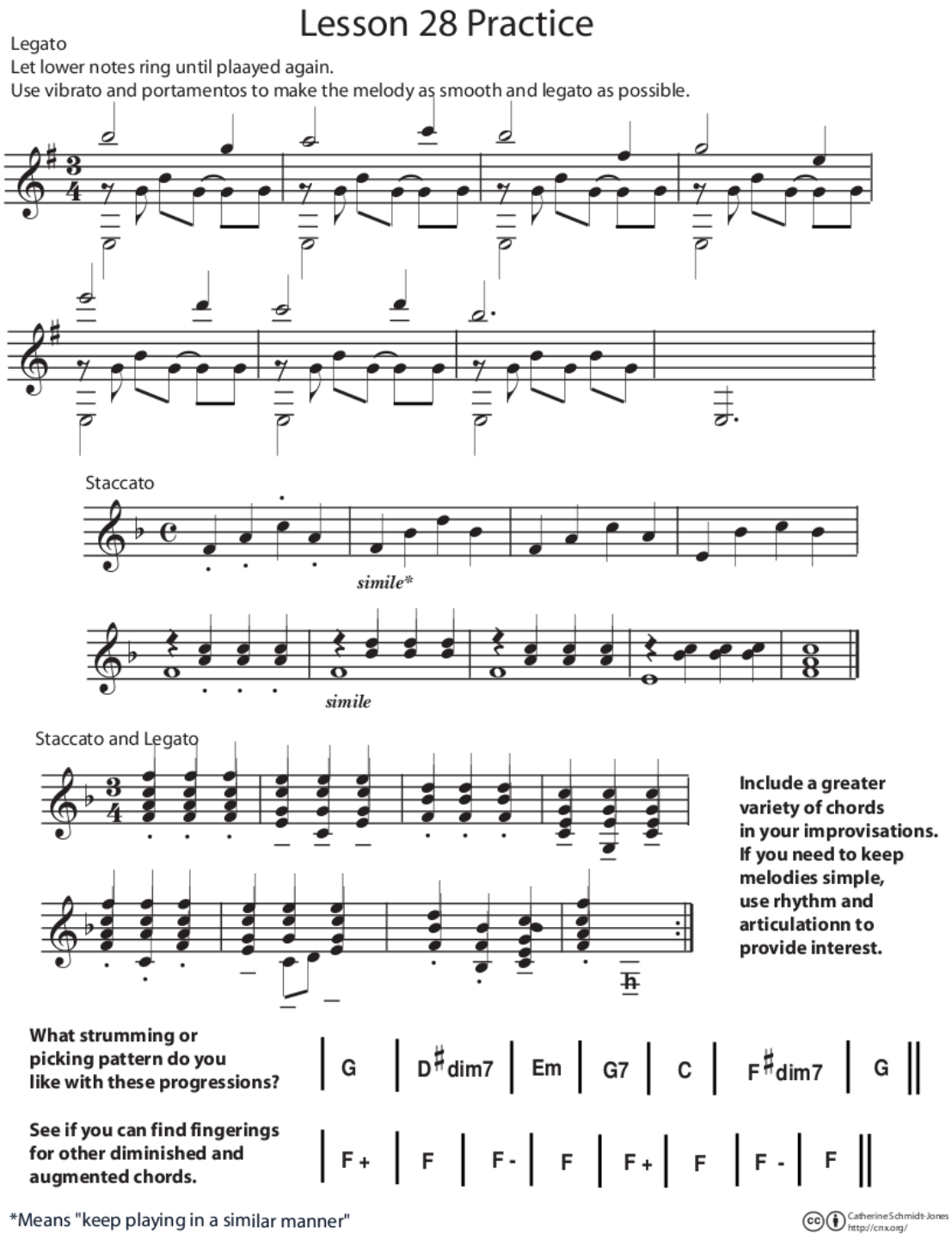
Lesson 28 Practice
Legato
Let lower notes ring until plaayed again.
Use vibrato and portamentos to make the melody as smooth and legato as possible.
Staccato
simile*
simile
Staccato and Legato
Include a greater variety of chords in your improvisations. If you need to keep melodies simple, use rhythm and articulationn to provide interest.
What strumming or picking pattern do you like with these progressions?
G | D♯dim7 | Em | G7 | C | F♯dim7 | G
See if you can find fingerings for other diminished and augmented chords.
F + | F | F - | F | F + | F | F - | F
*Means "keep playing in a similar manner"
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Figure 1.118

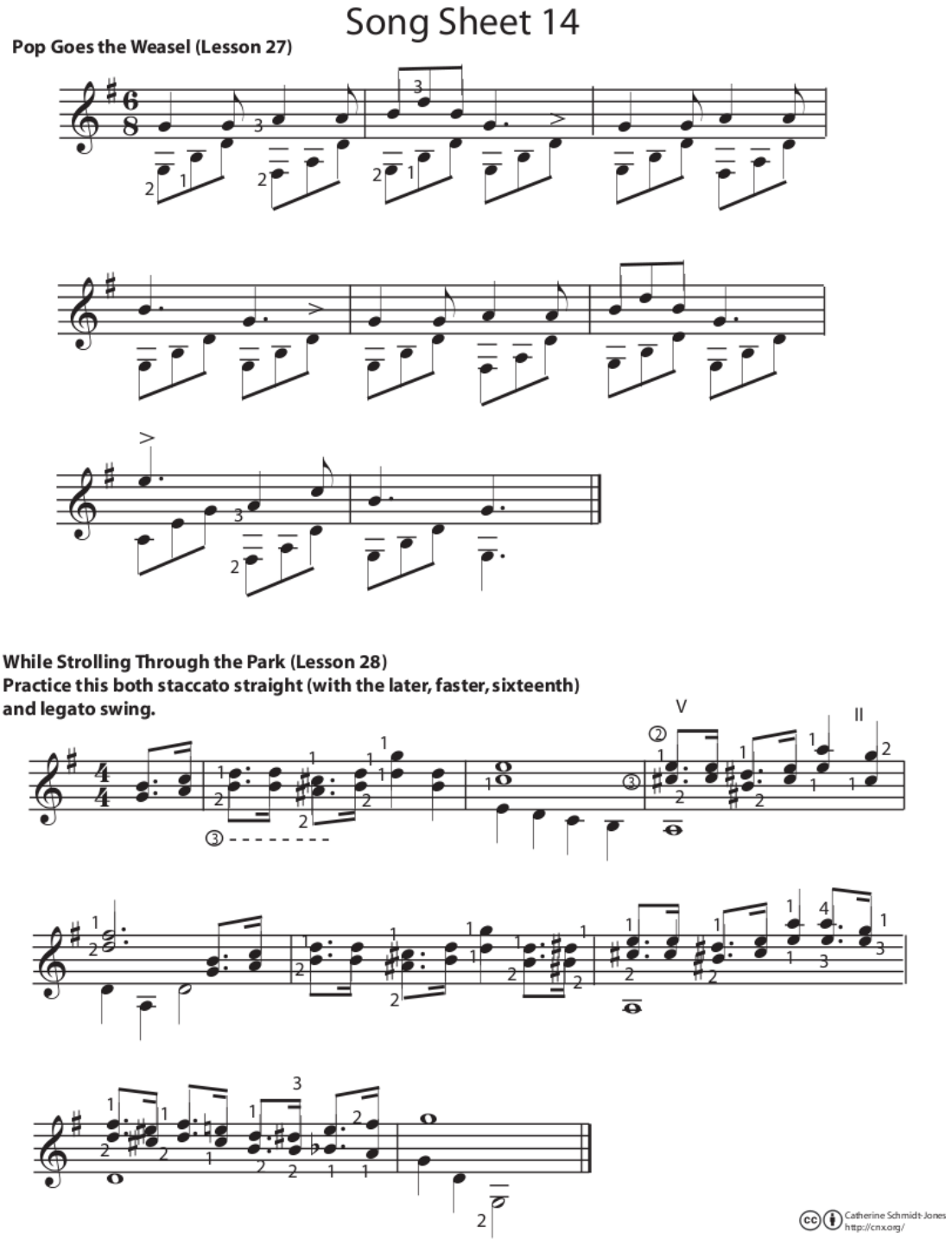
Song Sheet 14
Pop Goes the Weasel (Lesson 27)
While Strolling Through the Park (Lesson 28)
Practice this both staccato straight (with the later, faster, sixteenth)
and legato swing.
V
II
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Figure 1.119

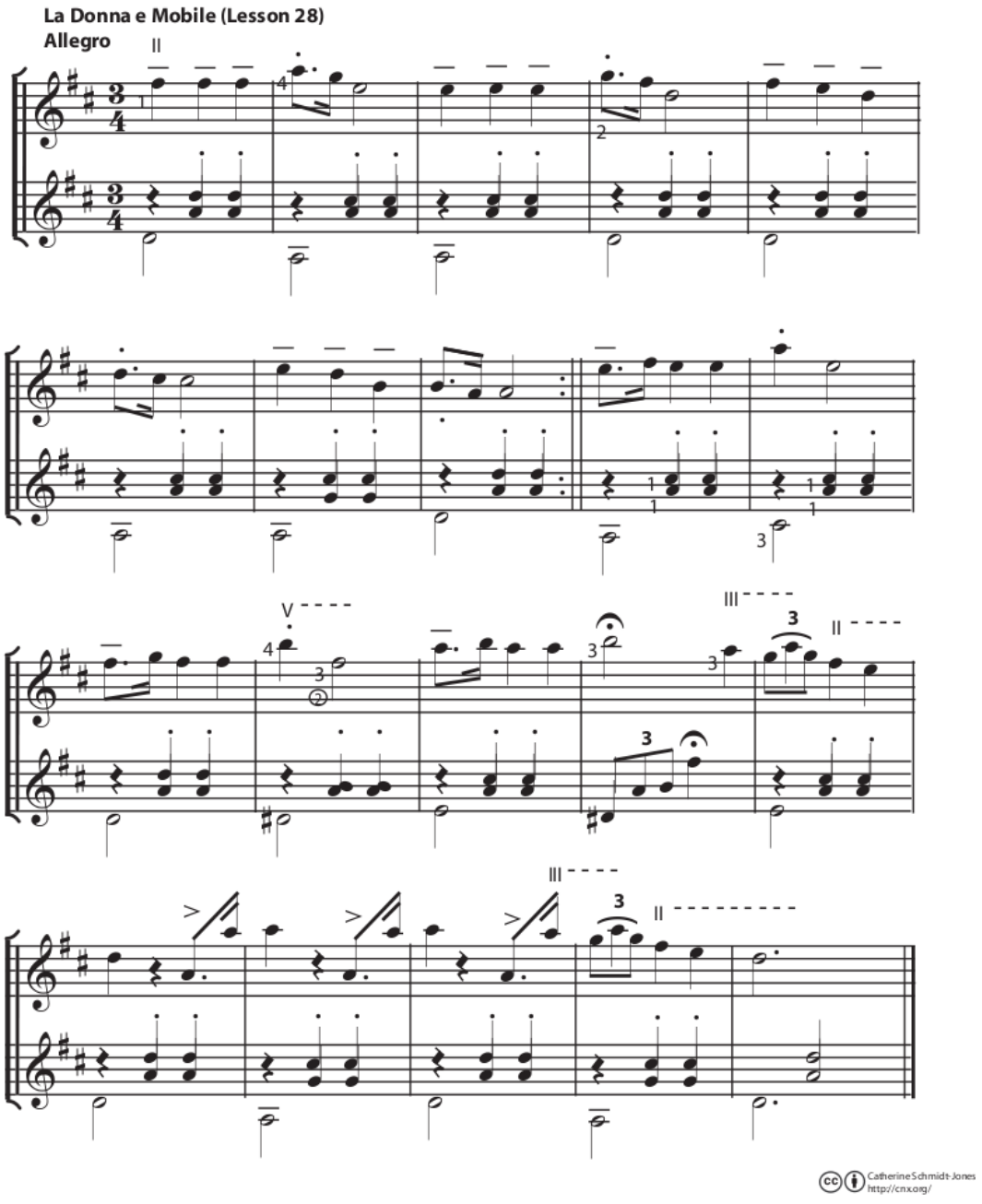

Ensembles 24
La Donna e Mobile (Lesson 28)
Allegro
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.120

1.29 Guitar Lesson 29: Alternate Tunings, Other Keys, and Moving Chord Shapes[151]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[152], the Home Practice Page[153], the Song Sheet[154], and the Ensemble Page[155] for this lesson.

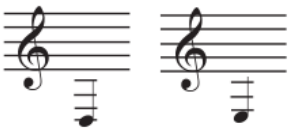
[151] This content is available online at <http://cnx.org/content/m31427/1.1/>.
[152] See the file at <http://cnx.org/content/m31427/latest/29GuitarLesson.pdf>
[153] See the file at <http://cnx.org/content/m31427/latest/29GuitarPractice.pdf>
[154] See the file at <http://cnx.org/content/m31427/latest/SongSheet15.pdf>
[155] See the file at <http://cnx.org/content/m31427/latest/Ensemble25.pdf>

Lesson 29

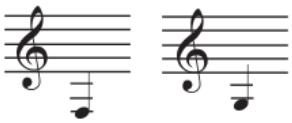
Guitar Technique

The tuning you have been using is the most common guitar tuning. Other tunings will obviously change where the notes are on the strings and how chords are fingered.
D tuning, for example, is sometimes used to give the key of D a more "open strings" sound.
A variety of open tunings are very popular in several styles of guitar playing, for example Hawaiian, steel guitar, and counatry blues.

Notes on the Sixth String in D tuning

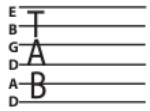


Open String Second Fret

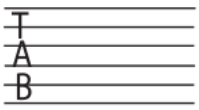


Third Fret Fifth Fret

Tablature indicates alternate tunings at the beginning of the first line.

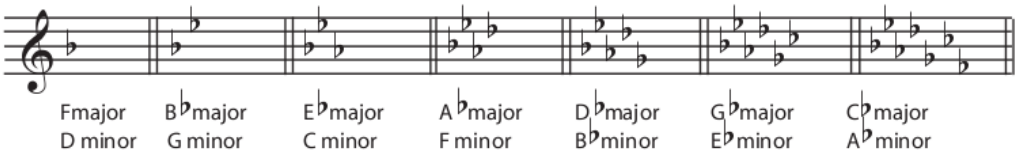


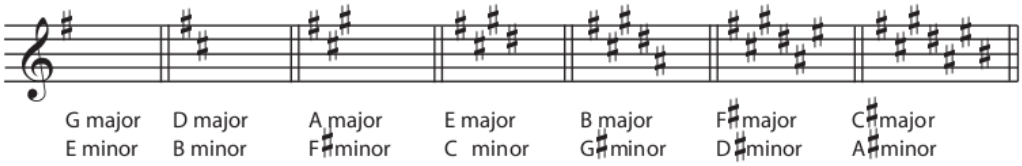
Open G Tuning: D G D G B D



Common Notation

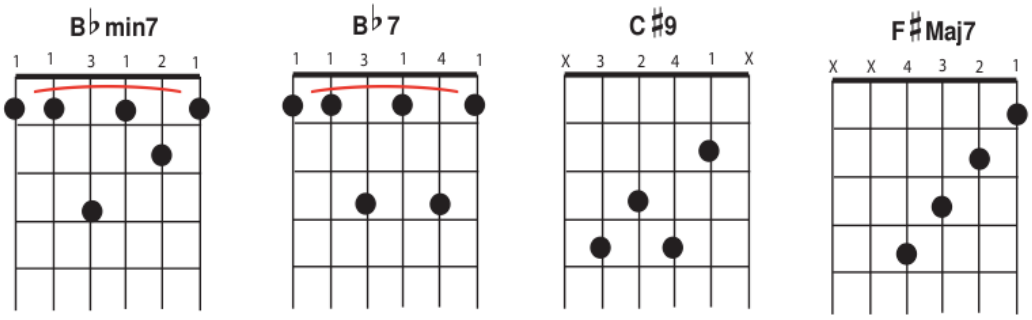
So far, you have only been practicing in the keys that are easiest for guitar.
Singers and other instruments will often prefer other keys.
Practice playing pieces in other keys, and learn the main chords in each key.*





Chords

Barre chords become very useful in keys that have many flats or sharps.
Make barre chords by replacing the open strings of easy chords with a first finger barre.
Or play fewer strings, adding fingers only on the necessary strings.
Or transpose to an easier key (see lesson 25) and use a capo.



*the circle of fifths helps keep track of key signatures: http://cnx.org/content/m10865/latest/

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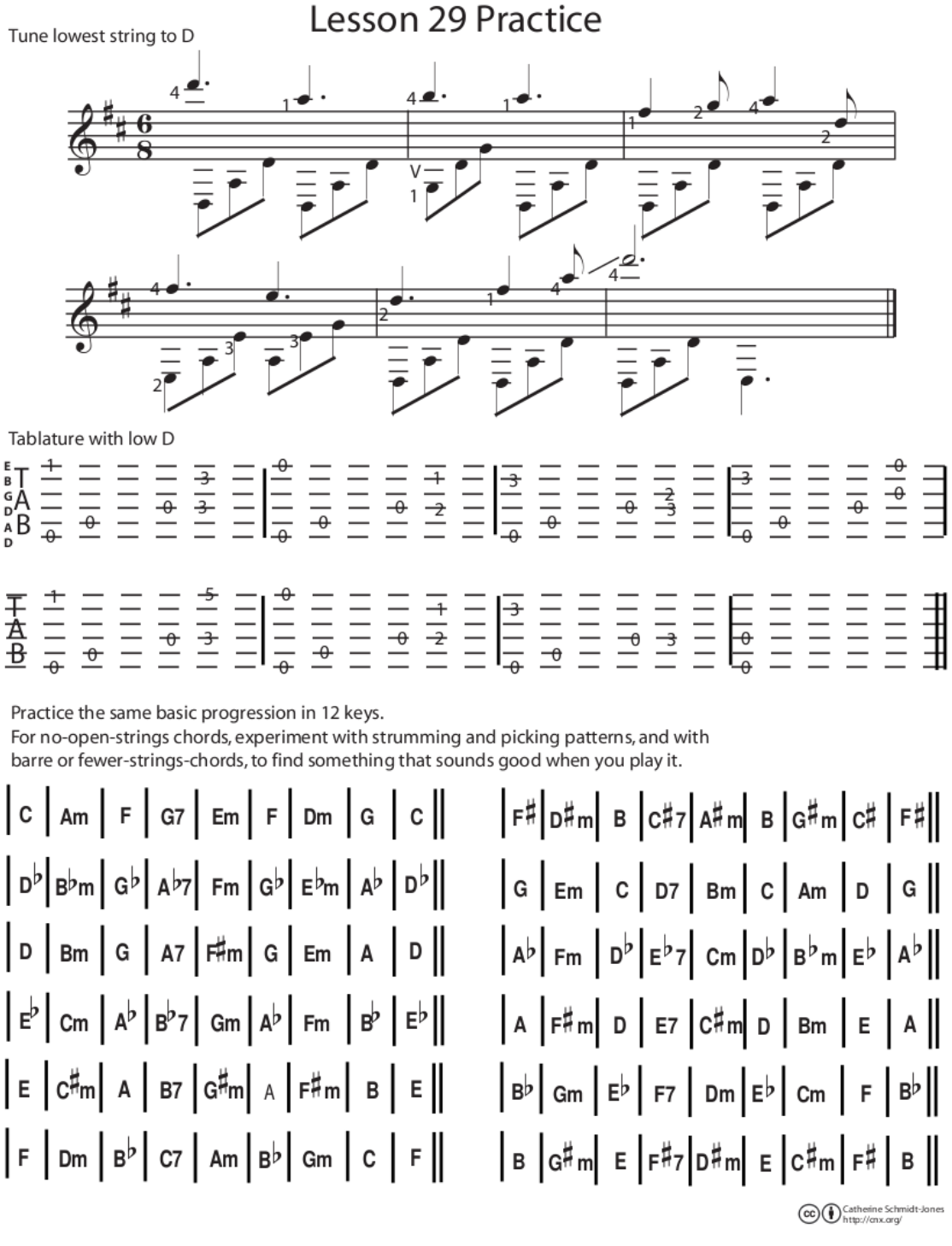
Figure 1.121


Lesson 29 Practice
Tune lowest string to D
Tablature with low D
Practice the same basic progression in 12 keys.
For no-open-strings chords, experiment with strumming and picking patterns, and with barre or fewer-strings-chords, to find something that sounds good when you play it.
C | Am | F | G7 | Em | F | Dm | G | C
D♭ | B♭m | G♭ | A♭7 | Fm | G♭ | E♭m | A♭ | D♭
D | Bm | G | A7 | F♯m | G | Em | A | D
E♭ | Cm | A♭ | B♭7 | Gm | A♭ | Fm | B♭ | E♭
E | C♯m | A | B7 | G♯m | A | F♯m | B | E
F | Dm | B♭ | C7 | Am | B♭ | Gm | C | F
F♯ | D♯m | B | C♯7 | A♯m | B | G♯m | C♯ | F♯
G | Em | C | D7 | Bm | C | Am | D | G
A♭ | Fm | D♭ | E♭7 | Cm | D♭ | B♭m | E♭ | A♭
A | F♯m | D | E7 | C♯m | D | Bm | E | A
B♭ | Gm | E♭ | F7 | Dm | E♭ | Cm | F | B♭
B | G♯m | E | F♯7 | D♯m | E | C♯m | F♯ | B
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http://cnx.org/

Figure 1.122

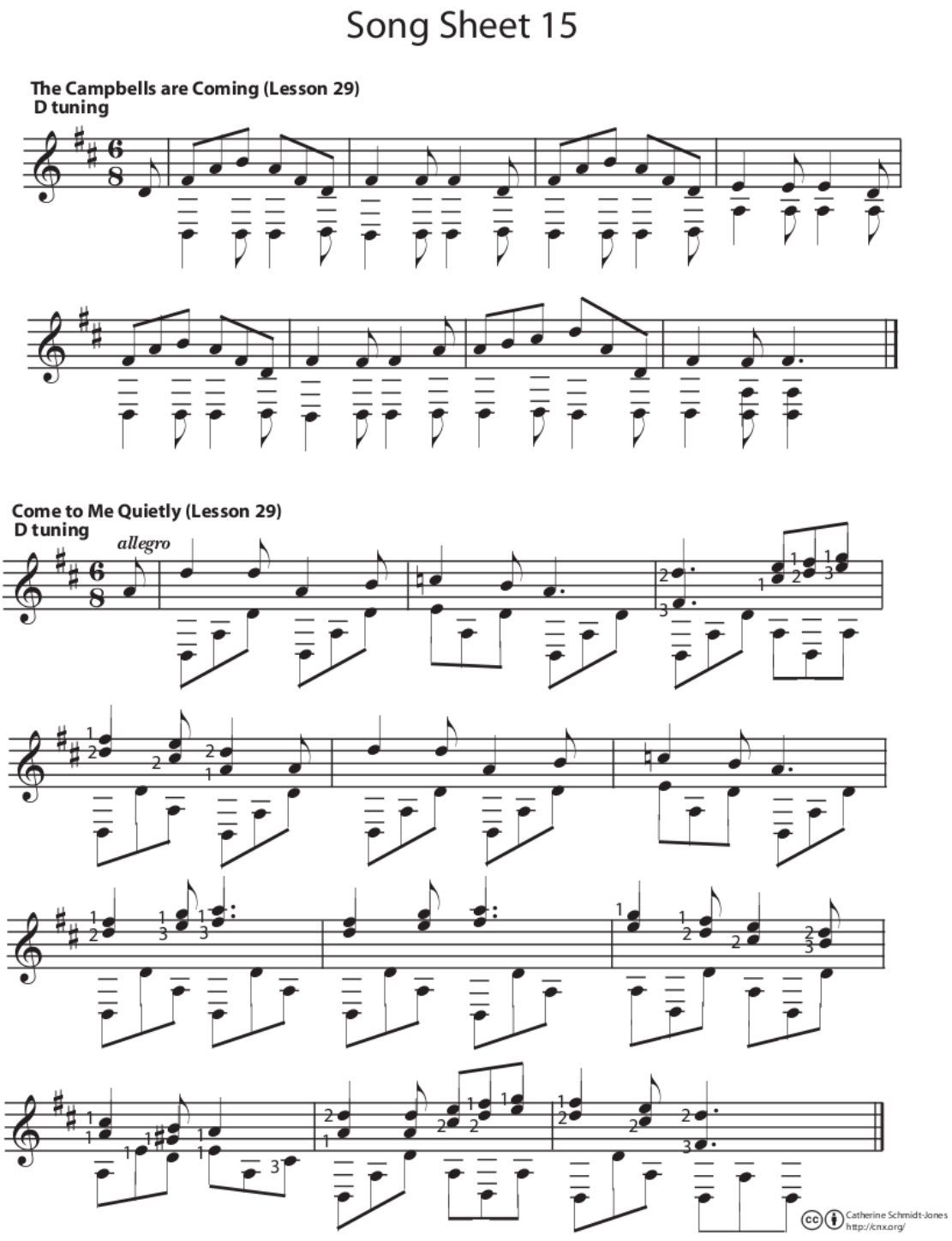

Song Sheet 15
The Campbells are Coming (Lesson 29)
D tuning
Come to Me Quietly (Lesson 29)
D tuning
allegro
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.123

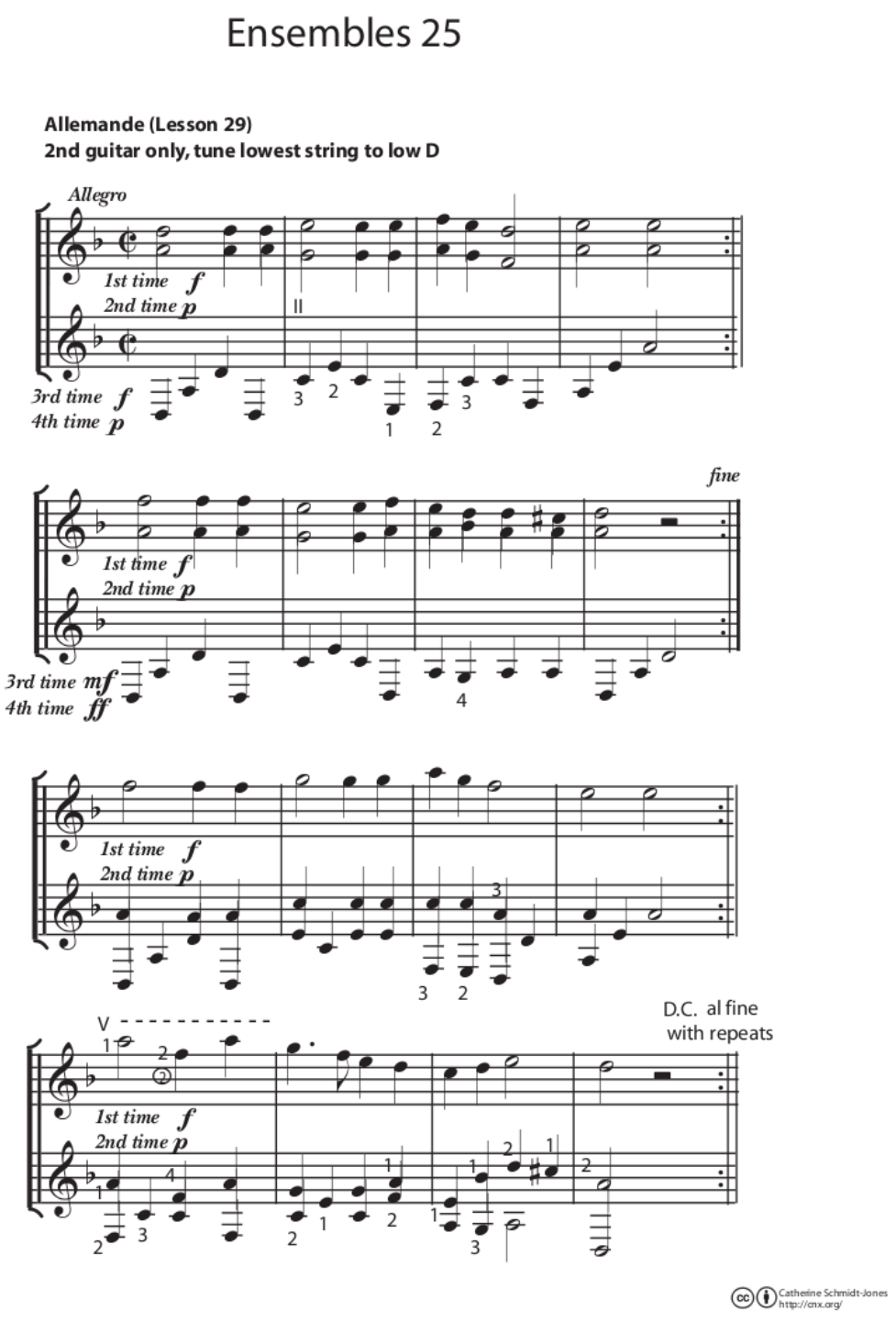

Ensembles 25
Allemande (Lesson 29)
2nd guitar only, tune lowest string to low D
Allegro
1st time f
2nd time p
3rd time f
4th time p
fine
1st time f
2nd time p
3rd time mf
4th time ff
1st time f
2nd time p
D.C. al fine
with repeats
1st time f
2nd time p
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.124

1.30 Guitar Lesson 30: Harmonics, and the Variety of Scales and Modes[156]

Please see Guitar Lesson 1 (Section 1.1) for notes about this course. Here are PDF files of the Lesson Page[157], the Home Practice Page[158], the Song Sheet[159], and the Ensemble Page[160] for this lesson.

[156] This content is available online at <http://cnx.org/content/m31431/1.1/>.
[157] See the file at <http://cnx.org/content/m31431/latest/30GuitarLesson.pdf>
[158] See the file at <http://cnx.org/content/m31431/latest/30GuitarPractice.pdf>
[159] See the file at <http://cnx.org/content/m31431/latest/SongSheet16.pdf>
[160] See the file at <http://cnx.org/content/m31431/latest/Ensemble26.pdf>

Lesson 30

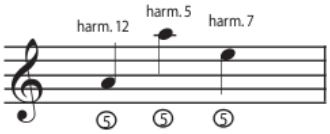
Guitar Technique

Guitarists play harmonics*
by touching the string very lightly
at the correct spot while it is being plucked.
On open strings^, harmonics can only be
played easily at the12th, 5th, and 7th frets.

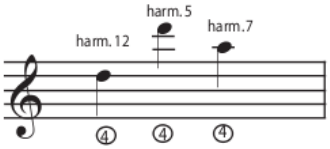
12th fret (1/2 string) sounds one octave higher,
5th fret (1/4 string) sounds two octaves higher,
7th fret (1/3 string) an octave and a fifth higher,
than the open string.

Touch the string firmly, but without holding it down,
directly over the fret.

Here are the easiest harmonics
to play on the A string:



Here are the easiest harmonics
to play on the D string:



Music Theory for Guitar

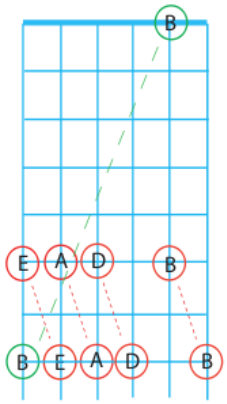
Some guitarists prefer to use harmonics to tune their guitars.
When done carefully, this can give a very accurate, pleasing tuning.

Tune the sixth string as usual.

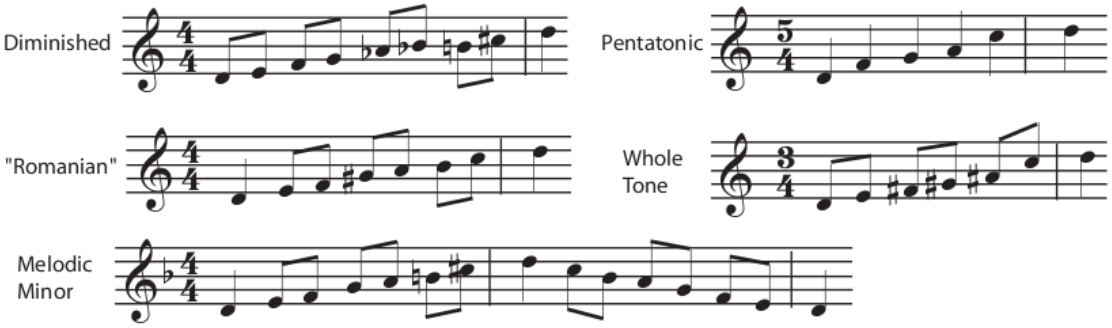
Then tune the fifth string by matching its 7th-fret harmonic
to the sixth string fifth-fret harmonic.

Follow the same procedure for all other strings except the second string.

The B string can be tuned by matching the open string
to the 7th fret of the harmonic of the sixth string.



There are many, many different types of scales^ that represent the notes used in different music genres.
You may find the same scale under different names, or different scales under the same name.
Compare the following possibilities to your D major, D natural minor, D harmonic minor, and D blues scales.



^More harmonics can be played by holding the string down at one fret while playing the harmonic at another,
but this is an advanced technique.

*learn more about harmonics:http://cnx.org/content/m11118/latest/
^learn more about other scales http://cnx.org/content/m11636/latest/

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Figure 1.125

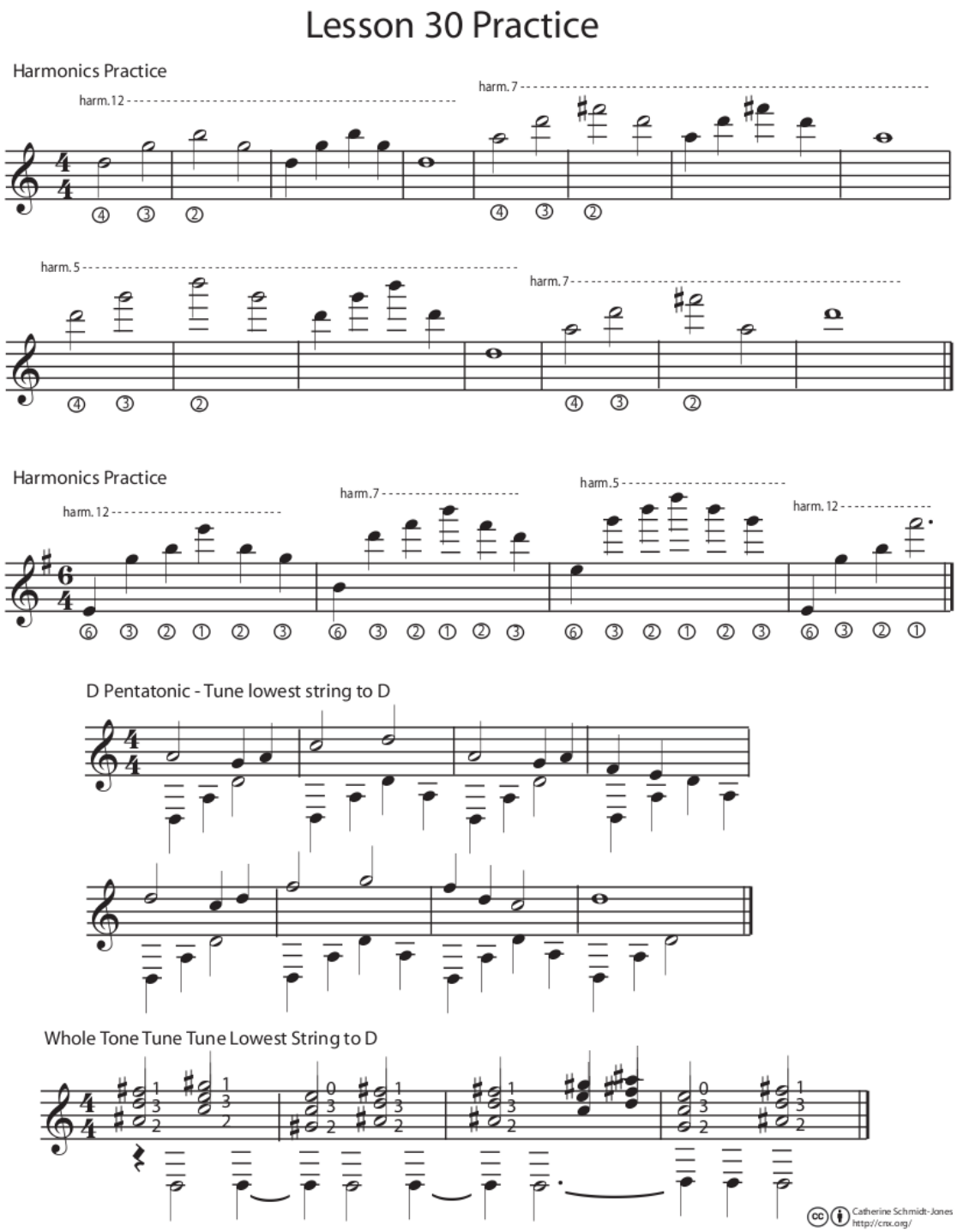

Lesson 30 Practice
Harmonics Practice
harm. 12
harm. 7
harm. 5
harm. 7
Harmonics Practice
harm. 12
harm. 7
harm. 5
harm. 12
D Pentatonic - Tune lowest string to D
Whole Tone Tune Tune Lowest String to D
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.126

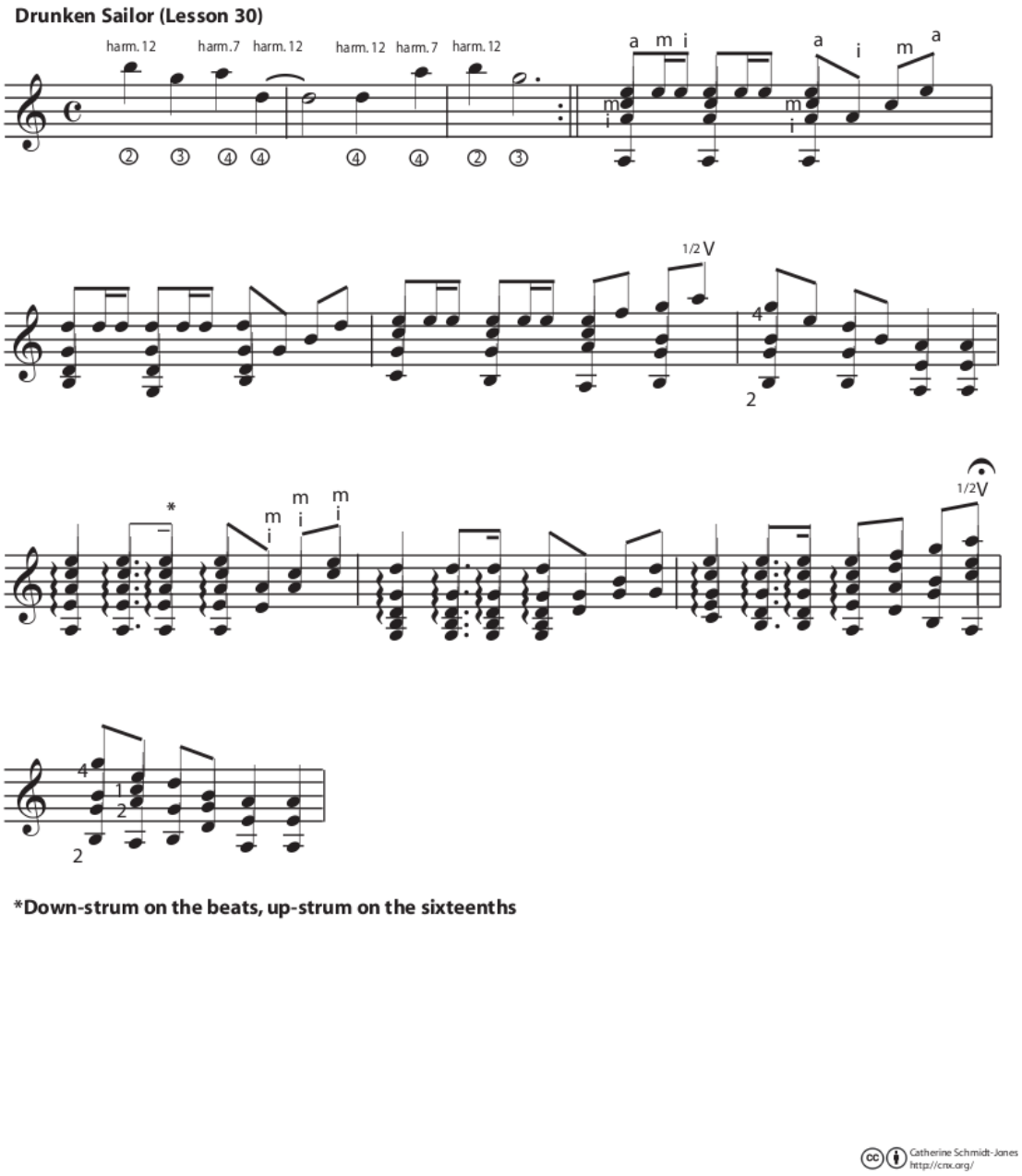

Song Sheet 16
Drunken Sailor (Lesson 30)
harm. 12
harm. 7
harm. 12
harm. 12
harm. 7
harm. 12
1/2 V
*Down-strum on the beats, up-strum on the sixteenths
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.127

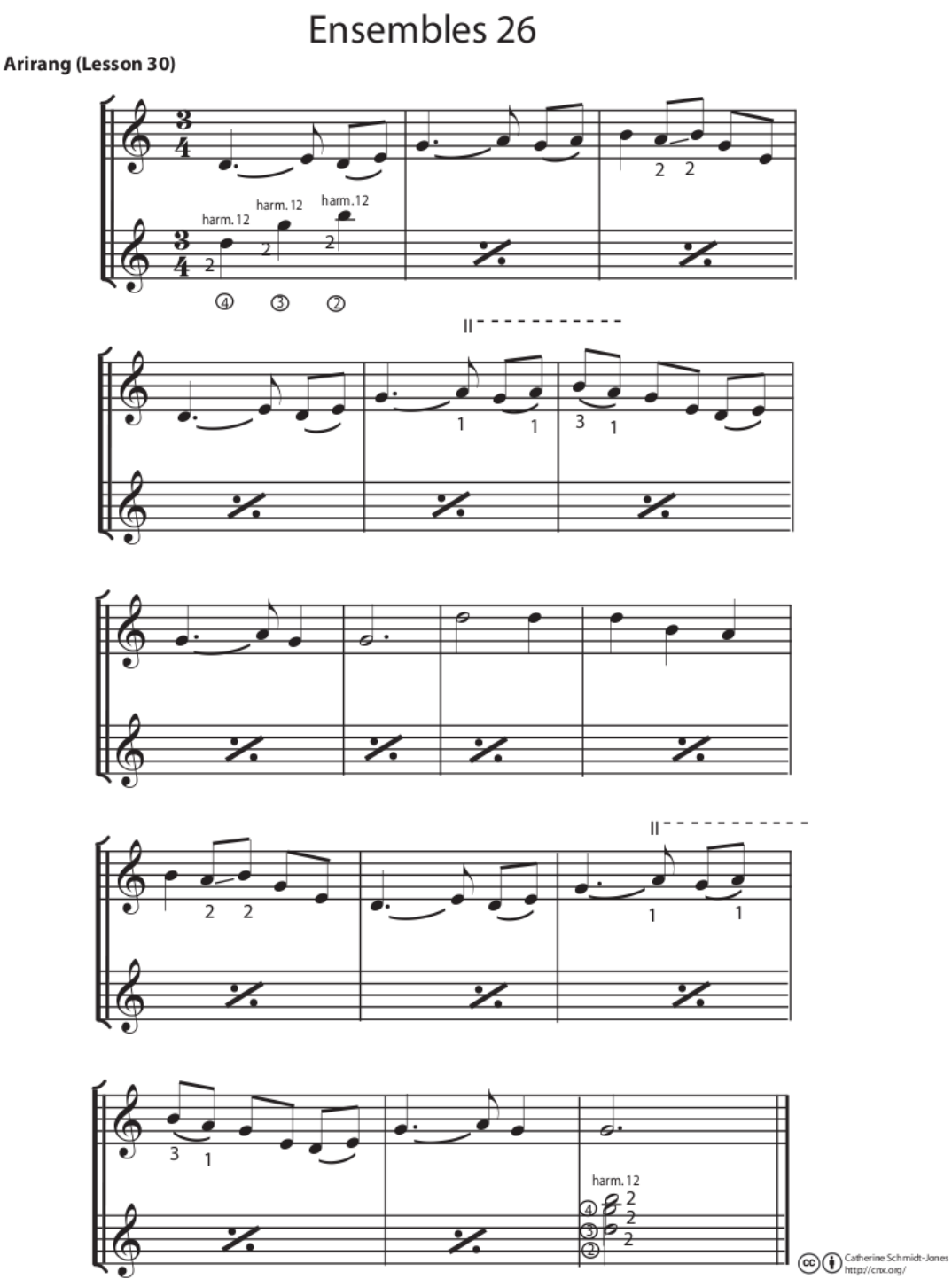

Ensembles 26
Arirang (Lesson 30)
harm. 12
harm. 12
harm. 12
Catherine Schmidt-Jones
http://cnx.org/

Figure 1.128

Chapter 2

Theory for the Beginning Guitarist

2.1 Clef[1]

2.1.1 Treble Clef and Bass Clef

The first symbol that appears at the beginning of every music staff[2] is a **clef symbol**. It is very important because it tells you which note (Section 2.3) (A, B, C, D, E, F, or G) is found on each line or space. For example, a **treble clef** symbol tells you that the second line from the bottom (the line that the symbol curls around) is "G". On any staff, the notes are always arranged so that the next letter is always on the next higher line or space. The last note letter, G, is always followed by another A.

Treble Clef

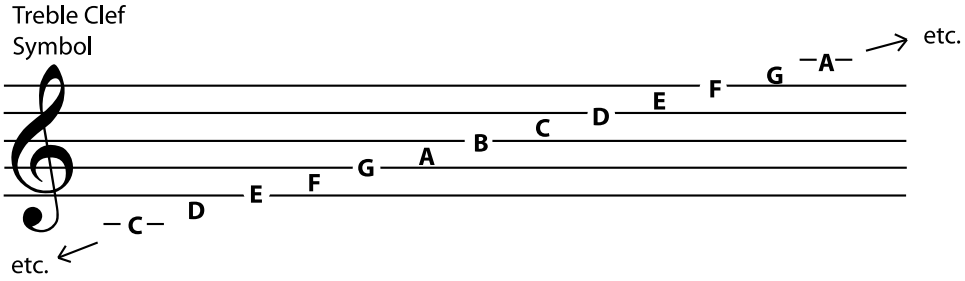


Figure 2.1

A **bass clef** symbol tells you that the second line from the top (the one bracketed by the symbol's dots) is F. The notes are still arranged in ascending order, but they are all in different places than they were in treble clef.

[1] This content is available online at <http://cnx.org/content/m10941/2.21/>.
[2] "The Staff" <http://cnx.org/content/m10880/latest/>

Bass Clef

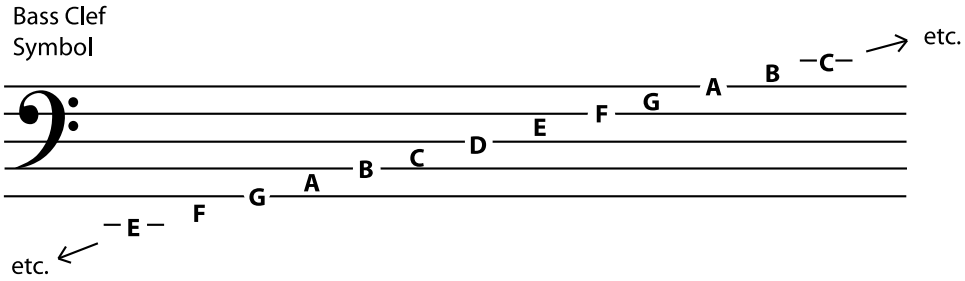


Figure 2.2

2.1.2 Memorizing the Notes in Bass and Treble Clef

One of the first steps in learning to read music in a particular clef is memorizing where the notes are. Many students prefer to memorize the notes and spaces separately. Here are some of the most popular mnemonics used.

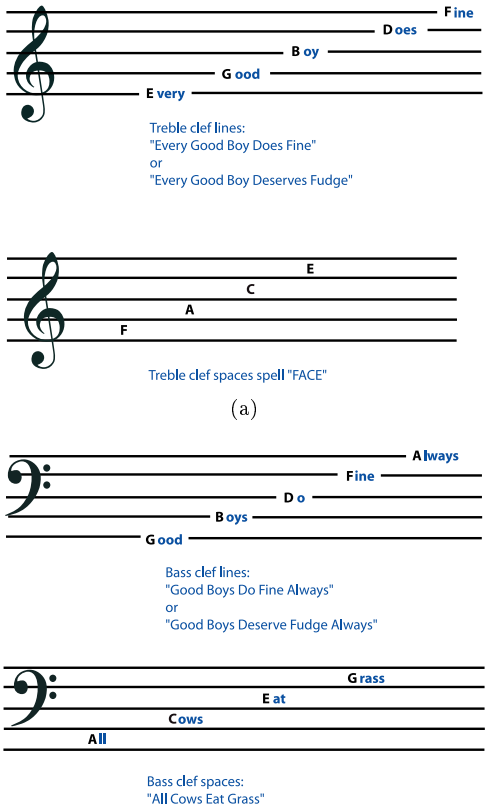


Figure 2.3: You can use a word or silly sentence to help you memorize which notes belong on the lines or spaces of a clef. If you don't like these ones, you can make up your own.

2.1.3 Moveable Clefs

Most music these days is written in either bass clef or treble clef, but some music is written in a **C clef**. The C clef is moveable: whatever line it centers on is a middle C[3].

[3] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/#p2bb>

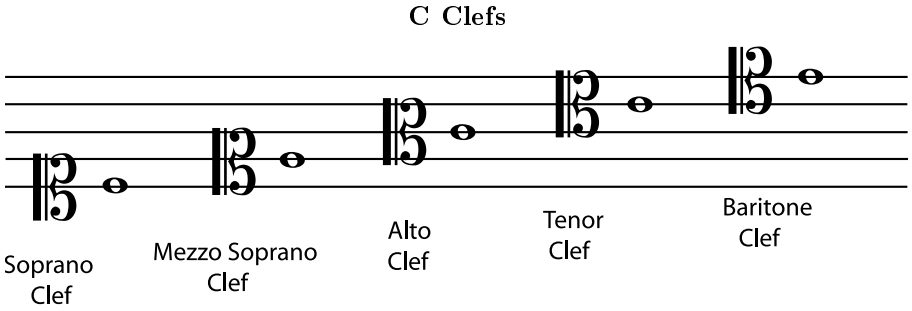


Figure 2.4: All of the notes on this staff are middle C.

The bass and treble clefs were also once moveable, but it is now very rare to see them anywhere but in their standard positions. If you do see a treble or bass clef symbol in an unusual place, remember: treble clef is a **G clef**; its spiral curls around a G. Bass clef is an **F clef**; its two dots center around an F.

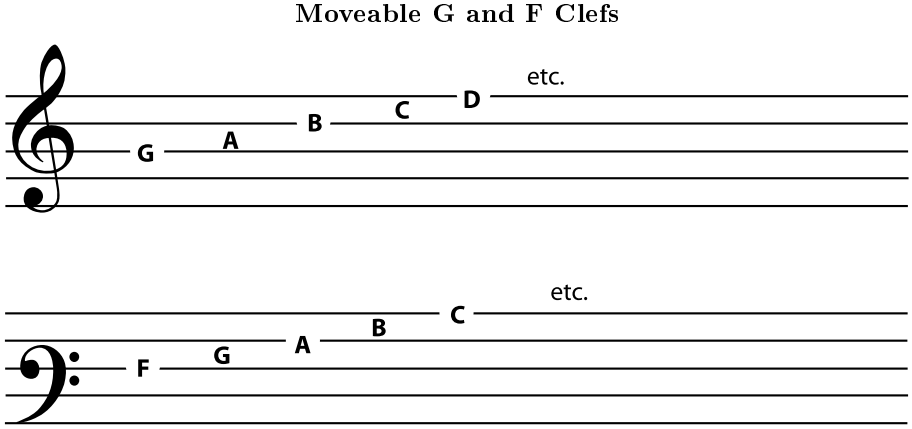


Figure 2.5: It is rare these days to see the G and F clefs in these nonstandard positions.

Much more common is the use of a treble clef that is meant to be read one octave below the written pitch. Since many people are uncomfortable reading bass clef, someone writing music that is meant to sound in the region of the bass clef may decide to write it in the treble clef so that it is easy to read. A very small "8" at the bottom of the treble clef symbol means that the notes should sound one octave lower than they are written.

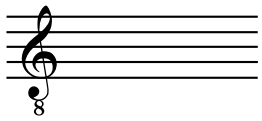


Figure 2.6: A small "8" at the bottom of a treble clef means that the notes should sound one octave lower than written.

2.1.4 Why use different clefs?

Music is easier to read and write if most of the notes fall on the staff and few ledger lines[4] have to be used.

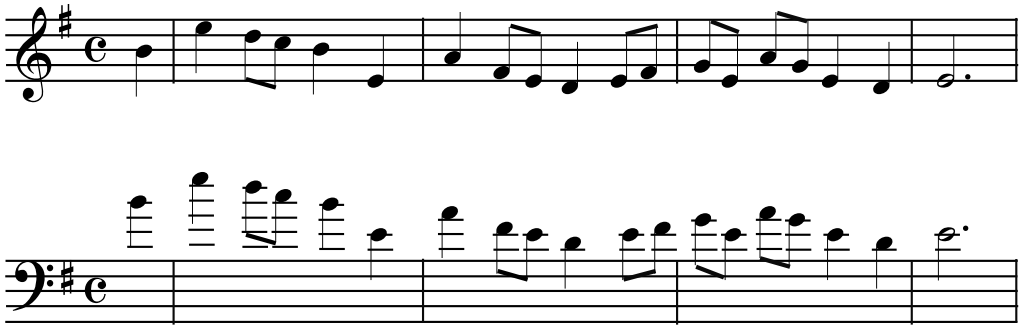


Figure 2.7: These scores show the same notes written in treble and in bass clef. The staff with fewer ledger lines is easier to read and write.

The G indicated by the treble clef is the G above middle C[5], while the F indicated by the bass clef is the F below middle C. (C clef indicates middle C.) So treble clef and bass clef together cover many of the notes that are in the range[6] of human voices and of most instruments. Voices and instruments with higher ranges usually learn to read treble clef, while voices and instruments with lower ranges usually learn to read bass clef. Instruments with ranges that do not fall comfortably into either bass or treble clef may use a C clef or may be transposing instruments[7].

[4] "The Staff" <http://cnx.org/content/m10880/latest/#p1a>
[5] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/#p2bb>
[6] "Range" <http://cnx.org/content/m12381/latest/>
[7] "Transposing Instruments" <http://cnx.org/content/m10672/latest/>

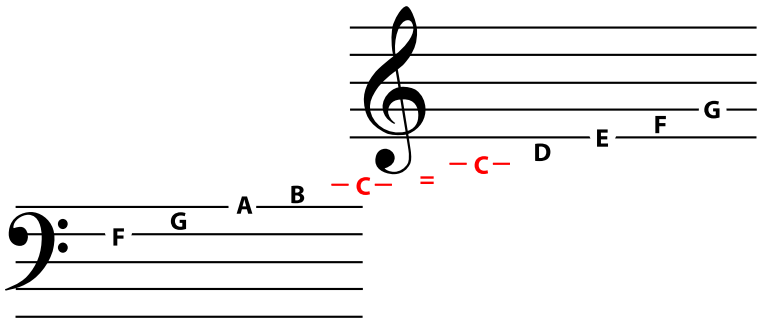


Figure 2.8: Middle C is above the bass clef and below the treble clef; so together these two clefs cover much of the range of most voices and instruments.

Exercise 2.1.1 *(Solution on p. 276.)*

Write the name of each note below the note on each staff in Figure 2.9.

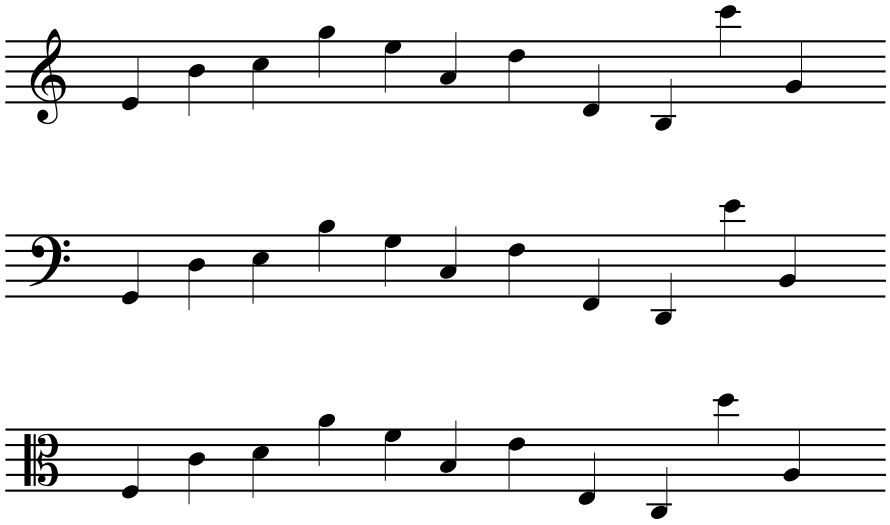


Figure 2.9

Exercise 2.1.2 *(Solution on p. 276.)*

Choose a clef in which you need to practice recognizing notes above and below the staff in Figure 2.10. Write the clef sign at the beginning of the staff, and then write the correct note names below each note.

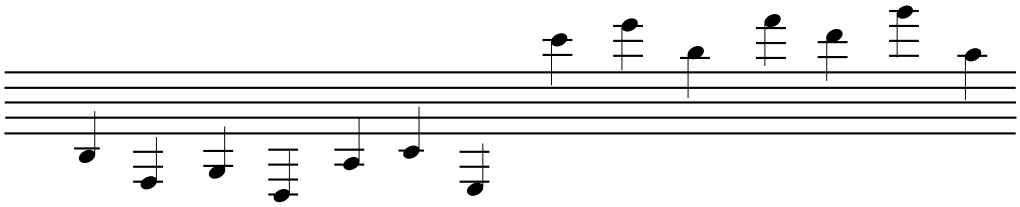


Figure 2.10

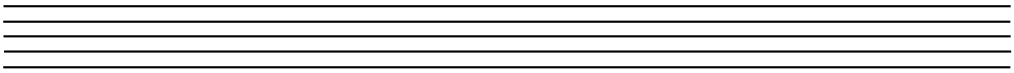
Exercise 2.1.3 ***(Solution on p. 277.)***

Figure 2.11 gives more exercises to help you memorize whichever clef you are learning. You may print these exercises as a PDF worksheet[8] if you like.

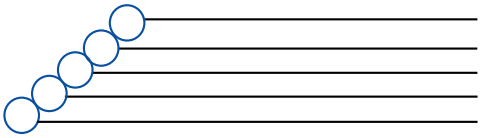
[8]See the file at <http://cnx.org/content/m10941/latest/ClefWorksheet.pdf>

Clef Practice

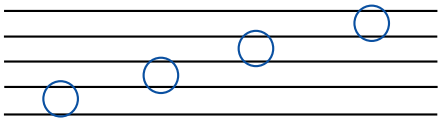
Practice writing your clef symbol on this staff. Write at least eight clef symbols



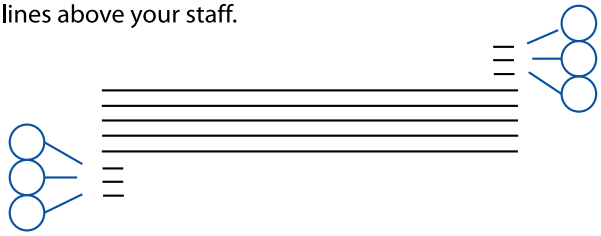
Write the letter names of the lines in your staff:



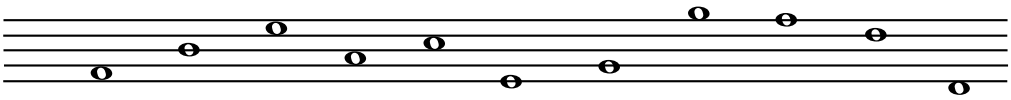
Write the letter names of the spaces:



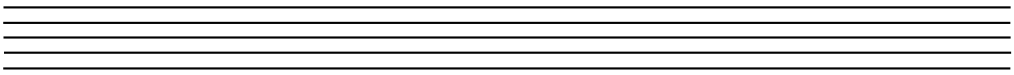
Write the letter names of the three ledger lines below
and the three ledger lines above your staff.



Write your clef symbol at the beginning of this line.
Then write the correct letter name above each note.



Write your clef symbol at the beginning of this line.
Then write a note in the staff for each letter below the staff.



C G F D E A B

Figure 2.11

2.2 Time Signature[9]

In common notation[10], the **time signature** appears at the beginning of a piece of music, right after the key signature (Section 2.9). Unlike the key signature, which is on every staff[11], the time signature will not appear again in the music unless the meter changes. The meter[12] of a piece is a repetitive rhythmic pulse that underlies the music. The time signature is the symbol that tells you what meter is being used in a piece of music and what types of note (Section 2.3)) are being used to write it out.

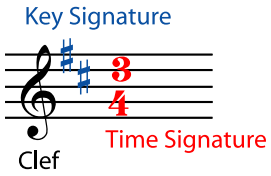


Figure 2.12: The time signature appears at the beginning of the piece of music, right after the clef symbol and key signature.

2.2.1 Beats and Measures

Music happens over a period of time, so a very common way to organize music is to divide that time into short periods of the same length, using audible pulses called **beats**. Each pulse is **a beat**, and the regular, predictable pulse of a piece of music is **the beat**. The beat is created when the musicians do things (like hit a drum, strum a guitar, or start singing a word) at very regular intervals. This creates an audible, predictable pulse that helps the musicians to coordinate what they are doing so that they sound good together. The predictability and audibility of the beat also allows others to join in. As soon as listeners can "feel the beat," they can clap hands, snap fingers, tap their feet, nod their heads, march, dance, or sing along "in time" with the music (in other words, coordinated with the musicians). Anything that happens during the audible pulse (a clap or drum hit, for example), as well as anything that starts during a pulse (such as a sung word, or a note on a flute or violin) is said to be **on the beat**. Of course, things can happen in between the beats, too, but the timing for those is also coordinated using the beats; for example, a note might begin at exactly the halfway point between two beats.

NOTE: Not all music has beats and a time signature. In music with a **free** rhythm or meter, there is no time signature, and no regular pulse to the music; the musicians are free to play or sing a note at whatever time they feel is best. Other pieces may have a written time signature, to help the musicians keep track of time, but the musical events in the piece do not give it an audible beat.

Example 2.1
Listen to excerpts A, B, C and D. Can you clap your hands, tap your feet, or otherwise move "to the beat"? Is there a piece in which it is easier or harder to feel the beat?

- A[13]

[9] This content is available online at <http://cnx.org/content/m10956/2.15/>.
[10] "The Staff" <http://cnx.org/content/m10880/latest/>
[11] "The Staff" <http://cnx.org/content/m10880/latest/>
[12] "Meter in Music" <http://cnx.org/content/m12405/latest/>
[13] See the file at <http://cnx.org/content/m10956/latest/Tanz.mp3>

- B[14]
- C[15]
- D[16]

When music is organized into beats, it makes sense to write it down that way. In common notation[17], the composer assigns a particular kind of note to be one beat long. For example, if "a quarter note gets a beat," then playing many quarter notes in a row would mean playing a new note on every beat. The quarter note is most likely to play this role, but any type of note (Section 2.3) can get the "this is one beat" designation.

In most metered music, some of the beats are stronger (louder, more powerful, more noticeable, or busier), than others, and there is a regular pattern of stronger and weaker beats, for example, strong-weak-weak-strong-weak-weak, or strong-weak-strong-weak. So the beats are organized even further by grouping them into **bars**, or **measures**. (The two words mean the same thing.) For example, for music with a beat pattern of strong-weak-weak-strong-weak-weak, or 1-2-3-1-2-3, a measure would have three beats in it. The **time signature** tells you two things: how many beats there are in each measure, and what type of note (Section 2.3) gets a beat.

Reading the Time Signature

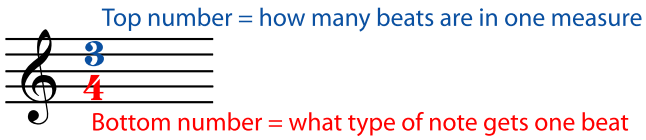


Figure 2.13: This time signature means that there are three quarter notes (or any combination of notes that equals three quarter notes) in every measure. A piece with this time signature would be "in three four time" or just "in three four".

Exercise 2.2.1 ***(Solution on p. 279.)***

Listen again to the music in Example 2.1. Instead of clapping, count each beat. Decide whether the music has 2, 3, or 4 beats per measure. In other words, does it feel more natural to count 1-2-1-2, 1-2-3-1-2-3, or 1-2-3-4-1-2-3-4?

2.2.2 Reading Time Signatures

Most time signatures contain two numbers. The top number tells you how many beats there are in a measure. The bottom number tells you what kind of note gets a beat.

[14] See the file at <http://cnx.org/content/m10956/latest/EasyWinners.MID>
[15] See the file at <http://cnx.org/content/m10956/latest/Jetztkommt.MID>
[16] See the file at <http://cnx.org/content/m10956/latest/Greensleeves.mp3>
[17] "The Staff" <http://cnx.org/content/m10880/latest/>

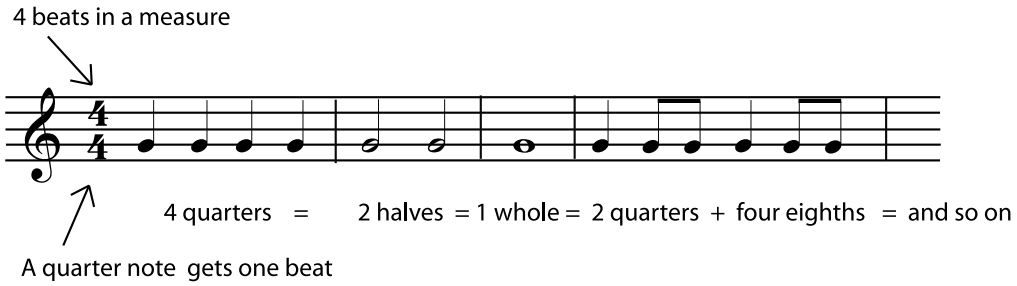


Figure 2.14: In "four four" time, there are four beats in a measure and a quarter note gets a beat. In order to keep the meter going steadily, every measure must have a combination of notes and rests that is equivalent to four quarter notes.

You may have noticed that the time signature looks a little like a fraction in arithmetic. Filling up measures feels a little like finding equivalent fractions[18], too. In "four four time", for example, there are four beats in a measure and a quarter note gets one beat. So four quarter notes would fill up one measure. But so would any other combination of notes and rests (Section 2.4) that equals four quarters: one whole, two halves, one half plus two quarters, a half note and a half rest, and so on.

Example 2.2

If the time signature is three eight, any combination of notes that adds up to three eighths will fill a measure. Remember that a dot[19] is worth an extra half of the note it follows. Listen[20] to the rhythms in Figure 2.15.

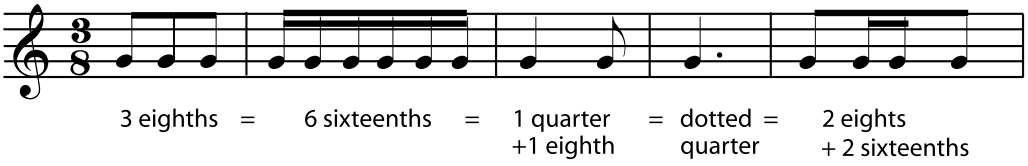


Figure 2.15: If the time signature is three eight, a measure may be filled with any combination of notes and rests that adds up to three eight.

Exercise 2.2.2 ***(Solution on p. 279.)***

Write each of the time signatures below (with a clef symbol) at the beginning of a staff. Write at least four measures of music in each time signature. Fill each measure with a different combination of note lengths. Use at least one dotted note on each staff. If you need some staff paper, you can download this PDF file[21].

1. Two four time
2. Three eight time

[18] "Fractions, Multiples, Beats, and Measures" <http://cnx.org/content/m11807/latest/>
[19] "Dots, Ties, and Borrowed Divisions" <http://cnx.org/content/m11888/latest/>
[20] See the file at <http://cnx.org/content/m10956/latest/timesig1.MID>
[21] See the file at <http://cnx.org/content/m10956/latest/staffpaper1.pdf>

3. Six four time

A few time signatures don't have to be written as numbers. Four four time is used so much that it is often called **common time**, written as a bold "C". When both fours are "cut" in half to twos, you have **cut time**, written as a "C" cut by a vertical slash.

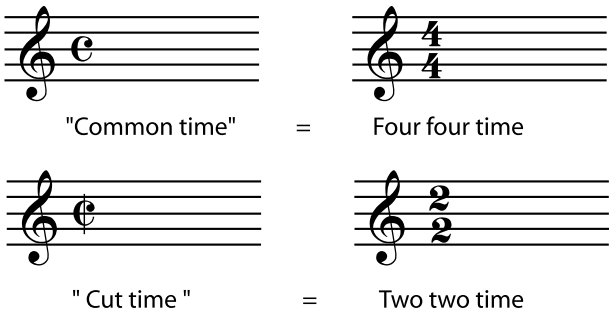


Figure 2.16

2.2.3 Counting and Conducting

You may have already noticed that a measure in four four time looks the same as a measure in two two. After all, in arithmetic, four quarters adds up to the same thing as two halves. For that matter, why not call the time signature "one one" or "eight eight"?

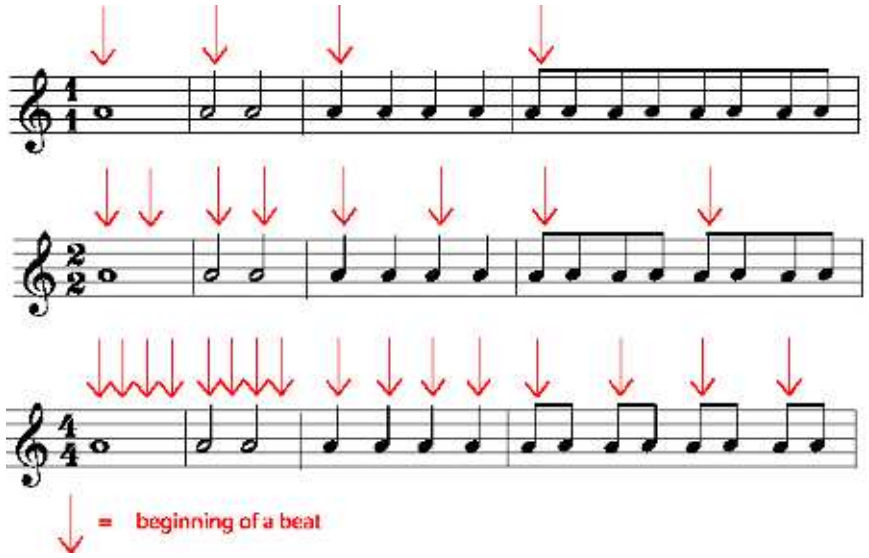


Figure 2.17: Measures in all of these meters look the same, but feel different. The difference is how many downbeats there are in a measure.

Or why not write two two as two four, giving quarter notes the beat instead of half notes? The music would look very different, but it would sound the same, as long as you made the beats the same speed. The music in each of the staves in Figure 2.18 would sound like this[22].

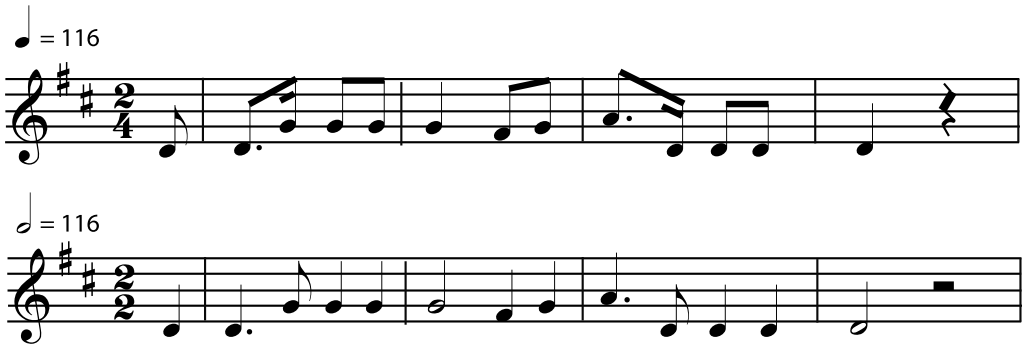


Figure 2.18: The music in each of these staves should sound exactly alike.

So why is one time signature chosen rather than another? The composer will normally choose a time signature that makes the music easy to read and also easy to count and conduct[23]. Does the music feel like

[22] See the file at <http://cnx.org/content/m10956/latest/14k.mid>
[23] "Conducting" <http://cnx.org/content/m12404/latest/>

it has four beats in every measure, or does it go by so quickly that you only have time to tap your foot twice in a measure?

A common exception to this rule of thumb is six eight time, and the other time signatures (for example nine eight and twelve eight) that are used to write compound meters[24]. A piece in six eight might have six beats in every measure, with an eighth note getting a beat. But it is more likely that the conductor (or a tapping foot) will give only two beats per measure, with a dotted quarter (or three eighth notes) getting one beat. In the same way, three eight may only have one beat per measure; nine eight, three beats per measure; and twelve eight, four beats per measure. Why the exceptions? Since beats normally get divided into halves and quarters, this is the easiest way for composers to write beats that are divided into thirds.

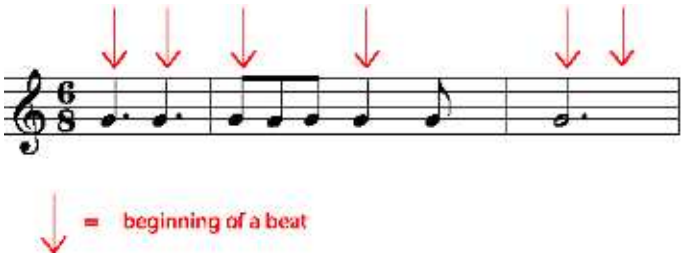


Figure 2.19: In six eight time, a dotted quarter usually gets one beat. This is the easiest way to write beats that are evenly divided into three rather than two.

2.3 Duration: Note Lengths in Written Music[25]

2.3.1 The Shape of a Note

In standard notation, a single musical sound is written as a **note**. The two most important things a written piece of music needs to tell you about a note are its pitch - how high or low it is - and its **duration** - how long it lasts.

To find out the pitch (Section 2.6) of a written note, you look at the clef (Section 2.1) and the key signature (Section 2.9), then see what line or space the note is on. The higher a note sits on the staff[26], the higher it sounds. To find out the duration of the written note, you look at the tempo (Section 2.21) and the time signature (Section 2.2) and then see what the note looks like.

[24] "Meter in Music" <http://cnx.org/content/m12405/latest/>
[25] This content is available online at <http://cnx.org/content/m10945/2.14/>.
[26] "The Staff" <http://cnx.org/content/m10880/latest/>

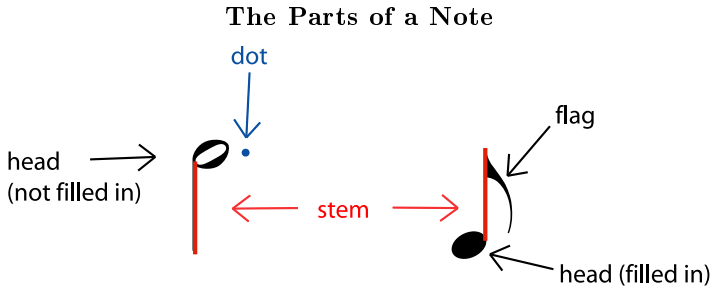


Figure 2.20: All of the parts of a written note affect how long it lasts.

The pitch of the note depends only on what line or space the **head** of the note is on. (Please see pitch (Section 2.6) , clef (Section 2.1) and key signature (Section 2.9) for more information.) If the note does not have a head (see Figure 2.21 (Notes Without Heads)), that means that it does not have one definite pitch.

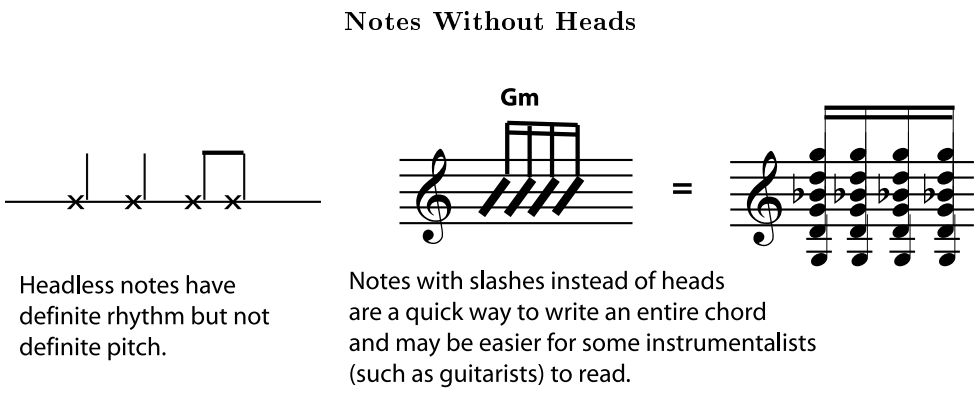


Figure 2.21: If a note does not have head, it does not have one definite pitch. Such a note may be a pitchless sound, like a drum beat or a hand clap, or it may be an entire chord rather than a single note.

The head of the note may be filled in (black), or not. The note may also have (or not) a stem, one or more flags, beams connecting it to other notes, or one or more dots following the head of the note. All of these things affect how much time the note is given in the music.

NOTE: A dot that is someplace other than next to the head of the note **does not affect the rhythm**. Other dots are articulation[27] marks. They may affect the actual length of the note (the amount of time it sounds), but do not affect the amount of time it must be given. (The extra time when the note could be sounding, but isn't, becomes an unwritten rest (Section 2.4).) If this is confusing, please see the explanation in articulation[28].

[27] "Articulation" <http://cnx.org/content/m11884/latest/>
[28] "Articulation" <http://cnx.org/content/m11884/latest/>

2.3.2 The Length of a Note

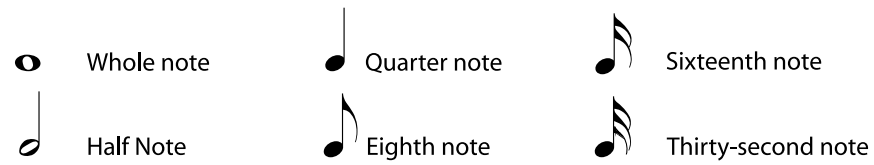


Figure 2.22

The simplest-looking note, with no stems or flags, is a **whole note**. All other note lengths are defined by how long they last compared to a whole note. A note that lasts half as long as a whole note is a **half note**. A note that lasts a quarter as long as a whole note is a **quarter note**. The pattern continues with **eighth notes**, **sixteenth notes**, **thirty-second notes**, **sixty-fourth notes**, and so on, each type of note being half the length of the previous type. (There are no such thing as third notes, sixth notes, tenth notes, etc.; see Dots, Ties, and Borrowed Divisions[29] to find out how notes of unusual lengths are written.)

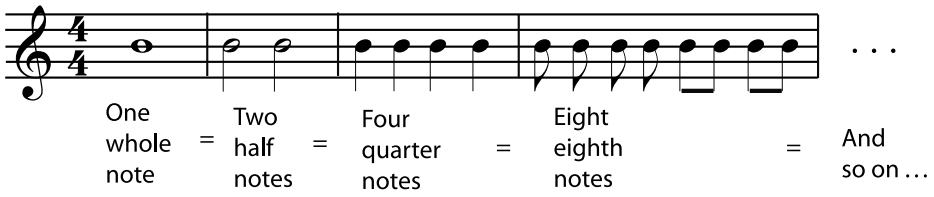


Figure 2.23: Note lengths work just like fractions in arithmetic: two half notes or four quarter notes last the same amount of time as one whole note. Flags are often replaced by beams that connect the notes into easy-to-read groups.

You may have noticed that some of the eighth notes in Figure 2.23 don't have flags; instead they have a **beam** connecting them to another eighth note. If flagged notes are next to each other, their flags can be replaced by beams that connect the notes into easy-to-read groups. The beams may connect notes that are all in the same beat, or, in some vocal music, they may connect notes that are sung on the same text syllable. Each note will have the same number of beams as it would have flags.

[29] "Dots, Ties, and Borrowed Divisions" <http://cnx.org/content/m11888/latest/>

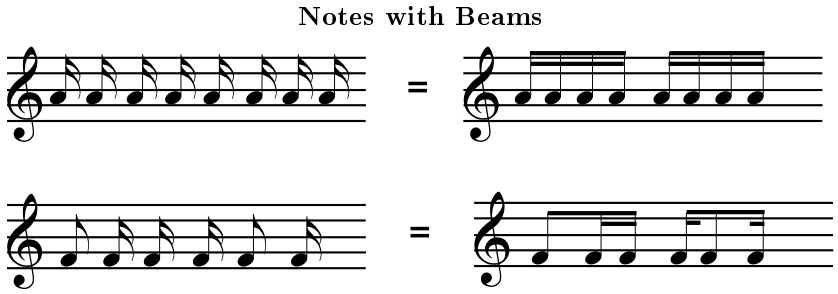


Figure 2.24: The notes connected with beams are easier to read quickly than the flagged notes. Notice that each note has the same number of beams as it would have flags, even if it is connected to a different type of note. The notes are often (but not always) connected so that each beamed group gets one beat. This makes the notes easier to read quickly.

You may have also noticed that the note lengths sound like fractions in arithmetic. In fact they work very much like fractions: two half notes will be equal to (last as long as) one whole note; four eighth notes will be the same length as one half note; and so on. (For classroom activities relating music to fractions, see Fractions, Multiples, Beats, and Measures[30].)

Example 2.3

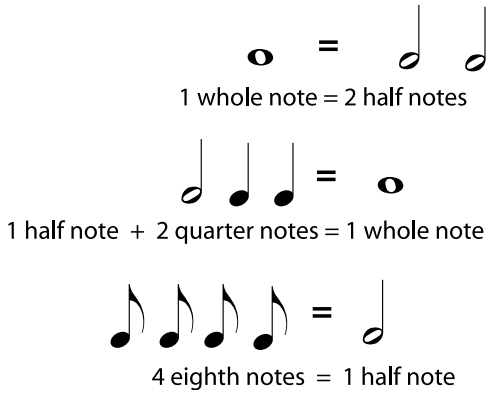


Figure 2.25

Exercise 2.3.1 ***(Solution on p. 280.)***

Draw the missing notes and fill in the blanks to make each side the same duration (length of time).

[30] "Fractions, Multiples, Beats, and Measures" <http://cnx.org/content/m11807/latest/>

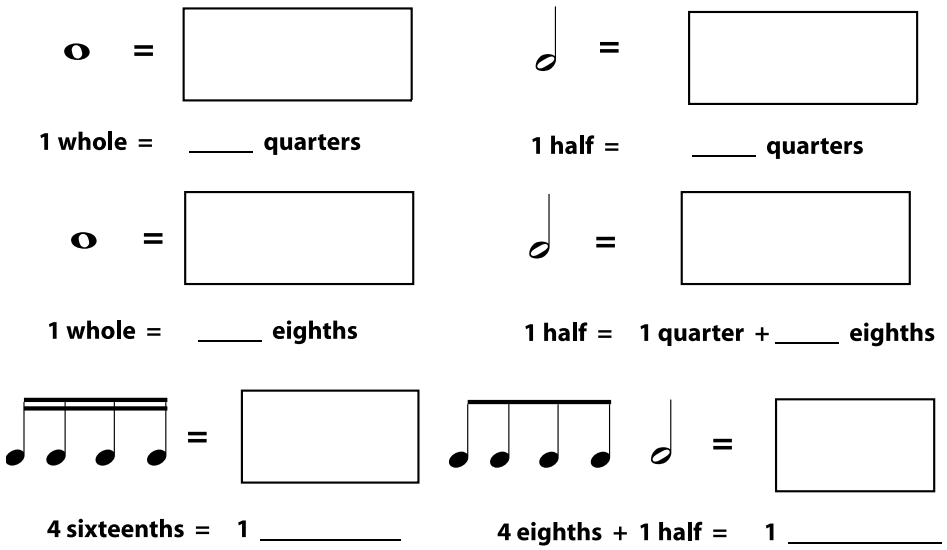


Figure 2.26

So how long does each of these notes actually last? That depends on a couple of things. A written note lasts for a certain amount of time measured in beats (Section 2.2.1: Beats and Measures). To find out exactly how many beats it takes, you must know the time signature (Section 2.2). And to find out how long a beat is, you need to know the tempo (Section 2.21).

Example 2.4

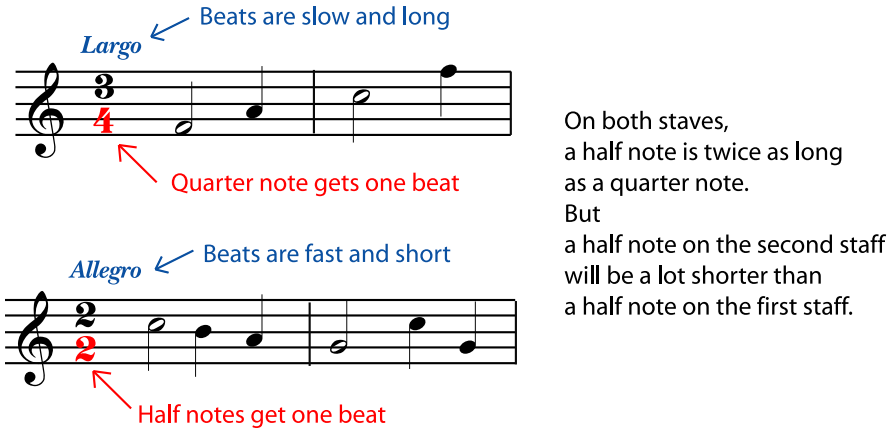


Figure 2.27: In any particular section of a piece of music, a half note is always twice as long as a quarter note. But how long each note actually lasts depends on the time signature and the tempo.

2.3.3 More about Stems

Whether a stem points up or down does not affect the note length at all. There are two basic ideas that lead to the rules for stem direction. One is that the music should be as easy as possible to read and understand. The other is that the notes should tend to be "in the staff" as much as reasonably possible.

Basic Stem Direction Rules

1. **Single Notes** - Notes below the middle line of the staff should be stem up. Notes on or above the middle line should be stem down.
2. **Notes sharing a stem (block chords)** - Generally, the stem direction will be the direction for the note that is furthest away from the middle line of the staff
3. **Notes sharing a beam** - Again, generally you will want to use the stem direction of the note farthest from the center of the staff, to keep the beam near the staff.
4. **Different rhythms being played at the same time by the same player** - Clarity requires that you write one rhythm with stems up and the other stems down.
5. **Two parts for different performers written on the same staff** - If the parts have the same rhythm, they may be written as block chords. If they do not, the stems for one part (the "high" part or "first" part) will point up and the stems for the other part will point down. This rule is especially important when the two parts cross; otherwise there is no way for the performers to know that the "low" part should be reading the high note at that spot.

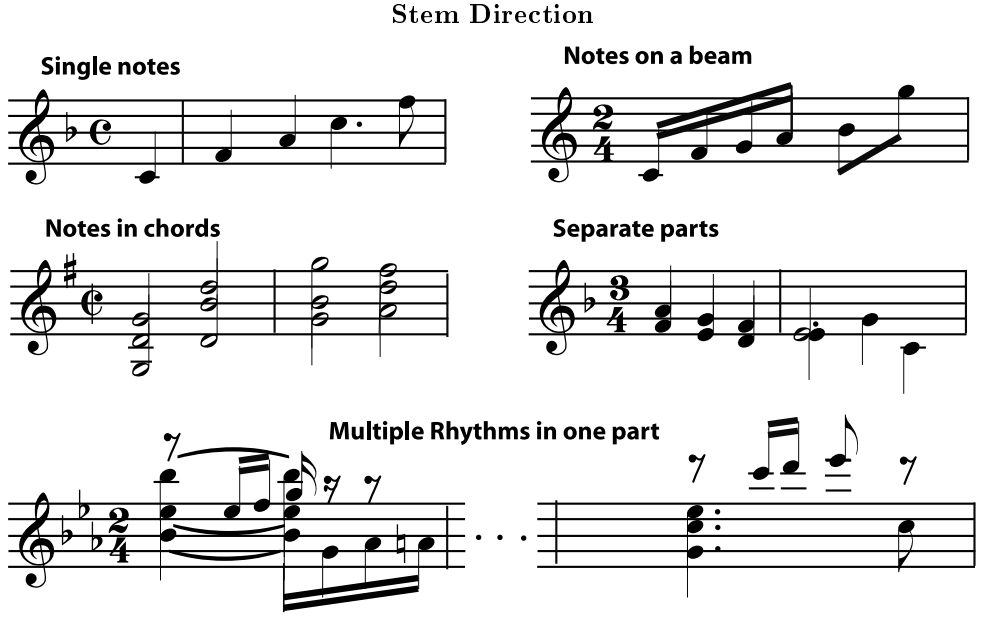


Figure 2.28: Keep stems and beams in or near the staff, but also use stem direction to clarify rhythms and parts when necessary.

2.4 Duration: Rest Length[31]

A **rest** stands for a silence in music. For each kind of note (Section 2.3), there is a written rest of the same length.

The Most Common Rests

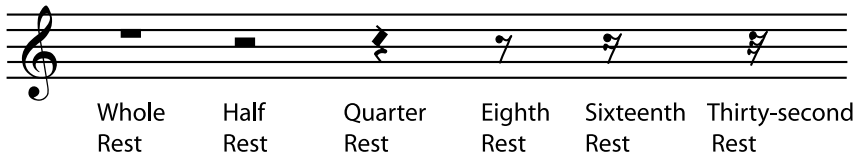


Figure 2.29

Exercise 2.4.1 ***(Solution on p. 280.)***

For each note on the first line, write a rest of the same length on the second line. The first measure (Section 2.2.1: Beats and Measures) is done for you.

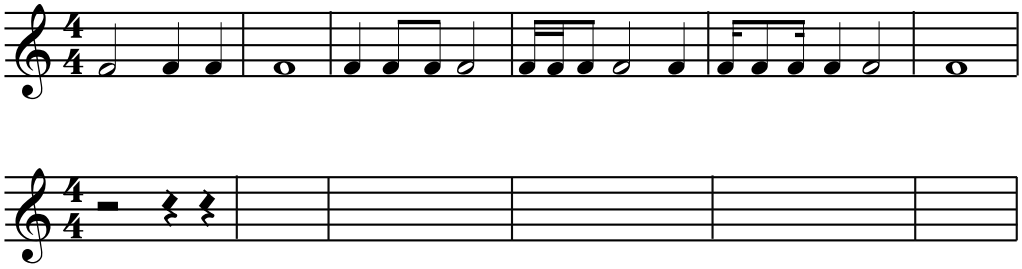


Figure 2.30

Rests don't necessarily mean that there is silence in the music at that point; only that that part is silent. Often, on a staff[32] with multiple parts, a rest must be used as a placeholder for one of the parts, even if a single person is playing both parts. When the rhythms are complex, this is necessary to make the rhythm in each part clear.

[31] This content is available online at <http://cnx.org/content/m11887/1.9/>.
[32] "The Staff" <http://cnx.org/content/m10880/latest/>

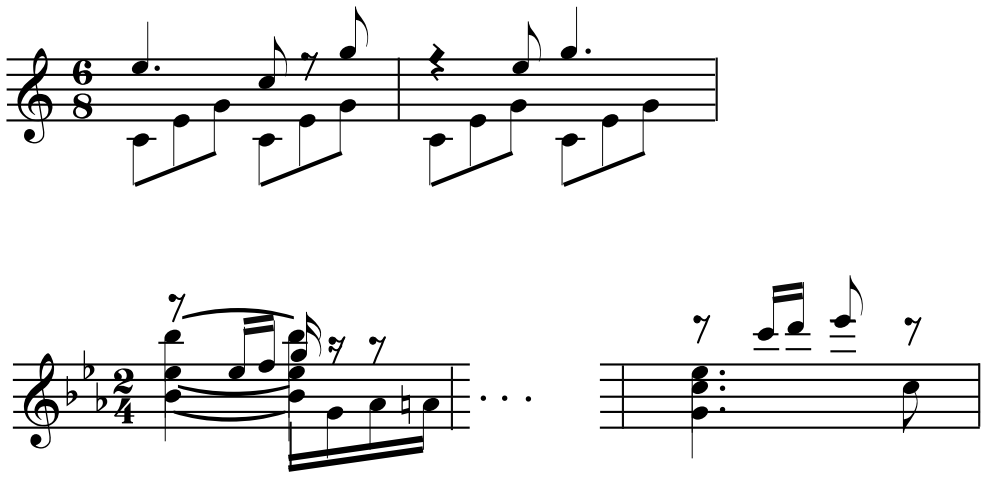


Figure 2.31: When multiple simultaneous rhythms are written on the same staff, rests may be used to clarify individual rhythms, even if another rhythm contains notes at that point.

The normal rule in common notation is that, for any line of music, the notes and rests in each measure must "add up" to exactly the amount in the time signature (Section 2.2), no more and no less. For example, in 3/4 time, a measure can have any combination of notes and rests that is the same length as three quarter notes. There is only one common exception to this rule. As a simplifying shorthand, a completely silent measure can simply have a whole rest. In this case, "whole rest" does not necessarily mean "rest for the same length of time as a whole note"; it means "rest for the entire measure".

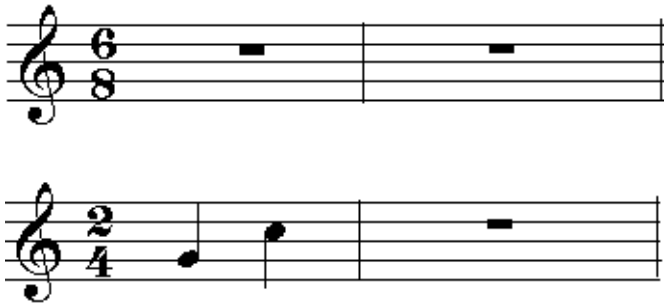


Figure 2.32: A whole rest may be used to indicate a completely silent measure, no matter what the actual length of the measure will be.

2.5 Pickup Notes and Measures[33]

2.5.1 Pickup Measures

Normally, all the measures[34] of a piece of music must have exactly the number of beats (Section 2.2.1: Beats and Measures) indicated in the time signature (Section 2.2). The beats may be filled with any combination of notes or rests (with duration (Section 2.3) values also dictated by the time signature), but they must combine to make exactly the right number of beats. If a measure or group of measures has more or fewer beats, the time signature must change.

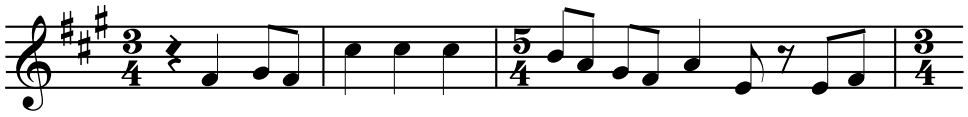


Figure 2.33: Normally, a composer who wants to put more or fewer beats in a measure must change the time signature, as in this example from Mussorgsky's *Boris Godunov*.

There is one common exception to this rule. (There are also some less common exceptions not discussed here.) Often, a piece of music does not begin on the strongest downbeat (p. 170). Instead, the strong beat that people like to count as "one" (the beginning of a measure), happens on the second or third note, or even later. In this case, the first measure may be a full measure that begins with some rests. But often the first measure is simply not a full measure. This shortened first measure is called a **pickup measure**.

If there is a pickup measure, the final measure of the piece should be shortened by the length of the pickup measure (although this rule is sometimes ignored in less formal written music). For example, if the meter[35] of the piece has four beats, and the pickup measure has one beat, then the final measure should have only three beats. (Of course, any combination of notes and rests can be used, as long as the total in the first and final measures equals one full measure.

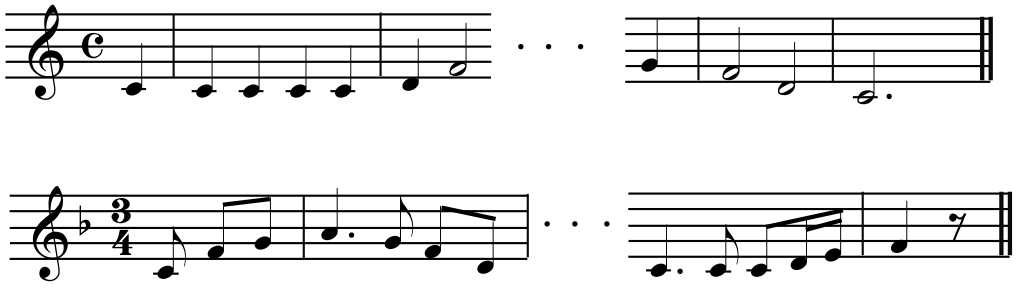


Figure 2.34: If a piece begins with a pickup measure, the final measure of the piece is shortened by the length of the pickup measure.

[33] This content is available online at <http://cnx.org/content/m12717/1.8/>.
[34] "The Staff": Section The Staff <http://cnx.org/content/m10880/latest/#s1>
[35] "Meter in Music" <http://cnx.org/content/m12405/latest/>

2.5.2 Pickup Notes

Any phrase[36] of music (not just the first one) may begin someplace other than on a strong downbeat. All the notes before the first strong downbeat of any phrase are the **pickup notes** to that phrase.

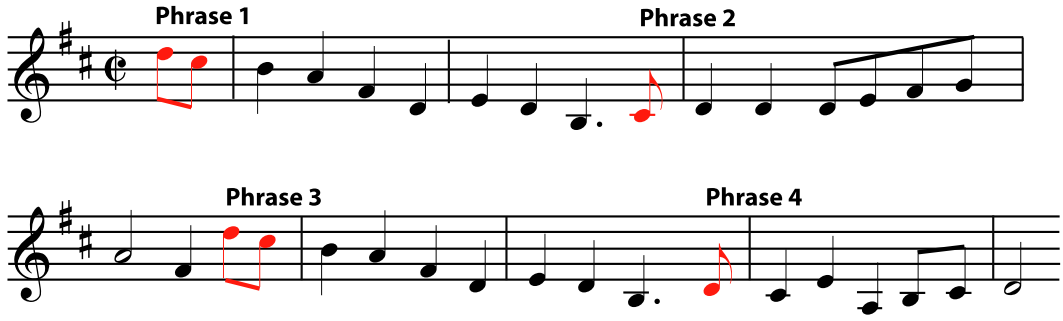


Figure 2.35: Any phrase may begin with pickup notes. Each of these four phrases begins with one or two pickup notes. (You may listen to the tune here[37]; can you hear that the pickup notes lead to the stronger downbeat?)

A piece that is using pickup measures or pickup notes may also sometimes place a double bar[38] (with or without repeat signs) inside a measure, in order to make it clear which phrase and which section of the music the pickup notes belong to. If this happens (which is a bit rare, because it can be confusing to read), there is still a single bar line where it should be, at the end of the measure.

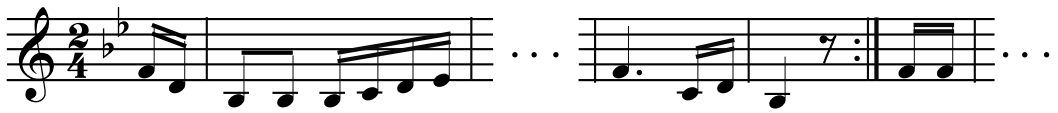


Figure 2.36: At the ends of sections of the music, a measure may be interrupted by a double bar that places the pickup notes in the correct section and assures that repeats have the correct number of beats. When this happens, the bar line will still appear at the end of the completed measure. This notation can be confusing, though, and in some music the pickups and repeats are written in a way that avoids these broken-up measures.

[36] "Melody": Section Melodic Phrases <http://cnx.org/content/m11647/latest/#s2>
[37] See the file at <http://cnx.org/content/m12717/latest/GirlILeftBehind.MID>
[38] "The Staff" <http://cnx.org/content/m10880/latest/#p1a>

2.6 Pitch: Sharp, Flat, and Natural Notes[39]

The **pitch** of a note is how high or low it sounds. Pitch depends on the frequency[40] of the fundamental (p. 254) sound wave of the note. The higher the frequency of a sound wave, and the shorter its wavelength[41], the higher its pitch sounds. But musicians usually don't want to talk about wavelengths and frequencies. Instead, they just give the different pitches different letter names: A, B, C, D, E, F, and G. These seven letters name all the **natural** notes (on a keyboard, that's all the white keys) within one octave. (When you get to the eighth natural note, you start the next octave[42] on another A.)

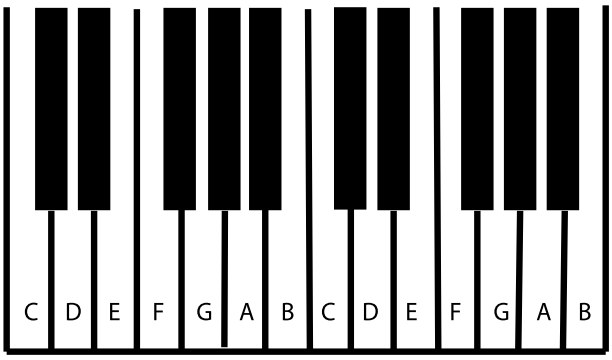


Figure 2.37: The natural notes name the white keys on a keyboard.

But in Western[43] music there are twelve notes in each octave that are in common use. How do you name the other five notes (on a keyboard, the black keys)?

[39] This content is available online at <http://cnx.org/content/m10943/2.14/>.
[40] "Acoustics for Music Theory": Section Wavelength, Frequency, and Pitch <http://cnx.org/content/m13246/latest/#s2>
[41] "Acoustics for Music Theory": Section Wavelength, Frequency, and Pitch <http://cnx.org/content/m13246/latest/#s2>
[42] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[43] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

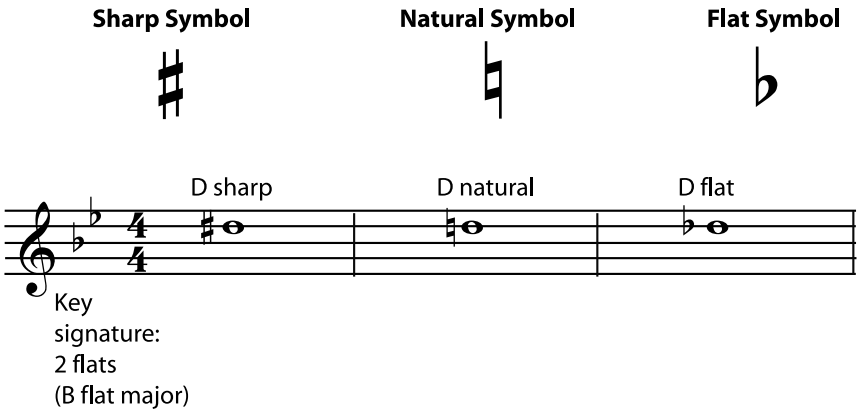


Figure 2.38: Sharp, flat, and natural signs can appear either in the key signature (Section 2.9), or right in front of the note that they change.

A **sharp sign** means "the note that is one half step (Section 2.8) higher than the natural note". A **flat sign** means "the note that is one half step lower than the natural note". Some of the natural notes are only one half step apart, but most of them are a whole step (Section 2.8) apart. When they are a whole step apart, the note in between them can only be named using a flat or a sharp.

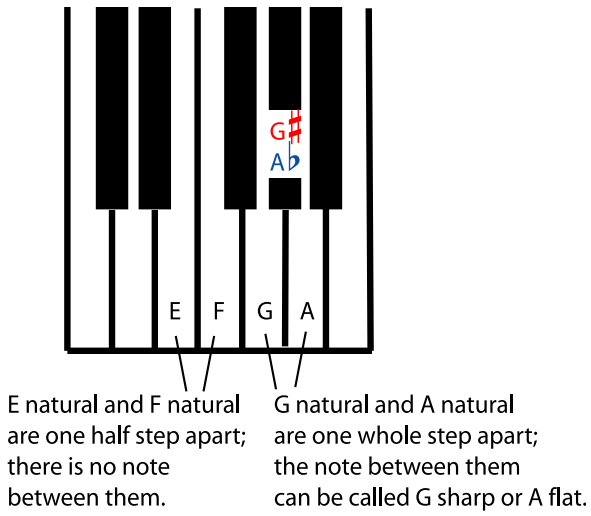


Figure 2.39

Notice that, using flats and sharps, any pitch can be given more than one note name. For example, the G sharp and the A flat are played on the same key on the keyboard; they sound the same. You can also name and write the F natural as "E sharp"; F natural is the note that is a half step higher than E natural, which

is the definition of E sharp. Notes that have different names but sound the same are called enharmonic (Section 2.7) notes.

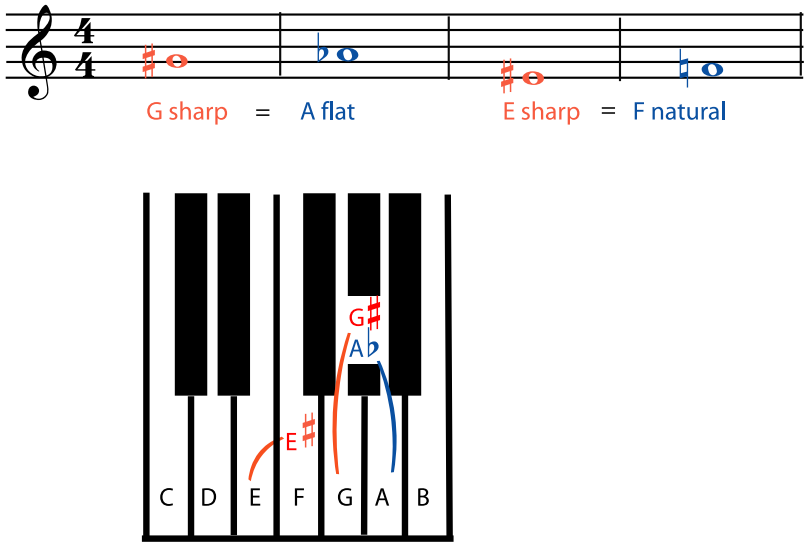


Figure 2.40: G sharp and A flat sound the same. E sharp and F natural sound the same.

Sharp and flat signs can be used in two ways: they can be part of a key signature (Section 2.9), or they can mark accidentals. For example, if most of the C's in a piece of music are going to be sharp, then a sharp sign is put in the "C" space at the beginning of the staff[44], in the key signature. If only a few of the C's are going to be sharp, then those C's are marked individually with a sharp sign right in front of them. Pitches that are not in the key signature are called **accidentals**.

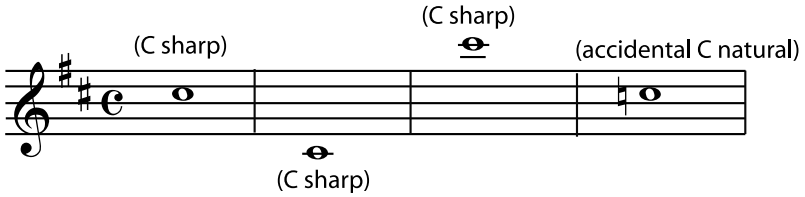


Figure 2.41: When a sharp sign appears in the C space in the key signature, all C's are sharp unless marked as accidentals.

A note can also be double sharp or double flat. A **double sharp** is two half steps (one whole step) higher than the natural note; a **double flat** is two half steps (a whole step) lower. Triple, quadruple, etc. sharps

[44] "The Staff" <http://cnx.org/content/m10880/latest/>

and flats are rare, but follow the same pattern: every sharp or flat raises or lowers the pitch one more half step.

Using double or triple sharps or flats may seem to be making things more difficult than they need to be. Why not call the note "A natural" instead of "G double sharp"? The answer is that, although A natural and G double sharp are the same pitch, they don't have the same function within a particular chord or a particular key. For musicians who understand some music theory (and that includes most performers, not just composers and music teachers), calling a note "G double sharp" gives important and useful information about how that note functions in the chord[45] and in the progression of the harmony (Section 2.18).

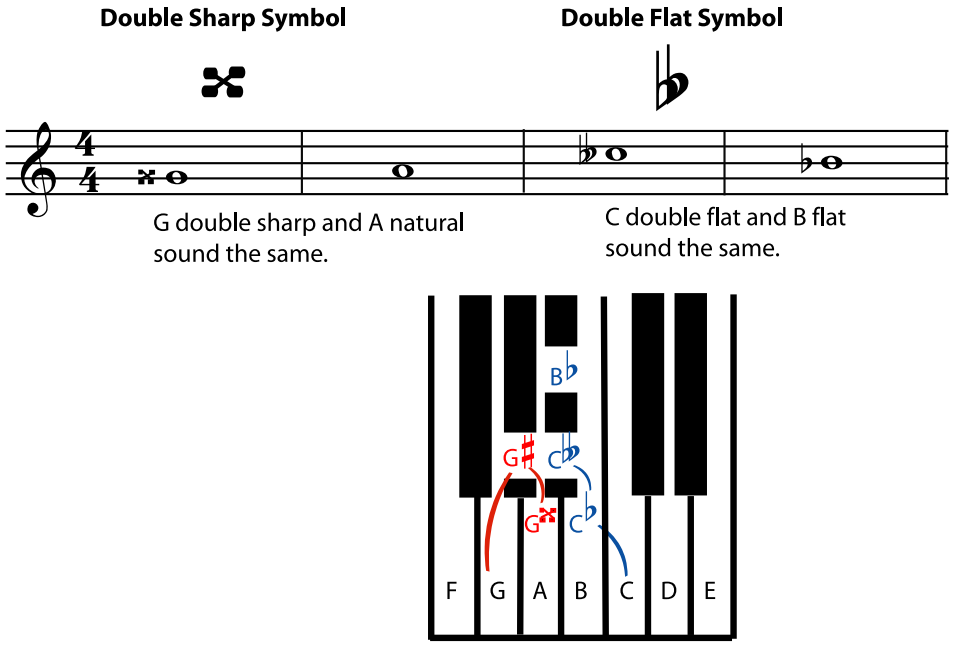


Figure 2.42: Double sharps raise the pitch by two half steps (one whole step). Double flats lower the pitch by two half steps (one whole step).

2.7 Enharmonic Spelling[46]

2.7.1 Enharmonic Notes

In common notation[47], any note can be sharp, flat, or natural (Section 2.6). A sharp symbol raises the pitch (Section 2.6) (of a natural note) by one half step (Section 2.8); a flat symbol lowers it by one half step.

[45] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[46] This content is available online at <http://cnx.org/content/m11641/1.14/>.
[47] "The Staff" <http://cnx.org/content/m10880/latest/>

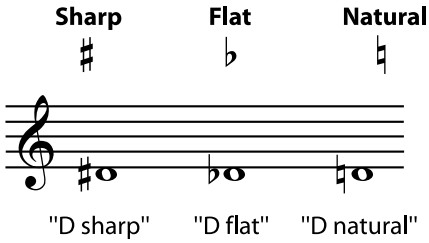


Figure 2.43

Why do we bother with these symbols? There are twelve pitches available within any octave[48]. We could give each of those twelve pitches its own name (A, B, C, D, E, F, G, H, I, J, K, and L) and its own line or space on a staff. But that would actually be fairly inefficient, because most music is in a particular key (Section 2.10). And music that is in a major (Section 2.10) or minor (Section 2.13) key will tend to use only seven of those twelve notes. So music is easier to read if it has only lines, spaces, and notes for the seven pitches it is (mostly) going to use, plus a way to write the occasional notes that are not in the key.

This is basically what common notation does. There are only seven note names (A, B, C, D, E, F, G), and each line or space on a staff[49] will correspond with one of those note names. To get all twelve pitches using only the seven note names, we allow any of these notes to be sharp, flat, or natural. Look (Figure 2.44) at the notes on a keyboard.

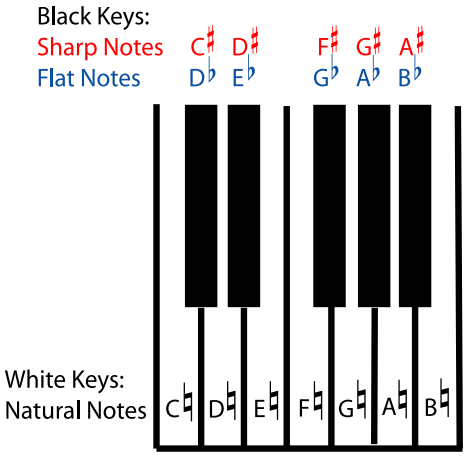


Figure 2.44: Seven of the twelve possible notes in each octave[50] are "natural" notes.

Because most of the natural notes are two half steps apart, there are plenty of pitches that you can only get by naming them with either a flat or a sharp (on the keyboard, the "black key" notes). For example,

[48] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[49] "The Staff" <http://cnx.org/content/m10880/latest/>
[50] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>

the note in between D natural and E natural can be named either D sharp or E flat. These two names look very different on the staff, but they are going to sound exactly the same, since you play both of them by pressing the same black key on the piano.

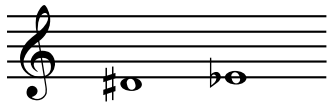


Figure 2.45: D sharp and E flat look very different when written in common notation, but they sound exactly the same when played on a piano.

This is an example of **enharmonic spelling**. Two notes are **enharmonic** if they sound the same on a piano but are named and written differently.

Exercise 2.7.1 ***(Solution on p. 281.)***

Name the other enharmonic notes that are listed above the black keys on the keyboard in Figure 2.44. Write them on a treble clef staff. If you need staff paper, you can print out this PDF file[51]

But these are not the only possible enharmonic notes. Any note can be flat or sharp, so you can have, for example, an E sharp. Looking at the keyboard (Figure 2.44) and remembering that the definition of sharp is "one half step higher than natural", you can see that an E sharp must sound the same as an F natural. Why would you choose to call the note E sharp instead of F natural? Even though they sound the same, E sharp and F natural, as they are actually used in music, are different notes. (They may, in some circumstances, also sound different; see below (Section 2.7.4: Enharmonic Spellings and Equal Temperament).) Not only will they look different when written on a staff, but they will have different functions within a key and different relationships with the other notes of a piece of music. So a composer may very well prefer to write an E sharp, because that makes the note's place in the harmonies of a piece more clear to the performer. (Please see Triads (Section 2.14), Beyond Triads (Section 2.16), and Harmonic Analysis (Section 2.18) for more on how individual notes fit into chords and harmonic progressions.)

In fact, this need (to make each note's place in the harmony very clear) is so important that double sharps and double flats have been invented to help do it. A double sharp is two half steps (one whole step (Section 2.8)) higher than the natural note. A double flat is two half steps lower than the natural note. Double sharps and flats are fairly rare, and triple and quadruple flats even rarer, but all are allowed.

[51] See the file at <http://cnx.org/content/m11641/latest/staffpaper1.pdf>

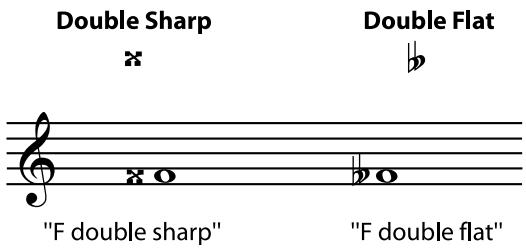


Figure 2.46

Exercise 2.7.2 *(Solution on p. 281.)*

Give at least one enharmonic spelling for the following notes. Try to give more than one. (Look at the keyboard (Figure 2.44) again if you need to.)

1. E natural
2. B natural
3. C natural
4. G natural
5. A natural

2.7.2 Enharmonic Keys and Scales

Keys and scales can also be enharmonic. Major keys, for example, always follow the same pattern of half steps and whole steps. (See Major Keys and Scales (Section 2.10). Minor keys also all follow the same pattern, different from the major scale pattern; see Minor Keys (Section 2.13).) So whether you start a major scale on an E flat, or start it on a D sharp, you will be following the same pattern, playing the same piano keys as you go up the scale. But the notes of the two scales will have different names, the scales will look very different when written, and musicians may think of them as being different. For example, most instrumentalists would find it easier to play in E flat than in D sharp. In some cases, an E flat major scale may even sound slightly different from a D sharp major scale. (See below (Section 2.7.4: Enharmonic Spellings and Equal Temperament).)

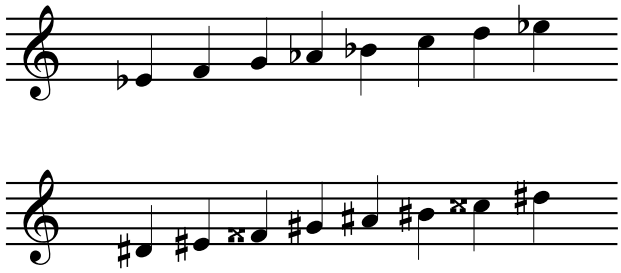


Figure 2.47: The E flat major and D sharp major scales sound the same on the piano, although they look very different. If this surprises you, look again at the piano keyboard (Figure 2.44) and find the notes that you would play for each scale.

Since the scales are the same, D sharp major and E flat major are also **enharmonic keys**. Again, their key signatures will look very different, but music in D sharp will not be any higher or lower than music in E flat.

Enharmonic Keys

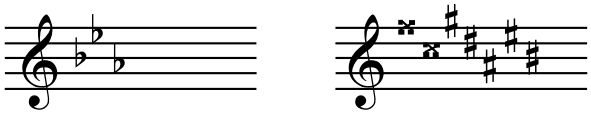


Figure 2.48: The key signatures for E flat and D sharp look very different, but would sound the same on a keyboard.

Exercise 2.7.3 ***(Solution on p. 281.)***

Give an enharmonic name and key signature for the keys given in Figure 2.49. (If you are not well-versed in key signatures (Section 2.9) yet, pick the easiest enharmonic spelling for the key name, and the easiest enharmonic spelling for every note in the key signature. Writing out the scales may help, too.)

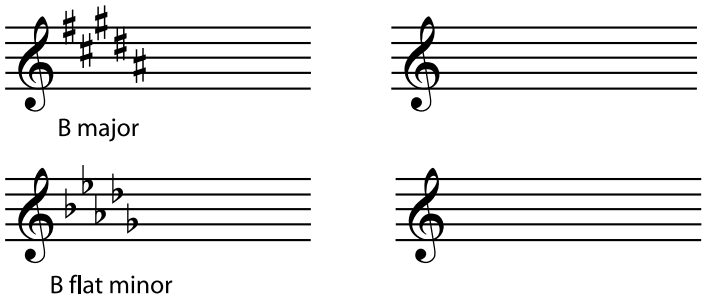


Figure 2.49

2.7.3 Enharmonic Intervals and Chords

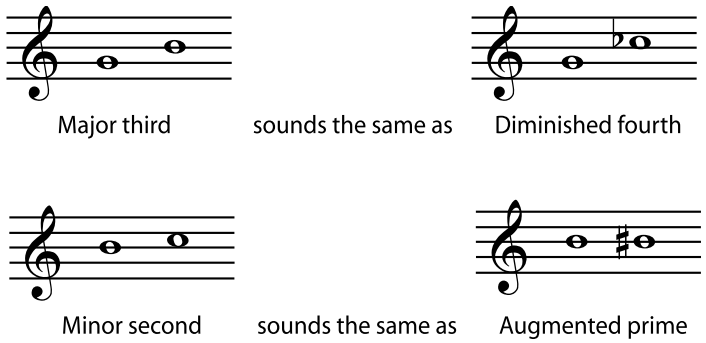


Figure 2.50

Chords[52] and intervals (Section 2.11) also can have enharmonic spellings. Again, it is important to name a chord or interval as it has been spelled, in order to understand how it fits into the rest of the music. A C sharp major chord means something different in the key of D than a D flat major chord does. And an interval of a diminished fourth means something different than an interval of a major third, even though they would be played using the same keys on a piano. (For practice naming intervals, see Interval (Section 2.11). For practice naming chords, see Naming Triads (Section 2.15) and Beyond Triads (Section 2.16). For an introduction to how chords function in a harmony, see Beginning Harmonic Analysis (Section 2.18).)

[52] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>

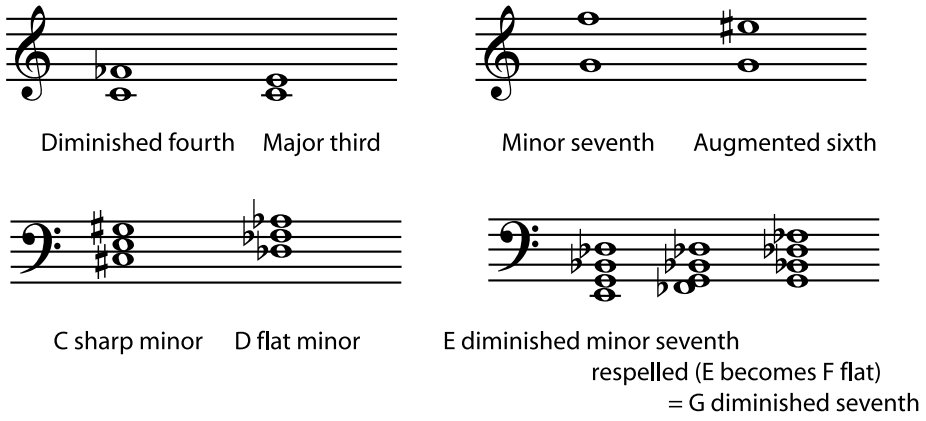


Figure 2.51

2.7.4 Enharmonic Spellings and Equal Temperament

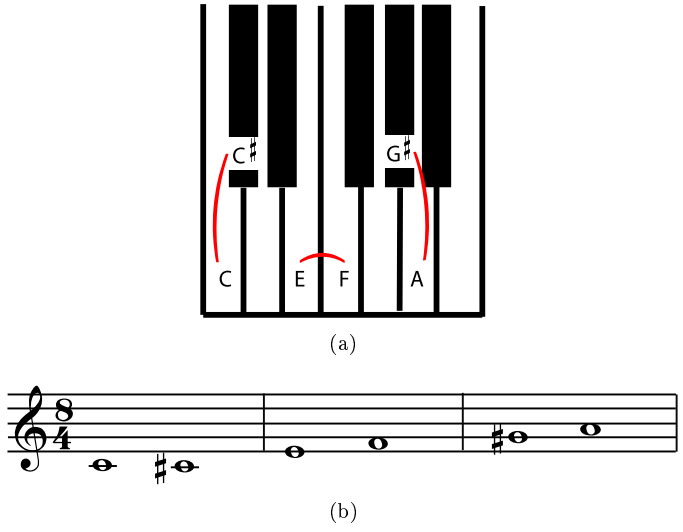
All of the above discussion assumes that all notes are tuned in equal temperament[53]. Equal temperament has become the "official" tuning system for Western music[54]. It is easy to use in pianos and other instruments that are difficult to retune (organ, harp, and xylophone, to name just a few), precisely because enharmonic notes sound exactly the same. But voices and instruments that can fine-tune quickly (for example violins, clarinets, and trombones) often move away from equal temperament. They sometimes drift, consciously or unconsciously, towards just intonation[55], which is more closely based on the harmonic series[56]. When this happens, enharmonically spelled notes, scales, intervals, and chords, may not only be theoretically different. They may also actually be slightly different pitches. The differences between, say, a D sharp and an E flat, when this happens, are very small, but may be large enough to be noticeable. Many Non-western music traditions[57] also do not use equal temperament. **Sharps and flats used to notate music in these traditions should not be assumed to mean a change in pitch equal to an equal-temperament half-step**. For definitions and discussions of equal temperament, just intonation, and other tuning systems, please see Tuning Systems[58].

2.8 Half Steps and Whole Steps[59]

The **pitch** of a note is how high or low it sounds. Musicians often find it useful to talk about how much higher or lower one note is than another. This distance between two pitches is called the **interval** between them. In Western music[60], the small interval from one note to the next closest note higher or lower is called a **half step** or **semi-tone**.

[53] "Tuning Systems": Section Equal Temperament <http://cnx.org/content/m11639/latest/#s22>
[54] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[55] "Tuning Systems" <http://cnx.org/content/m11639/latest/#p12a>
[56] "Harmonic Series I: Timbre and Octaves" <http://cnx.org/content/m13682/latest/>
[57] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[58] "Tuning Systems" <http://cnx.org/content/m11639/latest/>
[59] This content is available online at <http://cnx.org/content/m10866/2.22/>.
[60] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

Half Steps



(a)

(b)

Figure 2.52: Three half-step intervals: between C and C sharp (or D flat); between E and F; and between G sharp (or A flat) and A.

Listen[61] to the half steps in Figure 2.52 (Half Steps).

The intervals in Figure 2.52 (Half Steps) look different on a staff[62]; sometimes they are on the same line, sometimes not. But it is clear at the keyboard that in each case there is no note in between them.

So a scale (Section 2.10) that goes up or down by half steps, a **chromatic scale**, plays all the notes on both the white and black keys of a piano. It also plays all the notes easily available on most Western[63] instruments. (A few instruments, like trombone[64] and violin[65], can easily play pitches that aren't in the chromatic scale, but even they usually don't.)

One Octave Chromatic Scale

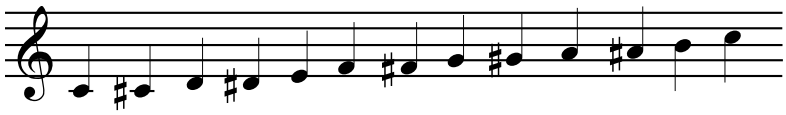


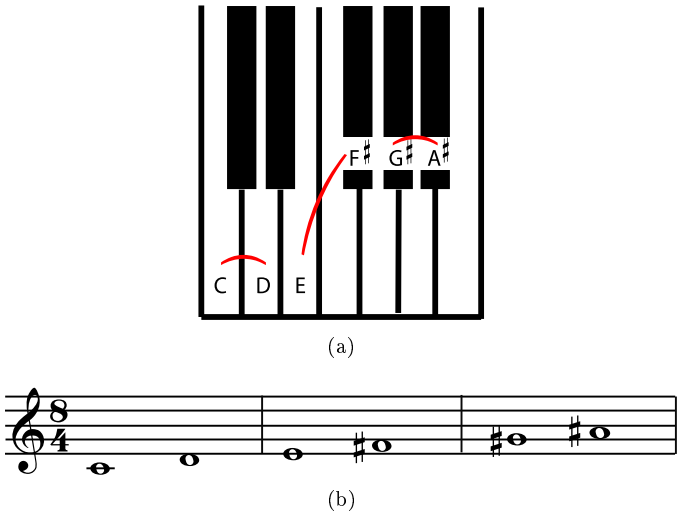
Figure 2.53: All intervals in a **chromatic scale** are half steps. The result is a scale that plays all the notes easily available on most instruments.

[61] See the file at <http://cnx.org/content/m10866/latest/6f.mid>
[62] "The Staff" <http://cnx.org/content/m10880/latest/>
[63] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[64] "Trombones" <http://cnx.org/content/m12602/latest/>
[65] "Introduction to the Violin and FAQ" <http://cnx.org/content/m13437/latest/>

Listen[66] to a chromatic scale.

If you go up or down two half steps from one note to another, then those notes are a **whole step**, or **whole tone** apart.

Whole Steps



(a)

(b)

Figure 2.54: Three whole step intervals: between C and D; between E and F sharp; and between G sharp and A sharp (or A flat and B flat).

A **whole tone scale**, a scale made only of whole steps, sounds very different from a chromatic scale.

Whole Tone Scale

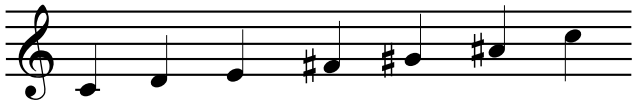


Figure 2.55: All intervals in a **whole tone scale** are whole steps.

Listen[67] to a whole tone scale.

You can count any number of whole steps or half steps between notes; just remember to count all sharp or flat notes (the black keys on a keyboard) as well as all the natural notes (the white keys) that are in between.

[66] See the file at <http://cnx.org/content/m10866/latest/6a.mid>
[67] See the file at <http://cnx.org/content/m10866/latest/6b.mid>

Example 2.5
The interval between C and the F above it is 5 half steps, or two and a half steps.

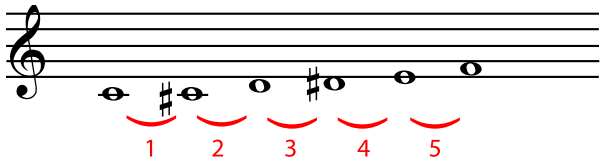


Figure 2.56: Going from C up to F takes five half steps.

Exercise 2.8.1 *(Solution on p. 281.)*
Identify the intervals below in terms of half steps and whole steps. If you have trouble keeping track of the notes, use a piano keyboard, a written chromatic scale, or the chromatic fingerings for your instrument to count half steps.

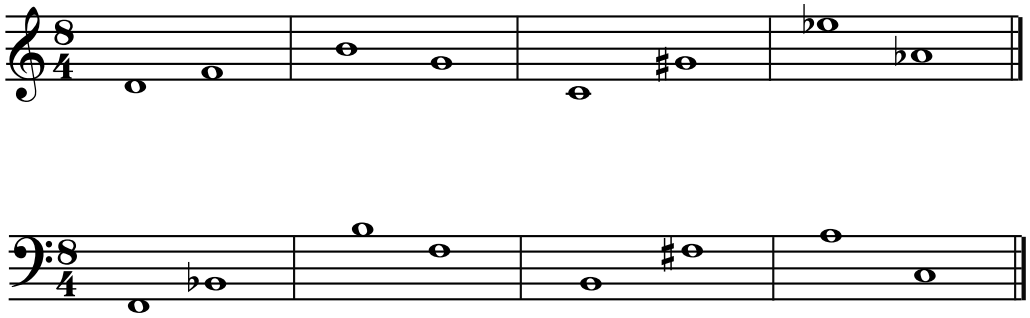


Figure 2.57

Exercise 2.8.2 *(Solution on p. 282.)*
Fill in the second note of the interval indicated in each measure. If you need staff paper for this exercise, you can print out this staff paper[68] PDF file.

[68] See the file at <http://cnx.org/content/m10866/latest/staffpaper1.pdf>

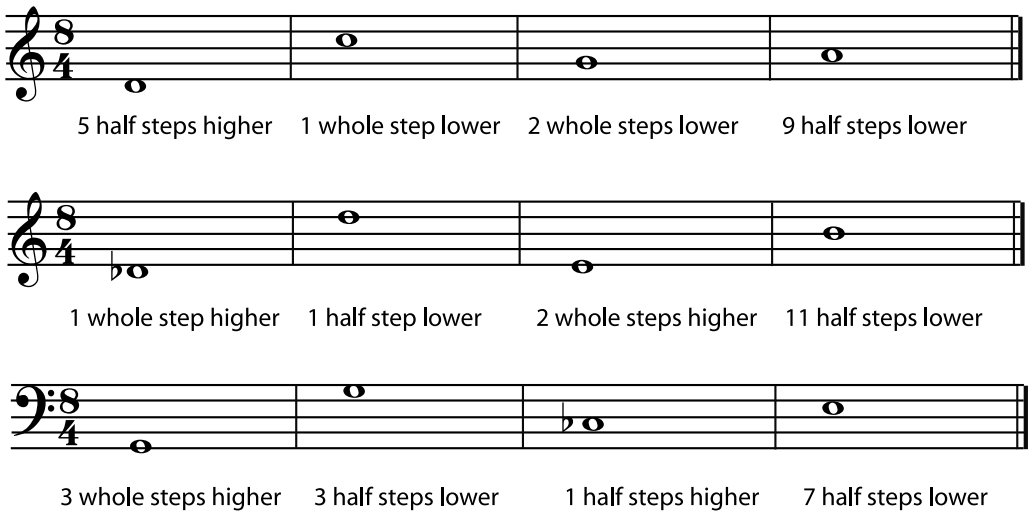


Figure 2.58

2.9 Key Signature[69]

The key signature appears right after the clef (Section 2.1) symbol on the staff[70]. In common notation, **clef and key signature are the only symbols that normally appear on every staff. They appear so often because they are such important symbols; they tell you what note is found on each line and space of the staff.** This can change from one piece of music to another, so the musician must know the clef and key signature in order to read the music correctly; in a way, the written music is a coded message, with each note standing for a sound with a particular pitch (Section 2.6), and the clef and key signature are the key that tell you how to decode this particular message. (For an explanation of why things are done this way, please see how to read music[71].)

[69] This content is available online at <http://cnx.org/content/m10881/2.17/>.
[70] "The Staff" <http://cnx.org/content/m10880/latest/>
[71] "How to Read Music": Section Learning to read music accurately and independently <http://cnx.org/content/m43040/latest/#eip-216>

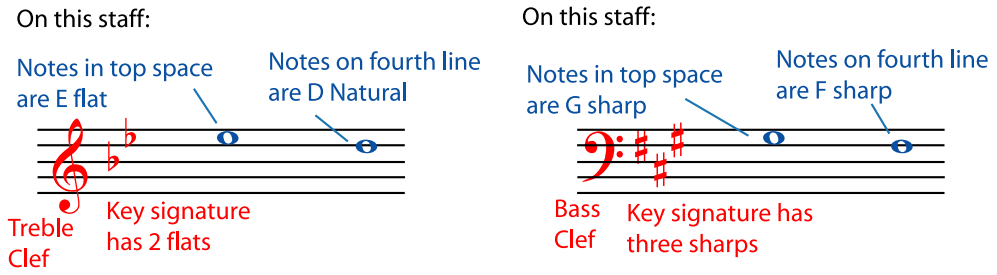


Figure 2.59

The clef tells you the letter name of the note - for example, the top line on a bass clef staff is always some kind of A; but you need the key signature to tell you what kind of A. It may have either some sharp (Section 2.6) symbols on particular lines or spaces, or some flat (Section 2.6) symbols, again on particular lines or spaces. If there are no flats or sharps listed after the clef symbol, then the key signature is "all notes are natural".

The **key signature** is a list of all the sharps and flats in the key (Section 2.10) that the music is in. **When a sharp (or flat) appears on a line or space in the key signature, all the notes on that line or space are sharp (or flat), and all other notes with the same letter names in other octaves are also sharp (or flat).**

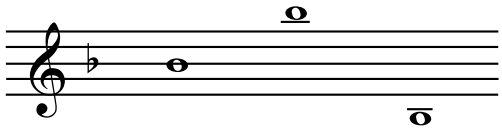


Figure 2.60: This key signature has a flat on the "B" line, so all of these B's are flat.

The sharps or flats always appear in the same order in all key signatures. This is the same order in which they are added as keys get sharper or flatter. For example, if a key (G major or E minor) has only one sharp, it will be F sharp, so F sharp is always the first sharp listed in a sharp key signature. The keys that have two sharps (D major and B minor) have F sharp and C sharp, so C sharp is always the second sharp in a key signature, and so on. **The order of sharps is: F sharp, C sharp, G sharp, D sharp, A sharp, E sharp, B sharp. The order of flats is the reverse of the order of sharps: B flat, E flat, A flat, D flat, G flat, C flat, F flat.** So the keys with only one flat (F major and D minor) have a B flat; the keys with two flats (B flat major and G minor) have B flat and E flat; and so on. The order of flats and sharps, like the order of the keys themselves, follows a circle of fifths (Section 2.17).

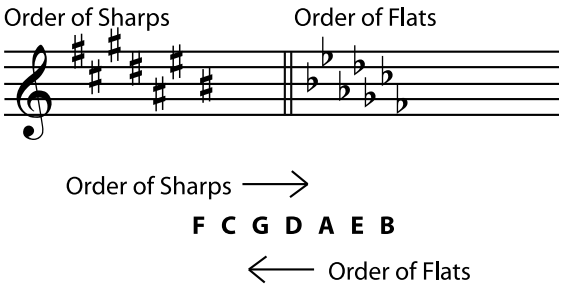


Figure 2.61

If you do not know the name of the key of a piece of music, the key signature can help you find out. Assume for a moment that you are in a major key (Section 2.10). If the key contains sharps, the name of the key is one half step (Section 2.8) higher than the last sharp in the key signature. If the key contains flats, the name of the key signature is the name of the second-to-last flat in the key signature.

Example 2.6

Figure 2.62 demonstrates quick ways to name the (major) key simply by looking at the key signature. In flat keys, the second-to-last flat names the key. In sharp keys, the note that names the key is one half step above the final sharp.

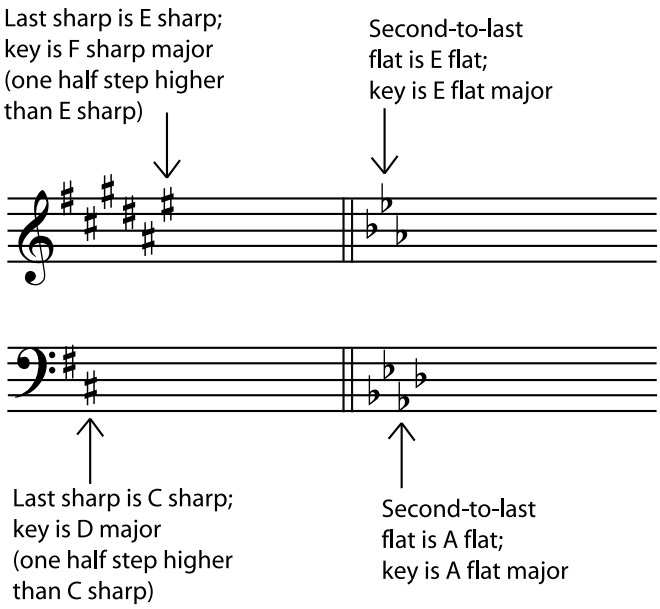


Figure 2.62

The only major keys that these rules do not work for are C major (no flats or sharps) and F major (one flat). It is easiest just to memorize the key signatures for these two very common keys. If you want a rule

that also works for the key of F major, remember that the second-to-last flat is always a perfect fourth (p. 207) higher than (or a perfect fifth lower than) the final flat. So you can also say that the name of the key signature is a perfect fourth lower than the name of the final flat.

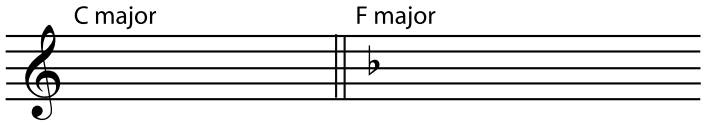


Figure 2.63: The key of C major has no sharps or flats. F major has one flat.

If the music is in a minor key, it will be in the relative minor (Section 2.13.3: Relative Minor and Major Keys) of the major key for that key signature. You may be able to tell just from listening (see Major Keys and Scales (Section 2.10)) whether the music is in a major or minor key. If not, the best clue is to look at the final chord[72]. That chord (and often the final note of the melody, also) will usually name the key.

Exercise 2.9.1 ***(Solution on p. 282.)***

Write the key signatures asked for in Figure 2.64 and name the major keys that they represent.

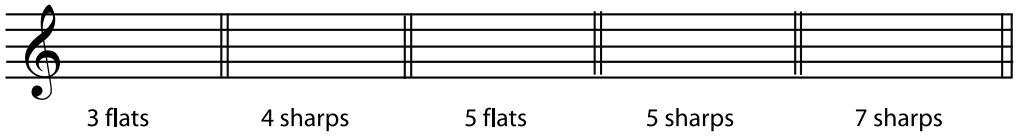


Figure 2.64

2.10 Major Keys and Scales[73]

The simple, sing-along, nursery rhymes and folk songs we learn as children; the "catchy" tunes used in advertising jingles; the cheerful, toe-tapping pop and rock we dance to; the uplifting sounds of a symphony: most music in a major key has a bright sound that people often describe as cheerful, inspiring, exciting, or just plain fun.

How are these moods produced? Music in a particular **key** tends to use only some of the many possible notes available; these notes are listed in the **scale** associated with that key. In major keys, the notes of the scale are often used to build "bright"-sounding major chords (Section 2.15). They also give a strong feeling of having a tonal center (p. 201), a note or chord that feels like "home", or "the resting place", in that key. The "bright"-sounding major chords and the strong feeling of tonality are what give major keys their happy, pleasant moods. This contrasts with the moods usually suggested by music that uses minor (Section 2.13) keys, scales, and chords. Although it also has a strong tonal center (the Western[74] tradition

[72] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[73] This content is available online at <http://cnx.org/content/m10851/2.27/>.
[74] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

of tonal harmony[75] is based on major and minor keys and scales), music in a minor key is more likely to sound sad, ominous, or mysterious. In fact, most musicians, and even many non-musicians, can distinguish major and minor keys just by listening to the music.

Exercise 2.10.1 ***(Solution on p. 283.)***

Listen to these excerpts. Three are in a major key and two in a minor key. Can you tell which is which simply by listening?

- 1.[76]
- 2.[77]
- 3.[78]
- 4.[79]
- 5.[80]

NOTE: If you must determine whether a piece of music is major or minor, and cannot tell just by listening, you may have to do some simple harmonic analysis (Section 2.18.5: Minor Keys) in order to decide.

2.10.1 Tonal Center

A scale starts with the note that names the key. This note is the **tonal center** of that key, the note where music in that key feels "at rest". It is also called the **tonic**, and it's the "do" in "do-re-mi". For example, music in the key of A major almost always ends on an A major chord, the chord[81] built on the note A. It often also begins on that chord, returns to that chord often, and features a melody and a bass line that also return to the note A often enough that listeners will know where the tonal center of the music is, even if they don't realize that they know it. (For more information about the tonic chord and its relationship to other chords in a key, please see Beginning Harmonic Analysis (Section 2.18).)

Example 2.7

Listen to these examples. Can you hear that they do not feel "done" until the final tonic is played?

- Example A[82]
- Example B[83]

2.10.2 Major Scales

To find the rest of the notes in a major key, start at the tonic and go up following this pattern: **whole step, whole step, half step, whole step, whole step, whole step, half step**. This will take you to the tonic one octave higher than where you began, and includes all the notes in the key in that octave.

[75] "Harmony" <http://cnx.org/content/m11654/latest/>
[76] See the file at <http://cnx.org/content/m10851/latest/Guitar1.mp3>
[77] See the file at <http://cnx.org/content/m10851/latest/Guitar2.mp3>
[78] See the file at <http://cnx.org/content/m10851/latest/Guitar3.mp3>
[79] See the file at <http://cnx.org/content/m10851/latest/Tanz.mp3>
[80] See the file at <http://cnx.org/content/m10851/latest/Greensleeves.mp3>
[81] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[82] See the file at <http://cnx.org/content/m10851/latest/Tonal1.MID>
[83] See the file at <http://cnx.org/content/m10851/latest/tonic2.MID>

Example 2.8
These major scales all follow the same pattern of whole steps and half steps. They have different sets of notes because the pattern starts on different notes.

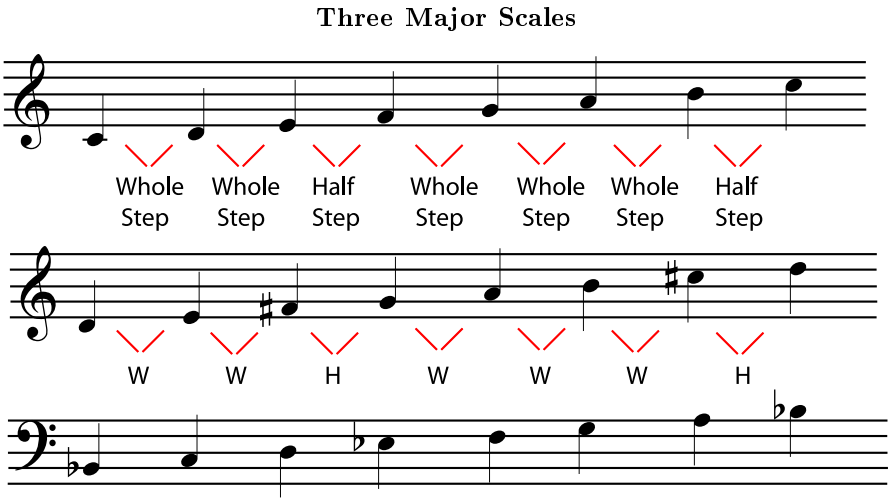


Figure 2.65: All major scales have the same pattern of half steps and whole steps, beginning on the note that names the scale - the tonic (p. 201).

Listen to the difference between the C major[84], D major[85], and B flat major[86] scales.

Exercise 2.10.2 ***(Solution on p. 283.)***
For each note below, write a major scale, one octave, ascending (going up), beginning on that note. If you're not sure whether a note should be written as a flat, sharp, or natural, remember that you won't ever skip a line or space, or write two notes of the scale on the same line or space. If you need help keeping track of half steps, use a keyboard, a picture of a keyboard[87], a written chromatic scale (p. 194), or the chromatic scale fingerings for your instrument. If you need more information about half steps and whole steps, see Half Steps and Whole Steps (Section 2.8).

If you need staff paper for this exercise, you can print out this staff paper[88] PDF file.

[84] See the file at <http://cnx.org/content/m10851/latest/tonmjC.mp3>
[85] See the file at <http://cnx.org/content/m10851/latest/tonmjD.mp3>
[86] See the file at <http://cnx.org/content/m10851/latest/tonmjBflat.mp3>
[87] "Octaves and the Major-Minor Tonal System", Figure 6: Keyboard <http://cnx.org/content/m10862/latest/#fig3a>
[88] See the file at <http://cnx.org/content/m10851/latest/staffpaper1.pdf>

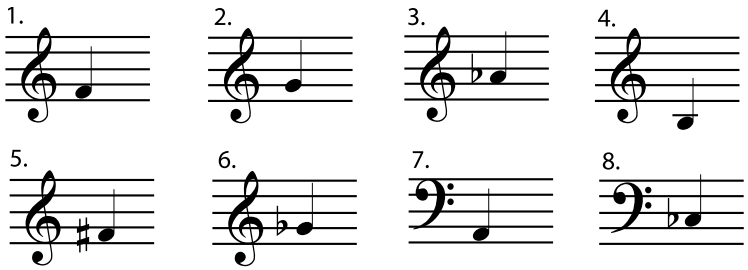


Figure 2.66

In the examples above, the sharps and flats are written next to the notes. In common notation, the sharps and flats **that belong in the key** will be written at the beginning of each staff, in the **key signature**. For more practice identifying keys and writing key signatures, please see Key Signature (Section 2.9). For more information about how keys are related to each other, please see The Circle of Fifths (Section 2.17).

NOTE: Do key signatures make music more complicated than it needs to be? Is there an easier way? Join the discussion at Opening Measures[89] .

2.10.3 Music in Different Major Keys

What difference does key make? Since the major scales all follow the same pattern, they all sound very much alike. Here is the tune "Row, Row, Row Your Boat", written in G major and also in D major.

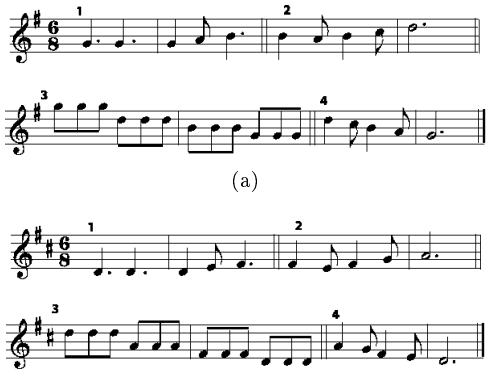


Figure 2.67: The same tune looks very different when written in two different major keys. (a) In G Major (b) In D Major

[89] http://openingmeasures.com/music/22/why-cant-we-use-something-simpler-than-key-signatures/

Listen to this tune in G major[90] and in D major[91]. The music may look quite different, but the only difference when you listen is that one sounds higher than the other. So why bother with different keys at all? Before equal temperament[92] became the standard tuning system, major keys sounded more different from each other than they do now. Even now, there are subtle differences between the sound of a piece in one key or another, mostly because of differences in the timbre[93] of various notes on the instruments or voices involved. But today the most common reason to choose a particular key is simply that the music is easiest to sing or play in that key. (Please see Transposition[94] for more about choosing keys.)

2.11 Interval[95]

2.11.1 The Distance Between Pitches

The **interval** between two notes is the distance between the two pitches (Section 2.6) - in other words, how much higher or lower one note is than the other. This concept is so important that it is almost impossible to talk about scales (Section 2.10), chords[96], harmonic progression[97], cadence[98], or dissonance[99] without referring to intervals. So if you want to learn music theory, it would be a good idea to spend some time getting comfortable with the concepts below and practicing identifying intervals.

Scientists usually describe the distance between two pitches in terms of the difference between their frequencies[100]. Musicians find it more useful to talk about interval. Intervals can be described using half steps and whole steps (Section 2.8). For example, you can say "B natural is a half step below C natural", or "E flat is a step and a half above C natural". But when we talk about larger intervals in the major/minor system[101], there is a more convenient and descriptive way to name them.

2.11.2 Naming Intervals

The first step in naming the interval is to find the distance between the notes **as they are written on the staff**. Count every line and every space in between the notes, as well as the lines or spaces that the notes are on. This gives you the number for the interval.

Example 2.9

[90] See the file at <http://cnx.org/content/m10851/latest/RowBoatG.mid>
[91] See the file at <http://cnx.org/content/m10851/latest/RowBoatD.mid>
[92] "Tuning Systems": Section Equal Temperament <http://cnx.org/content/m11639/latest/#s22>
[93] "Timbre: The Color of Music" <http://cnx.org/content/m11059/latest/>
[94] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>
[95] This content is available online at <http://cnx.org/content/m10867/2.27/>.
[96] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[97] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[98] "Cadence in Music" <http://cnx.org/content/m12402/latest/>
[99] "Consonance and Dissonance" <http://cnx.org/content/m11953/latest/>
[100] "Frequency, Wavelength, and Pitch" <http://cnx.org/content/m11060/latest/>
[101] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>

Counting Intervals

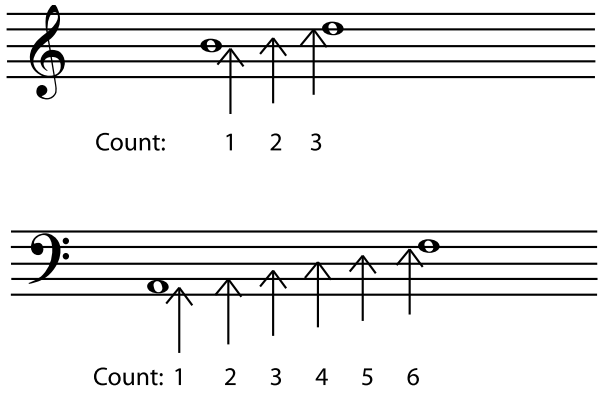


Figure 2.68

To find the interval, count the lines or spaces that the two notes are on as well as all the lines or spaces in between. The interval between B and D is a third. The interval between A and F is a sixth. Note that, at this stage, key signature (Section 2.9), clef (Section 2.1), and accidentals (p. 186) do not matter at all.

The **simple intervals** are one octave or smaller.

Simple Intervals

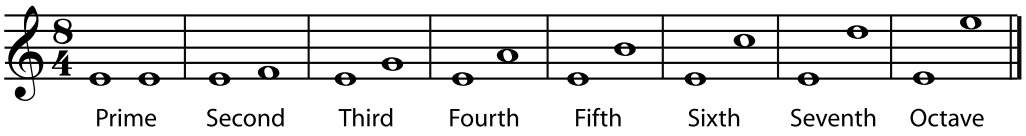


Figure 2.69

If you like you can listen to each interval as written in Figure 2.69 (Simple Intervals): prime[102], second[103], third[104], fourth[105], fifth[106], sixth[107], seventh[108], octave[109].

Compound intervals are larger than an octave.

[102] See the file at <http://cnx.org/content/m10867/latest/prime.mid>
[103] See the file at <http://cnx.org/content/m10867/latest/second.mid>
[104] See the file at <http://cnx.org/content/m10867/latest/third.mid>
[105] See the file at <http://cnx.org/content/m10867/latest/fourht.mid>
[106] See the file at <http://cnx.org/content/m10867/latest/fifth.mid>
[107] See the file at <http://cnx.org/content/m10867/latest/sixth.mid>
[108] See the file at <http://cnx.org/content/m10867/latest/seventh.mid>
[109] See the file at <http://cnx.org/content/m10867/latest/octave.mid>

Compound Intervals

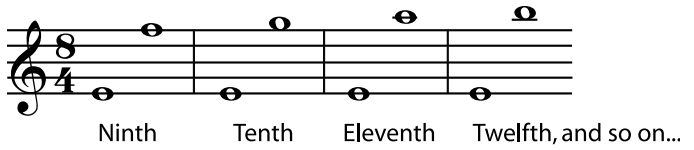


Figure 2.70

Listen to the compound intervals in Figure 2.70 (Compound Intervals): ninth[110], tenth[111], eleventh[112].

Exercise 2.11.1 ***(Solution on p. 285.)***

Name the intervals.

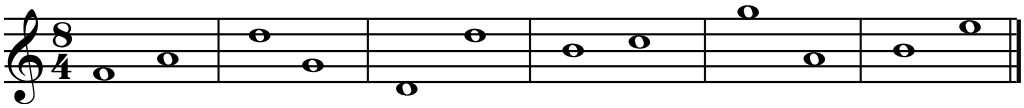


Figure 2.71

Exercise 2.11.2 ***(Solution on p. 285.)***

Write a note that will give the named interval.

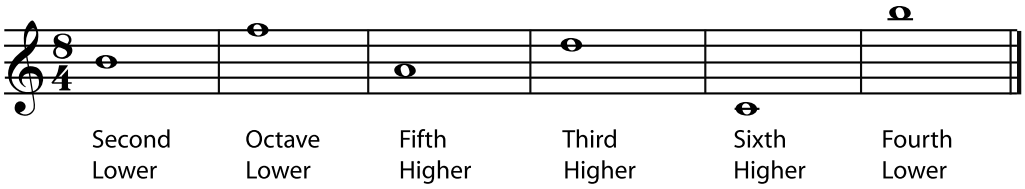


Figure 2.72

2.11.3 Classifying Intervals

So far, the actual distance, in half-steps, between the two notes has not mattered. But a third made up of three half-steps sounds different from a third made up of four half-steps. And a fifth made up of seven half-steps sounds very different from one of only six half-steps. So in the second step of identifying an interval, clef (Section 2.1), key signature (Section 2.9), and accidentals (p. 186) become important.

[110] See the file at <http://cnx.org/content/m10867/latest/ninth.mid>
[111] See the file at <http://cnx.org/content/m10867/latest/tenth.mid>
[112] See the file at <http://cnx.org/content/m10867/latest/eleventh.mid>

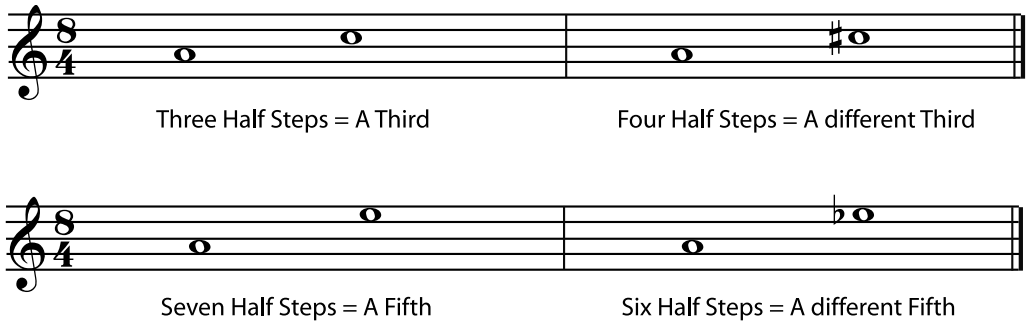


Figure 2.73: A to C natural and A to C sharp are both thirds, but A to C sharp is a larger interval, with a different sound. The difference between the intervals A to E natural and A to E flat is even more noticeable.

Listen to the differences in the thirds[113] and the fifths[114] in Figure 2.73.

So the second step to naming an interval is to classify it based on the number of half steps (Section 2.8) in the interval. Familiarity with the chromatic scale (p. 194) is necessary to do this accurately.

2.11.3.1 Perfect Intervals

Primes, octaves, fourths, and fifths can be **perfect** intervals.

> NOTE: These intervals **are never classified as major or minor**, although they can be augmented or diminished (see below (Section 2.11.3.3: Augmented and Diminished Intervals)).

What makes these particular intervals perfect? The physics of sound waves (**acoustics**) shows us that the notes of a perfect interval are very closely related to each other. (For more information on this, see Frequency, Wavelength, and Pitch[115] and Harmonic Series (Section 2.19).) Because they are so closely related, they sound particularly good together, a fact that has been noticed since at least the times of classical Greece, and probably even longer. (Both the octave and the perfect fifth have prominent positions in most of the world's musical traditions.) Because they sound so closely related to each other, they have been given the name "perfect" intervals.

> NOTE: Actually, modern equal temperament[116] tuning does not give the harmonic-series-based pure[117] perfect fourths and fifths. For the music-theory purpose of identifying intervals, this does not matter. To learn more about how tuning affects intervals as they are actually played, see Tuning Systems[118].

A perfect prime is also called a **unison**. It is two notes that are the same pitch (Section 2.6). A perfect octave is the "same" note an octave[119] - 12 half-steps - higher or lower. A **perfect 5th** is 7 half-steps. A **perfect fourth** is 5 half-steps.

[113] See the file at <http://cnx.org/content/m10867/latest/twothirds.mid>
[114] See the file at <http://cnx.org/content/m10867/latest/twofifths.mid>
[115] "Frequency, Wavelength, and Pitch" <http://cnx.org/content/m11060/latest/>
[116] "Tuning Systems": Section Equal Temperament <http://cnx.org/content/m11639/latest/#s22>
[117] "Tuning Systems": Section Pythagorean Intonation <http://cnx.org/content/m11639/latest/#s11>
[118] "Tuning Systems" <http://cnx.org/content/m11639/latest/>
[119] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>

Example 2.10

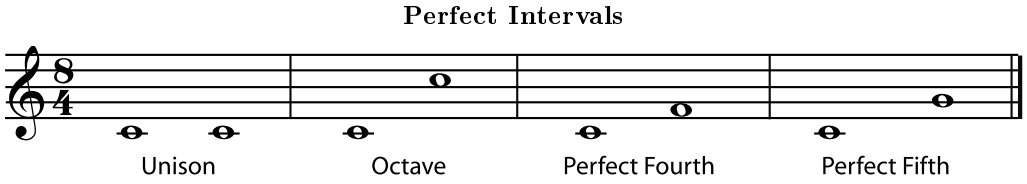


Figure 2.74

Listen to the octave[120], perfect fourth[121], and perfect fifth[122].

2.11.3.2 Major and Minor Intervals

Seconds, thirds, sixths, and sevenths can be **major intervals** or **minor intervals**. The minor interval is always a half-step smaller than the major interval.

Major and Minor Intervals

- 1 half-step = minor second (m2)
- 2 half-steps = major second (M2)
- 3 half-steps = minor third (m3)
- 4 half-steps = major third (M3)
- 8 half-steps = minor sixth (m6)
- 9 half-steps = major sixth (M6)
- 10 half-steps = minor seventh (m7)
- 11 half-steps = major seventh (M7)

Example 2.11

[120] See the file at <http://cnx.org/content/m10867/latest/P8.mp3>
[121] See the file at <http://cnx.org/content/m10867/latest/P4.mp3>
[122] See the file at <http://cnx.org/content/m10867/latest/P5.mp3>

Major and Minor Intervals

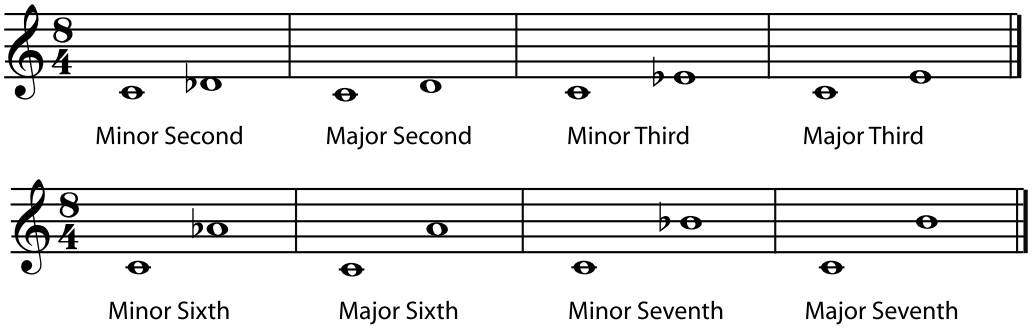


Figure 2.75

Listen to the minor second[123], major second[124], minor third[125], major third[126], minor sixth[127], major sixth[128], minor seventh[129], and major seventh[130].

Exercise 2.11.3 ***(Solution on p. 285.)***

Give the complete name for each interval.

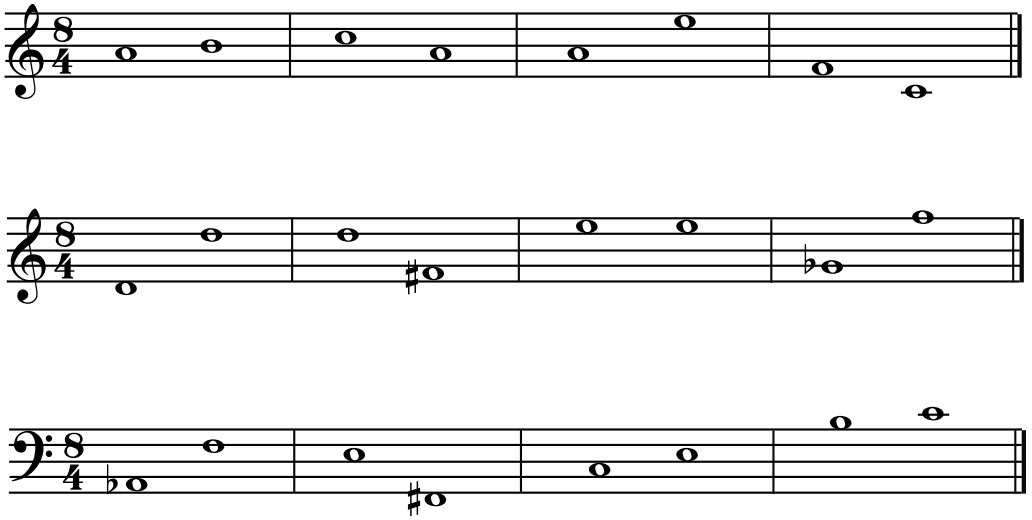


Figure 2.76

[123]See the file at <http://cnx.org/content/m10867/latest/min2.mp3>
[124]See the file at <http://cnx.org/content/m10867/latest/M2.mp3>
[125]See the file at <http://cnx.org/content/m10867/latest/min3.mp3>
[126]See the file at <http://cnx.org/content/m10867/latest/M3.mp3>
[127]See the file at <http://cnx.org/content/m10867/latest/min6.mp3>
[128]See the file at <http://cnx.org/content/m10867/latest/M6.mp3>
[129]See the file at <http://cnx.org/content/m10867/latest/min7.mp3>
[130]See the file at <http://cnx.org/content/m10867/latest/M7.mp3>

Exercise 2.11.4 *(Solution on p. 286.)*

Fill in the second note of the interval given.

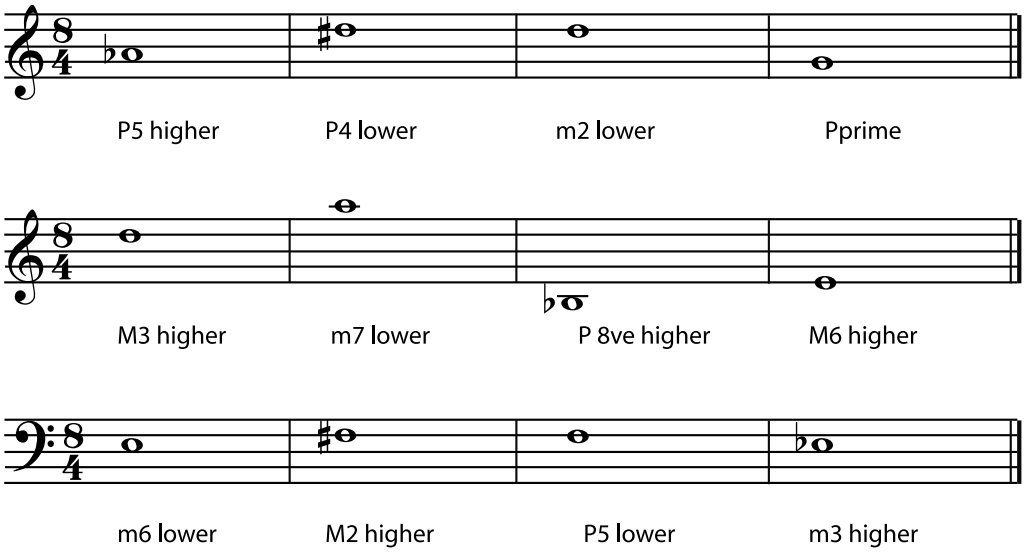


Figure 2.77

2.11.3.3 Augmented and Diminished Intervals

If an interval is a half-step larger than a perfect or a major interval, it is called **augmented**. An interval that is a half-step smaller than a perfect or a minor interval is called **diminished**. A double sharp (p. 186) or double flat (p. 186) is sometimes needed to write an augmented or diminished interval correctly. Always remember, though, that it is the actual distance in half steps between the notes that determines the type of interval, not whether the notes are written as natural, sharp, or double-sharp.

Example 2.12

Some Diminished and Augmented Intervals

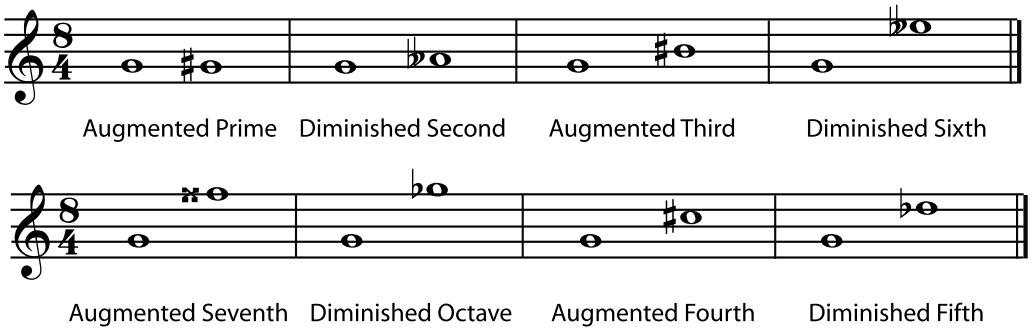


Figure 2.78

Listen to the augmented prime[131], diminished second[132], augmented third[133], diminished sixth[134], augmented seventh[135], diminished octave[136], augmented fourth[137], and diminished fifth[138]. Are you surprised that the augmented fourth and diminished fifth sound the same?

Exercise 2.11.5 ***(Solution on p. 286.)***

Write a note that will give the named interval.

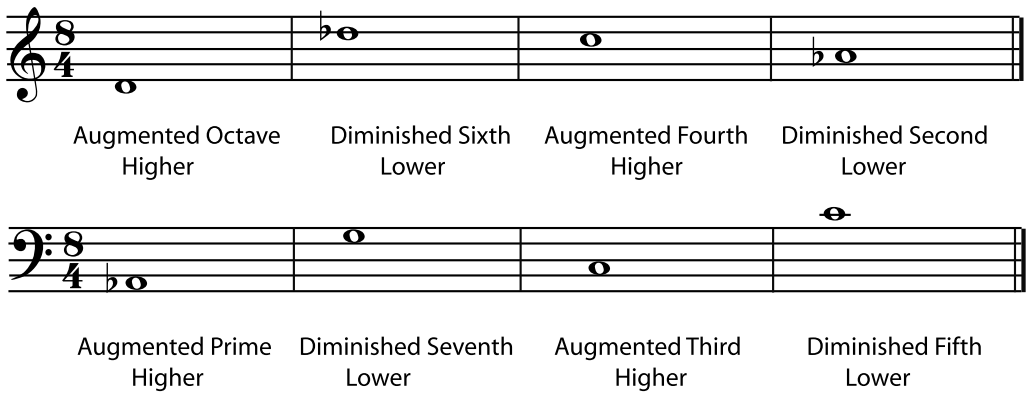


Figure 2.79

As mentioned above, the diminished fifth and augmented fourth sound the same. Both are six half-steps, or **three whole tones**, so another term for this interval is a **tritone**. In Western Music[139], this unique

[131] See the file at <http://cnx.org/content/m10867/latest/aug1.mid>
[132] See the file at <http://cnx.org/content/m10867/latest/dim2.mid>
[133] See the file at <http://cnx.org/content/m10867/latest/aug3.mid>
[134] See the file at <http://cnx.org/content/m10867/latest/dim6.mid>
[135] See the file at <http://cnx.org/content/m10867/latest/aug7.mid>
[136] See the file at <http://cnx.org/content/m10867/latest/dim8.mid>
[137] See the file at <http://cnx.org/content/m10867/latest/aug4.mid>
[138] See the file at <http://cnx.org/content/m10867/latest/dim5.mid>
[139] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

interval, which cannot be spelled as a major, minor, or perfect interval, is considered unusually dissonant[140] and unstable (tending to want to resolve[141] to another interval).

You have probably noticed by now that the tritone is not the only interval that can be "spelled" in more than one way. In fact, because of enharmonic spellings (Section 2.7), the interval for any two pitches can be written in various ways. A major third could be written as a diminished fourth, for example, or a minor second as an augmented prime. **Always classify the interval as it is written; the composer had a reason for writing it that way.** That reason sometimes has to do with subtle differences in the way different written notes will be interpreted by performers, but it is mostly a matter of placing the notes correctly in the context of the key (Section 2.10), the chord[142], and the evolving harmony[143]. (Please see Beginning Harmonic Analysis (Section 2.18) for more on that subject.)

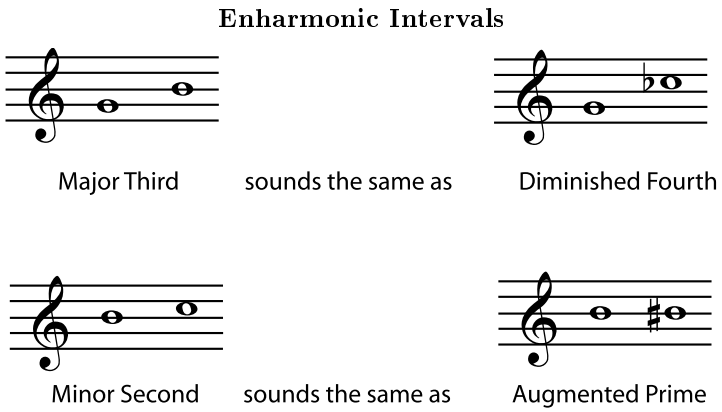


Figure 2.80: Any interval can be written in a variety of ways using enharmonic (Section 2.7) spelling. Always classify the interval as it is written.

2.11.4 Inverting Intervals

To **invert** any interval, simply imagine that one of the notes has moved one octave, so that the higher note has become the lower and vice-versa. Because inverting an interval only involves moving one note by an octave (it is still essentially the "same" note in the tonal system), intervals that are **inversions** of each other have a very close relationship in the tonal[144] system.

[140] "Consonance and Dissonance" <http://cnx.org/content/m11953/latest/>
[141] "Consonance and Dissonance" <http://cnx.org/content/m11953/latest/#p0h>
[142] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[143] "Harmony" <http://cnx.org/content/m11654/latest/>
[144] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>

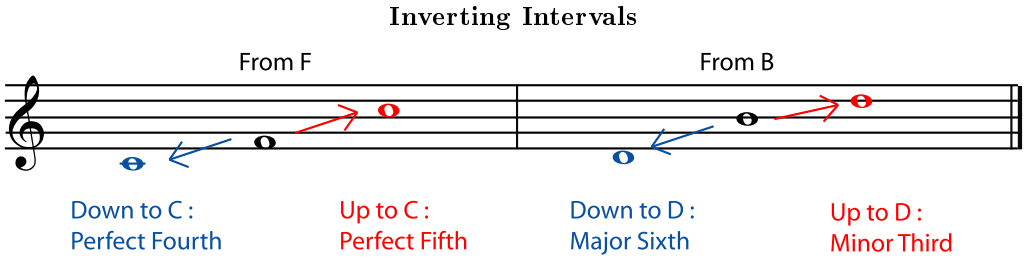


Figure 2.81

To find the inversion of an interval

1. To name the new interval, subtract the name of the old interval from 9.
2. The inversion of a perfect interval is still perfect.
3. The inversion of a major interval is minor, and of a minor interval is major.
4. The inversion of an augmented interval is diminished and of a diminished interval is augmented.

Example 2.13

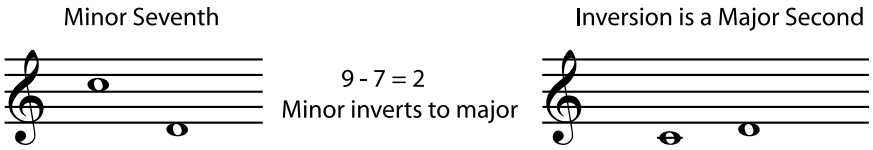


Figure 2.82

Exercise 2.11.6 ***(Solution on p. 287.)***

What are the inversions of the following intervals?

1. Augmented third
2. Perfect fifth
3. Diminished fifth
4. Major seventh
5. Minor sixth

2.11.5 Summary

Here is a quick summary of the above information, for reference.

Number of half steps	Common Spelling	Example, from C	Alternate Spelling	Example, from C	Inversion
0	Perfect Unison (P1)	C	Diminished Second	D double flat	Octave (P8)
1	Minor Second (m2)	D flat	Augmented Unison	C sharp	Major Seventh (M7)
2	Major Second (M2)	D	Diminished Third	E double flat	Minor Seventh (m7)
3	Minor Third (m3)	E flat	Augmented Second	D sharp	Major Sixth (M6)
4	Major Third (M3)	E	Diminished Fourth	F flat	Minor Sixth (m6)
5	Perfect Fourth (P4)	F	Augmented Third	E sharp	Perfect Fifth (P5)
6	Tritone (TT)	F sharp or G flat	Augmented Fourth or Diminished Fifth	F sharp or G flat	Tritone (TT)
7	Perfect Fifth (P5)	G	Diminished Sixth	A double flat	Perfect Fourth (P4)
8	Minor Sixth (m6)	A flat	Augmented Fifth	G sharp	Major Third (M3)
9	Major Sixth (M6)	A	Diminished Seventh	B double flat	Minor Third (m3)
10	Minor Seventh (m7)	B flat	Augmented Sixth	A sharp	Major Second (M2)
11	Major Seventh (M7)	B	Diminished Octave	C' flat	Minor Second (m2)
12	Perfect Octave (P8)	C'	Augmented Seventh	B sharp	Perfect Unison (P1)

Table 2.1: The examples given name the note reached if one starts on C, and goes up the named interval.

Summary Notes: Perfect Intervals

- A perfect prime is often called a unison. It is two notes of the same pitch.
- A perfect octave is often simply called an octave. It is the next "note with the same name".
- Perfect intervals - unison, fourth, fifth, and octave - are never called major or minor

Summary Notes: Augmented and Diminished Intervals

- An augmented interval is one half step larger than the perfect or major interval.
- A diminished interval is one half step smaller than the perfect or minor interval.

Summary Notes: Inversions of Intervals

- To find the inversion's number name, subtract the interval number name from 9.
- Inversions of perfect intervals are perfect.

- Inversions of major intervals are minor, and inversions of minor intervals are major.
- Inversions of augmented intervals are diminished, and inversions of diminished intervals are augmented.

2.12 Repeats and Other Musical Road Map Signs[145]

Repetition, either exact or with small or large variations, is one of the basic organizing principles of music. Repeated notes (Section 2.3), motifs[146], phrases[147], melodies[148], rhythms[149], chord progressions[150], and even entire repeated sections in the overall form[151], are all very crucial in helping the listener make sense of the music. So good music is surprisingly repetitive!

So, in order to save time, ink, and page turns, common notation has many ways to show that a part of the music should be repeated exactly.

If the repeated part is very small - only one or two measures, for example - the repeat sign will probably look something like those in Figure 2.83 (Repeated Measures). If you have very many such repeated measures in a row, you may want to number them (in pencil) to help you keep track of where you are in the music.

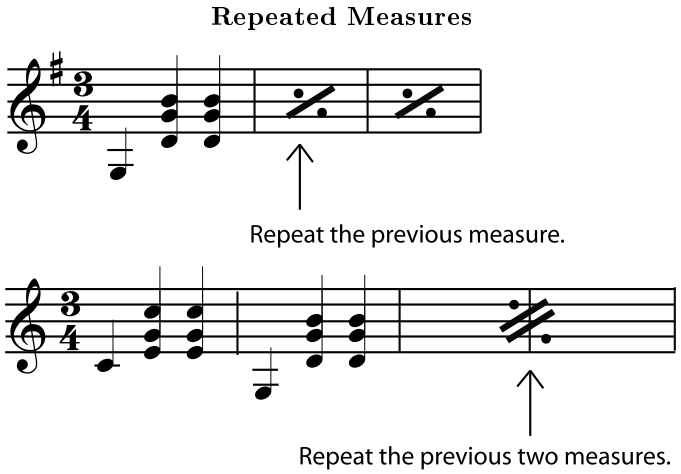


Figure 2.83

For repeated sections of medium length - usually four to thirty-two measures - **repeat dots** with or without endings are the most common markings. Dots to the right of a double bar line[152] begin the repeated section; dots to the left of a double bar line end it. If there are no beginning repeat dots, you should go all the way back to the beginning of the music and repeat from there.

[145] This content is available online at <http://cnx.org/content/m12805/1.8/>.
[146] "Melody": Section Motif <http://cnx.org/content/m11647/latest/#s3>
[147] "Melody": Section Melodic Phrases <http://cnx.org/content/m11647/latest/#s2>
[148] "Melody" <http://cnx.org/content/m11647/latest/>
[149] "Rhythm" <http://cnx.org/content/m11646/latest/>
[150] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[151] "Form in Music" <http://cnx.org/content/m10842/latest/>
[152] "The Staff": Section The Staff <http://cnx.org/content/m10880/latest/#s1>

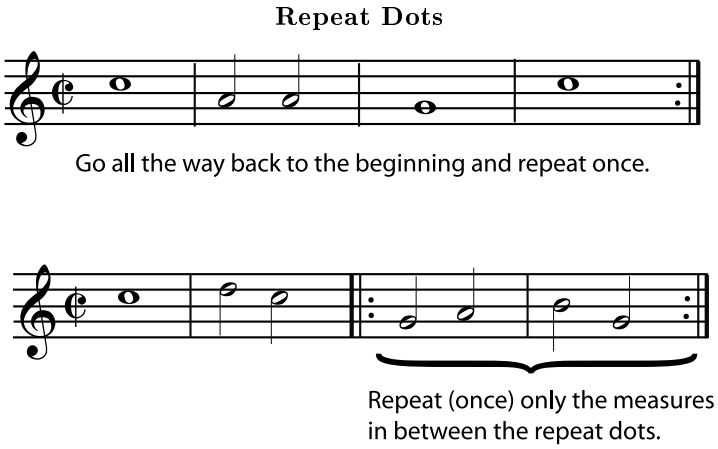


Figure 2.84: If there are no extra instructions, a repeated section should be played twice. Occasionally you will see extra instructions over the repeat dots, for example to play the section "3x" (three times).

It is very common for longer repeated sections of music to be repeated exactly until the last few measures. When this happens, the repeat dots will be put in an **ending**. The bracket over the music shows you which measures to play each time you arrive at that point in the music. For example, the second time you reach a set of endings, you will **skip the music in all the other endings; play only the measures in the second ending, and then do whatever the second ending directs you to do** (repeat, go on, skip to somewhere else, etc.).

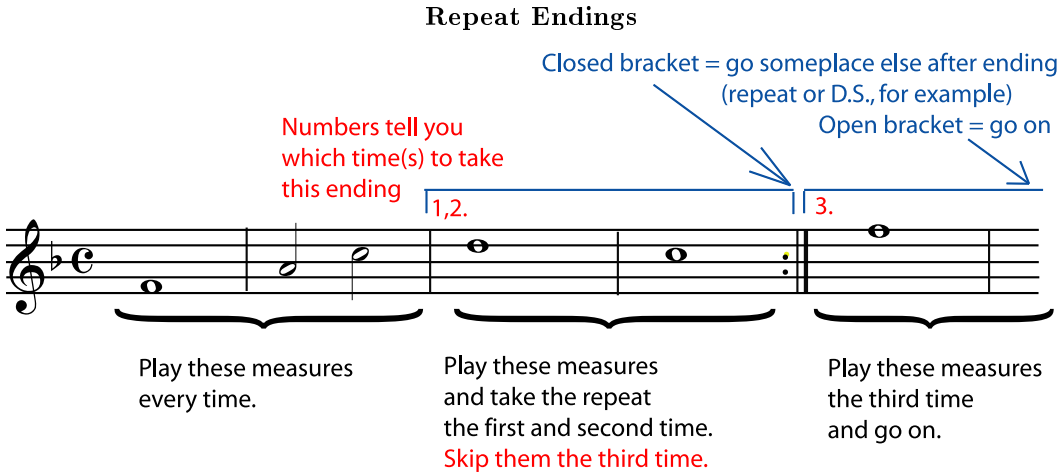


Figure 2.85: Some "endings" of a section of music may include a repeat, while others do not. Play only one ending each time (skipping over other, previously played endings when necessary), and then follow the "instructions" at the end of the ending (to repeat, go on, go someplace else, etc.).

When you are repeating large sections in more informally written music, you may simply find instructions in the music such as "to refrain", "to bridge", "to verses", etc. Or you may find extra instructions to play certain parts "only on the repeat". Usually these instructions are reasonably clear, although you may need to study the music for a minute to get the "road map" clear in your mind. Pencilled-in markings can be a big help if it's difficult to spot the place you need to skip to. In order to help clarify things, repeat dots and other repeat instructions are almost always marked by a double bar line[153].

In Western classical music[154], the most common instructions for repeating large sections are traditionally written (or abbreviated) in Italian. The most common instructions from that tradition are in Figure 2.86 (Other Common "Road Map" Signs).

[153] "The Staff": Section The Staff <http://cnx.org/content/m10880/latest/#s1>
[154] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

Other Common "Road Map" Signs

D.C. or *da capo*	"To the head" - Go back to the very beginning
D.S. or *dal segno*	"To the sign" - Go back to the sign
al fine	"To the end" - On the repeat, stop when it says "*fine*"
𝄋	Sign
fine	"End" - On the last time through, stop here
to ⊕	Go to the coda section
⊕	Coda section

Figure 2.86

Again, instructions can easily get quite complicated, and these large-section markings may require you to study your part for a minute to see how it is laid out, and even to mark (in pencil) circles and arrows that help you find the way quickly while you are playing. Figure 2.87 contains a few very simplistic examples of how these "road map signs" will work.

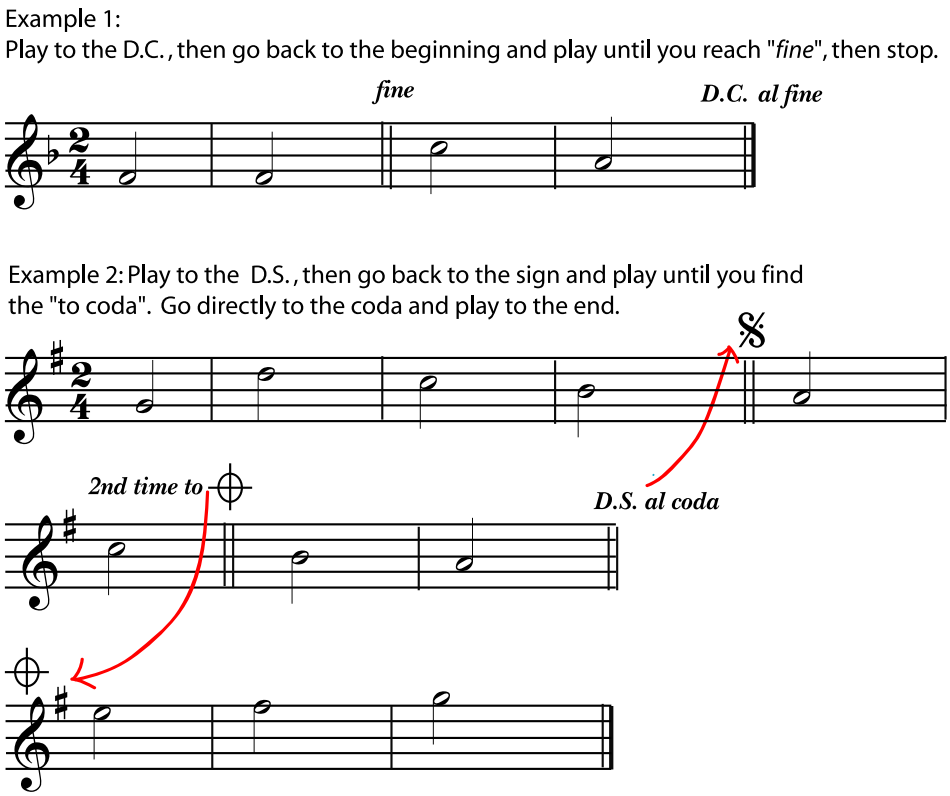


Figure 2.87: Here are some (shortened) examples of how these types of repeat instructions may be arranged. These types of signs usually mark longer repeated sections. In many styles of music, a short repeated section (usually marked with repeat dots) is often **not** repeated after a *da capo* or *dal segno*.

2.13 Minor Keys and Scales[155]

2.13.1 Music in a Minor Key

Each major key (Section 2.10) uses a different set of notes (Section 2.3) (its major scale (Section 2.10.2: Major Scales)). In each major scale, however, the notes are arranged in the same major scale pattern and build the same types of chords that have the same relationships with each other. (See Beginning Harmonic Analysis (Section 2.18) for more on this.) So music that is in, for example, C major, will not sound significantly different from music that is in, say, D major. But music that is in D minor will have a different quality, because the notes in the minor scale follow a different pattern and so have different relationships with each other. Music in minor keys has a different sound and emotional feel, and develops differently harmonically. So you can't, for example, transpose[156] a piece from C major to D minor (or even to C minor) without changing it a great deal. Music that is in a minor key is sometimes described as sounding more solemn, sad,

[155] This content is available online at <http://cnx.org/content/m10856/2.24/>.
[156] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>

mysterious, or ominous than music that is in a major key. To hear some simple examples in both major and minor keys, see Major Keys and Scales (Exercise 2.10.1).

2.13.2 Minor Scales

Minor scales sound different from major scales because they are based on a different pattern of intervals (Section 2.11). Just as it did in major scales, starting the minor scale pattern on a different note will give you a different key signature (Section 2.9), a different set of sharps or flats. The scale that is created by playing all the notes in a minor key signature is a **natural minor scale**. To create a natural minor scale, start on the tonic note (p. 201) and go up the scale using the interval pattern: **whole step, half step, whole step, whole step, half step, whole step, whole step**.

Natural Minor Scale Intervals

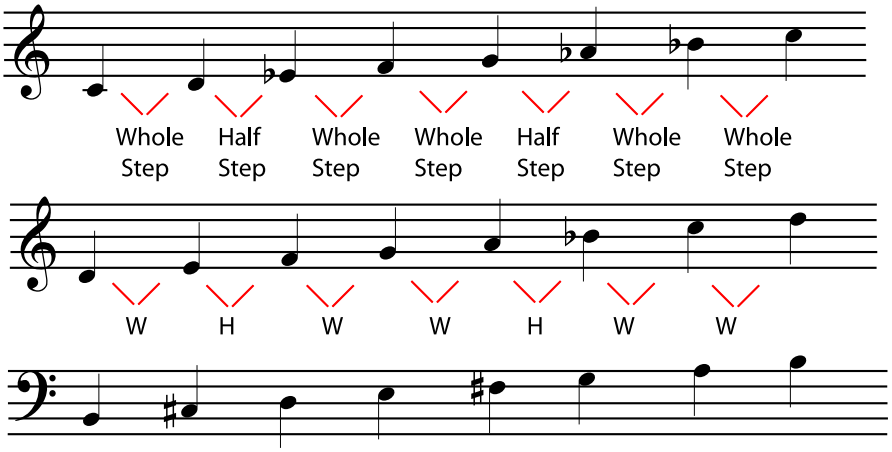


Figure 2.88

Listen[157] to these minor scales.

Exercise 2.13.1 ***(Solution on p. 287.)***

For each note below, write a natural minor scale, one octave, ascending (going up) beginning on that note. If you need staff paper, you may print the staff paper[158] PDF file.

[157] See the file at <http://cnx.org/content/m10856/latest/3a.mid>
[158] See the file at <http://cnx.org/content/m10856/latest/staffpaper1.pdf>

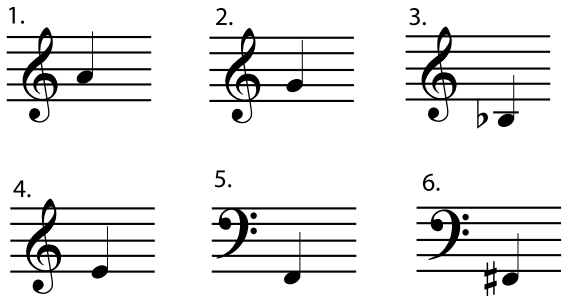


Figure 2.89

2.13.3 Relative Minor and Major Keys

Each minor key shares a key signature (Section 2.9) with a major key. A minor key is called the **relative minor** of the major key that has the same key signature. Even though they have the same key signature, a minor key and its **relative major** sound very different. They have different tonal centers (p. 201), and each will feature melodies, harmonies, and chord progressions[159] built around their (different) tonal centers. In fact, certain strategic accidentals (p. 186) are very useful in helping establish a strong tonal center in a minor key. These useful accidentals are featured in the melodic minor (Section 2.13.3: Relative Minor and Major Keys) and harmonic minor (Section 2.13.3: Relative Minor and Major Keys) scales.

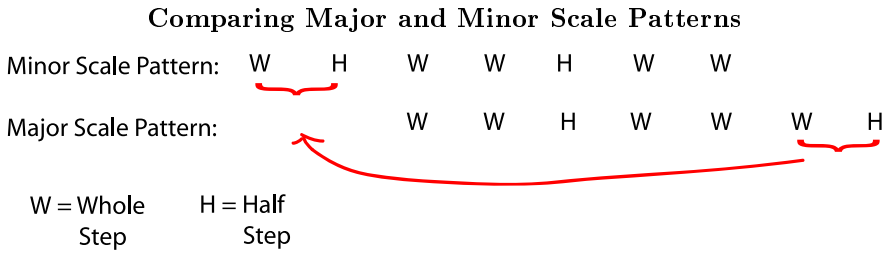


Figure 2.90: The interval patterns for major and natural minor scales are basically the same pattern starting at different points.

It is easy to predict where the relative minor of a major key can be found. Notice that the pattern for minor scales overlaps the pattern for major scales. In other words, they are the same pattern starting in a different place. (If the patterns were very different, minor key signatures would not be the same as major key signatures.) The pattern for the minor scale starts a half step plus a whole step lower than the major scale pattern, so **a relative minor is always three half steps lower than its relative major**. For example, C minor has the same key signature as E flat major, since E flat is a minor third higher than C.

[159] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>

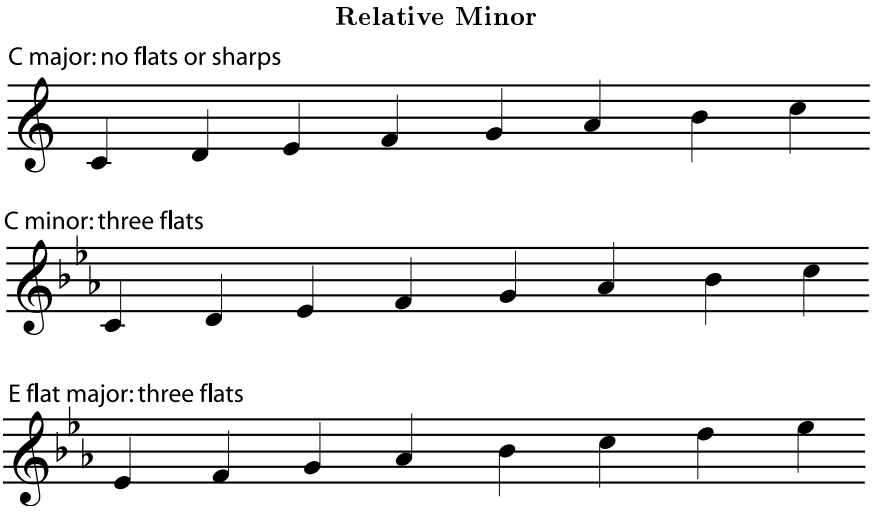


Figure 2.91: The C major and C minor scales start on the same note, but have different key signatures. C minor and E flat major start on different notes, but have the same key signature. C minor is the **relative minor** of E flat major.

Exercise 2.13.2 ***(Solution on p. 288.)***
What are the relative majors of the minor keys in Figure 2.89?

2.13.4 Harmonic and Melodic Minor Scales

NOTE: Do key signatures make music more complicated than it needs to be? Is there an easier way? Join the discussion at Opening Measures[160] .

All of the scales above are **natural minor scales**. They contain only the notes in the minor key signature. There are two other kinds of minor scales that are commonly used, both of which include notes that are not in the key signature. The **harmonic minor scale raises the seventh note of the scale by one half step, whether you are going up or down the scale**. Harmonies in minor keys often use this raised seventh tone in order to make the music feel more strongly centered on the tonic (p. 201). (Please see Beginning Harmonic Analysis (Section 2.18.5: Minor Keys) for more about this.) In the **melodic minor scale**, **the sixth and seventh notes of the scale are each raised by one half step when going up the scale, but return to the natural minor when going down the scale**. Melodies in minor keys often use this particular pattern of accidentals (p. 186), so instrumentalists find it useful to practice melodic minor scales.

[160] http://openingmeasures.com/music/22/why-cant-we-use-something-simpler-than-key-signatures/

Comparing Types of Minor Scales

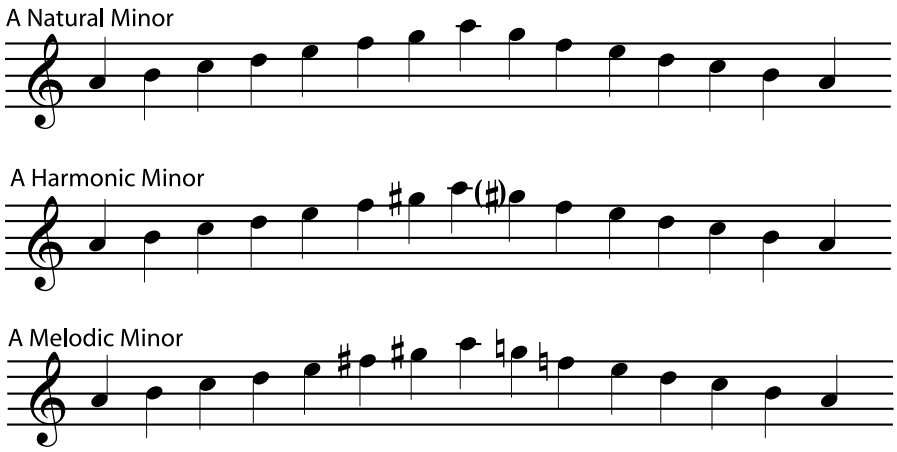


Figure 2.92

Listen to the differences between the natural minor[161], harmonic minor[162], and melodic minor[163] scales.

Exercise 2.13.3 ***(Solution on p. 288.)***
Rewrite each scale from Figure 2.89 as an ascending harmonic minor scale.

Exercise 2.13.4 ***(Solution on p. 289.)***
Rewrite each scale from Figure 2.89 as an ascending and descending melodic minor scale.

2.13.5 Jazz and "Dorian Minor"

Major and minor scales are traditionally the basis for Western Music[164], but jazz theory also recognizes other scales, based on the medieval church modes[165], which are very useful for improvisation. One of the most useful of these is the scale based on the dorian mode, which is often called the **dorian minor**, since it has a basically minor sound. Like any minor scale, dorian minor may start on any note, but like dorian mode, it is often illustrated as natural notes beginning on d.

[161] See the file at <http://cnx.org/content/m10856/latest/tonminnatural.mp3>
[162] See the file at <http://cnx.org/content/m10856/latest/tonminharmonic.mp3>
[163] See the file at <http://cnx.org/content/m10856/latest/tonminmelodic.mp3>
[164] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[165] "Modes and Ragas: More Than just a Scale" <http://cnx.org/content/m11633/latest/#p2a>

Dorian Minor

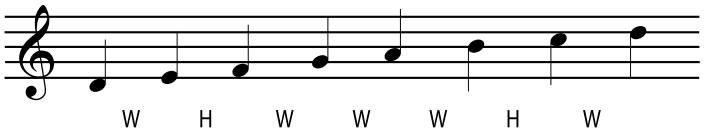


Figure 2.93: The "dorian minor" can be written as a scale of natural notes starting on d. Any scale with this interval pattern can be called a "dorian minor scale".

Comparing this scale to the natural minor scale makes it easy to see why the dorian mode sounds minor; only one note is different.

Comparing Dorian and Natural Minors

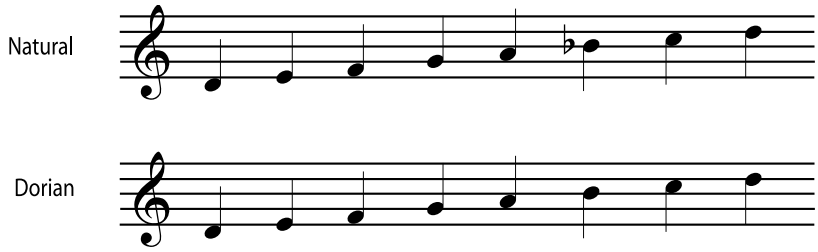


Figure 2.94

You may find it helpful to notice that the "relative major" of the Dorian begins one whole step lower. (So, for example, D Dorian has the same key signature as C major.) In fact, the reason that Dorian is so useful in jazz is that it is the scale used for improvising while a ii chord (Section 2.18.2: Basic Triads in Major Keys) is being played (for example, while a d minor chord is played in the key of C major), a chord which is very common in jazz. (See Beginning Harmonic Analysis (Section 2.18) for more about how chords are classified within a key.) The student who is interested in modal jazz will eventually become acquainted with all of the **modal scales**. Each of these is named for the medieval church mode[166] which has the same interval pattern, and each can be used with a different chord within the key. Dorian is included here only to explain the common jazz reference to the "dorian minor" and to give notice to students that the jazz approach to scales can be quite different from the traditional classical approach.

[166] "Modes and Ragas: More Than just a Scale" <http://cnx.org/content/m11633/latest/#p2a>

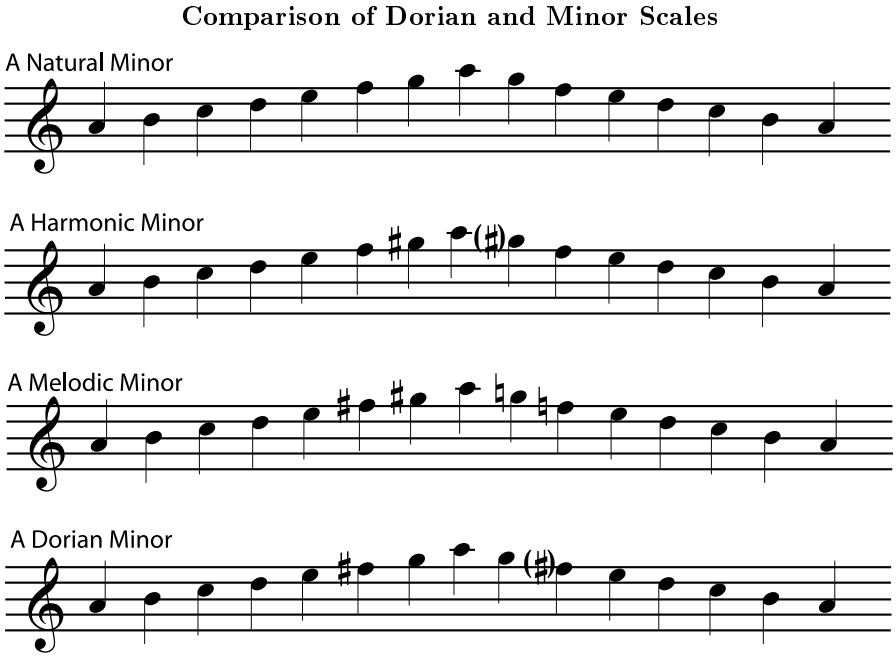


Figure 2.95: You may also find it useful to compare the dorian with the minor scales from Figure 2.92 (Comparing Types of Minor Scales). Notice in particular the relationship of the altered notes in the harmonic, melodic, and dorian minors.

2.14 Triads[167]

Harmony[168] in Western music[169] is based on triads. **Triads** are simple three-note chords[170] built of thirds (p. 205).

[167] This content is available online at <http://cnx.org/content/m10877/2.18/>.
[168] "Harmony" <http://cnx.org/content/m11654/latest/>
[169] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[170] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>

2.14.1 Triads in Root Position

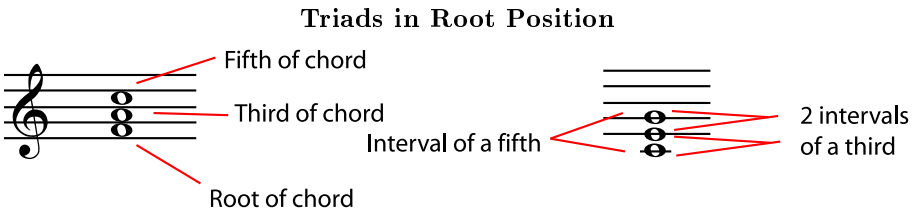


Figure 2.96

The chords in Figure 2.96 (Triads in Root Position) are written in root position, which is the most basic way to write a triad. In **root position**, the **root**, which is the note that names the chord, is the lowest note. The **third of the chord** is written a third (Figure 2.69: Simple Intervals) higher than the root, and the **fifth of the chord** is written a fifth (Figure 2.69: Simple Intervals) higher than the root (which is also a third higher than the third of the chord). So the simplest way to write a triad is as a stack of thirds, in root position.

NOTE: The type of interval or chord - major, minor, diminished, etc., is not important when you are determining the position of the chord. To simplify things, all notes in the examples and exercises below are natural, but it would not change their position at all if some notes were sharp or flat. It would, however, change the name of the triad - see Naming Triads (Section 2.15).

Exercise 2.14.1 ***(Solution on p. 290.)***

Write a triad in root position using each root given. If you need some staff paper for exercises you can print this PDF file[171].

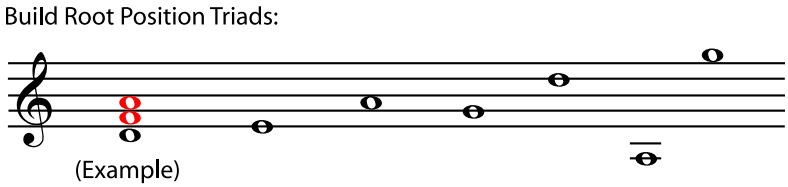


Figure 2.97

2.14.2 First and Second Inversions

Any other chord that has the same-named notes as a root position chord is considered to be essentially the same chord in a different **position**. In other words, all chords that have only D naturals, F sharps, and A naturals, are considered D major chords.

[171] See the file at <http://cnx.org/content/m10877/latest/staffpaper1.pdf>

NOTE: **But** if you change the pitch (Section 2.6) or spelling (Section 2.7) of any note in the triad, you have changed the chord (see Naming Triads (Section 2.15)). For example, if the F sharps are written as G flats, or if the A's are sharp instead of natural, you have a different chord, not an inversion of the same chord. If you add notes, you have also changed the name of the chord (see Beyond Triads (Section 2.16)). **You cannot call one chord the inversion of another if either one of them has a note that does not share a name (for example "F sharp" or "B natural") with a note in the other chord.**

If the third of the chord is the lowest note, the chord is in **first inversion**. If the fifth of the chord is the lowest note, the chord is in **second inversion**. A chord in second inversion may also be called a **six-four chord**, because the intervals (Section 2.11) in it are a sixth and a fourth.

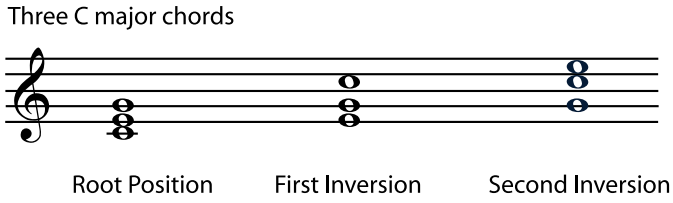


Figure 2.98

It does not matter how far the higher notes are from the lowest note, or how many of each note there are (at different octaves or on different instrumentsl); all that matters is which note is lowest. (In fact, one of the notes may not even be written, only implied by the context of the chord in a piece of music. A practiced ear will tell you what the missing note is; we won't worry about that here.) To decide what position a chord is in, move the notes to make a stack of thirds and identify the root.

Example 2.14

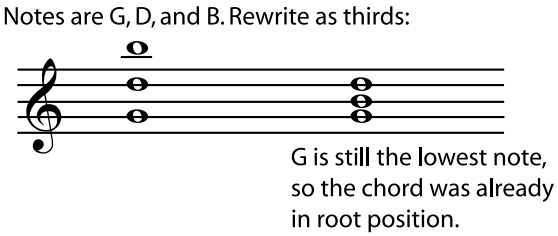


Figure 2.99

Example 2.15

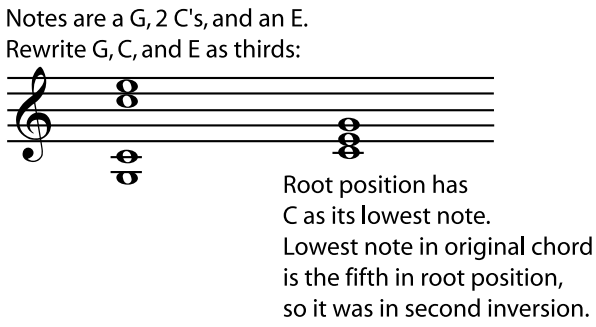


Figure 2.100

Exercise 2.14.2 ***(Solution on p. 290.)***

Rewrite each chord in root position, and name the original position of the chord.

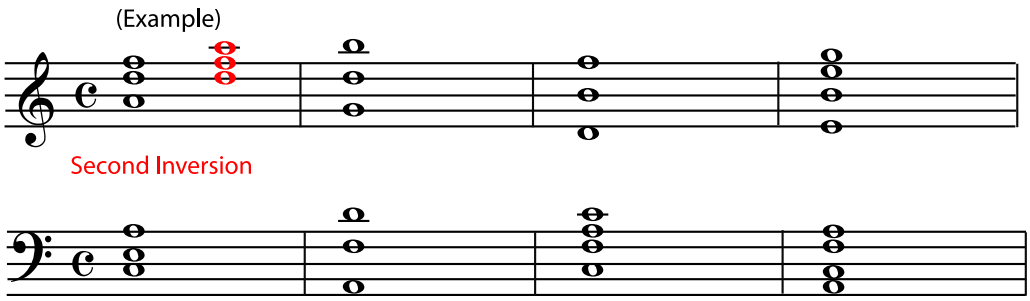


Figure 2.101

2.15 Naming Triads[172]

The position (Section 2.14) that a chord is in does make a difference in how it sounds, but it is a fairly small difference. Listen[173] to a G major chord in three different positions.

[172] This content is available online at <http://cnx.org/content/m10890/2.17/>.
[173] See the file at <http://cnx.org/content/m10890/latest/Inversions.MID>

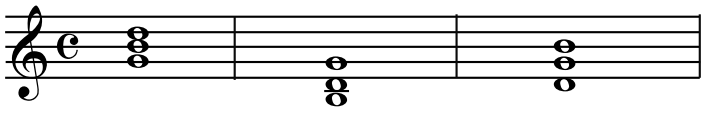


Figure 2.102: G major chord in three different positions.

A much bigger difference in the chord's sound comes from the intervals (Section 2.11) between the root-position notes of the chord. For example, if the B in one of the chords above was changed to a B flat, you would still have a G triad (Section 2.14), but the chord would now sound very different. So chords are named according to the intervals between the notes when the chord is in root position (Section 2.14). Listen[174] to four different G chords.

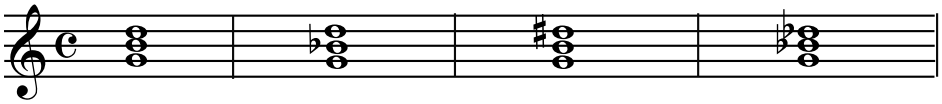


Figure 2.103: These are also all G chords, but they are four different G chords. The intervals between the notes are different, so the chords sound very different.

2.15.1 Major and Minor Chords

The most commonly used triads (Section 2.14) form major (Section 2.10) chords and minor (Section 2.13) chords. All major chords and minor chords have an interval (Section 2.11) of a perfect fifth (p. 207) between the root and the fifth of the chord (Section 2.14). A perfect fifth (7 half-steps) can be divided into a major third (Major and Minor Intervals, p. 208) (4 half-steps) plus a minor third (Major and Minor Intervals, p. 208) (3 half-steps). If the interval between the root and the third of the chord is the major third (with the minor third between the third and the fifth of the chord), the triad is a **major chord**. If the interval between the root and the third of the chord is the minor third (and the major third is between the third and fifth of the chord), then the triad is a **minor chord**. Listen closely to a major triad[175] and a minor triad[176].

Example 2.16

[174] See the file at <http://cnx.org/content/m10890/latest/GChords.MID>
[175] See the file at <http://cnx.org/content/m10890/latest/chomj.mp3>
[176] See the file at <http://cnx.org/content/m10890/latest/chomin.mp3>

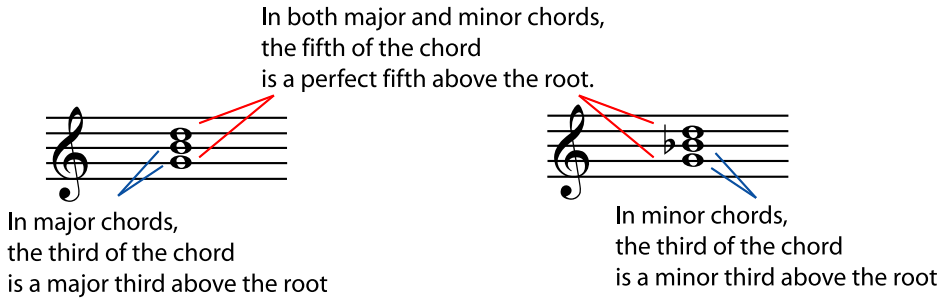


Figure 2.104

Example 2.17

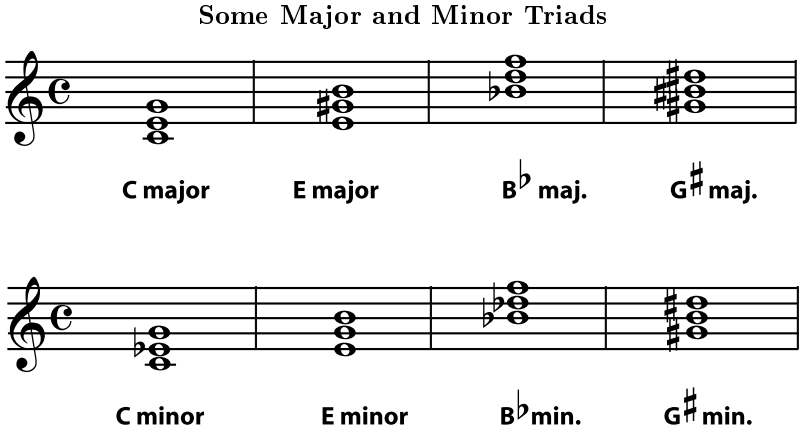


Figure 2.105

Exercise 2.15.1 ***(Solution on p. 291.)***

Write the major chord for each root given.

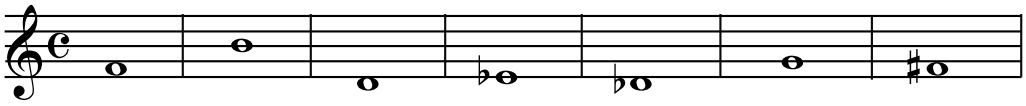


Figure 2.106

Exercise 2.15.2 ***(Solution on p. 291.)***

Write the minor chord for each root given.

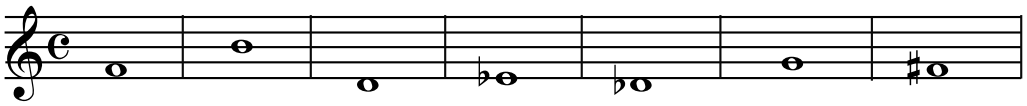


Figure 2.107

2.15.2 Augmented and Diminished Chords

Because they don't contain a perfect fifth, augmented and diminished chords have an unsettled feeling and are normally used sparingly. An **augmented chord** is built from two major thirds, which adds up to an augmented fifth. A **diminished chord** is built from two minor thirds, which add up to a diminished fifth. Listen closely to an augmented triad[177] and a diminished triad[178].

Example 2.18

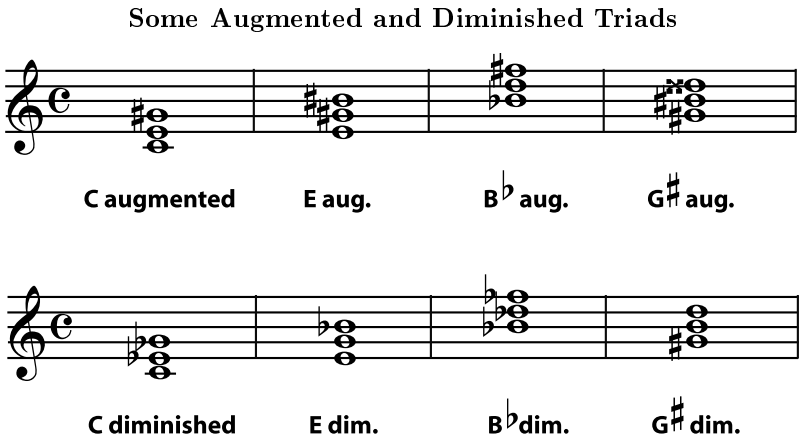


Figure 2.108

Exercise 2.15.3 ***(Solution on p. 291.)***

Write the augmented triad for each root given.

[177] See the file at <http://cnx.org/content/m10890/latest/choaug.mp3>
[178] See the file at <http://cnx.org/content/m10890/latest/chodim.mp3>

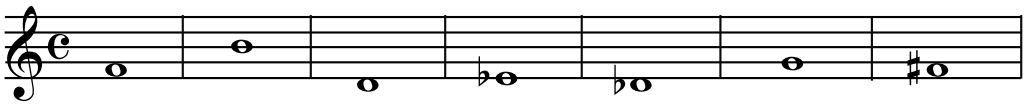


Figure 2.109

Exercise 2.15.4 *(Solution on p. 291.)*

Write the diminished triad for each root given.

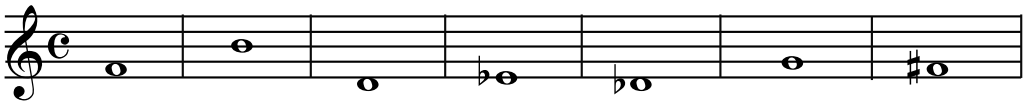


Figure 2.110

Notice that you can't avoid double sharps or double flats by writing the note on a different space or line. **If you change the spelling (Section 2.7) of a chord's notes, you have also changed the chord's name.** For example, if, in an augmented G sharp major chord, you rewrite the D double sharp as an E natural, the triad becomes an E augmented chord.

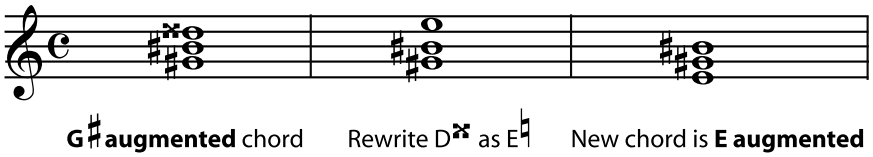


Figure 2.111: Changing the spelling of any note in a chord also changes the chord's name.

You can put the chord in a different position (Section 2.14) or add more of the same-named notes at other octaves without changing the name of the chord. But changing the note names or adding different-named notes, will change the name of the chord. Here is a summary of the intervals in triads in root position.

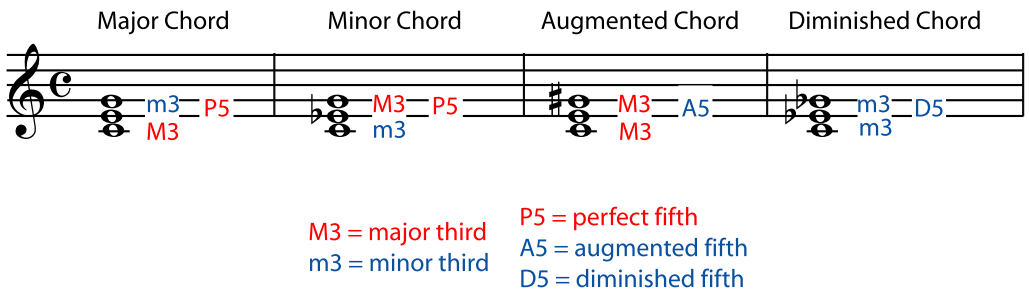


Figure 2.112

Exercise 2.15.5 ***(Solution on p. 292.)***

Now see if you can identify these chords that are not necessarily in root position. Rewrite them in root position first if that helps.

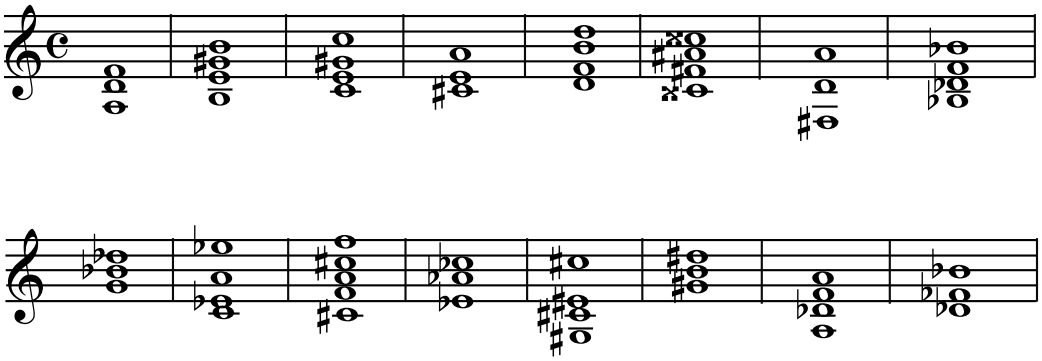


Figure 2.113

2.16 Beyond Triads: Naming Other Chords[179]

2.16.1 Introduction

Once you know how to name triads (please see Triads (Section 2.14) and Naming Triads (Section 2.15)), you need only a few more rules to be able to name all of the most common chords.

This skill is necessary for those studying music theory. It's also very useful at a "practical" level for composers, arrangers, and performers (especially people playing chords, like pianists and guitarists), who need to be able to talk to each other about the chords that they are reading, writing, and playing.

Chord manuals, fingering charts, chord diagrams, and notes written out on a staff are all very useful, especially if the composer wants a very particular sound on a chord. But all you really need to know are the

[179]This content is available online at <http://cnx.org/content/m11995/1.16/>.

name of the chord, your major scales (Section 2.10) and minor scales (Section 2.13), and a few rules, and you can figure out the notes in any chord for yourself.

What do you need to know to be able to name most chords?

1. You must know your major, minor, augmented and diminished triads. Either have them all memorized, or be able to figure them out following the rules for triads. (See Triads (Section 2.14) and Naming Triads (Section 2.15).)
2. You must be able to find intervals from the root (Section 2.14) of the chord. One way to do this is by using the rules for intervals. (See Interval (Section 2.11).) **Or** if you know your scales and don't want to learn about intervals, you can use the method in #3 instead.
3. If you know all your scales (always a good thing to know, for so many reasons), you can find all the intervals from the root using scales. For example, the "4" in Csus4 is the 4th note in a C (major or minor) scale, and the "minor 7th" in Dm7 is the 7th note in a D (natural) minor scale. If you would prefer this method, but need to brush up on your scales, please see Major Keys and Scales (Section 2.10) and Minor Keys and Scales (Section 2.13).
4. You need to know the rules for the common seventh chords (Section 2.16.3: Seventh Chords), for extending (Section 2.16.4: Added Notes, Suspensions, and Extensions) and altering (Section 2.16.6: Altering Notes and Chords) chords, for adding notes (Section 2.16.4: Added Notes, Suspensions, and Extensions), and for naming bass notes (Section 2.16.5: Bass Notes). The basic rules for these are all found below.

NOTE: Please note that the modern system of chord symbols, discussed below, is very different from the **figured bass** shorthand popular in the seventeenth century (which is not discussed here). For example, the "6" in figured bass notation implies the first inversion (Section 2.14) chord, not an added 6. (As of this writing, there was a very straightforward summary of figured bass at Ars Nova Software[180] .)

2.16.2 Chord Symbols

Some instrumentalists, such as guitarists and pianists, are sometimes expected to be able to play a named chord, or an accompaniment[181] based on that chord, without seeing the notes written out in common notation[182]. In such cases, a **chord symbol** above the staff[183] tells the performer what chord should be used as accompaniment to the music until the next symbol appears.

[180] http://www.ars-nova.com/cpmanual/realizeharmony.htm
[181] "Harmony": Accompaniment <http://cnx.org/content/m11654/latest/#l0c>
[182] "The Staff" <http://cnx.org/content/m10880/latest/>
[183] "The Staff" <http://cnx.org/content/m10880/latest/>

Chord Symbols

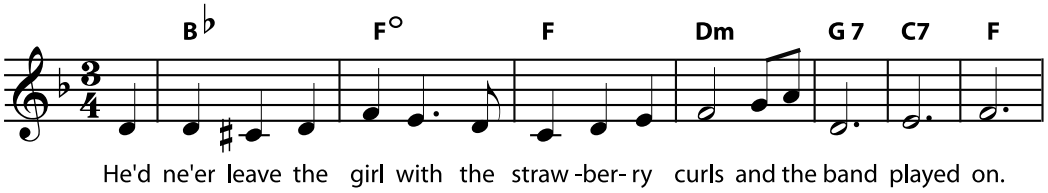


Figure 2.114: A chord symbol above the staff is sometimes the only indication of which notes should be used in the accompaniment[184]. Chord symbols also may be used even when an accompaniment is written out, so that performers can read either the chord symbol or the notated music, as they prefer.

There is widespread agreement on how to name chords, but there are several different systems for writing chord symbols. Unfortunately, this can be a little confusing, particularly when different systems use the same symbol to refer to different chords. If you're not certain what chord is wanted, you can get useful clues both from the notes in the music and from the other chord symbols used. (For example, if the "minus" chord symbol is used, check to see if you can spot any chords that are clearly labelled as either minor or diminished.)

Examples of Chord Symbol Variety

Major chord	**C**	**CMaj**	**C△**		
Minor chord	**Cm**	**Cmin**	**C −**		
Augmented Chord	**Caug**	**C +**			
Diminished Chord*	**Cdim**	**C −**			
Major Seventh	**CM7**	**CMaj7**	**C△**	**C△7**	**C 7**
Minor Seventh	**Cm7**	**Cmin7**	**C−7**		
Diminished Seventh*	**Cdim7**	**C °**			

*It is so common to add the (diminished) seventh to the diminished chord, that the symbol for the diminished chord may be used with the assumption that you will add the diminished seventh.

Figure 2.115: There is unfortunately a wide variation in the use of chord symbols. In particular, notice that some symbols, such as the "minus" sign and the triangle, can refer to different chords, depending on the assumptions of the person who wrote the symbol.

[184] "Harmony": Accompaniment <http://cnx.org/content/m11654/latest/#l0c>

2.16.3 Seventh Chords

If you take a basic triad (Section 2.14) and add a note that is a seventh (p. 205) above the root (Section 2.14), you have a **seventh chord**. There are several different types of seventh chords, distinguished by both the type of triad and the type of seventh used. Here are the most common.

Seventh Chords

- Seventh (or "dominant seventh") chord = major triad + minor seventh
- Major Seventh chord = major triad + major seventh
- Minor Seventh chord = minor triad + minor seventh
- Diminished Seventh chord = diminished triad + diminished seventh (half step lower than a minor seventh)
- Half-diminished Seventh chord = diminished triad + minor seventh

An easy way to remember where each seventh is:

- The **major seventh** is one half step below the octave[185].
- The **minor seventh** is one half step below the major seventh.
- The **diminished seventh** is one half step below the minor seventh.

Common Seventh Chords

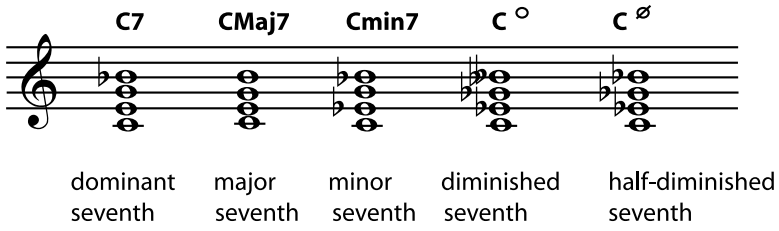


Figure 2.116

Listen to the differences between the C seventh[186], C major seventh[187], C minor seventh[188], C diminished seventh[189], and C half-diminished seventh[190].

Exercise 2.16.1 ***(Solution on p. 292.)***

Write the following seventh chords. If you need staff paper, you can print this PDF file[191]

1. G minor seventh
2. E (dominant) seventh
3. B flat major seventh
4. D diminished seventh
5. F (dominant) seventh

[185] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[186] See the file at <http://cnx.org/content/m11995/latest/chodom7.mp3>
[187] See the file at <http://cnx.org/content/m11995/latest/choM7.mp3>
[188] See the file at <http://cnx.org/content/m11995/latest/chomin7.mp3>
[189] See the file at <http://cnx.org/content/m11995/latest/chodim7.mp3>
[190] See the file at <http://cnx.org/content/m11995/latest/chohalfdim.mp3>
[191] See the file at <http://cnx.org/content/m11995/latest/staffpaper1.pdf>

6. F sharp minor seventh
7. G major seventh
8. B half-diminished seventh

Exercise 2.16.2 *(Solution on p. 292.)*
Write a Ddim7, Fdim7, G#dim7, and Bdim7. Look closely at the chords you have written and see if you can notice something surprising about them. (Hint: try rewriting the chords enharmonically (Section 2.7) so that all the notes are either natural or (single) flat.

2.16.4 Added Notes, Suspensions, and Extensions

The seventh is not the only note you can add to a basic triad to get a new chord. You can continue to **extend** the chord by adding to the stack of thirds (Section 2.14), or you can **add** any note you want. The most common additions and extensions add notes that are in the scale named by the chord.

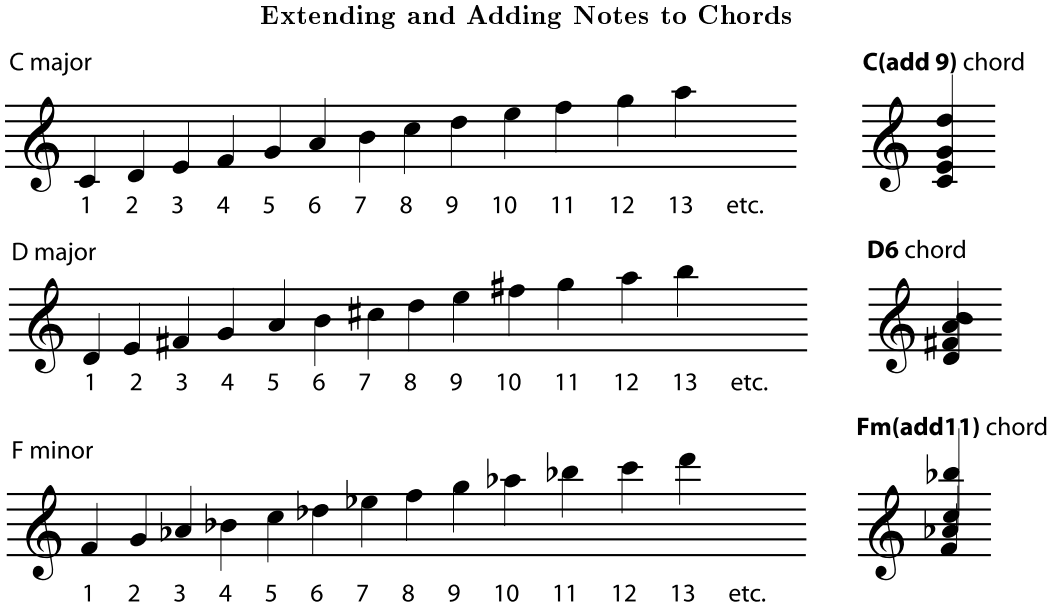


Figure 2.117: To find out what to call a note added to a chord, count the notes of the scale named by the chord.

The first, third, and fifth (1, 3, and 5) notes of the scale are part of the basic triad. So are any other notes in other octaves that have the same name as 1, 3, or 5. In a C major chord, for example, that would be any C naturals, E naturals, and G naturals. If you want to add a note with a different name, just list its number (its **scale degree**) after the name of the chord.

Adding to and Extending Chords

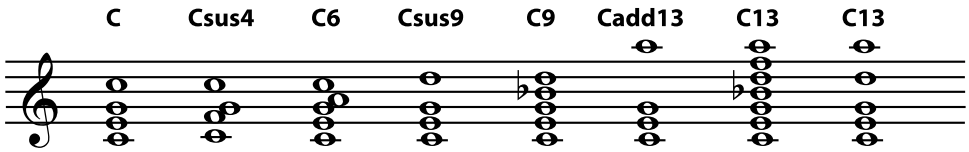


Figure 2.118: Labelling a number as "sus" (suspended) implies that it replaces the chord tone immediately below it. Labelling it "add" implies that only that note is added. In many other situations, the performer is left to decide how to play the chord most effectively. Chord tones may or may not be left out. In an extended chord, all or some of the notes in the "stack of thirds" below the named note may also be added.

Many of the higher added notes are considered **extensions** of the "stack of thirds" begun in the triad. In other words, a C13 can include (it's sometimes the performer's decision which notes will actually be played) the seventh, ninth, and eleventh as well as the thirteenth. Such a chord can be dominant, major, or minor; the performer must take care to play the correct third and seventh. If a chord symbol says to "add13", on the other hand, this usually means that only the thirteenth is added.

A Variety of Ninth Chords

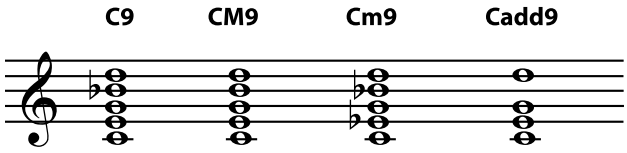


Figure 2.119: Take care to use the correct third and seventh - dominant, major, or minor - with extended chords. If the higher note is labelled "add", don't include the chord extensions that aren't named.

NOTE: All added notes and extensions, including sevenths, introduce dissonance[192] into the chord. In some modern music, many of these dissonances are heard as pleasant or interesting or jazzy and don't need to be resolved. However, in other styles of music, dissonances need to be resolved[193], and some chords may be altered to make the dissonance sound less harsh (for example, by leaving out the 3 in a chord with a 4).

You may have noticed that, once you pass the octave (8), you are repeating the scale. In other words, C2 and C9 both add a D, and C4 and C11 both add an F. It may seem that C4 and C11 should therefore be the same chords, but in practice these chords usually do sound different; for example, performers given a C4

[192] "Consonance and Dissonance" <http://cnx.org/content/m11953/latest/>
[193] "Consonance and Dissonance" <http://cnx.org/content/m11953/latest/#p0h>

chord will put the added note near the bass note and often use it as a temporary replacement for the third (the "3") of the chord. On the other hand, they will put the added note of a C11 at the top of the chord, far away from the bass note and piled up on top of all the other notes of the chord (including the third), which may include the 7 and 9 as well as the 11. The result is that the C11 - an **extension** - has a more diffuse, jazzy, or impressionistic sound. The C4, on the other hand, has a more intense, needs-to-be-resolved, classic **suspension** sound. In fact, 2, 4, and 9 chords are often labelled **suspended** (sus), and follow the same rules for resolution[194] in popular music as they do in classical.

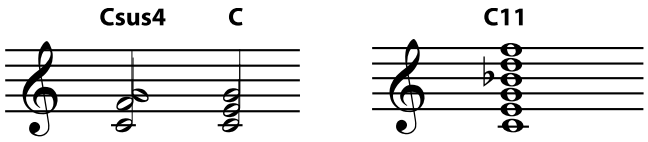


Figure 2.120: Low-number added notes and high-number added notes are treated differently. So even though they both add an F, a C4 suspension[195] will sound quite different from a C11[196] extended chord.

2.16.5 Bass Notes

The bass line[197] of a piece of music is very important, and the composer/arranger often will want to specify what note should be the lowest-sounding in the chord. At the end of the chord name will be a slash followed by a note name, for example C/E. The note following the slash should be the bass note.

Naming the Bass Note

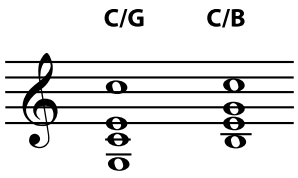


Figure 2.121: The note following the slash is the bass note of the chord. It can be a note that is already in the chord - making the chord a first or second inversion (p. 226) - or it can be an added note, following the same basic rules as other added notes (including using it to replace other notes in the chord).

The note named as the bass note can be a note normally found in the chord - for example, C/E or C/G - or it can be an added note - for example C/B or C/A. If the bass note is not named, it is best to use the tonic (p. 201) as the primary bass note.

[194] "Consonance and Dissonance" <http://cnx.org/content/m11953/latest/#p0h>
[195] See the file at <http://cnx.org/content/m11995/latest/C4C.mid>
[196] See the file at <http://cnx.org/content/m11995/latest/C11.mid>
[197] "Harmony": Accompaniment <http://cnx.org/content/m11654/latest/#l0c>

Exercise 2.16.3 ***(Solution on p. 293.)***

Name the chords. (Hint: Look for suspensions, added notes, extensions, and basses that are not the root. Try to identify the main triad or root first.)

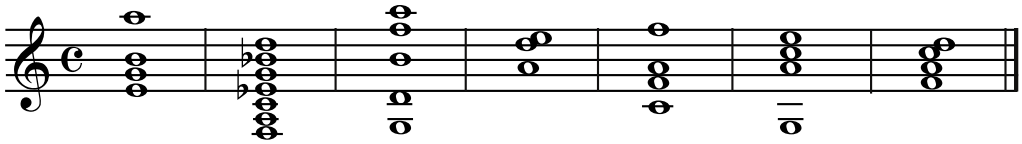


Figure 2.122

Exercise 2.16.4 ***(Solution on p. 293.)***

For guitarists, pianists, and other chord players: Get some practical practice. Name some chords you don't have memorized (maybe F6, Am/G, Fsus4, BM7, etc.). Chords with fingerings that you don't know but with a sound that you would recognize work best for this exercise. Decide what notes must be in those chords, find a practical fingering for them, play the notes and see what they sound like.

2.16.6 Altering Notes and Chords

If a note in the chord is not in the major or minor scale of the root (Section 2.14) of the chord, it is an **altered note** and makes the chord an **altered chord**. The alteration - for example "flat five" or "sharp nine" - is listed in the chord symbol. Any number of alterations can be listed, making some chord symbols quite long. **Alterations are not the same as accidentals (p. 186).** Remember, a chord symbol always names notes in the scale of the chord root (Section 2.14), ignoring the key signature (Section 2.9) of the piece that the chord is in, so the alterations are from the scale of the chord, not from the key of the piece.

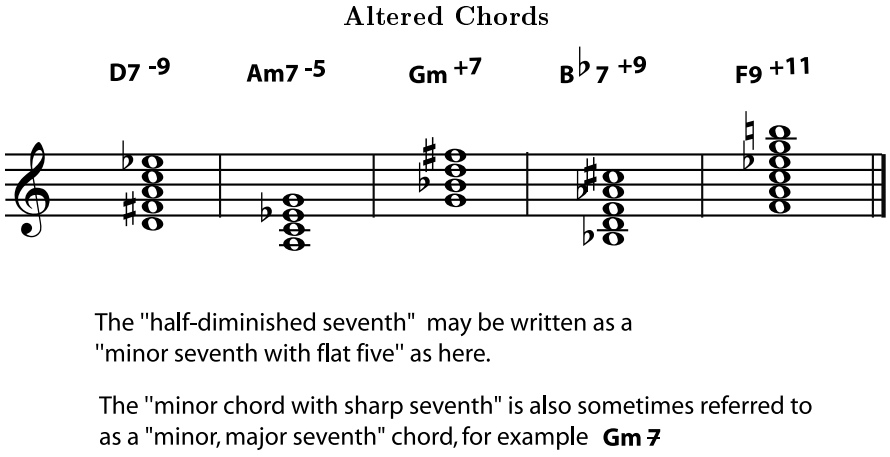


Figure 2.123: There is some variation in the chord symbols for altered chords. Plus/minus or sharp/flat symbols may appear before or after the note number. When sharps and flats are used, remember that the alteration is always from the scale of the chord root, not from the key signature.

Exercise 2.16.5 ***(Solution on p. 293.)***

On a treble clef staff, write the chords named. You can print this PDF file[198] if you need staff paper for this exercise.

1. D (dominant) seventh with a flat nine
2. A minor seventh with a flat five
3. G minor with a sharp seven
4. B flat (dominant) seventh with a sharp nine
5. F nine sharp eleven

2.17 The Circle of Fifths[199]

2.17.1 Related Keys

The circle of fifths is a way to arrange keys to show how closely they are related to each other.

[198] See the file at <http://cnx.org/content/m11995/latest/staffpaper1.pdf>
[199] This content is available online at <http://cnx.org/content/m10865/2.17/>.

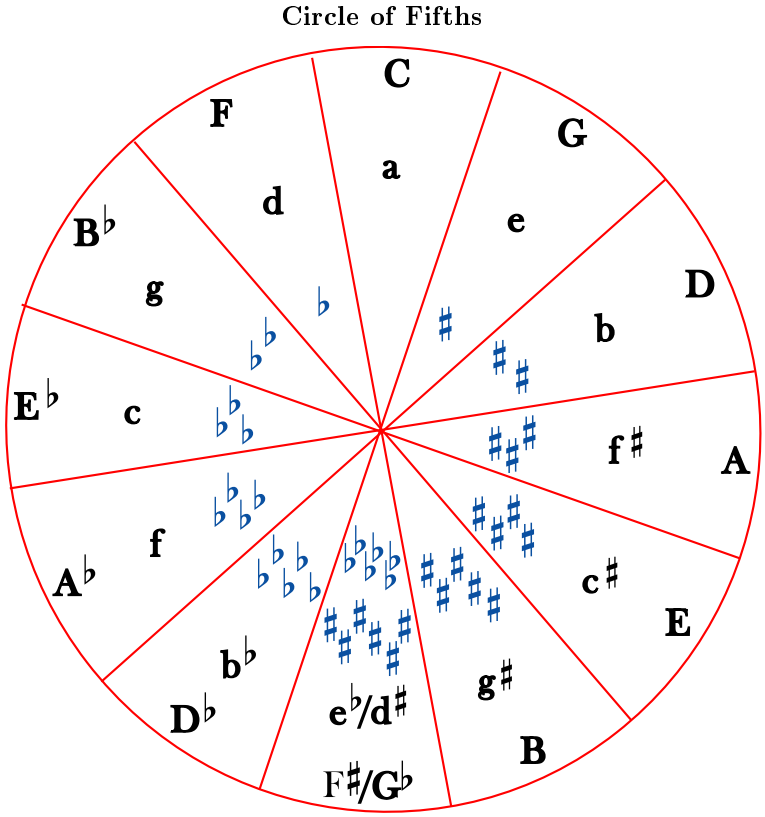


Figure 2.124: The major key for each key signature is shown as a capital letter; the minor key as a small letter. In theory, one could continue around the circle adding flats or sharps (so that B major is also C flat major, with seven flats, E major is also F flat major, with 6 flats and a double flat, and so on), but in practice such key signatures are very rare.

Keys are not considered closely related to each other if they are near each other in the chromatic scale (p. 194) (or on a keyboard). What makes two keys "closely related" is having similar key signatures (Section 2.9). So the most closely related key to C major, for example, is A minor, since they have the same key signature (no sharps and no flats). This puts them in the same "slice" of the circle. The next most closely related keys to C major would be G major (or E minor), with one sharp, and F major (or D minor), with only one flat. The keys that are most distant from C major, with six sharps or six flats, are on the opposite side of the circle.

The circle of fifths gets its name from the fact that as you go from one section of the circle to the next, you are going up or down by an interval (Section 2.11) of a perfect fifth (Section 2.11.3.1: Perfect Intervals). If you go up a perfect fifth (clockwise in the circle), you get the key that has one more sharp or one less flat; if you go down a perfect fifth (counterclockwise), you get the key that has one more flat or one less sharp. Since going down by a perfect fifth is the same as going up by a perfect fourth (p. 207), the counterclockwise direction is sometimes referred to as a "circle of fourths". (Please review inverted intervals (Section 2.11.4: Inverting Intervals) if this is confusing.)

Example 2.19

The key of D major has two sharps. Using the circle of fifths, we find that the most closely related major keys (one in each direction) are G major, with only one sharp, and A major, with three sharps. The relative minors of all of these keys (B minor, E minor, and F sharp minor) are also closely related to D major.

Exercise 2.17.1 ***(Solution on p. 294.)***

What are the keys most closely related to E flat major? To A minor?

Exercise 2.17.2 ***(Solution on p. 294.)***

Name the major and minor keys for each key signature.

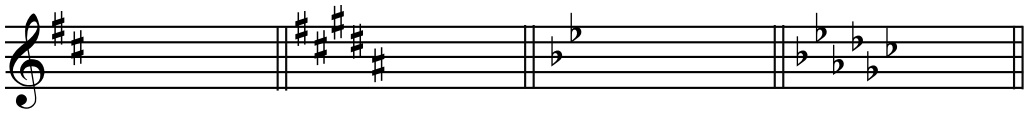


Figure 2.125

2.17.2 Key Signatures

If you do not know the order of the sharps and flats, you can also use the circle of fifths to find these. The first sharp in a key signature is always F sharp; the second sharp in a key signature is always (a perfect fifth away) C sharp; the third is always G sharp, and so on, all the way to B sharp.

The first flat in a key signature is always B flat (the same as the last sharp); the second is always E flat, and so on, all the way to F flat. Notice that, just as with the key signatures, you add sharps or subtract flats as you go clockwise around the circle, and add flats or subtract sharps as you go counterclockwise.

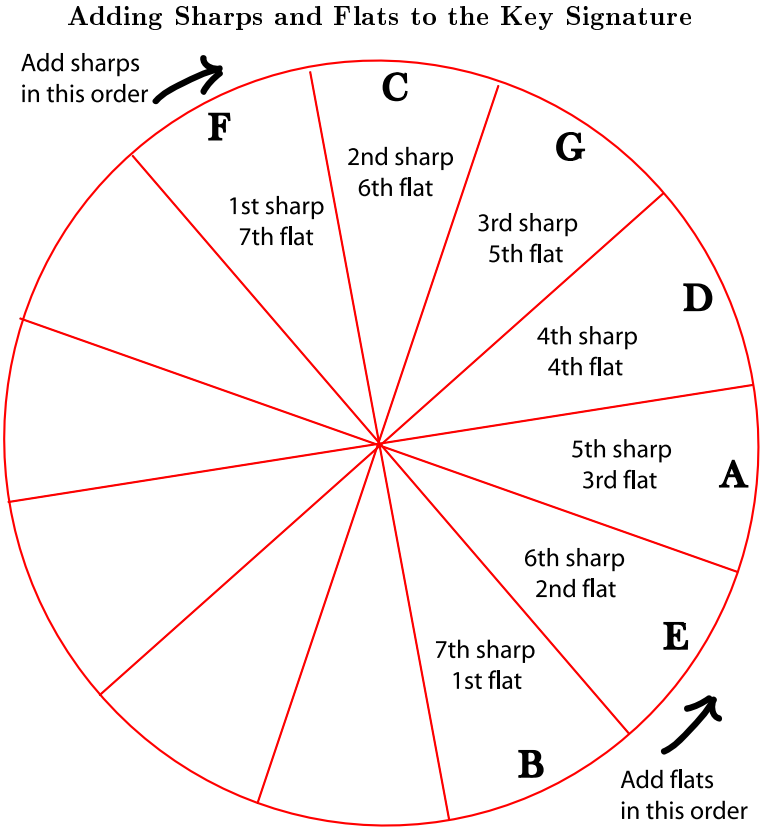


Figure 2.126: Each sharp and flat that is added to a key signature is also a perfect fifth away from the last sharp or flat that was added.

Exercise 2.17.3 ***(Solution on p. 294.)***

Figure 2.124 (Circle of Fifths) shows that D major has 2 sharps; Figure 2.126 (Adding Sharps and Flats to the Key Signature) shows that they are F sharp and C sharp. After D major, name the next four sharp keys, and name the sharp that is added with each key.

Exercise 2.17.4 ***(Solution on p. 295.)***

E minor is the first sharp minor key; the first sharp added in both major and minor keys is always F sharp. Name the next three sharp minor keys, and the sharp that is added in each key.

Exercise 2.17.5 ***(Solution on p. 295.)***

After B flat major, name the next four flat keys, and name the flat that is added with each key.

2.18 Beginning Harmonic Analysis[200]

2.18.1 Introduction

It sounds like a very technical idea, but basic **harmonic analysis** just means understanding how a chord is related to the key and to the other chords in a piece of music. This can be such useful information that you will find many musicians who have not studied much music theory, and even some who don't read music, but who can tell you what the I ("one") or the V ("five") chord are in a certain key.

Why is it useful to know how chords are related?

- Many standard forms[201] (for example, a "twelve bar blues") follow very specific chord progressions[202], which are often discussed in terms of harmonic relationships.
- If you understand chord relationships, you can transpose[203] any chord progression you know to any key (Section 2.10) you like.
- If you are searching for chords to go with a particular melody[204] (in a particular key), it is very helpful to know what chords are most likely in that key, and how they might be likely to progress from one to another.
- Improvisation requires an understanding of the chord progression.
- Harmonic analysis is also necessary for anyone who wants to be able to compose reasonable chord progressions or to study and understand the music of the great composers.

2.18.2 Basic Triads in Major Keys

Any chord might show up in any key, but some chords are much more likely than others. The most likely chords to show up in a key are the chords that use only the notes in that key (no accidentals (p. 186)). So these chords have both names and numbers that tell how they fit into the key. (We'll just discuss basic triads (Section 2.14) for the moment, not seventh chords (p. 236) or other added-note (Section 2.16.4: Added Notes, Suspensions, and Extensions) or altered (p. 240) chords.) The chords are numbered using Roman numerals from I to vii.

[200] This content is available online at <http://cnx.org/content/m11643/1.23/>.
[201] "Form in Music" <http://cnx.org/content/m10842/latest/>
[202] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[203] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>
[204] "Melody" <http://cnx.org/content/m11647/latest/>

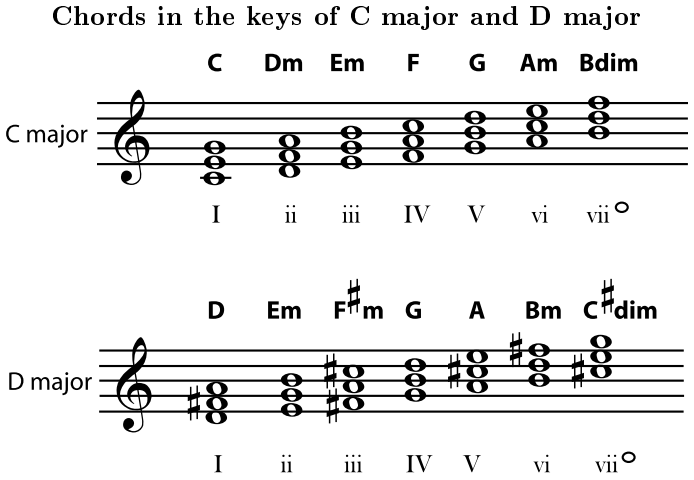


Figure 2.127: To find all the basic chords in a key, build a simple triad (in the key) on each note of the scale. You'll find that although the chords change from one key to the next, the **pattern** of major and minor chords is always the same.

Exercise 2.18.1 ***(Solution on p. 295.)***

Write and name the chords in G major and in B flat major. (Hint: Determine the key signature (Section 2.9) first. Make certain that each chord begins on a note in the major scale (Section 2.10) and contains only notes in the key signature.) If you need some staff paper, you can print this PDF file[205]

You can find all the basic triads that are possible in a key by building one triad, in the key, on each note of the scale (each **scale degree**). One easy way to name all these chords is just to number them: the chord that starts on the first note of the scale is "I", the chord that starts on the next scale degree is "ii", and so on. Roman numerals are used to number the chords. Capital Roman numerals are used for major chords (Section 2.15.1: Major and Minor Chords) and small Roman numerals for minor chords (Section 2.15.1: Major and Minor Chords). The diminished chord (Section 2.15.2: Augmented and Diminished Chords) is in small Roman numerals followed by a small circle. Because major scales always follow the same pattern, the pattern of major and minor chords is also the same in any major key. The chords built on the first, fourth, and fifth degrees of the scale are always major chords (I, IV, and V). The chords built on the second, third, and sixth degrees of the scale are always minor chords (ii, iii, and vi). The chord built on the seventh degree of the scale is a diminished chord.

NOTE: Notice that IV in the key of B flat is an E flat major chord, not an E major chord, and vii in the key of G is F sharp diminished, not F diminished. If you can't name the scale notes in a key, you may find it difficult to predict whether a chord should be based on a sharp, flat, or natural note. This is only one reason (out of many) why it is a good idea to memorize all the scales. (See Major Keys and Scales (Section 2.10).) However, if you don't plan on memorizing all the scales at this time, you'll find it useful to memorize at least the most important chords (start with I, IV, and V) in your favorite keys.

[205] See the file at <http://cnx.org/content/m11643/latest/staffpaper1.pdf>

2.18.3 A Hierarchy of Chords

Even among the chords that naturally occur in a key signature, some are much more likely to be used than others. In most music, the most common chord is I. In Western music[206], I is the tonal center (Section 2.10) of the music, the chord that feels like the "home base" of the music. As the other two major chords in the key, IV and V are also likely to be very common. In fact, the most common added-note chord in most types of Western music is a V chord (the dominant chord (Section 2.18.4: Naming Chords Within a Key)) with a minor seventh (Major and Minor Intervals, p. 208) added (V7). It is so common that this particular flavor of seventh (Section 2.16.3: Seventh Chords) (a major chord with a minor seventh added) is often called a **dominant seventh**, regardless of whether the chord is being used as the V (the dominant) of the key. Whereas the I chord feels most strongly "at home", V7 gives the strongest feeling of "time to head home now". This is very useful for giving music a satisfying ending. Although it is much less common than the V7, the diminished vii chord (often with a diminished seventh (Section 2.15.2: Augmented and Diminished Chords) added), is considered to be a harmonically unstable chord that strongly wants to resolve to I. Listen to these very short progressions and see how strongly each suggests that you must be in the key of C: C (major) chord(I)[207]; F chord to C chord (IV - I)[208]; G chord to C chord (V - I)[209]; G seventh chord to C chord (V7 - I)[210]; B diminished seventh chord to C chord (viidim7 - I)[211] (Please see Cadence[212] for more on this subject.)

Many folk songs and other simple tunes can be accompanied using only the I, IV and V (or V7) chords of a key, a fact greatly appreciated by many beginning guitar players. Look at some chord progressions from real music.

[206] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[207] See the file at <http://cnx.org/content/m11643/latest/Cchord.mid>
[208] See the file at <http://cnx.org/content/m11643/latest/FchordCchord.mid>
[209] See the file at <http://cnx.org/content/m11643/latest/GchordCchord.mid>
[210] See the file at <http://cnx.org/content/m11643/latest/G7chordCchord.mid>
[211] See the file at <http://cnx.org/content/m11643/latest/BdimchordCchord.MID>
[212] "Cadence in Music" <http://cnx.org/content/m12402/latest/>

Some chord progressions

A Common Twelve Bar Blues:

I	I	I	I7
IV7	IV7	I	I
V7	V7	I	I

Verse of "Jingle Bells"

I	I	I	IV
IV	V7	V7	I
I	I	I	IV
IV	V7	V7	I

Chorus of "Bye Bye, Love"

IV	I	IV	I
IV	I	V7	I

Figure 2.128: Much Western music is harmonically pretty simple, so it can be very useful just to know I, IV, and V in your favorite keys. This figure shows progressions as a list of chords (read left to right as if reading a paragraph), one per measure.

Typically, folk, blues, rock, marches, and Classical-era[213] music is based on relatively straightforward chord progressions, but of course there are plenty of exceptions. Jazz and some pop styles tend to include many chords with added (Section 2.16.4: Added Notes, Suspensions, and Extensions) or altered (p. 240) notes. Romantic-era[214] music also tends to use more complex chords in greater variety, and is very likely to use chords that are not in the key.

[213] "Classical Music and the Music of the Classical Era" <http://cnx.org/content/m15294/latest/>
[214] "The Music of the Romantic Era" <http://cnx.org/content/m11606/latest/>

More Complex Chord Progressions

Chorus of "Love Me Tender"

I	III7	vi	I7
IVM7	iv	I	I
v6	VI7	II7	II7
V7sus4	V7	I	I

Beginning of Liszt's "Liebestraum"

I	III7	Vi7	II7	
ii7	V7	I	Idim	I

Figure 2.129: Some music has more complex harmonies. This can include more unusual chords such as major sevenths, and chords with altered (p. 240) notes such as sharp fives. It may also include more basic chords that aren't in the key, such as I diminished and II (major), or even chords based on notes that are not in the key such as a sharp IV chord. (Please see Beyond Triads (Section 2.16.2: Chord Symbols) to review how to read chord symbols.)

Extensive study and practice are needed to be able to identify and understand these more complex progressions. It is not uncommon to find college-level music theory courses that are largely devoted to harmonic analysis and its relationship to musical forms. This course will go no further than to encourage you to develop a basic understanding of what harmonic analysis is about.

2.18.4 Naming Chords Within a Key

So far we have concentrated on identifying chord relationships by number, because this system is commonly used by musicians to talk about every kind of music from classical to jazz to blues. There is another set of names that is commonly used, particularly in classical music, to talk about harmonic relationships. Because numbers are used in music to identify everything from beats to intervals to harmonics to what fingering to use, this naming system is sometimes less confusing.

I	=	Tonic
ii	=	Supertonic
iii	=	Mediant
IV	=	Subdominant
V	=	Dominant
vi	=	Submediant
vii°	=	Subtonic, or Leading Tone

Figure 2.130

Exercise 2.18.2 ***(Solution on p. 296.)***

Name the chord.

1. Dominant in C major
2. Subdominant in E major
3. Tonic in G sharp major
4. Mediant in F major
5. Supertonic in D major
6. Submediant in C major
7. Dominant seventh in A major

Exercise 2.18.3 ***(Solution on p. 296.)***

The following chord progression is in the key of G major. Identify the relationship of each chord to the key by both name and number. Which chord is not in the key? Which chord in the key has been left out of the progression?

G **C** **Am** **Em**

A **D** **Bm** **D7**

G

Figure 2.131

2.18.5 Minor Keys

Since minor scales (Section 2.13) follow a different pattern of intervals (Section 2.11) than major scales, they will produce chord progressions with important differences from major key chord progressions.

Exercise 2.18.4 ***(Solution on p. 297.)***

Write (triad) chords that occur in the keys of A minor, E minor, and D minor. Remember to begin each triad on a note of the natural minor (Section 2.13.3: Relative Minor and Major Keys) scale and to include only notes in the scale in each chord. Which chord relationships are major? Which minor? Which diminished? If you need staff paper, print this PDF file[215]

Notice that the actual chords created using the major scale and its relative minor (Section 2.13.3: Relative Minor and Major Keys) scale are the same. For example, compare the chords in A minor (Figure 2.192) to the chords in C major (Figure 2.127 (Chords in the keys of C major and D major)). The difference is in how the chords are used. As explained above (p. 247), if the key is C major, the chord progression[216] will likely make it clear that C is the tonal center (p. 201) of the piece, for example by featuring the bright-sounding (major) tonic, dominant, and subdominant chords (C major, G major or G7, and F major), particularly in strong cadences[217] that end on a C chord.

If the piece is in A minor, on the other hand, it will be more likely to feature (particularly in cadences) the tonic, dominant, and subdominant of A minor (the A minor, D minor, and E minor chords). These

[215] See the file at <http://cnx.org/content/m11643/latest/staffpaper1.pdf>
[216] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[217] "Cadence in Music" <http://cnx.org/content/m12402/latest/>

chords are also available in the key of C major, of course, but they typically are not given such a prominent place.

As mentioned above (p. 247), the "flavor" of sound that is created by a major chord with a minor seventh added, gives a particularly dominant (wanting-to-go-to-the-home-chord) sound, which in turn gives a more strong feeling of tonality to a piece of music. Because of this, many minor pieces change the dominant chord so that it is a dominant seventh (a major chord with a minor seventh), even though that requires using a note that is not in the key.

Exercise 2.18.5 ***(Solution on p. 297.)***

Look at the chords in Figure 2.192. What note of each scale would have to be changed in order to make v major? Which other chords would be affected by this change? What would they become, and are these altered chords also likely to be used in the minor key?

The point of the harmonic minor (Section 2.13.3: Relative Minor and Major Keys) scale is to familiarize the musician with this common feature of harmony, so that the expected chords become easy to play in every minor key. There are also changes that can be made to the melodic[218] lines of a minor-key piece that also make it more strongly tonal. This involves raising (by one half step (Section 2.8)) both the sixth and seventh scale notes, but only when the melody is ascending. So the musician who wants to become familiar with melodic patterns in every minor key will practice melodic minor (Section 2.13.3: Relative Minor and Major Keys) scales, which use different notes for the ascending and descending scale.

You can begin practicing harmonic analysis by practicing identifying whether a piece is in the major key or in its relative minor. Pick any piece of music for which you have the written music, and use the following steps to determine whether the piece is major or minor:

Is it Major or Minor?

- Identify the chords used in the piece, particularly at the very end, and at other important cadences[219] (places where the music comes to a stopping or resting point). This is an important first step that may require practice before you become good at it. Try to start with simple music which either includes the names of the chords, or has simple chords in the accompaniment that will be relatively easy to find and name. If the chords are not named for you and you need to review how to name them just by looking at the written notes, see Naming Triads (Section 2.15) and Beyond Triads (Section 2.16).
- Find the key signature (Section 2.9).
- Determine both the major key (Section 2.10) represented by that key signature, and its relative minor (Section 2.13.3: Relative Minor and Major Keys) (the minor key that has the same key signature).
- Look at the very end of the piece. Most pieces will end on the tonic chord. If the final chord is the tonic of either the major or minor key for that key signature, you have almost certainly identified the key.
- If the final chord is not the tonic of either the major or the minor key for that key signature, there are two possibilities. One is that the music is not in a major or minor key! Music from other cultures, as well as some jazz, folk, modern, and pre-Baroque[220] European music are based on other modes or scales. (Please see Modes and Ragas[221] and Scales that aren't Major or Minor (Section 2.22) for more about this.) If the music sounds at all "exotic" or "unusual", you should suspect that this may be the case.
- If the final chord is not the tonic of either the major or the minor key for that key signature, but you still suspect that it is in a major or minor key (for example, perhaps it has a "repeat and fade" ending which avoids coming to rest on the tonic), you may have to study the rest of the music in order to discern the key. Look for important cadences before the end of the music (to identify I). You may be able to identify, just by listening, when the piece sounds as if it is approaching and landing on its "resting place". Also look for chords that have that "dominant seventh" flavor (to identify V). Look for

[218] "Melody" <http://cnx.org/content/m11647/latest/>
[219] "Cadence in Music" <http://cnx.org/content/m12402/latest/>
[220] "Music of the Baroque Period" <http://cnx.org/content/m14737/latest/>
[221] "Modes and Ragas: More Than just a Scale" <http://cnx.org/content/m11633/latest/>

the specific accidentals (p. 186) that you would expect if the harmonic minor (Section 2.13.3: Relative Minor and Major Keys) or melodic minor (Section 2.13.3: Relative Minor and Major Keys) scales were being used. Check to see whether the major or minor chords are emphasized overall. Put together the various clues to reach your final decision, and check it with your music teacher or a musician friend if possible.

2.18.6 Modulation

Sometimes a piece of music temporarily moves into a new key. This is called **modulation**. It is very common in traditional classical music; long symphony and concerto movements almost always spend at least some time in a different key (usually a closely related key (Section 2.17) such as the dominant (Section 2.18.4: Naming Chords Within a Key) or subdominant (Section 2.18.4: Naming Chords Within a Key), or the relative minor or relative major (Section 2.13.3: Relative Minor and Major Keys)), in order to keep things interesting. Shorter works, even in classical style, are less likely to have complete modulations. Abrupt changes of key can seem unpleasant and jarring. In most styles of music, modulation is accomplished gradually, using a progression of chords that seems to move naturally towards the new key. But implied modulations, in which the tonal center seems to suddenly shift for a short time, can be very common in some shorter works (jazz standards, for example). As in longer works, modulation, with its new set of chords, is a good way to keep a piece interesting. If you find that the chord progression in a piece of music suddenly contains many chords that you would not expect in that key, it may be that the piece has modulated. Lots of accidentals, or even an actual change of key signature (Section 2.9), are other clues that the music has modulated.

A new key signature (Section 2.9) may help you to identify the modulation key. If there is not a change of key signature, remember that the new key is likely to contain whatever accidentals (p. 186) are showing up. It is also likely that many of the chords in the progression will be chords that are common in the new key. Look particularly for tonic chords and dominant sevenths. The new key is likely to be closely related (Section 2.17) to the original key, but another favorite trick in popular music is to simply move the key up one whole step (Section 2.8), for example from C major to D major. Modulations can make harmonic analysis much more challenging, so try to become comfortable analyzing easier pieces before tackling pieces with modulations.

2.18.7 Further Study

Although the concept of harmonic analysis is pretty basic, actually analyzing complex pieces can be a major challenge. This is one of the main fields of study for those who are interested in studying music theory at a more advanced level. One next step for those interested in the subject is to become familiar with all the ways notes may be added to basic triads. (Please see Beyond Triads (Section 2.16) for an introduction to that subject.) At that point, you may want to spend some time practicing analyzing some simple, familiar pieces. Depending on your interests, you may also want to spend time creating pleasing chord progressions by choosing chords from the correct key that will complement a melody that you know. As of this writing, the site Music Theory for Songwriters[222] featured "chord maps" that help the student predict likely chord progressions.

For more advanced practice, look for music theory books that focus entirely on harmony or that spend plenty of time analyzing harmonies in real music. (Some music history textbooks are in this category.) You will progress more quickly if you can find books that focus on the music genre that you are most interested in (there are books specifically about jazz harmony, for example).

[222] http://www.chordmaps.com

2.19 Harmonic Series[223]

2.19.1 Introduction

Have you ever wondered how a trumpet[224] plays so many different notes with only three valves[225], or how a bugle plays different notes with no valves at all? Have you ever wondered why an oboe[226] and a flute[227] sound so different, even when they're playing the same note? What is a string player doing when she plays "harmonics"? Why do some notes sound good together while other notes seem to clash with each other? The answers to all of these questions will become clear with an understanding of the harmonic series.

2.19.2 Physics, Harmonics and Color

Most musical notes are sounds that have a particular pitch (Section 2.6). The pitch depends on the main frequency[228] of the sound; the higher the frequency, and shorter the wavelength, of the sound waves, the higher the pitch is. But musical sounds don't have just one frequency. Sounds that have only one frequency are not very interesting or pretty. They have no more musical color[229] than the beeping of a watch alarm. On the other hand, sounds that have too many frequencies, like the sound of glass breaking or of ocean waves crashing on a beach, may be interesting and even pleasant. But they don't have a particular pitch, so they usually aren't considered musical notes.

Frequency and Pitch

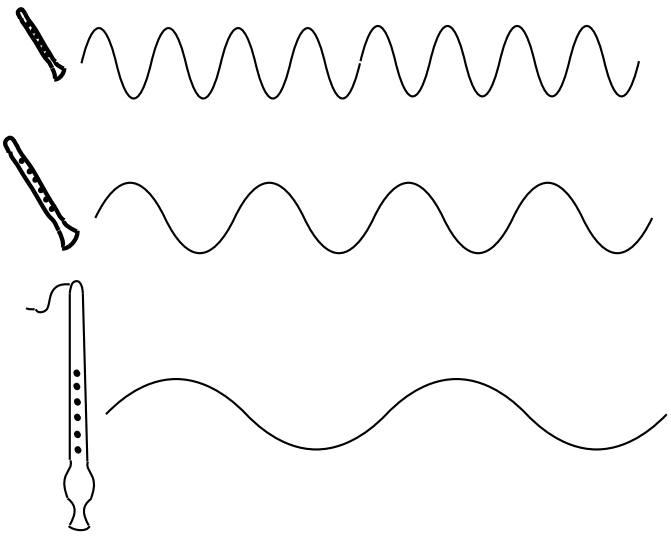


Figure 2.132: The higher the frequency, the higher the note sounds.

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[223] This content is available online at <http://cnx.org/content/m11118/2.19/>.
[224] "Trumpets and Cornets" <http://cnx.org/content/m12606/latest/>
[225] "Wind Instruments: Some Basics" <http://cnx.org/content/m12364/latest/#p2f>
[226] "The Oboe and its Relatives" <http://cnx.org/content/m12615/latest/>
[227] "Flutes" <http://cnx.org/content/m12603/latest/>
[228] "Frequency, Wavelength, and Pitch", Figure 1: Wavelength, Frequency, and Pitch <http://cnx.org/content/m11060/latest/#fig1b>
[229] "Timbre: The Color of Music" <http://cnx.org/content/m11059/latest/>

When someone plays or sings a note, only a very particular set of frequencies is heard. Imagine that each note that comes out of the instrument is a smooth mixture of many different pitches. These different pitches are called **harmonics**, and they are blended together so well that you do not hear them as separate notes at all. Instead, the harmonics give the note its color.

What is the color[230] of a sound? Say an oboe plays a middle C. Then a flute plays the same note at the same loudness as the oboe. It is still easy to tell the two notes apart, because an oboe sounds different from a flute. This difference in the sounds is the **color**, or **timbre** (pronounced "TAM-ber") of the notes. Like a color you see, the color of a sound can be bright and bold or deep and rich. It can be heavy, light, murky, thin, smooth, or transparently clear. Some other words that musicians use to describe the timbre of a sound are: reedy, brassy, piercing, mellow, thin, hollow, focussed, breathy (pronounced BRETH-ee) or full. Listen to recordings of a violin[231] and a viola[232]. Although these instruments are quite similar, the viola has a noticeably "deeper" and the violin a noticeably "brighter" sound that is not simply a matter of the violin playing higher notes. Now listen to the same phrase played by an electric guitar[233], an acoustic guitar with twelve steel strings[234] and an acoustic guitar with six nylon strings[235]. The words musicians use to describe timbre are somewhat subjective, but most musicians would agree with the statement that, compared with each other, the first sound is mellow, the second bright, and the third rich.

Exercise 2.19.1 ***(Solution on p. 298.)***

Listen to recordings of different instruments playing alone or playing very prominently above a group. Some suggestions: an unaccompanied violin or cello sonata, a flute, oboe, trumpet, or horn concerto, native American flute music, classical guitar, bagpipes, steel pan drums, panpipes, or organ. For each instrument, what "color" words would you use to describe the timbre of each instrument? Use as many words as you can that seem appropriate, and try to think of some that aren't listed above. Do any of the instruments actually make you think of specific shades of color, like fire-engine red or sky blue?

Where do the harmonics, and the timbre, come from? When a string vibrates, the main pitch you hear is from the vibration of the whole string back and forth. That is the **fundamental**, or first harmonic. But the string also vibrates in halves, in thirds, fourths, and so on. Each of these fractions also produces a harmonic. The string vibrating in halves produces the second harmonic; vibrating in thirds produces the third harmonic, and so on.

NOTE: This method of naming and numbering harmonics is the most straightforward and least confusing, but there are other ways of naming and numbering harmonics, and this can cause confusion. Some musicians do not consider the fundamental to be a harmonic; it is just the fundamental. In that case, the string halves will give the first harmonic, the string thirds will give the second harmonic and so on. When the fundamental is included in calculations, it is called the first **partial**, and the rest of the harmonics are the second, third, fourth partials and so on. Also, some musicians use the term **overtones** as a synonym for harmonics. For others, however, an overtone is any frequency (not necessarily a harmonic) that can be heard resonating with the fundamental. The sound of a gong or cymbals will include overtones that aren't harmonics; that's why the gong's sound doesn't seem to have as definite a pitch as the vibrating string does. If you are uncertain what someone means by the second harmonic or by the term overtones, ask for clarification.

[230] "Timbre: The Color of Music" <http://cnx.org/content/m11059/latest/>
[231] See the file at <http://cnx.org/content/m11118/latest/timvl.mp3>
[232] See the file at <http://cnx.org/content/m11118/latest/timvla.mp3>
[233] See the file at <http://cnx.org/content/m11118/latest/electricGUITARS.wav>
[234] See the file at <http://cnx.org/content/m11118/latest/12stringGUITARS.wav>
[235] See the file at <http://cnx.org/content/m11118/latest/nylonGUITARS.wav>

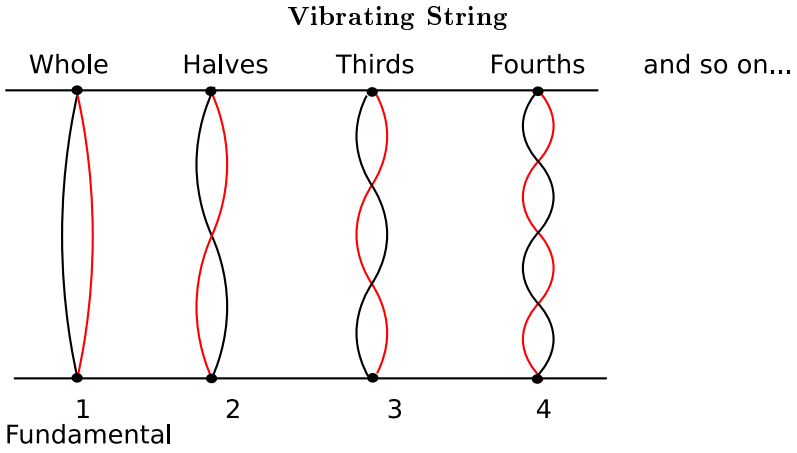

Figure 2.133: The fundamental pitch is produced by the whole string vibrating back and forth. But the string is also vibrating in halves, thirds, quarters, fifths, and so on, producing **harmonics**. All of these vibrations happen at the same time, producing a rich, complex, interesting sound.

A column of air vibrating inside a tube is different from a vibrating string, but the column of air can also vibrate in halves, thirds, fourths, and so on, of the fundamental, so the harmonic series will be the same. So why do different instruments have different timbres? The difference is the relative loudness of all the different harmonics compared to each other. When a clarinet[236] plays a note, perhaps the odd-numbered harmonics are strongest; when a French horn[237] plays the same notes, perhaps the fifth and tenth harmonics are the strongest. This is what you hear that allows you to recognize that it is a clarinet or horn that is playing.

NOTE: You will find some more extensive information on instruments and harmonics in Standing Waves and Musical Instruments[238] and Standing Waves and Wind Instruments[239].

2.19.3 The Harmonic Series

A harmonic series can have any note as its fundamental, so there are many different harmonic series. But the relationship between the frequencies[240] of a harmonic series is always the same. The second harmonic always has exactly half the wavelength (and twice the frequency) of the fundamental; the third harmonic always has exactly a third of the wavelength (and so three times the frequency) of the fundamental, and so on. For more discussion of wavelengths and frequencies, see Frequency, Wavelength, and Pitch[241].

[236] "Clarinets" <http://cnx.org/content/m12604/latest/>
[237] "The French Horn" <http://cnx.org/content/m11617/latest/>
[238] "Standing Waves and Musical Instruments" <http://cnx.org/content/m12413/latest/>
[239] "Standing Waves and Wind Instruments" <http://cnx.org/content/m12589/latest/>
[240] "Frequency, Wavelength, and Pitch", Figure 1: Wavelength, Frequency, and Pitch <http://cnx.org/content/m11060/latest/#fig1b>
[241] "Frequency, Wavelength, and Pitch" <http://cnx.org/content/m11060/latest/>

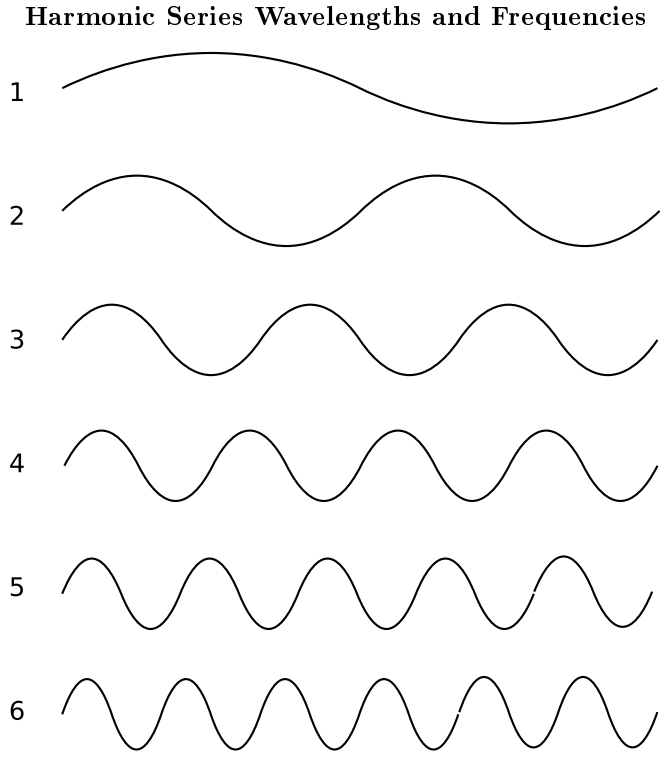

Figure 2.134: The second harmonic has half the wavelength and twice the frequency of the first. The third harmonic has a third the wavelength and three times the frequency of the first. The fourth harmonic has a quarter the wavelength and four times the frequency of the first, and so on. Notice that the fourth harmonic is also twice the frequency of the second harmonic, and the sixth harmonic is also twice the frequency of the third harmonic.

Say someone plays a note, a middle C. Now someone else plays the note that is twice the frequency of the middle C. Since this second note was already a harmonic of the first note, the sound waves of the two notes reinforce each other and sound good together. If the second person played instead the note that was just a litle bit more than twice the frequency of the first note, the harmonic series of the two notes would not fit together at all, and the two notes would not sound as good together. There are many combinations of notes that share some harmonics and make a pleasant sound together. They are considered consonant[242]. Other combinations share fewer or no harmonics and are considered dissonant[243] or, when they really clash, simply "out of tune" with each other. The scales and chords of most of the world's musics are based on these physical facts.

NOTE: In real music, consonance and dissonance also depend on the standard practices of a musical tradition, especially its harmony practices, but these are also often related to the harmonic series.

For example, a note that is twice the frequency of another note is one octave[244] higher than the first note. So in the figure above, the second harmonic is one octave higher than the first; the fourth harmonic is

[242] "Consonance and Dissonance" <http://cnx.org/content/m11953/latest/>
[243] "Consonance and Dissonance" <http://cnx.org/content/m11953/latest/>
[244] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>

one octave higher than the second; and the sixth harmonic is one octave higher than the third.

Exercise 2.19.2 ***(Solution on p. 298.)***

1. Which harmonic will be one octave higher than the fourth harmonic?
2. Predict the next four sets of octaves in a harmonic series.
3. What is the pattern that predicts which notes of a harmonic series will be one octave apart?
4. Notes one octave apart are given the same name. So if the first harmonic is a "A", the second and fourth will also be A's. Name three other harmonics that will also be A's.

A mathematical way to say this is "if two notes are an octave apart, the ratio[245] of their frequencies is two to one (2:1)". Although the notes themselves can be any frequency, the 2:1 ratio is the same for all octaves. And all the other intervals (Section 2.11) that musicians talk about can also be described as being particular ratios of frequencies.

A Harmonic Series Written as Notes

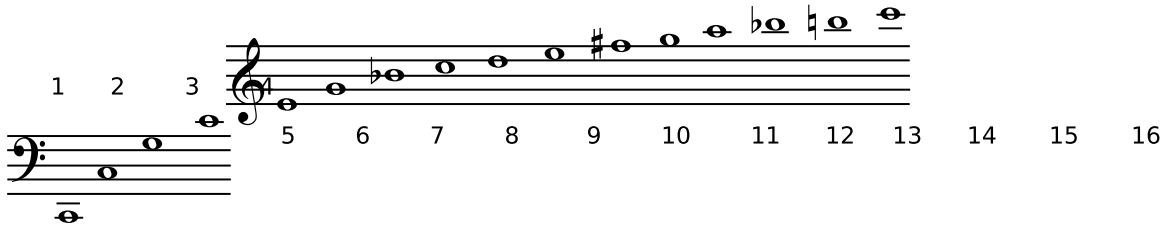

Figure 2.135

Take the third harmonic, for example. Its frequency is three times the first harmonic (ratio 3:1). Remember, the frequency of the second harmonic is two times that of the first harmonic. So the ratio[246] of the frequencies of the second to the third harmonics is 2:3. From the harmonic series shown above, you can see that the interval (Section 2.11) between these two notes is a perfect fifth (Section 2.11.3.1: Perfect Intervals). The ratio of the frequencies of all perfect fifths is 2:3.

Exercise 2.19.3 ***(Solution on p. 298.)***

1. The interval between the fourth and sixth harmonics (frequency ratio 4:6) is also a fifth. Can you explain this?
2. What other harmonics have an interval of a fifth?
3. Which harmonics have an interval of a fourth?
4. What is the frequency ratio for the interval of a fourth?

NOTE: If you have been looking at the harmonic series above closely, you may have noticed that some notes that are written to give the same interval have different frequency ratios. For example, the interval between the seventh and eighth harmonics is a major second, but so are the intervals between 8 and 9, between 9 and 10, and between 10 and 11. But 7:8, 8:9, 9:10, and 10:11, although they are pretty close, are not exactly the same. In fact, modern Western[247] music uses the equal

[245] "Musical Intervals, Frequency, and Ratio" <http://cnx.org/content/m11808/latest/>
[246] "Musical Intervals, Frequency, and Ratio" <http://cnx.org/content/m11808/latest/>
[247] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

temperament[248] tuning system, which divides the octave into twelve notes that are spaced equally far apart. The positive aspect of equal temperament (and the reason it is used) is that an instrument will be equally in tune in all keys. The negative aspect is that it means that all intervals except for octaves are slightly out of tune with regard to the actual harmonic series. For more about equal temperament, see Tuning Systems[249]. Interestingly, musicians have a tendency to revert to true harmonics when they can (in other words, when it is easy to fine-tune each note). For example, an a capella choral group or a brass ensemble, may find themselves singing or playing perfect fourths and fifths, "contracted" major thirds and "expanded" minor thirds.

2.19.4 Brass Instruments

The harmonic series is particularly important for brass instruments. A pianist or xylophone player only gets one note from each key. A string player who wants a different note from a string holds the string tightly in a different place. This basically makes a vibrating string of a new length, with a new fundamental.

But a brass player, without changing the length of the instrument, gets different notes by actually playing the harmonics of the instrument. Woodwinds also do this, although not as much. Most woodwinds can get two different octaves with essentially the same fingering; the lower octave is the fundamental of the column of air inside the instrument at that fingering. The upper octave is the first harmonic.

But it is the brass instruments that excel in getting different notes from the same length of tubing. The sound of a brass instruments starts with vibrations of the player's lips. By vibrating the lips at different speeds, the player can cause a harmonic of the air column to sound instead of the fundamental.

So a bugle player can play any note in the harmonic series of the instrument that falls within the player's range. Compare these well-known bugle calls to the harmonic series above (Figure 2.135: A Harmonic Series Written as Notes).

[248] "Tuning Systems": Section Equal Temperament <http://cnx.org/content/m11639/latest/#s22>
[249] "Tuning Systems": Section Temperament <http://cnx.org/content/m11639/latest/#s2>

Bugle Calls

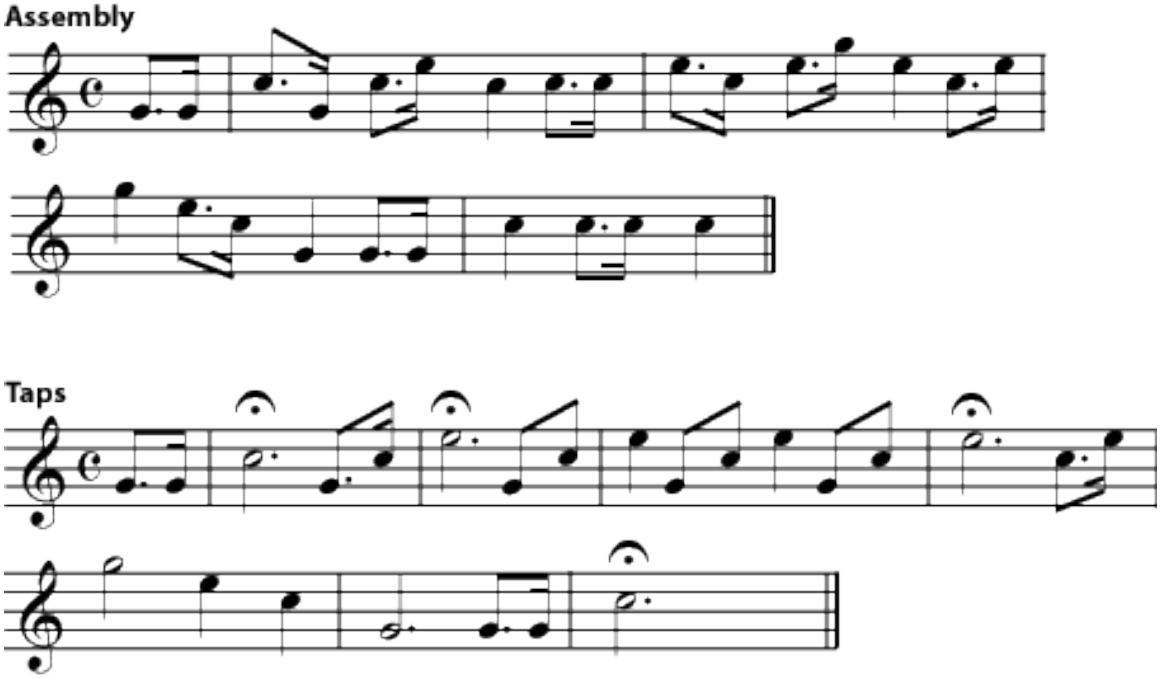

Figure 2.136: Although limited by the fact that it can only play one harmonic series, the bugle can still play many well-known tunes.

For centuries, all brass instruments were valveless. A brass instrument could play only the notes of one harmonic series. The upper octaves of the series, where the notes are close together, could be difficult or impossible to play, and some of the harmonics sound quite out of tune to ears that expect equal temperament. The solution to these problems, once brass valves were perfected, was to add a few valves to the instrument. Three is usually enough. Each valve opens an extra length of tube, making the instrument a little longer, and making available a whole new harmonic series. Usually one valve gives the harmonic series one half step lower than the valveless intrument, another one whole step lower, and another one and a half steps lower. The valves can be used at the same time, too, making even more harmonic series. So a valved brass instrument can find, in the comfortable middle of its range (its **middle register**), a valve combination that will give a reasonably in-tune version for every note of the chromatic scale (p. 194). (For more on the history of valved brass, see History of the French Horn[250]. For more on how and why harmonics are produced in wind instruments, please see Standing Waves and Wind Instruments[251])

NOTE: Trombones use a slide instead of valves to make their instrument longer. But the basic principle is still the same. At each slide "position", the instrument gets a new harmonic series. The notes in between the positions aren't part of the chromatic scale, so they are usually only used for special effects like **glissandos** (sliding notes).

[250] "The French Horn": Section History <http://cnx.org/content/m11617/latest/#s2>
[251] "Standing Waves and Wind Instruments" <http://cnx.org/content/m12589/latest/>

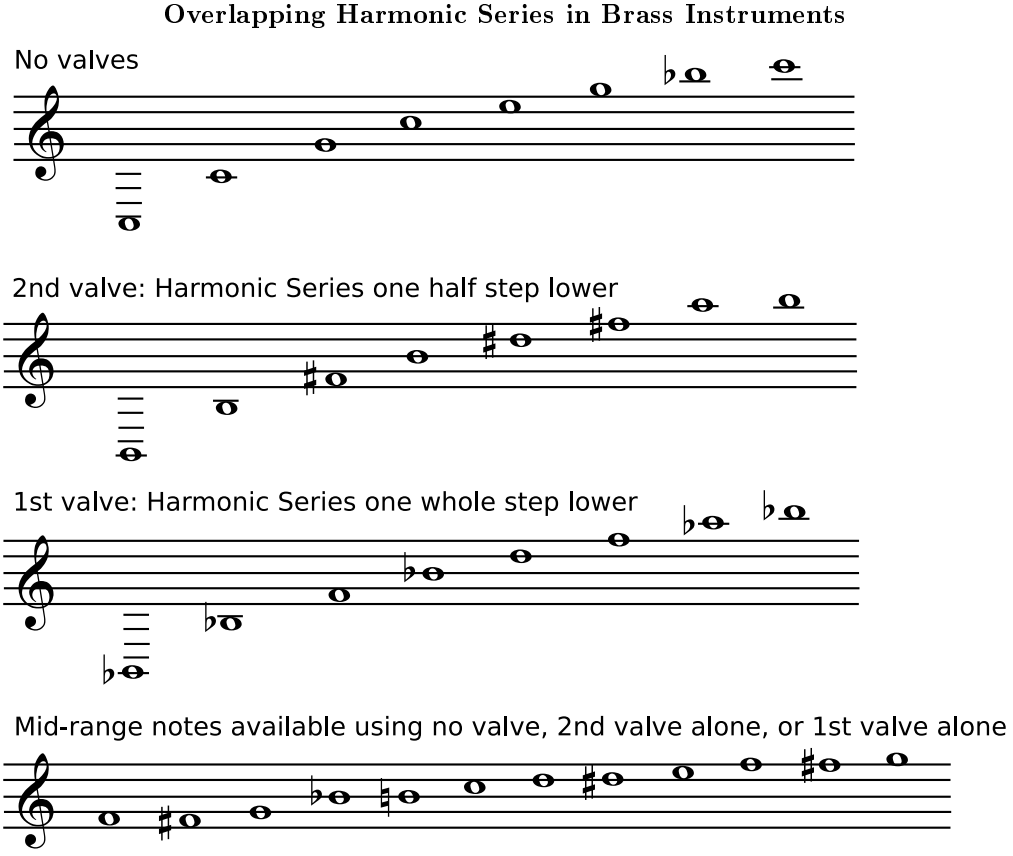

Figure 2.137: These harmonic series are for a brass instrument that has a "C" fundamental when no valves are being used - for example, a C trumpet. Remember, there is an entire harmonic series for every fundamental, and any note can be a fundamental. You just have to find the brass tube with the right length. So a trumpet or tuba can get one harmonic series using no valves, another one a half step lower using one valve, another one a whole step lower using another valve, and so on. By the time all the combinations of valves are used, there is some way to get an in-tune version of every note they need.

Exercise 2.19.4 ***(Solution on p. 298.)***

Write the harmonic series for the instrument above when both the first and second valves are open. (You can use this PDF file[252] if you need staff paper.) What new notes are added in the instrument's middle range? Are any notes still missing?

NOTE: The French horn[253] has a reputation for being a "difficult" instrument to play. This is also because of the harmonic series. Most brass instruments play in the first few octaves of the harmonic series, where the notes are farther apart and it takes a pretty big difference in the mouth and lips (the embouchure[254], pronounced AHM-buh-sher) to get a different note. The range of the French

[252] See the file at <http://cnx.org/content/m11118/latest/staffpaper1.pdf>
[253] "The French Horn" <http://cnx.org/content/m11617/latest/>
[254] "Wind Instruments: Some Basics" <http://cnx.org/content/m12364/latest/#p2a>

horn is higher in the harmonic series, where the notes are closer together. So very small differences in the mouth and lips can mean the wrong harmonic comes out.

2.19.5 Playing Harmonics on Strings

String players also use harmonics, although not as much as brass players. Harmonics on strings have a very different timbre[255] from ordinary string sounds. They give a quieter, thinner, more bell-like tone, and are usually used as a kind of ear-catching-special-effect.

Normally when a string player puts a finger on a string, he holds it down tight. This basically forms a (temporarily) shorter vibrating string, which then produces an entire harmonic series, with a shorter (higher) fundamental.

In order to play a harmonic, he touches the string very, very lightly instead. So the length of the string does not change. Instead, the light touch interferes with all of the vibrations that don't have a node at that spot. (A **node** is a place in the wave where the string does not move back-and-forth. For example, the ends of the string are both nodes, since they are held in place.)

String Harmonics

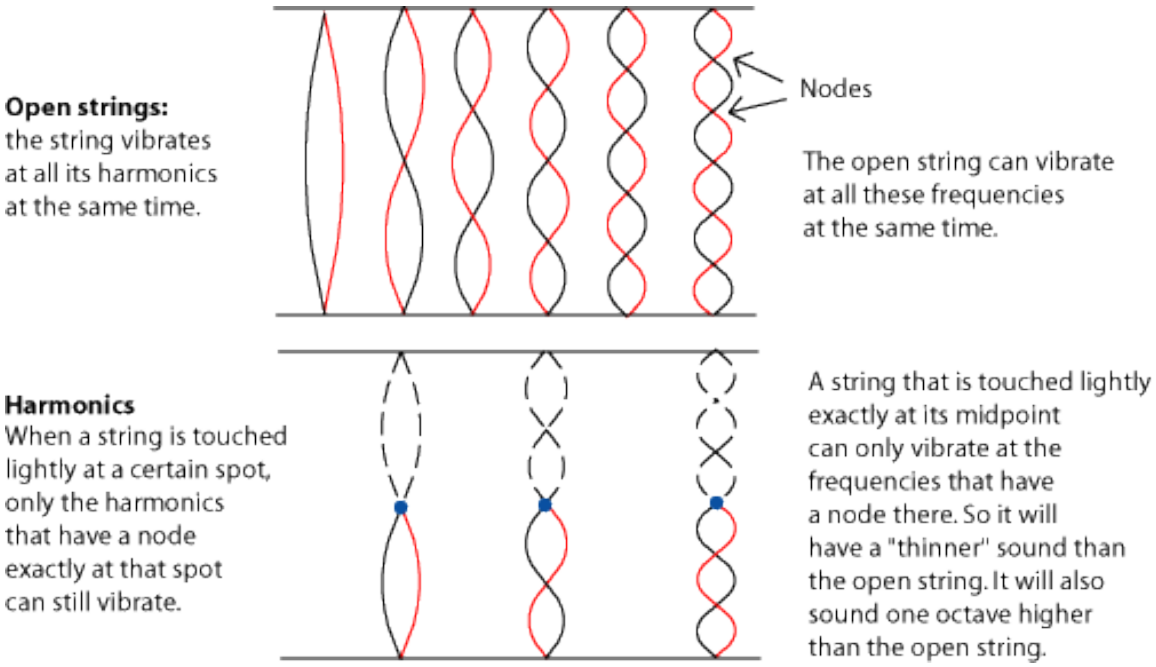

Figure 2.138

The thinner, quieter sound of "playing harmonics" is caused by the fact that much of the harmonic series is missing from the sound, which will of course be heard in the timbre (p. 254). Lightly touching the string in most spots will result in no sound at all. It only works at the precise spots that will leave some of the main harmonics (the longer, louder, lower-numbered ones) free to vibrate.

[255] "Timbre: The Color of Music" <http://cnx.org/content/m11059/latest/>

2.20 Dynamics and Accents in Music[256]

2.20.1 Dynamics

Sounds, including music, can be barely audible, or loud enough to hurt your ears, or anywhere in between. When they want to talk about the loudness of a sound, scientists and engineers talk about amplitude[257]. Musicians talk about **dynamics**. The amplitude of a sound is a particular number, usually measured in decibels, but dynamics are relative; an orchestra playing *fortissimo* sounds much louder than a single violin playing *fortissimo*. The exact interpretation of each dynamic marking in a piece of music depends on:

- comparison with other dynamics in that piece
- the typical dynamic range for that instrument or ensemble
- the abilities of the performer(s)
- the traditions of the musical genre being performed
- the acoustics of the performance space

Traditionally, dynamic markings are based on Italian words, although there is nothing wrong with simply writing things like "quietly" or "louder" in the music. *Forte* means loud and *piano* means quiet. The instrument commonly called the "piano" by the way, was originally called a "pianoforte" because it could play dynamics, unlike earlier popular keyboard instruments like the harpsichord and spinet.

[256] This content is available online at <http://cnx.org/content/m11649/1.13/>.
[257] "Acoustics for Music Theory": Section Wave Amplitude and Loudness <http://cnx.org/content/m13246/latest/#s12>

Typical Dynamic Markings

mf	mezzo forte	=	medium loud (pronounced "MET-soh FOR-tay")
f	forte	=	loud ("FOR-tay")
ff	fortissimo	=	very loud ("for-TISS-im-oh")
fff	fortisissimo	=	very, very loud ("FOR-tiss-SISS-im-oh")
ffff	and so on...		
mp	mezzo piano	=	medium quiet ("MET-soh PYAN-oh")
p	piano	=	quiet ("PYAN-oh")
pp	piannissimo	=	very quiet ("PEE-an-ISS-im-oh")
ppp	pianississimo	=	very, very quiet ("PEE-an-iss-ISS-im-oh")
pppp	and so on...		

Figure 2.139

When a composer writes a *forte* into a part, followed by a *piano*, the intent is for the music to be loud, and then suddenly quiet. If the composer wants the change from one dynamic level to another to be gradual, different markings are added. A *crescendo* (pronounced "cresh-EN-doe") means "gradually get louder"; a *decrescendo* or *diminuendo* means "gradually get quieter".

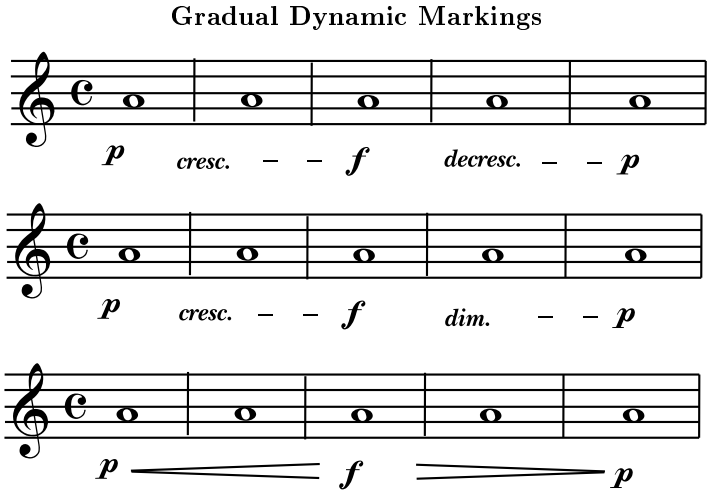

Figure 2.140: Here are three different ways to write the same thing: start softly (piano), gradually get louder (crescendo) until the music is loud (forte), then gradually get quieter (decrescendo or diminuendo) until it is quiet (piano) again.

2.20.2 Accents

A composer may want a particular note to be louder than all the rest, or may want the very beginning of a note to be loudest. **Accents** are markings that are used to indicate these especially-strong-sounding notes. There are a few different types of written accents (see Figure 2.141 (Common Accents)), but, like dynamics, the proper way to perform a given accent also depends on the instrument playing it, as well as the style and period of the music. Some accents may even be played by making the note longer or shorter than the other notes, in addition to, or even instead of being, louder. (See articulation[258] for more about accents.)

[258] "Articulation" <http://cnx.org/content/m11884/latest/>

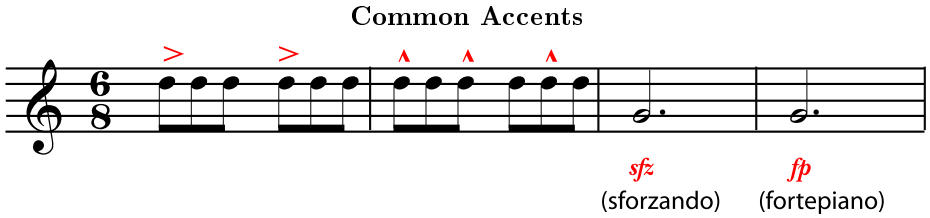

Figure 2.141: The exact performance of each type of accent depends on the instrument and the style and period of the music, but the *sforzando* and *fortepiano*-type accents are usually louder and longer, and more likely to be used in a long note that starts loudly and then suddenly gets much softer. *Caret*-type accents are more likely to be used to mark shorter notes that should be stronger than unmarked notes.

2.21 Tempo[259]

The **tempo** of a piece of music is its speed. There are two ways to specify a tempo. Metronome markings are absolute and specific. Other tempo markings are verbal descriptions which are more relative and subjective. Both types of markings usually appear above the staff, at the beginning of the piece, and then at any spot where the tempo changes. Markings that ask the player to deviate slightly from the main tempo, such as ritardando (Gradual Tempo Changes, p. 267) may appear either above or below the staff.

2.21.1 Metronome Markings

Metronome markings are given in beats per minute. They can be estimated using a clock with a second hand, but the easiest way to find them is with a **metronome**, which is a tool that can give a beat-per-minute tempo as a clicking sound or a pulse of light. Figure 2.142 shows some examples of metronome markings.

[259] This content is available online at <http://cnx.org/content/m11648/1.11/>.

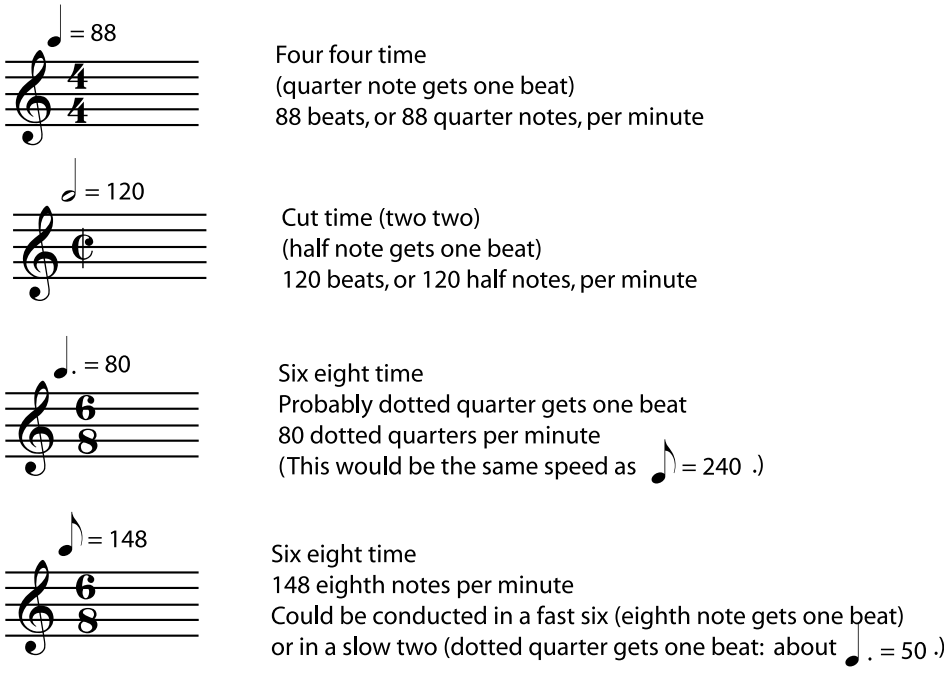

Figure 2.142

Metronomes often come with other tempo indications written on them, but this is misleading. For example, a metronome may have *allegro* marked at 120 beats per minute and *andante* marked at 80 beats per minute. *Allegro* should certainly be quite a bit faster than *andante*, but it may not be exactly 120 beats per minute.

2.21.2 Tempo Terms

A tempo marking that is a word or phrase gives you the composer's idea of **how fast the music should feel**. How fast a piece of music feels depends on several different things, including the texture and complexity of the music, how often the beat gets divided into faster notes, and how fast the beats themselves are (the metronome marking). Also, the same tempo marking can mean quite different things to different composers; if a metronome marking is not available, the performer should use a knowledge of the music's style and genre, and musical common sense, to decide on the proper tempo. When possible, listening to a professional play the piece can help with tempo decisions, but it is also reasonable for different performers to prefer slightly different tempos for the same piece.

Traditionally, tempo instructions are given in Italian.

Some Common Tempo Markings

- **Grave** - very slow and solemn (pronounced "GRAH-vay")
- **Largo** - slow and broad ("LAR-go")
- **Larghetto** - not quite as slow as largo ("lar-GET-oh")
- **Adagio** - slow ("uh-DAH-jee-oh")
- **Lento** - slow ("LEN-toe")

- **Andante** - literally "walking", a medium slow tempo ("on-DON-tay")
- **Moderato** - moderate, or medium ("MOD-er-AH-toe")
- **Allegretto** - Not as fast as allegro ("AL-luh-GRET-oh")
- **Allegro** - fast ("uh-LAY-grow")
- **Vivo, or Vivace** - lively and brisk ("VEE-voh")
- **Presto** - very fast ("PRESS-toe")
- **Prestissimo** - very, very fast ("press-TEE-see-moe")

These terms, along with a little more Italian, will help you decipher most tempo instructions.

More useful Italian

- **(un) poco** - a little ("oon POH-koe")
- **molto** - a lot ("MOLE-toe")
- **piu** - more ("pew")
- **meno** - less ("MAY-no")
- **mosso** - literally "moved"; motion or movement ("MOE-so")

Exercise 2.21.1 ***(Solution on p. 299.)***

Check to see how comfortable you are with Italian tempo markings by translating the following.

1. un poco allegro
2. molto meno mosso
3. piu vivo
4. molto adagio
5. poco piu mosso

Of course, tempo instructions don't have to be given in Italian. Much folk, popular, and modern music, gives instructions in English or in the composer's language. Tempo indications such as "Not too fast", "With energy", "Calmly", or "March tempo" give a good idea of how fast the music should feel.

2.21.3 Gradual Tempo Changes

If the tempo of a piece of music suddenly changes into a completely different tempo, there will be a new tempo given, usually marked in the same way (metronome tempo, Italian term, etc.) as the original tempo. Gradual changes in the basic tempo are also common in music, though, and these have their own set of terms. These terms often appear below the staff, although writing them above the staff is also allowed. These terms can also appear with modifiers (More useful Italian, p. 267) like *molto* or *un poco*. You may notice that there are quite a few terms for slowing down. Again, the use of these terms will vary from one composer to the next; unless beginning and ending tempo markings are included, the performer must simply use good musical judgement to decide how much to slow down in a particular *ritardando* or *rallentando*.

Gradual Tempo Changes

- **accelerando** - (abbreviated *accel.*) accelerating; getting faster
- **ritardando** - (abbrev. *rit.*) slowing down
- **ritenuto** - (abbrev. *riten.*) slower
- **rallentando** - (abbrev. *rall.*) gradually slower
- **rubato** - don't be too strict with the rhythm; while keeping the basic tempo, allow the music to gently speed up and relax in ways that emphasize the phrasing
- **poco a poco** - little by little; gradually
- **Tempo I** - ("tempo one" or "tempo primo") back to the original tempo (this instruction usually appears above the staff)

2.22 Scales that are not Major or Minor[260]

2.22.1 Introduction

Sounds - ordinary, everyday "noises" - come in every conceivable pitch (Section 2.6) and groups of pitches. In fact, the essence of noise, "white noise", is basically every pitch at once, so that no particular pitch is heard.

One of the things that makes music pleasant to hear and easy to "understand" is that only a few of all the possible pitches are used. But not all pieces of music use the same set of pitches. In order to be familiar with the particular notes that a piece of music is likely to use, musicians study scales.

The set of expected pitches for a piece of music can be arranged into a **scale**. In a scale, the pitches are usually arranged from lowest to highest (or highest to lowest), in a pattern that usually repeats within every octave[261].

> NOTE: In some kinds of music, the notes of a particular scale are the only notes allowed in a given piece of music. In other music traditions, notes from outside the scale (accidentals (p. 186)) are allowed, but are usually much less common than the scale notes.

The set of pitches, or notes, that are used, and their relationships to each other, makes a big impact on how the music sounds. For example, for centuries, most Western music[262] has been based on major (Section 2.10) and minor scales (Section 2.13). That is one of the things that makes it instantly recognizable as Western music. Much (though not all) of the music of eastern Asia, on the other hand, was for many centuries based on pentatonic scales, giving it a much different flavor that is also easy to recognize.

Some of the more commonly used scales that are not major or minor are introduced here. Pentatonic scales are often associated with eastern Asia, but many other music traditions also use them. Blues scales, used in blues, jazz, and other African-American traditions, grew out of a compromise between European and African scales. Some of the scales that sound "exotic" to the Western ear are taken from the musical traditions of eastern Europe, the Middle East, and western Asia. Microtones can be found in some traditional musics (for example, Indian classical music[263]) and in some modern art[264] music.

> NOTE: Some music traditions, such as Indian and medieval European, use modes or ragas, which are not quite the same as scales. Please see Modes and Ragas.[265]

2.22.2 Scales and Western Music

The Western[266] musical tradition that developed in Europe after the middle ages is based on major and minor scales, but there are other scales that are a part of this tradition.

In the **chromatic scale**, every interval (Section 2.11) is a half step (Section 2.8). This scale gives all the sharp, flat, and natural (Section 2.6) notes commonly used in all Western music. It is also the **twelve-tone scale** used by twentieth-century composers to create their atonal music[267]. Young instrumentalists are encouraged to practice playing the chromatic scale in order to ensure that they know the fingerings for all the notes. Listen to a chromatic scale[268].

[260] This content is available online at <http://cnx.org/content/m11636/1.21/>.
[261] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[262] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[263] "Indian Classical Music: Tuning and Ragas" <http://cnx.org/content/m12459/latest/>
[264] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/#p3aa>
[265] "Modes and Ragas: More Than just a Scale" <http://cnx.org/content/m11633/latest/>
[266] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[267] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/#p7e>
[268] See the file at <http://cnx.org/content/m11636/latest/Chromatic.MID>

Chromatic Scale

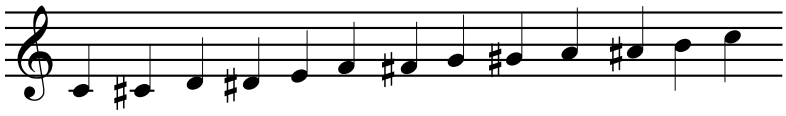

Figure 2.143: The chromatic scale includes all the pitches normally found in Western music. Note that, because of enharmonic (Section 2.7) spelling, many of these pitches could be written in a different way (for example, using flats instead of sharps).

In a **whole tone scale**, every interval is a whole step (Section 2.8). In both the chromatic and the whole tone scales, all the intervals are the same. This results in scales that have no tonal center (Section 2.10); no note feels more or less important than the others. Because of this, most traditional and popular Western music uses major or minor scales rather than the chromatic or whole tone scales. But composers who don't want their music to have a tonal center (for example, many composers of "modern classical" music) often use these scales. Listen to a whole tone scale[269].

A Whole Tone Scale

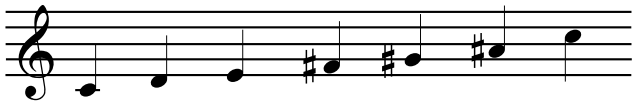

Figure 2.144: Because all the intervals are the same, it doesn't matter much where you begin a chromatic or whole tone scale. For example, this scale would contain the same notes whether you start it on C or E.

Exercise 2.22.1 ***(Solution on p. 299.)***

There is basically only one chromatic scale; you can start it on any note, but the pitches will end up being the same as the pitches in any other chromatic scale. There are basically two possible whole tone scales. Beginning on a b, write a whole tone scale that uses a different pitches than the one in Figure 2.144 (A Whole Tone Scale). If you need staff paper, you can download this PDF file[270].

Exercise 2.22.2 ***(Solution on p. 299.)***

Now write a whole tone scale beginning on an a flat. Is this scale essentially the same as the one in Figure 2.195 or the one in Figure 2.144 (A Whole Tone Scale)?

[269] See the file at <http://cnx.org/content/m11636/latest/WholeTone.mid>
[270] See the file at <http://cnx.org/content/m11636/latest/staffpaper1.pdf>

2.22.3 Pentatonic Scales

In Western music, there are twelve pitches within each octave[271]. (The thirteenth note starts the next octave.) But in a tonal[272] piece of music only seven of these notes, the seven notes of a major or minor scale, are used often.

In a **pentatonic scale**, only five of the possible pitches within an octave are used. (So the scale will repeat starting at the sixth tone.) The most familiar pentatonic scales are used in much of the music of eastern Asia. You may be familiar with the scale in Figure 2.145 (A Familiar Pentatonic Scale) as the scale that is produced when you play all the "black keys" on a piano keyboard.

A Familiar Pentatonic Scale

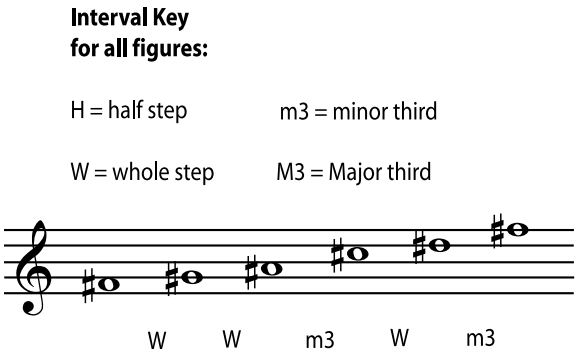

Figure 2.145: This is the pentatonic scale you get when you play the "black keys" on a piano.

Listen to the black key pentatonic scale[273]. Like other scales, this pentatonic scale is transposable[274]; you can move the entire scale up or down by a half step or a major third or any interval (Section 2.11) you like. The scale will sound higher or lower, but other than that it will sound the same, because the pattern of intervals between the notes (half steps, whole steps, and minor thirds) is the same. (For more on intervals, see Half Steps and Whole Steps (Section 2.8) and Interval (Section 2.11). For more on patterns of intervals within scales, see Major Scales (Section 2.10) and Minor Scales (Section 2.13).) Now listen to a transposed pentatonic scale[275].

[271] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[272] "What Kind of Music is That?": Section Tonal, Atonal, and Modal Music <http://cnx.org/content/m11421/latest/#s7>
[273] See the file at <http://cnx.org/content/m11636/latest/pentatonic1.mid>
[274] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>
[275] See the file at <http://cnx.org/content/m11636/latest/pentatonic2.mid>

Transposed Pentatonic Scale

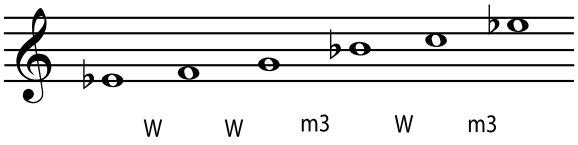

Figure 2.146: This is simply a transposition of the scale in Figure 2.145 (A Familiar Pentatonic Scale)

But this is not the only possible type of pentatonic scale. Any scale that uses only five notes within one octave is a pentatonic scale. The following pentatonic scale, for example, is not simply another transposition of the "black key" pentatonic scale; the pattern of intervals between the notes is different. Listen to this different pentatonic scale[276].

Different Pentatonic Scale

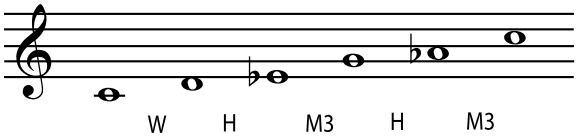

Figure 2.147: This pentatonic scale is not a transposed version of Figure 2.145 (A Familiar Pentatonic Scale).It has a different set of intervals.

The point here is that music based on the pentatonic scale in Figure 2.145 (A Familiar Pentatonic Scale) will sound very different from music based on the pentatonic scale in Figure 2.147 (Different Pentatonic Scale), because the relationships between the notes are different, much as music in a minor key is noticeably different from music in a major key. So there are quite a few different possible pentatonic scales that will produce a recognizably "unique sound", and many of these possible five-note scales have been named and used in various music traditions around the world.

Exercise 2.22.3 ***(Solution on p. 300.)***

To get a feeling for the concepts in this section, try composing some short pieces using the pentatonic scales given in Figure 2.145 (A Familiar Pentatonic Scale) and in Figure 2.147 (Different Pentatonic Scale). You may use more than one octave of each scale, but use only one scale for each piece. As you are composing, listen for how the constraints of using only those five notes, with those pitch relationships, affect your music. See if you can play your Figure 2.145 (A Familiar Pentatonic Scale) composition in a different key, for example, using the scale in Figure 2.146 (Transposed Pentatonic Scale).

[276] See the file at <http://cnx.org/content/m11636/latest/penta3.mid>

2.22.4 Dividing the Octave, More or Less

Any scale will list a certain number of notes within an octave. For major and minor scales, there are seven notes; for pentatonic, five; for a chromatic scale, twelve. Although some divisions are more common than others, any division can be imagined, and many are used in different musical traditions around the world. For example, the classical music of India recognizes twenty-two different possible pitches within an octave; each raga uses five, six, or seven of these possible pitches. (Please see Indian Classical Music: Tuning and Ragas[277] for more on this.) And there are some traditions in Africa that use six or eight notes within an octave. Listen to one possible eight-tone, or octatonic scale[278].

An Octatonic Scale

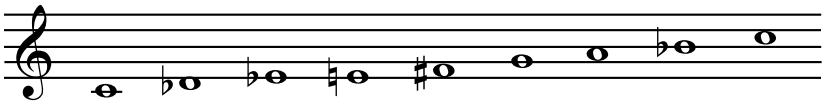

Figure 2.148

Many Non-Western traditions, besides using different scales, also use different tuning systems[279]; the intervals in the scales may involve **quarter tones** (a half of a half step), for example, or other intervals we don't use. Even trying to write them in common notation can be a bit misleading.

Microtones are intervals smaller than a half step. Besides being necessary to describe the scales and tuning systems of many Non-Western traditions, they have also been used in modern Western classical music, and are also used in African-American traditions such as jazz and blues. As of this writing, the Huygens-Fokker Foundation[280] was a good place to start looking for information on microtonal music.

2.22.5 Constructing a Blues Scale

Blues scales are closely related to pentatonic scales. (Some versions are pentatonic.) Rearrange the pentatonic scale in Figure 2.146 (Transposed Pentatonic Scale) above so that it begins on the C, and add an F sharp in between the F and G, and you have a commonly used version of the blues scale. Listen to this blues scale[281].

[277] "Indian Classical Music: Tuning and Ragas" <http://cnx.org/content/m12459/latest/>
[278] See the file at <http://cnx.org/content/m11636/latest/Octatonic.mid>
[279] "Tuning Systems" <http://cnx.org/content/m11639/latest/>
[280] http://www.xs4all.nl/~huygensf/english/index.html
[281] See the file at <http://cnx.org/content/m11636/latest/BlueScale.mid>

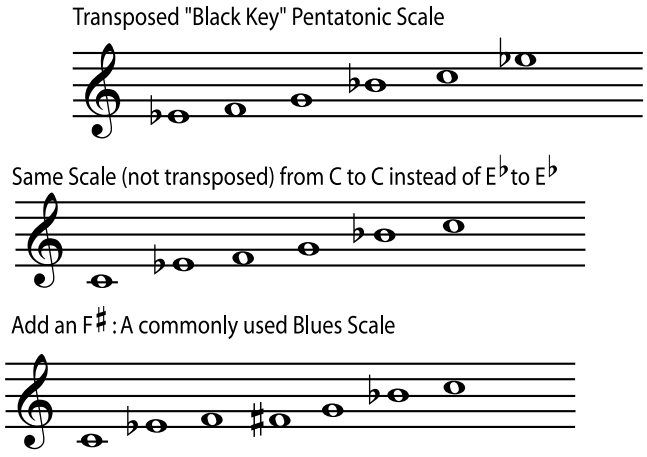

Figure 2.149: Blues scales are closely related to pentatonic scales.

2.22.6 Modes and Ragas

Many music traditions do not use scales. The most familiar of these to the Western[282] listener are medieval chant and the classical music of India. In these and other modal traditions, the rules for constructing a piece of music are quite different than the rules for music that is based on a scale. Please see Modes and Ragas[283] for more information.

2.22.7 Other Scales

There are many, many other possible scales that are not part of the major-minor system. Some, like pentatonic and octatonic scales, have fewer or more notes per octave, but many have seven tones, just as a major scale does. A scale may be chosen or constructed by a composer for certain intriguing characteristics, for the types of melodies or harmonies that the scale enables, or just for the interesting or pleasant sound of music created using the scale.

For example, one class of scales that intrigues some composers is **symmetrical scales**. The chromatic scale (p. 194) and whole tone (Figure 2.144: A Whole Tone Scale) scales fall into this category, but other symmetrical scales can also be constructed. A **diminished** scale, for example, not only has the "symmetrical" quality; it is also a very useful scale if, for example, you are improvising a jazz solo over diminished chords (Section 2.15.2: Augmented and Diminished Chords).

[282] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[283] "Modes and Ragas: More Than just a Scale" <http://cnx.org/content/m11633/latest/>

A Diminished Scale

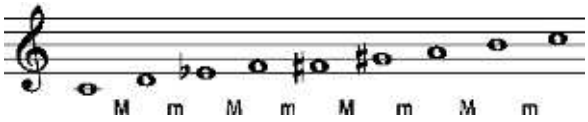

Figure 2.150: Like chromatic and whole tone scales, a diminished scale is "symmetrical".

Some scales are loosely based on the music of other cultures, and are used when the composer wants to evoke the music of another place or time. These scales are often borrowed from Non-western traditions, but are then used in ways typical of Western music. Since they usually ignore the tuning, melodic forms, and other aesthetic principles of the traditions that they are borrowed from, such uses of "exotic" scales should not be considered accurate representations of those traditions. There are examples in world music[284], however, in which the Non-western scale or mode[285] is used in an authentic way. Although there is general agreement about the names of some commonly used "exotic" scales, they are not at all standardized. Often the name of a scale simply reflects what it sounds like to the person using it, and the same name may be applied to different scales, or different names to the same scale.

Some "Exotic" Scales

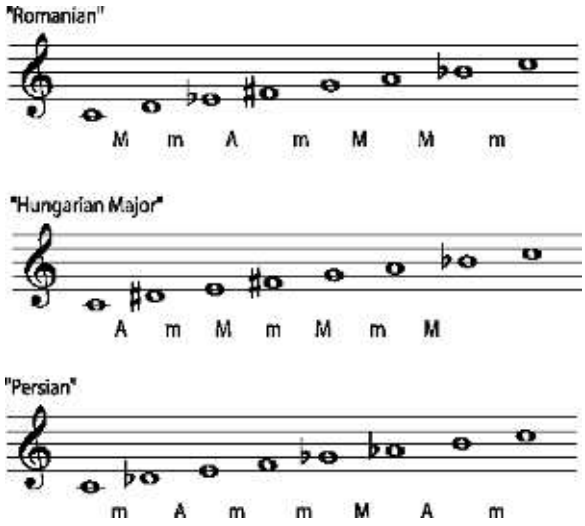

Figure 2.151

You may want to experiment with some of the many scales possible. Listen to one version each of: "di-

[284] "What Kind of Music is That?": Section Jazz, Blues, and World Music <http://cnx.org/content/m11421/latest/#s6>
[285] "Modes and Ragas: More Than just a Scale" <http://cnx.org/content/m11633/latest/>

minished" scale[286], "enigmatic" scale[287], "Romanian" Scale[288], "Persian" scale[289] and "Hungarian Major" Scale[290]. For even more possibilities, try a web search for "exotic scales"; or try inventing your own scales and using them in compositions and improvisations.

An "Enigmatic" Scale

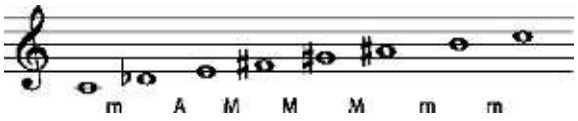

Figure 2.152

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[286]See the file at <http://cnx.org/content/m11636/latest/Diminished.mid>
[287]See the file at <http://cnx.org/content/m11636/latest/Enigmatic.mid>
[288]See the file at <http://cnx.org/content/m11636/latest/Romanian.mid>
[289]See the file at <http://cnx.org/content/m11636/latest/Persian.mid>
[290]See the file at <http://cnx.org/content/m11636/latest/HungarianMajor.mid>

Solutions to Exercises in Chapter 2

Solution to Exercise 2.1.1 (p. 166)

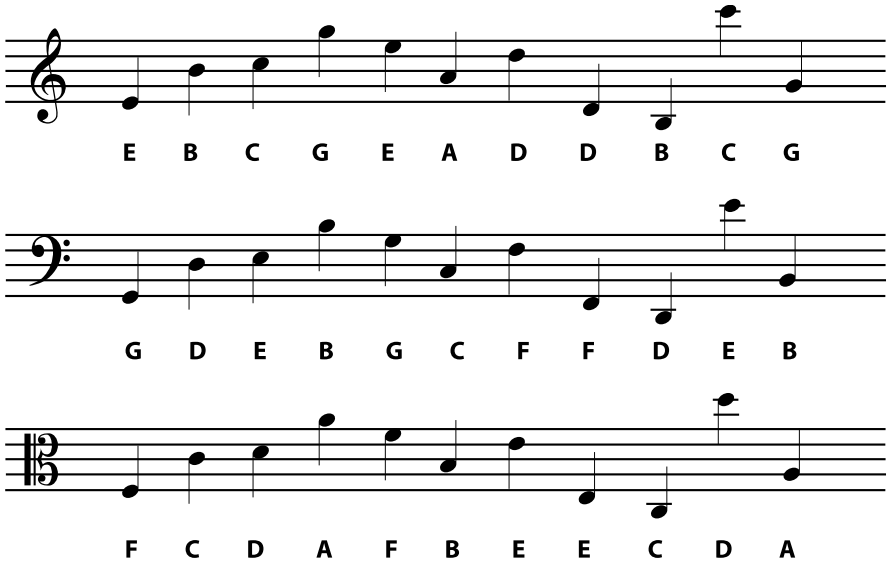


Figure 2.153

Solution to Exercise 2.1.2 (p. 166)
Figure 2.154 shows the answers for treble and bass clef. If you have done another clef, have your teacher check your answers.

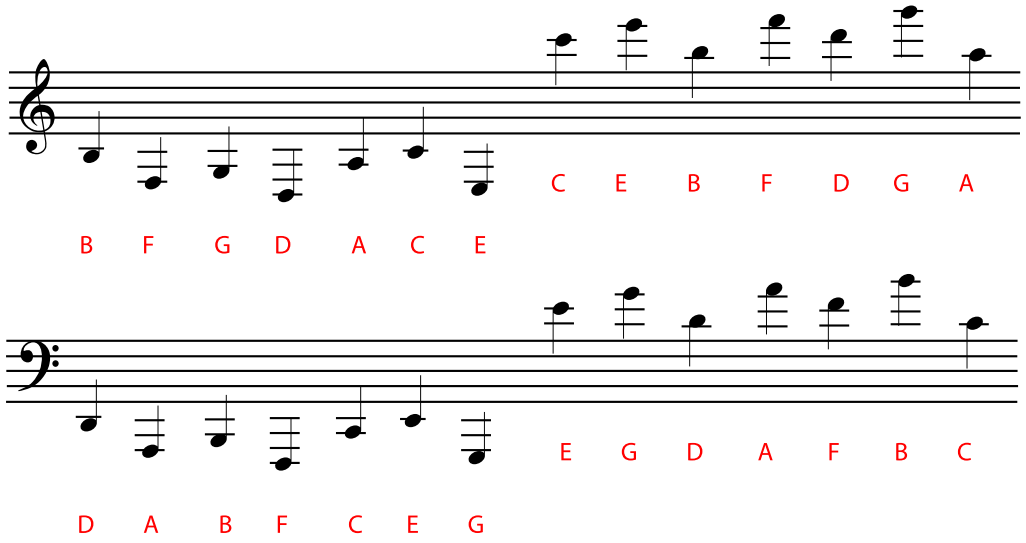
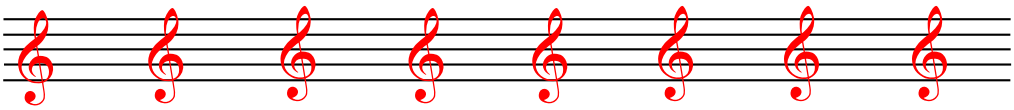


Figure 2.154

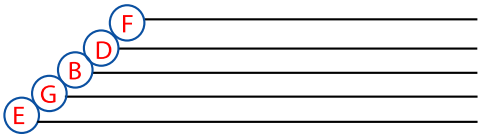
Solution to Exercise 2.1.3 (p. 167)
Figure 2.155 shows the answers for treble clef, and Figure 2.156 the answers for bass clef. If you are working in a more unusual clef, have your teacher check your answers.

Clef Practice

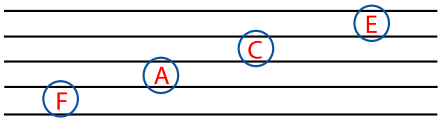
Practice writing your clef symbol on this staff. Write at least eight clef symbols



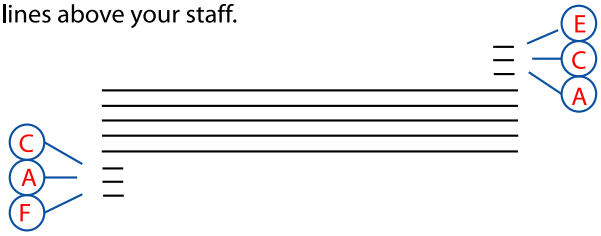
Write the letter names of the lines in your staff:



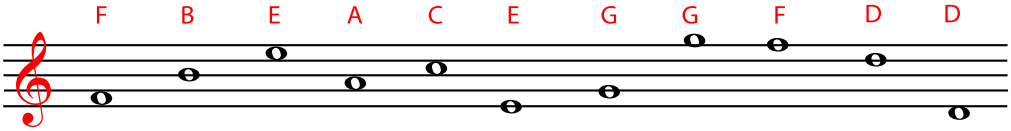
Write the letter names of the spaces:



Write the letter names of the three ledger lines below and the three ledger lines above your staff.



Write your clef symbol at the beginning of this line.
Then write the correct letter name above each note.



Write your clef symbol at the beginning of this line.
Then write a note in the staff for each letter below the staff.

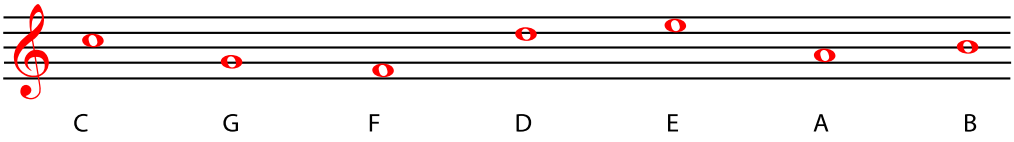
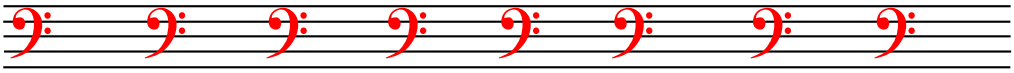


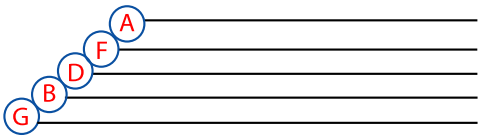
Figure 2.155

Clef Practice

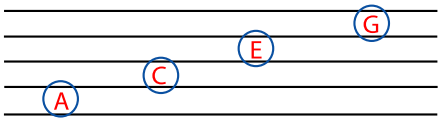
Practice writing your clef symbol on this staff. Write at least eight clef symbols



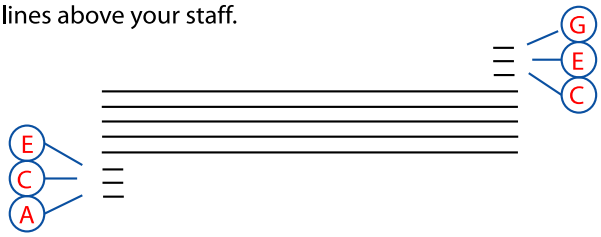
Write the letter names of the lines in your staff:



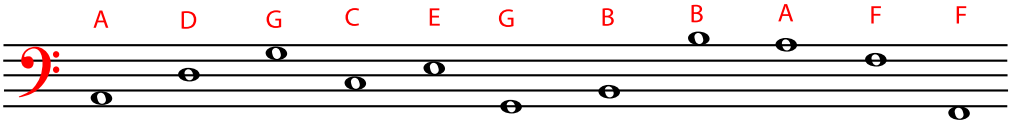
Write the letter names of the spaces:



Write the letter names of the three ledger lines below and the three ledger lines above your staff.



Write your clef symbol at the beginning of this line.
Then write the correct letter name above each note.



Write your clef symbol at the beginning of this line.
Then write a note in the staff for each letter below the staff.

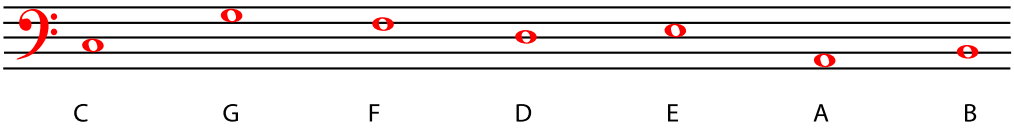


Figure 2.156

Solution to Exercise 2.2.1 (p. 170)

- A has a very strong, quick 1-2-3 beat.
- B is in a slow (easy) 2. You may feel it in a fast 4.
- C is in a stately 4.
- D is in 3, but the beat may be harder to feel than in A because the rhythms are more complex and the performer is taking some liberties with the tempo (Section 2.21).

Solution to Exercise 2.2.2 (p. 171)

There are an enormous number of possible note combinations for any time signature. That's one of the things that makes music interesting. Here are some possibilities. If you are not sure that yours are correct, check with your music instructor.

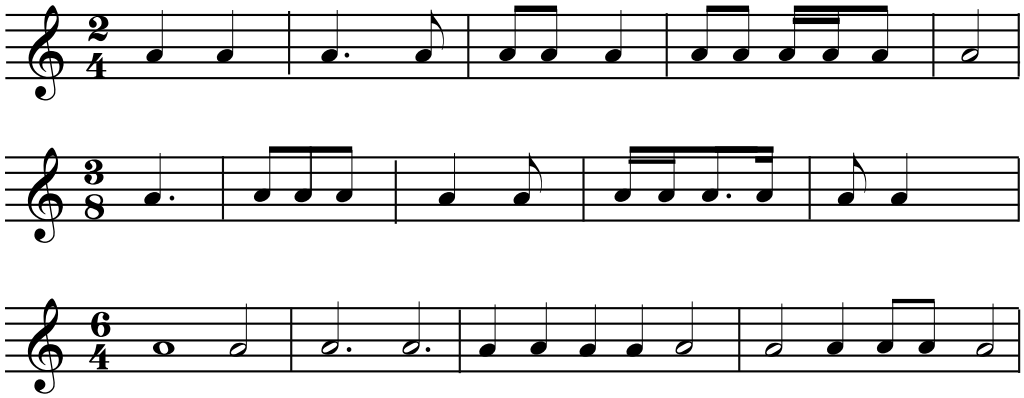


Figure 2.157: These are only a few of the many, many possible note combinations that could be used in these time signatures.

Solution to Exercise 2.3.1 (p. 177)

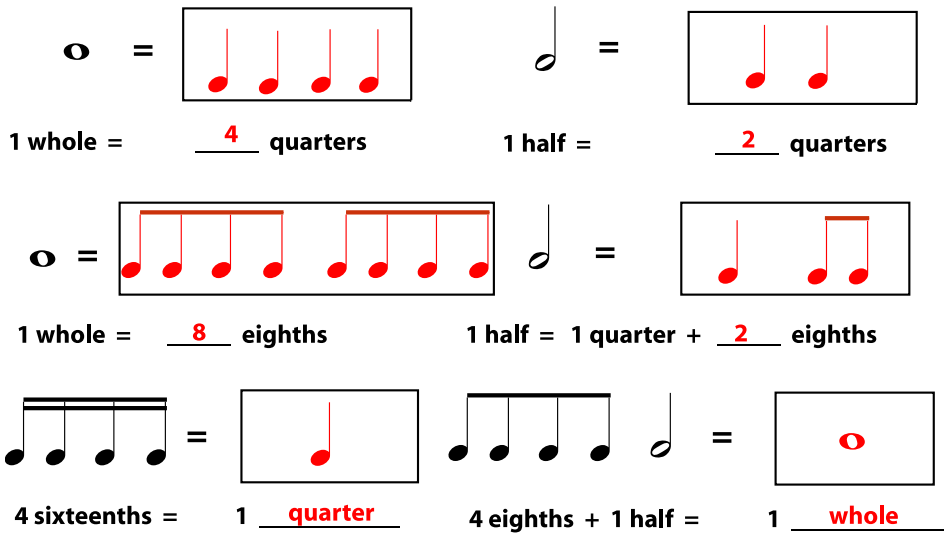


Figure 2.158

Solution to Exercise 2.4.1 (p. 180)

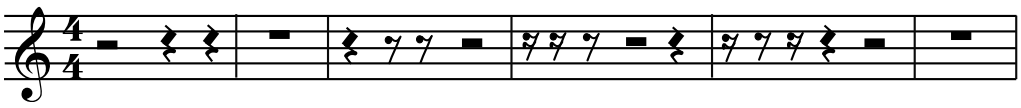


Figure 2.159

Solution to Exercise 2.7.1 (p. 189)

- C sharp and D flat
- F sharp and G flat
- G sharp and A flat
- A sharp and B flat

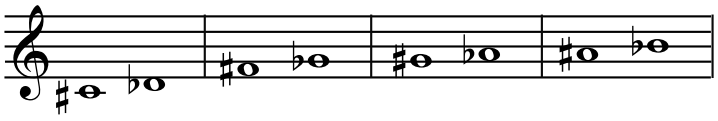


Figure 2.160

Solution to Exercise 2.7.2 (p. 190)

1. F flat; D double sharp
2. C flat; A double sharp
3. B sharp; D double flat
4. F double sharp; A double flat
5. G double sharp; B double flat

Solution to Exercise 2.7.3 (p. 191)

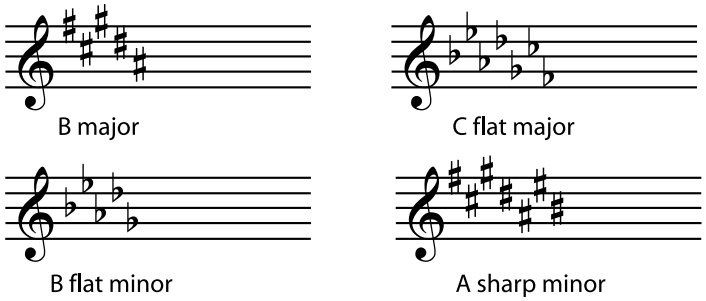


Figure 2.161

Solution to Exercise 2.8.1 (p. 196)

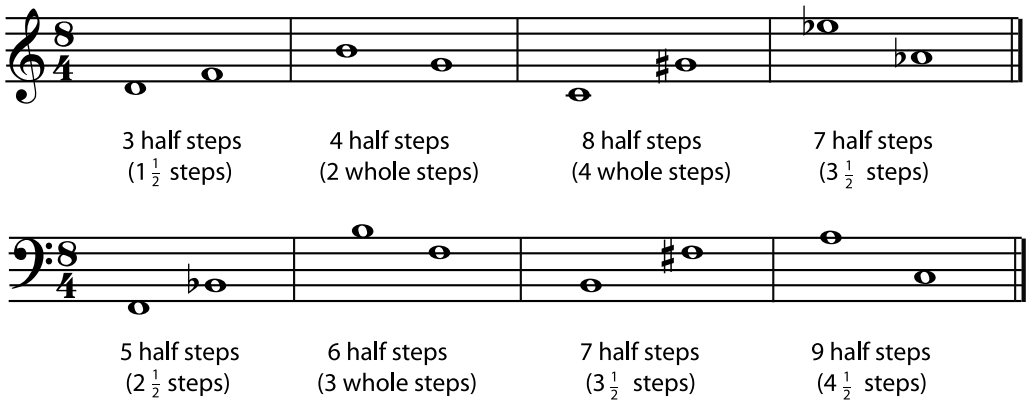


Figure 2.162

Solution to Exercise 2.8.2 (p. 196)

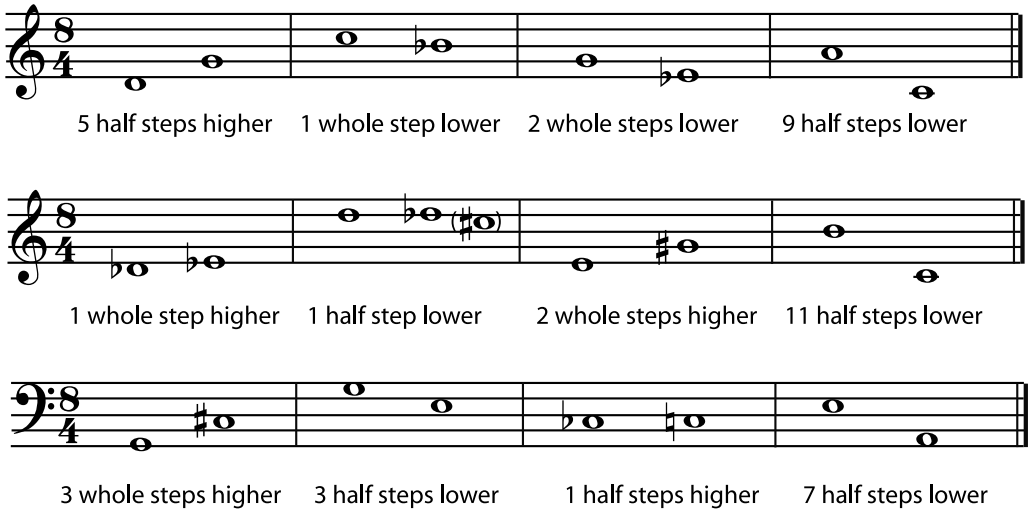


Figure 2.163: If your answer is different, check to see if you have written a different enharmonic spelling (Section 2.7) of the note in the answer. For example, the B flat could be written as an A sharp.

Solution to Exercise 2.9.1 (p. 200)

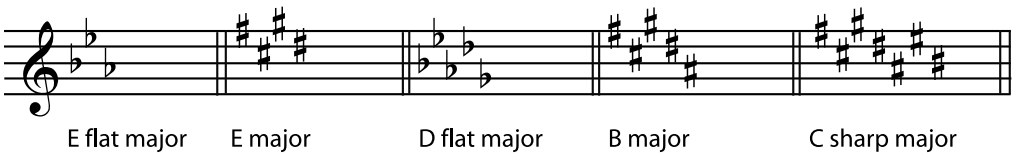


Figure 2.164

Solution to Exercise 2.10.1 (p. 201)

1. Major
2. Major
3. Minor
4. Major
5. Minor

Solution to Exercise 2.10.2 (p. 202)

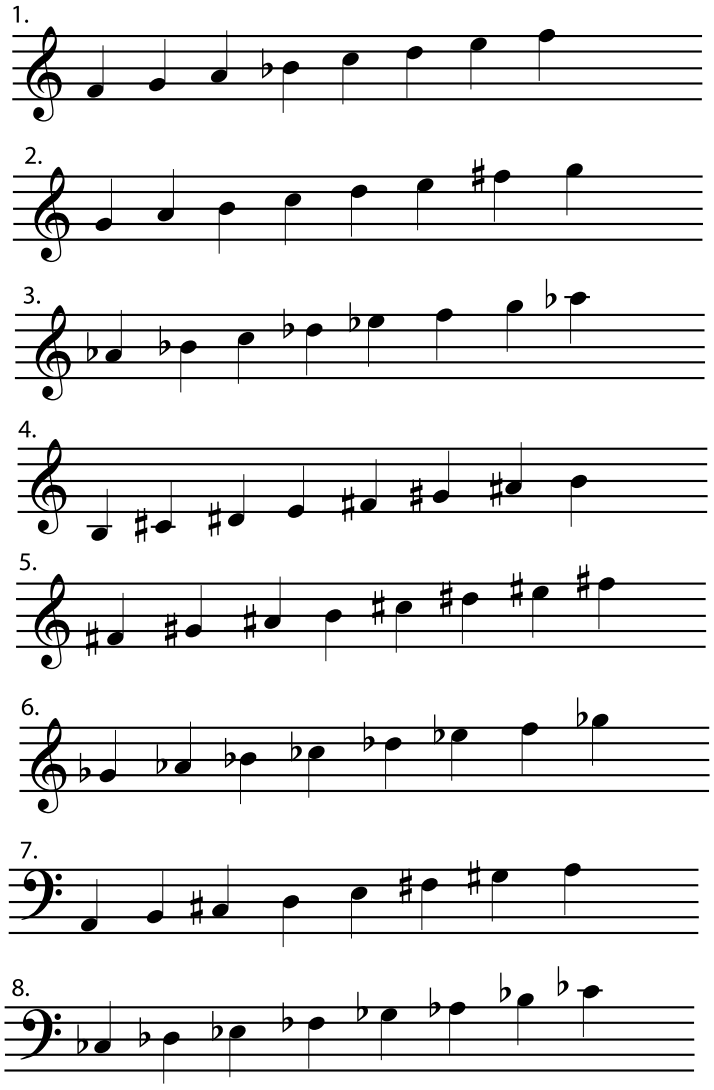


Figure 2.165

Notice that although they look completely different, the scales of F sharp major and G flat major (numbers 5 and 6) sound exactly the same when played, on a piano as shown in Figure 2.166 (Enharmonic Scales), or on any other instrument using equal temperament[291] tuning. If this surprises you, please read more about enharmonic (Section 2.7) scales.

[291] "Tuning Systems": Section Equal Temperament <http://cnx.org/content/m11639/latest/#s22>

Enharmonic Scales

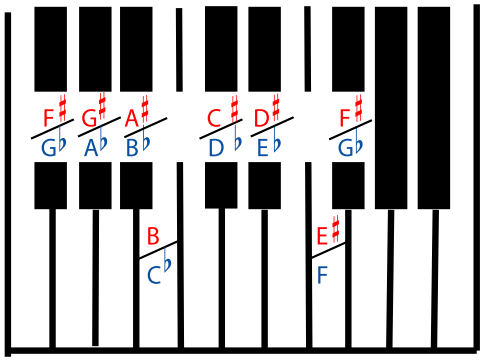


Figure 2.166: Using this figure of a keyboard, or the fingerings from your own instrument, notice that the notes for the F sharp major scale and the G flat major scale in Figure 2.165, although spelled differently, will sound the same.

Solution to Exercise 2.11.1 (p. 206)

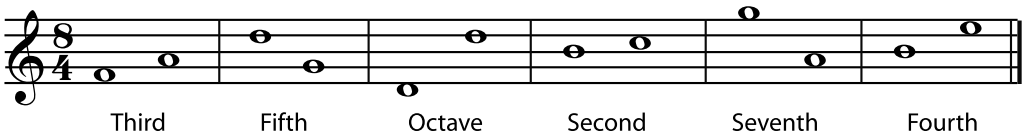


Figure 2.167

Solution to Exercise 2.11.2 (p. 206)

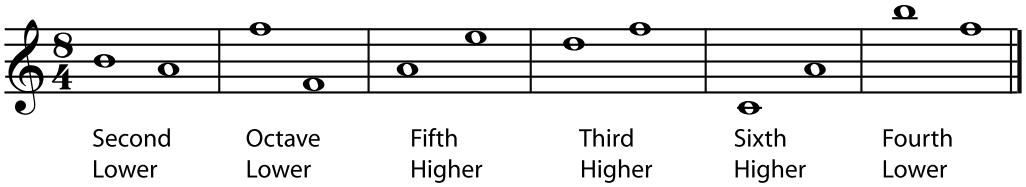


Figure 2.168

Solution to Exercise 2.11.3 (p. 209)

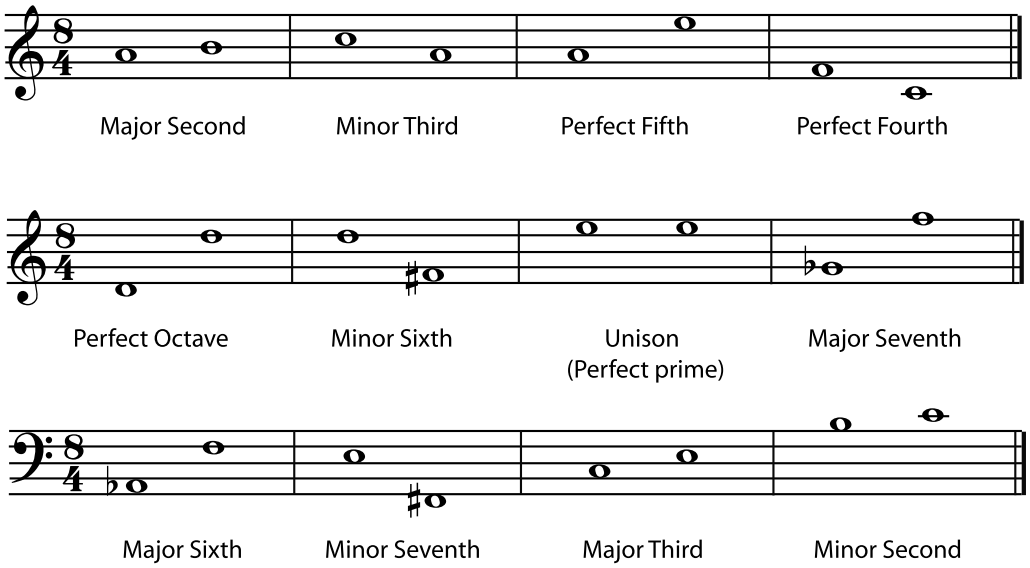


Figure 2.169

Solution to Exercise 2.11.4 (p. 210)

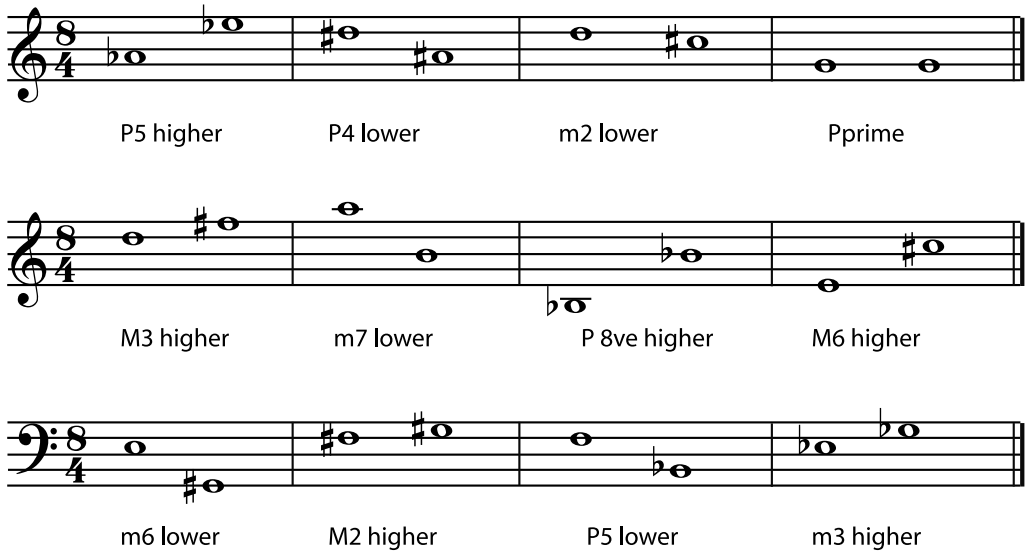


Figure 2.170

Solution to Exercise 2.11.5 (p. 211)

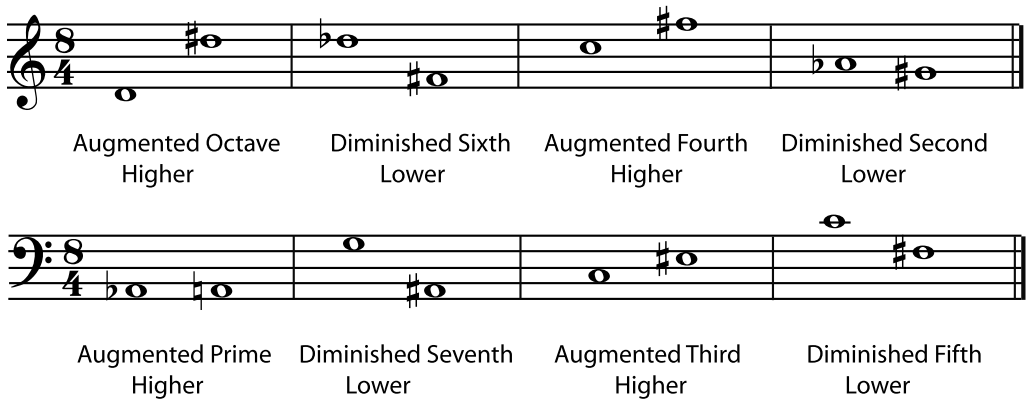


Figure 2.171

Solution to Exercise 2.11.6 (p. 213)

1. Diminished sixth
2. Perfect fourth
3. Augmented fourth
4. Minor second
5. Major third

Solution to Exercise 2.13.1 (p. 220)

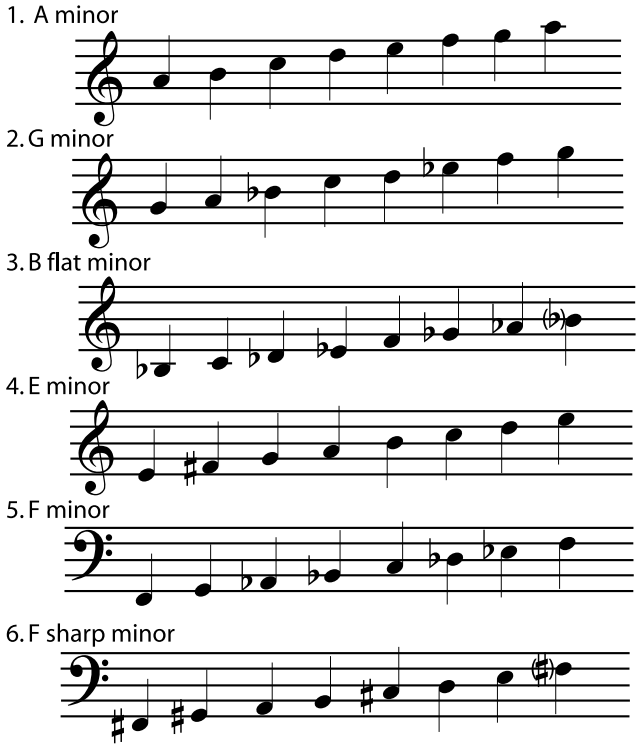


Figure 2.172

Solution to Exercise 2.13.2 (p. 222)

1. A minor: C major
2. G minor: B flat major
3. B flat minor: D flat major
4. E minor: G major
5. F minor: A flat major
6. F sharp minor: A major

Solution to Exercise 2.13.3 (p. 223)

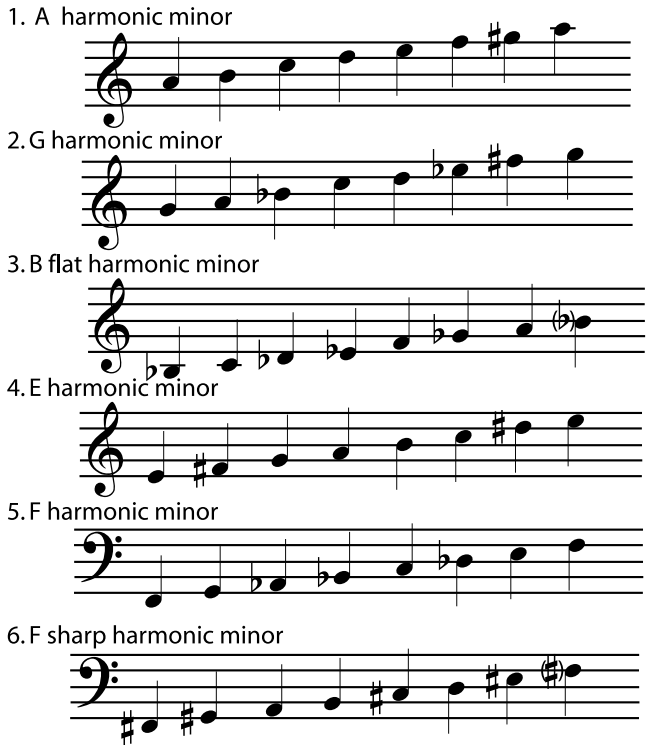


Figure 2.173

Solution to Exercise 2.13.4 (p. 223)

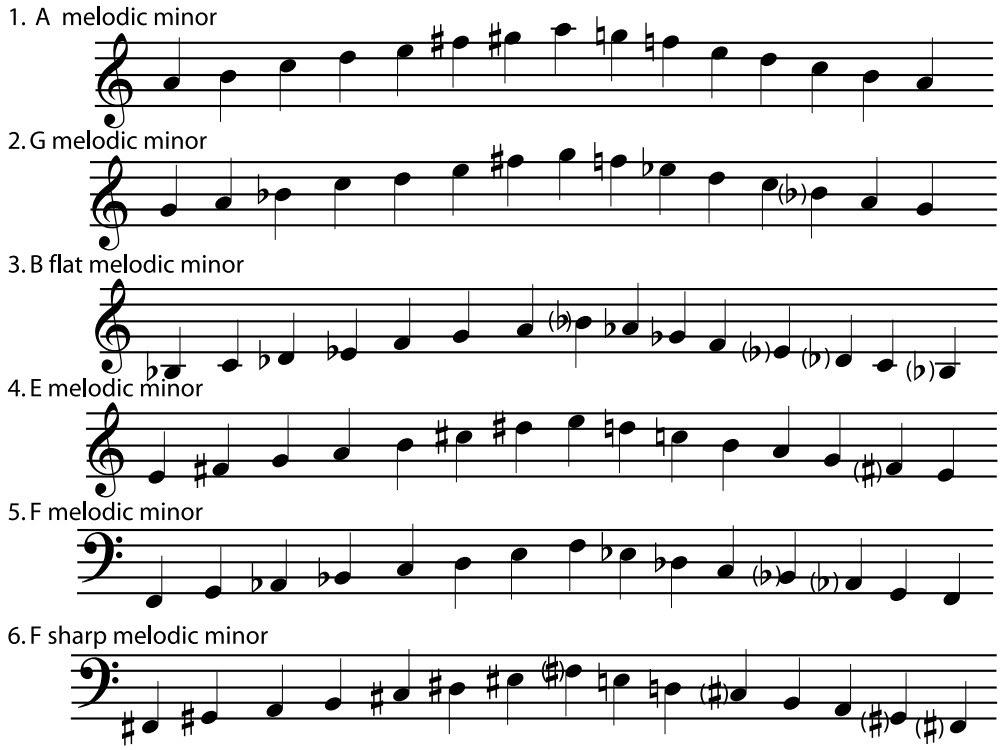


Figure 2.174

Solution to Exercise 2.14.1 (p. 226)

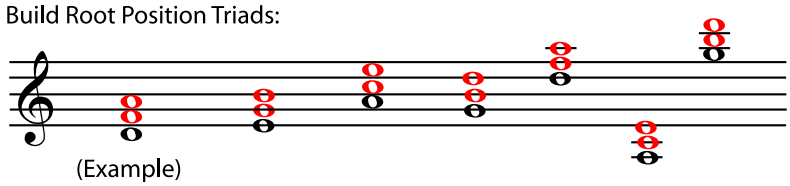


Figure 2.175

Solution to Exercise 2.14.2 (p. 228)

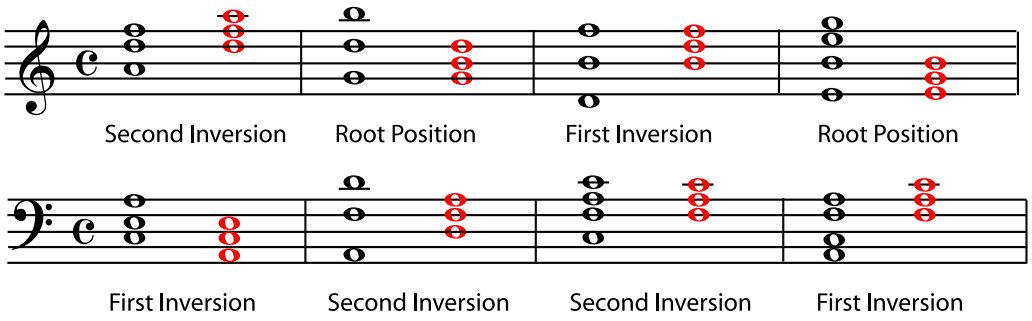


Figure 2.176

Solution to Exercise 2.15.1 (p. 230)

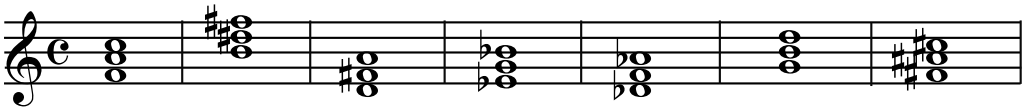


Figure 2.177

Solution to Exercise 2.15.2 (p. 230)

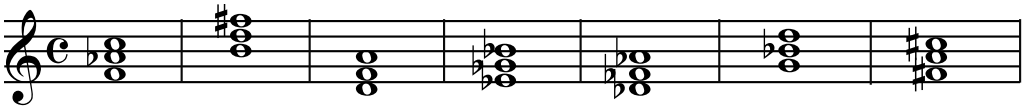


Figure 2.178

Solution to Exercise 2.15.3 (p. 231)

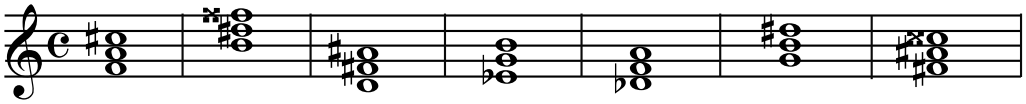


Figure 2.179

Solution to Exercise 2.15.4 (p. 232)

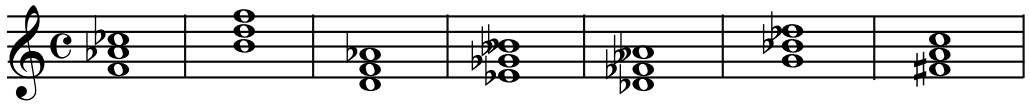


Figure 2.180

Solution to Exercise 2.15.5 (p. 233)

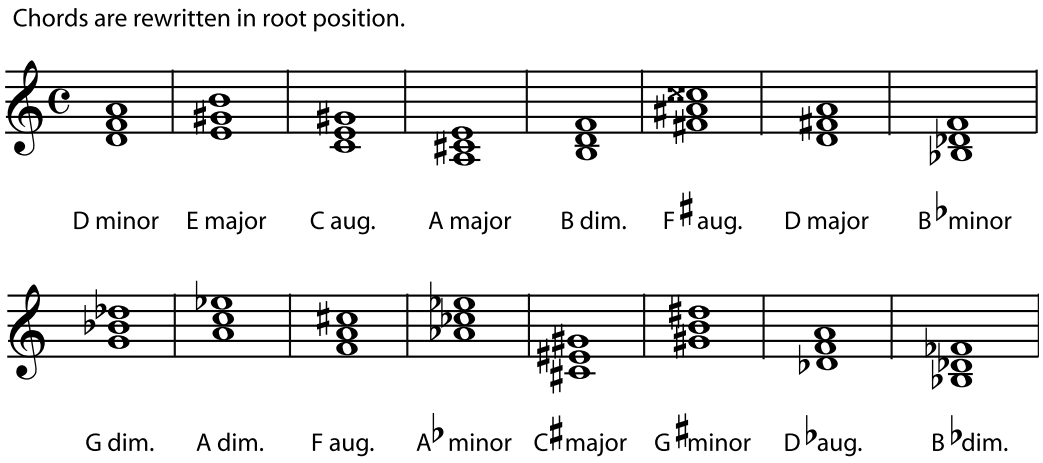


Figure 2.181

Solution to Exercise 2.16.1 (p. 236)

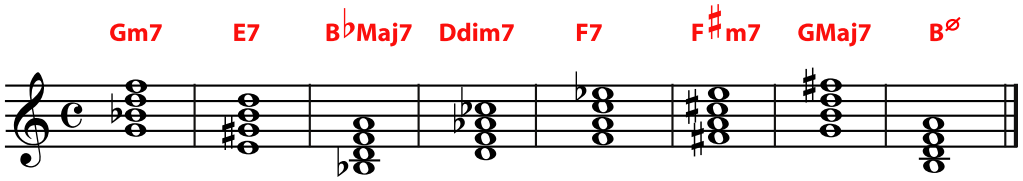


Figure 2.182

Solution to Exercise 2.16.2 (p. 237)

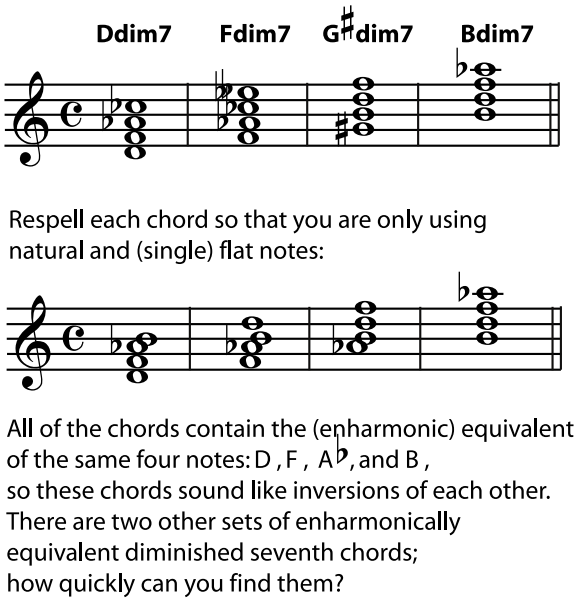


Figure 2.183

Solution to Exercise 2.16.3 (p. 239)

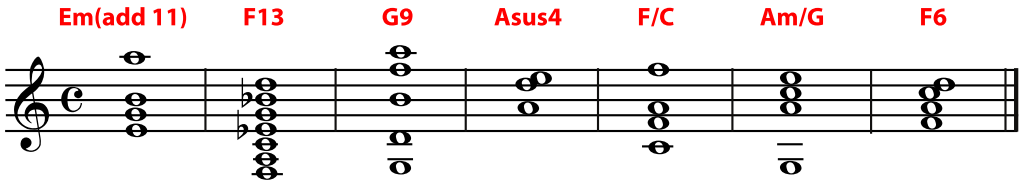


Figure 2.184

Solution to Exercise 2.16.4 (p. 240)

You can check your work by

- listening to the chords to see if they sound correct
- playing your chords for your teacher or other trained musician
- checking your answers using a chord manual or chord diagrams

Solution to Exercise 2.16.5 (p. 241)

Notice that a half-diminished seventh (Seventh Chords, p. 236) can be (and sometimes is) written as it is here, as a minor seventh with flat five.

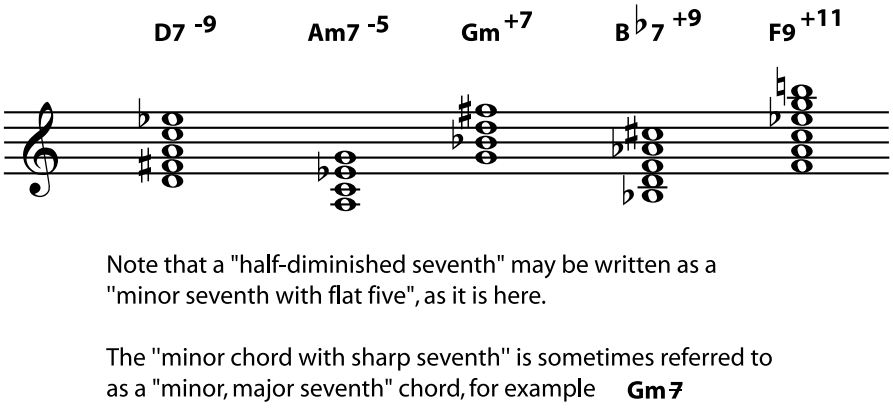


Figure 2.185

Solution to Exercise 2.17.1 (p. 243)

E flat major (3 flats):

- B flat major (2 flats)
- A flat major (4 flats)
- C minor (3 flats)
- G minor (2 flats)
- F minor (4 flats)

A minor (no sharps or flats):

- E minor (1 sharp)
- D minor (1 flat)
- C major (no sharps or flats)
- G major (1 sharp)
- F major (1 flat)

Solution to Exercise 2.17.2 (p. 243)

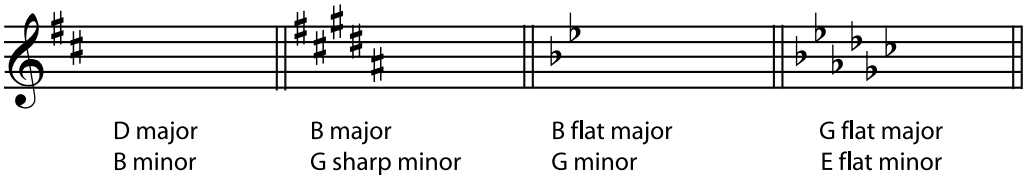


Figure 2.186

Solution to Exercise 2.17.3 (p. 244)

- A major adds G sharp
- E major adds D sharp

- B major adds A sharp
- F sharp major adds E sharp

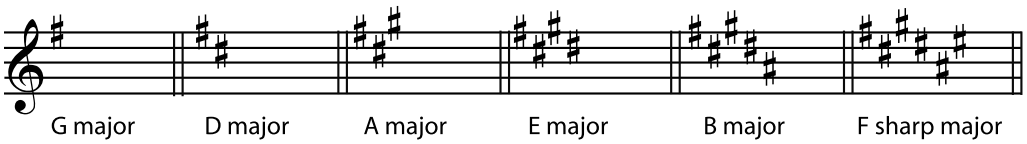


Figure 2.187

Solution to Exercise 2.17.4 (p. 244)

- B minor adds C sharp
- F sharp minor adds G sharp
- C sharp minor adds D sharp

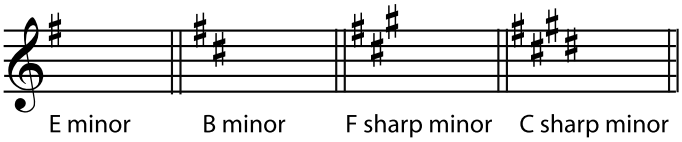


Figure 2.188

Solution to Exercise 2.17.5 (p. 244)

- E flat major adds A flat
- A flat major adds D flat
- D flat major adds G flat
- G flat major adds C flat

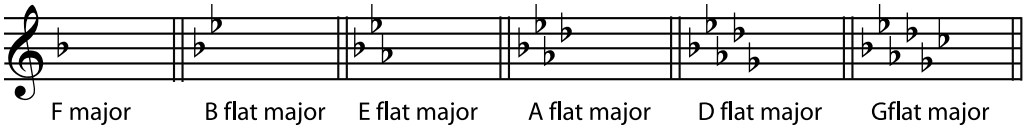


Figure 2.189

Solution to Exercise 2.18.1 (p. 246)

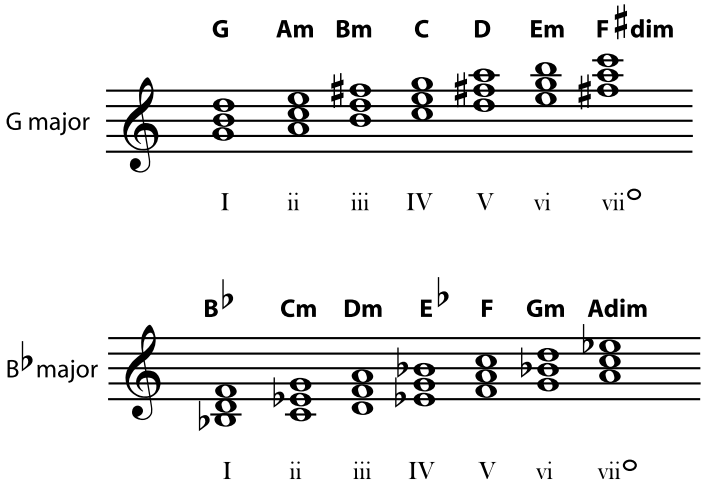


Figure 2.190

Solution to Exercise 2.18.2 (p. 249)

1. G major (G)
2. A major (A)
3. G sharp major (G#)
4. A minor (Am)
5. E minor (Em)
6. A minor (Am)
7. E seventh (E7)

Solution to Exercise 2.18.3 (p. 250)

I	IV	ii	vi
G	**C**	**Am**	**Em**
tonic	subdominant	supertonic	submediant
II	V	iii	V7
A	**D**	**Bm**	**D7**
not in key*	dominant	mediant	dominant seventh
I			
G			
tonic			

There is no subtonic in this progression.

*It is A minor (with a C natural), not A major (with a C sharp) that belongs in this key. An A major chord can sound good in the key of G major, however. It is the dominant of the dominant (D major), so playing an A major chord can sometimes make the music feel like it has temporarily moved to the (closely related) key of D major. This type of harmonic complexity helps keep a piece of music interesting.

Figure 2.191

Solution to Exercise 2.18.4 (p. 250)
The tonic, subdominant, and dominant are minor (i, iv, and v). The mediant, submediant, and subtonic are major (III, VI, and VII). The supertonic (ii) is diminished.

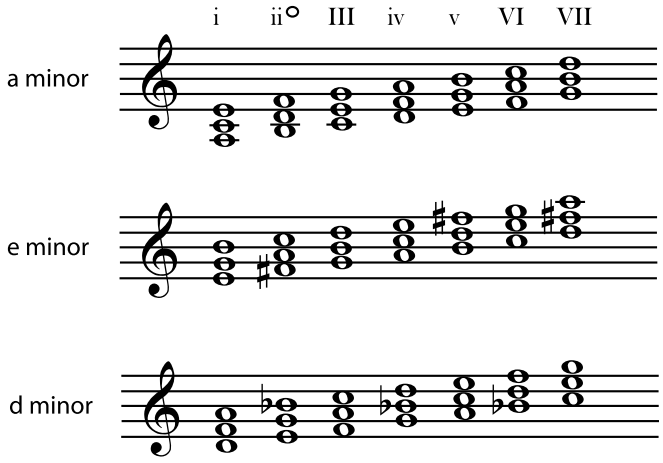


Figure 2.192

Solution to Exercise 2.18.5 (p. 251)
The seventh degree of the scale must be raised by one half step to make the v chord major. If the seventh scale note is raised, the III chord becomes augmented, and and the vii chord becomes a diminished chord (based on the sharp vii rather than the vii). The augmented III chord would not be particularly useful in

the key, but, as mentioned above (p. 247), a diminished seventh chord based on the leading tone (here, the sharp vii) is sometimes used in cadences[292].

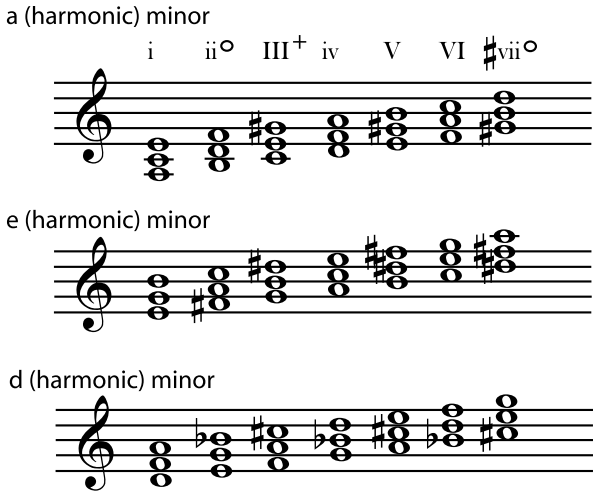


Figure 2.193

Solution to Exercise 2.19.1 (p. 254)
Although trained musicians will generally agree that a particular sound is reedy, thin, or full, there are no hard-and-fast right-and-wrong answers to this exercise.

Solution to Exercise 2.19.2 (p. 257)

1. The eighth harmonic
2. The fifth and tenth harmonics; the sixth and twelfth harmonics; the seventh and fourteenth harmonics; and the eighth and sixteenth harmonics
3. The note that is one octave higher than a harmonic is also a harmonic, and its number in the harmonic series is twice (2 X) the number of the first note.
4. The eighth, sixteenth, and thirty-second harmonics will also be A's.

Solution to Exercise 2.19.3 (p. 257)

1. The ratio 4:6 reduced to lowest terms is 2:3. (If you are more comfortable with fractions than with ratios, think of all the ratios as fractions instead. 2:3 is just two-thirds, and 4:6 is four-sixths. Four-sixths reduces to two-thirds.)
2. Six and nine (6:9 also reduces to 2:3); eight and twelve; ten and fifteen; and any other combination that can be reduced to 2:3 (12:18, 14:21 and so on).
3. Harmonics three and four; six and eight; nine and twelve; twelve and sixteen; and so on.
4. 3:4

Solution to Exercise 2.19.4 (p. 260)
Opening both first and second valves gives the harmonic series one-and-a-half steps lower than "no valves".

[292] "Cadence in Music" <http://cnx.org/content/m12402/latest/>

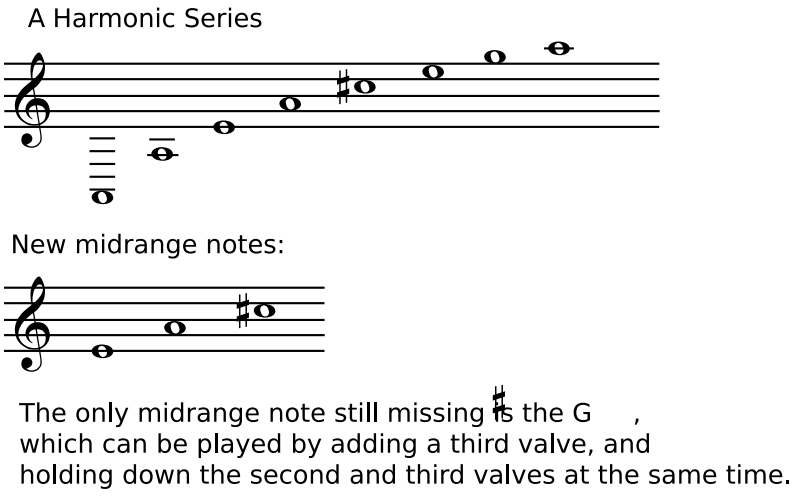


Figure 2.194

Solution to Exercise 2.21.1 (p. 267)

1. a little fast
2. much less motion = much slower
3. more lively = faster
4. very slow
5. a little more motion = a little faster

Solution to Exercise 2.22.1 (p. 269)

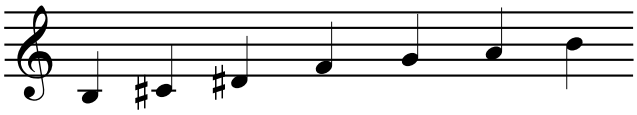


Figure 2.195: This whole tone scale contains the notes that are not in the whole tone scale in Figure 2.144 (A Whole Tone Scale).

Solution to Exercise 2.22.2 (p. 269)

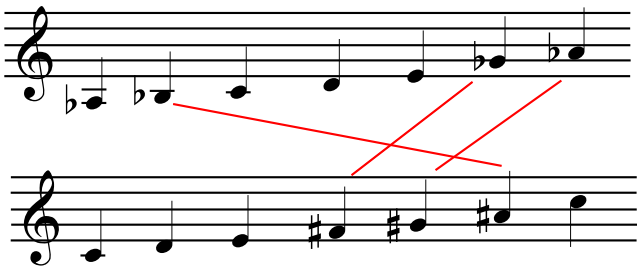


Figure 2.196: The flats in one scale are the enharmonic (Section 2.7) equivalents of the sharps in the other scale.

Assuming that octaves don't matter - as they usually don't in Western[293] music theory, this scale shares all of its possible pitches with the scale in Figure 2.144 (A Whole Tone Scale).

Solution to Exercise 2.22.3 (p. 271)

If you can, have your teacher listen to your compositions.

[293] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

Chapter 3

Other Useful Information

3.1 Guitars[1]

3.1.1 Introduction

The group of instruments called guitars includes some of the world's most popular instruments. The guitar is classified as a chordophone in the plucked lute family[2]. The fairly large, waisted (hourglass-shape) body that is most typical of the acoustic guitar (Section 3.1.3: Acoustic Instruments) gives it a fuller, more resonant sound than most other plucked strings. The electric guitar (Section 3.1.4: Electric Guitars) may have a different body shape and a more electronic timbre[3] that features an ability to be altered in interesting ways, but the technique for playing the instruments is essentially the same, and players can switch back and forth between various types of guitars with little difficulty. There are many varieties of guitar found around the world; the guitars described below are only the ones most familiar in modern Western[4] music.

3.1.2 Instrument Basics

Most modern guitars have six strings. Modern instruments that have fewer strings are usually called by a different name, although they may still clearly be in the guitar family (ukulele, for example). The exception to this is the electric bass guitar, which, although it is called a guitar, has only four strings and functions more as a bass than as a guitar. Some guitars have a seventh string - an extra bass (low) string - but this is quite rare. There are twelve string guitars (p. 303), but the strings of these are arranged so that the playing technique is the same as that for a six-stringed instrument.

[1] This content is available online at <http://cnx.org/content/m12745/1.5/>.
[2] "Classifying Musical Instruments": Section Chordophones <http://cnx.org/content/m11896/latest/#s21>
[3] "Timbre: The Color of Music" <http://cnx.org/content/m11059/latest/>
[4] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>

Standar Guitar Tuning

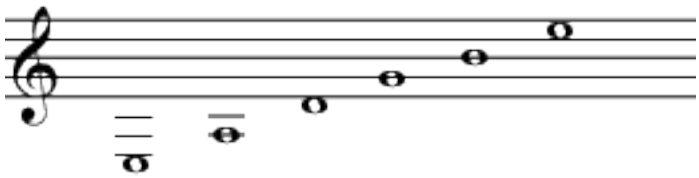


Figure 3.1: This is the standard tuning for guitar strings, **as written for the guitarist**. Music for guitar actually sounds one octave[5] lower than written.

The strings of most guitars are normally tuned to E, A, d, g, b, and e'. However, parts for the instrument are written an octave higher, so that the lowest written note is the e below the treble staff, not E. (See Octaves and Diatonic Music[6] for an explanation of octave identification. See Transposing Instruments[7] for more about instruments whose parts are not written where they sound.) Alternative tunings are occasionally used, particularly "D tuning", which involves tuning the lowest string to D rather than E. Hawaiian **slack key** guitar playing also features tuning some strings lower (or more "slack"), usually so that the open strings will play a major chord (Section 2.15.1: Major and Minor Chords). Alternative tunings are usually used to provide easier fingerings in some keys (Section 2.10) and take advantage of the more resonant[8] sound of the open string.

The four strings of the bass guitar are tuned one octave[9] below the lowest four strings of a regular guitar.

The guitar is played by being plucked or strummed with the right hand, either directly with the fingers, or using a **plectrum**, usually called a **pick**. This can be either a flat pick, held between the thumb and fingers, or plectrums that are curled so that they can be worn individually on the thumb and each finger.

The left hand **fingers** the notes and chords[10] by holding the strings down against the neck. The neck is fretted; the **frets** are thin raised bars embedded in the neck. When a string is held down, the string stops vibrating at the fret, not at the finger as it does for a non-fretted stringed instrument like the violin. Notes on the same string one fret apart are one half step (Section 2.8) apart. (For more about how holding a string down affects the pitch, see Standing Waves and Musical Instruments[11] and Harmonic Series (Section 2.19).) On a **steel guitar**, the pitches are changed by sliding a steel bar up and down the strings, rather than holding them down with the fingers. Steel guitars often do not have raised frets, which would interfere with the **portamento** (gliding pitch change) that is the characteristic sound of steel guitars.

A guitar may be acoustic, electric, or some combination of acoustic and electric. In an **acoustic** guitar, the vibrations of the string are picked up and amplified in the instrument's body. In an **electric guitar**, the string vibrations are picked up and amplified by electronic components. An **electric-acoustic** is a hybrid instrument that has a hollow, resonating body, but also an electronic pickup, which amplifies the sound from both the strings and the body.

[5] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[6] "Octaves and the Major-Minor Tonal System": Section Naming Octaves <http://cnx.org/content/m10862/latest/#s2>
[7] "Transposing Instruments" <http://cnx.org/content/m10672/latest/>
[8] "Resonance and Musical Instruments" <http://cnx.org/content/m13537/latest/>
[9] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[10] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[11] "Standing Waves and Musical Instruments": Section Standing Waves on Strings <http://cnx.org/content/m12413/latest/#s1>

If you would like some idea of the variation in sounds that different guitars get, here are audio examples of a (nylon-string acoustic) classical guitar[12], a (steel-string acoustic) twelve-striong guitar[13], a (steel-string) electric-acoustic (minimal distortion)[14], and an electric bass guitar [15], all playing the same short riff.

3.1.3 Acoustic Instruments

(a) Classical Guitar

(b) Twelve-String Guitar

Figure 3.2

There are several different types of acoustic guitar. The modern **classical** guitar or **Spanish** guitar uses nylon strings (the lower three strings are wrapped in metal wire) and has a fairly wide neck. It has a large, waisted (hourglass-shape) body with a flat back. This is the modern instrument used to play "classical" guitar music from any era, as well as Flamenco and many other folk styles.

The **steel-string** acoustic guitar has the same basic shape as the classical guitar. The metal strings give it a brighter, less mellow timbre[16] than the classical guitar. It may have a narrow or wide neck, and the back of the body may be flat or rounded. This instrument is used for some types of popular music, for example American "country", and also for some types of folk music, including some blues.

Some acoustic steel-string guitars are twelve string guitars. **Twelve string guitars** have six **courses**, or groups of strings (two strings in each course, in this case) that are strung very close together and played (held down and plucked or strummed) together, as if they are one string. The highest (pitched) two courses are simply two e' and two b strings. The other courses consist of one string tuned as it is in a regular guitar plus one string tuned an octave[17] higher. The total effect is a bright, full sound that is particularly useful for acoustic accompaniments.

The steel-string guitar should not be confused with the steel guitar (p. 302), which is often more box-shaped than hourglass-shaped. Also called **Hawaiian guitar** (it was developed in Hawaii), the steel guitar is rested flat on the lap or on a stand, and may include floor pedals and knee levers for changing the string tunings while the instrument is being played. **Resonator** guitars, which do have the typical guitar shape,

[12] See the file at <http://cnx.org/content/m12745/latest/nylonGUITARS.mp3>
[13] See the file at <http://cnx.org/content/m12745/latest/12stringGUITARS.mp3>
[14] See the file at <http://cnx.org/content/m12745/latest/electricGUITARS.mp3>
[15] See the file at <http://cnx.org/content/m12745/latest/bassGUITARS.mp3>
[16] "Timbre: The Color of Music" <http://cnx.org/content/m11059/latest/>
[17] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>

have a metal resonator rather than a sound hole in the body, and are typically played with a sliding steel bar, like the steel guitar. Besides being common in Hawaiian music, the steel guitar is also found in some blues and American "country" music. Many modern steel guitars are electric instruments.

3.1.4 Electric Guitars

Electric Bass Guitar

Figure 3.3

In the true **electric** guitar, the body is not hollow and does not act as a resonator. The vibrations of the strings are picked up and amplified electronically. This is the guitar most commonly found in all kinds of rock and pop bands, and it is also common in jazz.

There are also various hybrid **electric-acoustic** guitars. Some are essentially steel-string acoustic guitars that have a built-in electronic pick-up. Others are "hollow-body electric" guitars that have the neck and strings of an electric guitar, but with a body that, while not as deep as an acoustic guitar, is hollow and does provide some acoustic resonance[18]. In hybrid instruments, the sound from both the strings and the body is amplified electronically, giving an amplified sound that still has some acoustic timbre[19]. Hybrid instruments can be found playing folk, country, blues, jazz, pop, and rock music.

The **electric bass guitar** has only four strings, which are tuned an octave[20] below the four lowest strings on a six-string guitar. The bass guitar is a standard part of rock and pop bands, and is also often used instead of the more traditional double bass[21] in jazz and many other genres. Unlike other guitars, which play chordal[22] accompaniments[23] or melodies, the bass guitar generally plays the bass line[24]. For this reason, switching to bass guitar, or doubling[25] as a bass guitarist may be easier for a double bass player than for a guitar player.

3.1.5 Chordal Accompaniments on the Guitar

The guitar is often used as a melody[26] instrument. The **lead** guitar in a rock band, for example, specializes in playing solo melodies. Classical guitar music usually includes a melody and enough accompaniment to suggest either a countermelody or a chordal[27] accompaniment.

[18] "Resonance and Musical Instruments" <http://cnx.org/content/m13537/latest/>
[19] "Timbre: The Color of Music" <http://cnx.org/content/m11059/latest/>
[20] "Octaves and the Major-Minor Tonal System" <http://cnx.org/content/m10862/latest/>
[21] "The Double Bass" <http://cnx.org/content/m14624/latest/>
[22] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>
[23] "Harmony": Accompaniment <http://cnx.org/content/m11654/latest/#l0c>
[24] "Harmony": Accompaniment <http://cnx.org/content/m11654/latest/#l0c>
[25] "A Parent's Guide to School Band Programs" <http://cnx.org/content/m14266/latest/#element-435>
[26] "Melody" <http://cnx.org/content/m11647/latest/>
[27] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>

Many guitarists, however, specialize in playing chordal accompaniments; the **rhythm** guitarist in a rock band, or the typical folk guitarist are examples. Chordal accompaniments may be strummed **block** chords, with all the notes of the chord played together, or they may be picked arpeggios, with the notes of the chord played one or two at a time. In either case, the guitarist may choose either to use as many open strings as possible in each chord, or may instead use mostly **barre chords**, which have no open strings. Chords with plenty of open strings have a more resonant sound, are easier to play with the left hand, and are often favored by acoustic guitar players. Barre chords give more control over exactly when the chord stops sounding, are easier to transpose[28] to other keys, and are often favored by electric guitar players. (Holding down all six strings on an acoustic guitar requires much more hand strength than does holding down all the strings of an electric guitar.)

The **capo** is a device that stretches across all of the strings, holding them down firmly. The shortening of all the strings changes the "open-string" tuning of the instrument and transposes[29] the chords played to a new key (Section 2.10). The capo is sometimes used simply to transpose[30] a piece to a different key (in order to be able to sing it more easily, for example). At other times, the capo is used to make it possible to play easy, open-string-style chords in a key (Section 2.10) that generally doesn't use open strings. For example, a capo at the first fret (p. 302) causes the strings to sound one half step (Section 2.8) higher. A player who plays open-string-style chords with the capo (for example C - G - E minor), will be playing them in a new key (D flat - A flat - F minor).

3.1.6 History

Guitar-like instruments are an ancient group. Because the guitar gradually developed from other, similar instruments in the lute family, it is difficult to pinpoint the exact beginnings of the instrument. It may have developed from an instrument used in Asia since ancient times; or it may have developed from an instrument in use in medieval Europe. Guitars were definitely being played in Spain and France by the middle of the 1500's. The modern guitar is based on the designs of Spaniard Antonio de Torres, and the guitar has historically been closely associated with Spain. Early instruments were smaller and quieter than the modern acoustic guitar.

In order to get a louder, richer tone, these early instruments almost always had doubled strings. The earliest guitars had four pairs of strings (four **courses**), and later - by the early 1600's - guitars had five pairs. By the late 1700's, guitars with six pairs of strings or six single strings were being made.

3.1.7 Suggestions for Beginners and Parents of Beginners

You must be near adult size to play a full-size guitar comfortably. Children under ten who want to play guitar will probably need a half-size or three-quarter-size guitar. Most "guitars" this size are toys, not musical instruments, so get the help of a guitar teacher or other knowledgeable musician in choosing an instrument.

There are many different types of guitar and styles of guitar playing. A student who wants to learn classical guitar will need a different instrument and probably a different teacher than a student who wants to learn jazz improvisation. If you're not sure what you want, talk to a guitar teacher about it and listen to recordings of guitars playing in different styles.

On the other hand, it's very useful to learn the basics of all the styles. It's a good idea to know how to read common notation (including classical guitar fingerings) and tablature notation as well as chord charts, no matter what style of guitar you normally play. If you can play a solo line and classical and jazz scales as well as chord strumming and picking, this will make you a much more versatile instrumentalist.

[28] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>
[29] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>
[30] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>

3.1.8 Repertoire

There is a huge and varied repertoire of music out there for guitar. Almost any radio station, whether it's playing pop, rock, jazz, country, even folk or classical, will feature plenty of guitar music. Recordings featuring guitar are also very easy to find.

3.1.9 Practical Information for Composers and Arrangers

Written Range of the Guitar

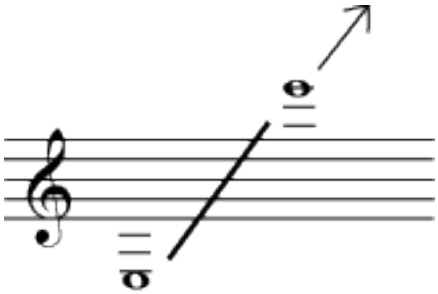


Figure 3.4: The guitar sounds one octave lower than written. Write for guitar in treble clef or guitar tablature (Section 3.3).

Written Range of Bass Guitar

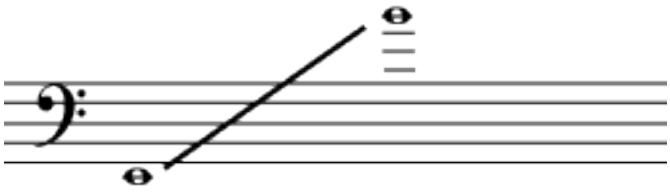


Figure 3.5: Bass guitar players usually read bass clef. Bass guitar also sounds one octave lower than written.

The guitar sounds an octave lower than written. This need not concern you as an arranger, unless the specific octave of the note is very important to you. Guitar players prefer to read treble clef or guitar tablature (some may only read one or the other). Bass guitar players read bass clef. Some guitar players cannot usefully

read either tablature or common notation, but will easily improvise an accompaniment using only the chord names written above the staff.

Guitar is a very versatile instrument. An accomplished guitarist can play strummed (block chord) or picked (arpeggiated chord) accompaniment, solo melody, improvised solos, melody and accompaniment at the same time, or even several lines of counterpoint[31] at the same time. As composer or arranger, you may specify exactly how you want something played (even which fingers of both hands are used), or you may write a fairly sketchy part (melodic line and chords, or just chords) and expect that the guitarist to fill it out for you.

If all you want from the guitarist is a chordal accompaniment of the type that guitars often provide, it is enough to provide the guitarist with just chord names (along with some indication of when to change chords, such as the lyrics, or a staff with measures indicated). You do not have to write out the accompaniment unless you want a particular rhythm, strum, or picking pattern. If the chord rhythm or picking pattern you want is very repetitive, you may wish to write out just the rhythm or pattern and indicate how you want it repeated.

If you want specific notes or a melody from the guitar, of course you will have to write it out. Some guitarists are not comfortable reading common notation; they may prefer that you write the music in tablature (Section 3.3). Don't write out very complex parts for the guitar unless you are very familiar with the instrument. Very fast, complex music can be played on the instrument, but only if it is written by someone who knows whether a particular combination of notes and fingerings are easy, difficult, or impossible. If you do write out complex parts that are only easy or possible using a certain fingering, be sure to notate it properly (with fingerings, left hand position, etc.).

Also, some guitar chords are easier to play, and sound better than others. (See above (p. 304).) Keys that favor open strings (i.e. any key (Section 2.10) in which the most common chords (Section 2.18) tend to contain the notes E, A, G, D, and/or B) are preferred by many guitarists. Favorite keys include: G, D, C, A, and E major, and E, A, and D minor. Keys with more than one flat can be daunting and may sound noticeably less resonant. If you are writing in a key that is awkward for guitar, you may want to consider giving the guitar player the option of using a capo (p. 305) and playing in an easier key. This will require offering a transposed[32] version of the chords, but will make your music much more approachable for younger and/or less-experienced players. On the other hand, many players of electric guitar prefer the control over the resonance that barre chords (with no open strings) give them. If this will be the case for your music, key matters much less. If you do offer a capo version of the chord names, remember that a capo can only raise, not lower the sound of the guitar. Since the sound of the instrument has been raised, the guitarist can play chords from a lower (easier) key. (For example, if you want a piece to sound in A flat major, you can have the guitarist capo first fret, raising the sound by a half step, and play the chords - in G major - that would normally sound a half-step lower. For more information and practice transposing, please see Transposition[33].) Capoing above about the fourth fret tends to give a tinny, out-of-tune sound, so try to find a key only a step or two lower that will give easy-to-play chords.

[31] "An Introduction to Counterpoint" <http://cnx.org/content/m11634/latest/>
[32] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>
[33] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>

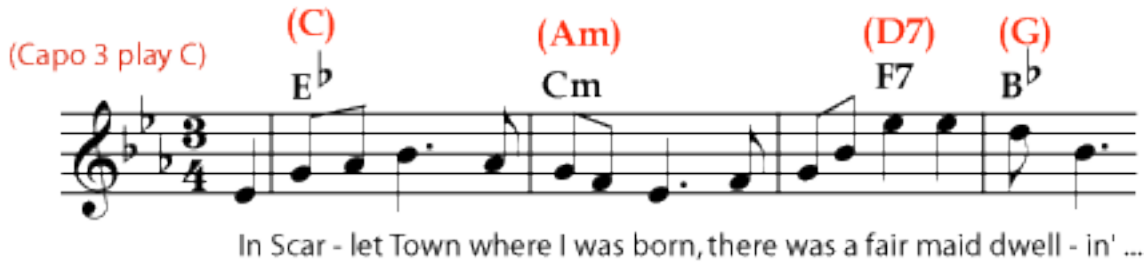


Figure 3.6: If guitar chords are an important part of the music, you may want to put the music in a key that is good for guitars (please see Transposition[34]). If it is important to use a flat key (for the singing range, for example), give the guitarist the option of using a capo.

The guitar is such a versatile instrument that there are many different styles and methods of playing it. Classical guitar, folk guitar, rock guitar, flamenco guitar, and blues guitar are just some of the classifications of guitar music that require very different methods, styles, skills, and even instruments. Most guitarists specialize in just one or two of these areas. If you are writing for a particular player, or want a particular sound, your arrangement will be more successful if you are aware of what is reasonable to ask of that player, instrument, and style.

Bass guitar is not normally a strummed instrument. It is usually given the bass line, and in some groups is considered interchangeable with the double bass. It can be a solo instrument, but write a very light, soft accompaniment when you write bass solos, so that they can be heard.

[34] "Transposition: Changing Keys" <http://cnx.org/content/m10668/latest/>

3.2 An Example Beginning Guitar Home Practice Session[35]

3.2.1 Introduction

For parents, beginning students, and young teachers: This is an example of what a good home practice session might look like for a young guitar student who has been taking lessons for less than a year. Unless the student is quite mature and very motivated, private or group lessons or some kind of coaching is necessary at this level for adequate progress. For more general suggestions on practicing music at home, please see A Guide to Great Home Music Practice[36].

3.2.2 Warm-Ups

Good practice sessions start with warm-ups. This is a chance to get into the right frame of mind and to practice basic skills as well as get physically warmed up. If your instructor wants you to make changes in your playing style (for example in your left hand position or the way you strum), this is the best time to practice those changes, too. Your teacher may give you warm-ups that are ideal for you right now. If not, below are some ideas for warm-up exercises for beginning guitar students, with an example of each type.

Strumming

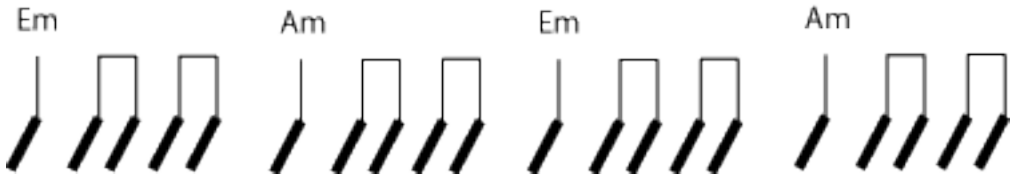


Figure 3.7: Strumming easy, familiar chords with an easy, familiar strumming pattern is a good first warmup. Start with the easiest chords and strums, and then do some harder ones. Each pattern should be repeated until the strings are sounding clearly and the strumming is steady, rhythmic and confident.

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[35] This content is available online at <http://cnx.org/content/m11903/1.2/>.
[36] "A Guide to Great Home Music Practice" <http://cnx.org/content/m11883/latest/>

Finger Picking

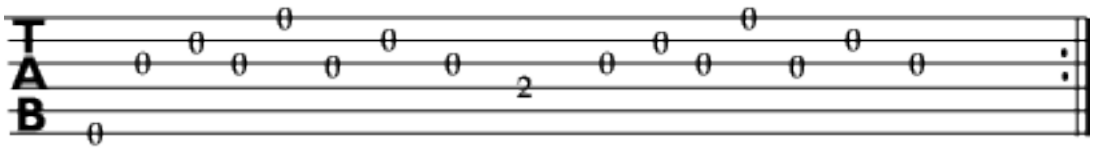

Figure 3.8: Students who are not ready to use finger picking while changing chords or singing can practice a finger picking pattern on a single, easy chord during warm-ups every day. (Eventually the patterns become easy and can be used in "real music".) Each pattern should be repeated (as slowly as necessary) until it is steady and rhythmic.

Alternating Fingers

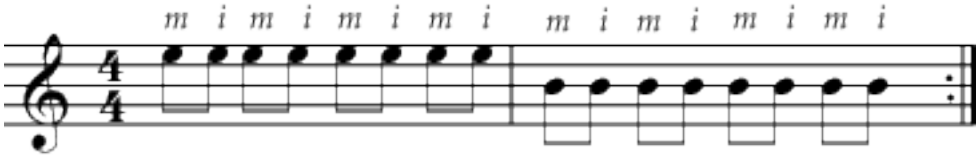

Figure 3.9: Alternating fingers can be very difficult for the beginner. Easy exercises that practice alternating fingers are a very useful warm-up.

Scales

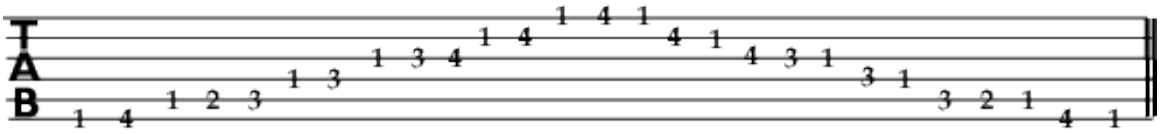

Figure 3.10: Guitar students may be reluctant to practice scales. Teachers can point out that improvisation and solo work is based on scales, and can also provide "fun" scales like this blues scale. Scale fingering patterns like this one can be used in many different keys, since they can be used at any fret. During warm-ups, the student can play each scale pattern several times, starting at the first fret, and then moving up the neck until the body of the guitar is too much in the way. After practicing a scale, budding improvisers (even beginners) may want to spend a few warm-up minutes improvising around one of the scales.

3.2.3 Practice

After warming up, the student practices the assignments for the week. Weekly assignments for a new guitar player often include:

- memorizing a new chord
- practicing a new strumming pattern
- practicing a new picking pattern
- working on a piece that requires reading music (and maybe also tablature)
- working on a song that requires singing and playing at the same time, and changing chords quickly while maintaining a steady strum or picking pattern

For best results, all assignments should be practiced as slowly and carefully as necessary to get a good, clear sound and very steady tempo. Never practice fast and sloppy. Once you are playing something clearly and steadily, speed it up a little, but only as fast as you can still play it well.

3.2.4 Winding Up

The ideal way to end a practice session is to play something easy and fun. For a beginning guitar student this will be music that has been mastered in lessons over the previous weeks, perhaps one or two "music-reading" assignments and one or two songs that the student wouldn't mind performing for friends and family. This cool-down session:

- Relaxes any tenseness and frustration from practicing the new requirements
- Is a reminder of the rewards of practice
- Keeps up a repertoire of pieces the student can play whenever anyone asks

Unlike during the practice session, the student should usually play these pieces straight through. The emphasis should be on memorizing and touching up the pieces, so that they are easy and enjoyable to perform.

3.3 Reading Guitar Tablature[37]

A **tablature** is a form of music notation that is designed for a particular musical instrument, for example by specifically indicating keys or fingerings. Obviously, tablatures aren't as generally useful as common notation[38], since they can only be easily read by players of one particular kind of instrument. Also, tablatures contain different information, and may not have as much information, as standard notation. But many instrumentalists find tablature easier to read and therefore useful for learning new pieces or as a memory aid when playing the piece. Music written in guitar tablature is particularly common in pop and rock genres. (In some other genres, such as classical guitar, students are usually advised to learn common notation.) Here is a short guide to reading modern guitar tablature. Tablature for other fretted, stringed instruments follows similar rules.

On a common notation staff[39], the lines represent particular pitches (Section 2.6). For example, on a treble clef (Section 2.1) staff, the bottom line stands for the E above middle C; any note on that line will be some version (sharp, flat, or natural (Section 2.6)) of that E. The spaces in between the lines also represent particular pitches; for example, the space above that "E line" is where F notes appear. In other words, the placement of the note on a line or space of the staff does not tell the instrumentalist how to play that note. It only gives more general information (its pitch), because common notation is meant to be a generally-useful "common language" that can be read on any instrument. This means the guitarist can share and discuss

[37] This content is available online at <http://cnx.org/content/m11905/1.2/>.
[38] "The Staff" <http://cnx.org/content/m10880/latest/>
[39] "The Staff" <http://cnx.org/content/m10880/latest/>

common notation easily with a pianist or vocalist, for example. However, it also makes reading the notes a two-step process: The reader must first remember what the note represents ("middle C," for example) and then remember how that note is played on the instrument. This makes learning common notation quite challenging for beginners, particularly those who are trying to simultaneously learn to play an instrument and learn to read music.

In guitar tablature, each line represents a particular guitar string. The spaces between the lines are not used. For example, the bottom line of a guitar tablature represents the sixth, or lowest-sounding, string of the guitar. All notes on that line will be played on that string. The highest line represents the highest-sounding string.

Individual notes are represented by numbers on the lines. The number indicates where (which fret) to hold down that string (with the left hand) for that note. "0" means to pluck the open string. "2" means to hold the string down at the second fret while plucking it. In other words, in tablature, the notation indicates how to play the note, rather than indicating the pitch of the note. Although it is not useful for other instrumentalists, this more-direct approach is easier for guitarists to learn.

Reading Guitar Tablature

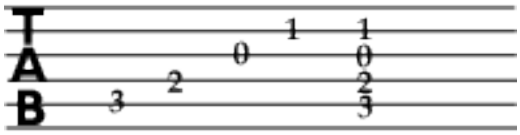

Figure 3.11: The six lines represent the six strings of the guitar, from lowest-sounding (bottom line) to highest-sounding (top line). The numbers tell where (which fret) to hold the string down. So this line of tablature means: play the fifth string third fret, then fourth string second fret, then third string open, then second string first fret, then all four at the same time.

There are some similarities between the two notations. Both are read from left to right, with notes that are played at the same time lined up in a vertical stack.

Tablature often includes other information on how to play the note, such as whether to "bend" the string or slide the finger between notes. However, unlike common notation, it usually does not include detailed information about the rhythm[40]. Common notation developed as a way to widely distribute new music, before recording was invented. It had to include all the information needed to figure out how the music sounds. Since rhythm is such a crucial aspect of the music, this included very precise detail about the rhythm.

[40] "Rhythm" <http://cnx.org/content/m11646/latest/>

Comparing Tablature and Standard Notation

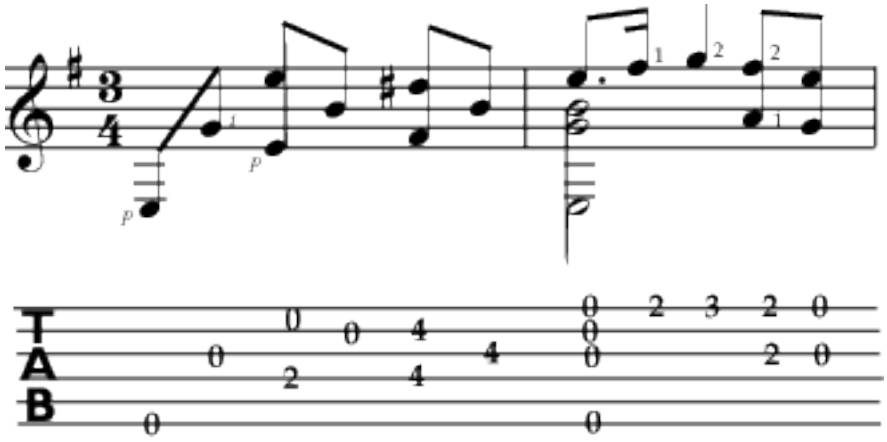

Figure 3.12: Guitar music written in standard notation often has useful information such as which left-hand fingers to use (the small letters next to the notes) and which right-hand fingers to use (the small numbers). But the most important information left out of most tablature is the detailed information about the rhythm (indicated, for example, by the way the notes are connected to each other).

Tablature is sometimes published alongside regular notation. When common notation is not included, some rhythm information may be indicated, but in general tablature is most useful when the guitarist already knows what the music should sound like. If you learn to read tablature but not standard notation, you will need some way to find out the rhythms of the music. You can learn them from recordings, or from other musicians. You may want to learn enough standard notation to be able to read the rhythms only (in Connexions, see Duration: Note Length (Section 2.3), Duration: Rest Length (Section 2.4), and Time Signature (Section 2.2) for the basics). Or you may want to learn standard notation well enough to read it slowly, for study purposes, even if you can't read it fast enough to read and play at the same time.

3.4 Tuning Your Guitar[41]

3.4.1 Introduction

There are several different popular methods for tuning a guitar. All are adequate, but you will probably find that some are either more convenient for you or easier for you to hear well. Also, the results of each method are slightly different. For the beginning guitarist who is just practicing alone, it is most important to choose a tuning method that is easy and convenient. But as you start to play with other people or become more picky about how your guitar sounds, the results of the different tuning methods will be more important to you.

[41] This content is available online at <http://cnx.org/content/m11949/1.3/>.

3.4.2 Pitch Pipes

There are pitch pipes available (check your local guitar supplier) that give the pitches for all six strings; you simply match the pitch of each string to the appropriate pipe.

Pitch pipes are inexpensive (say, compared to an electronic tuner) and easy to use even for young beginners. They are small and easy to bring along.

Pitch pipes do not have as clear and precise a pitch as a tuning fork, piano, or electronic tuner, and their pitches are equal temperament[42]. (See the discussion in the keyboard section, below (p. 316), for more about guitars and equal temperament.) Advanced players often find the result dissatisfying.

3.4.3 Electronic Tuner

Also available are electronic tuners that can also give you each of the individual pitches you need for all six strings. Electronic tuners also have a setting that allows to you check a sound to see whether it is flat, sharp, or on pitch.

Electronic tuners have a more precise pitch than a pitch pipe and some people find the feature that lets them check their pitch useful. Some are large, but plenty are small and easy to bring along.

Electronic tuners are quite expensive, however, and require batteries or an electrical outlet. Also, they are set to give equal temperament tuning (see the discussion below (p. 316)) and some people have trouble tuning to a thin, electronic tone. It is generally not worth the expense to get an electronic tuner just to tune a guitar.

3.4.4 Keyboard

If an electronic keyboard or a well-tuned piano is available, this can also be an easy way to tune the guitar. **Be aware that guitar music actually sounds one octave lower than written, so the highest guitar string, for example, is only the E above middle C, not the E an octave and a third above middle C, as it is written.**

[42] "Tuning Systems": Section Temperament <http://cnx.org/content/m11639/latest/#s2>

Tuning to a Keyboard

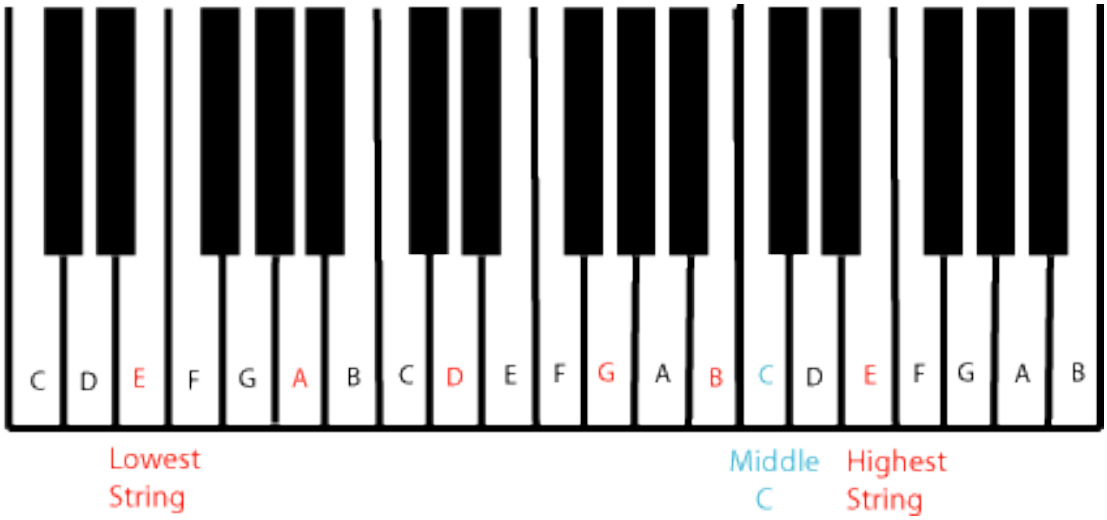

Figure 3.13: The open strings of the guitar (the six red notes) span two octaves from the E above middle C to the E two octaves below that.

Pianos and keyboards give a precise, clear, loud pitch that is easy to tune to. This can be a good choice for beginners who have a keyboard available, or for guitarists who are going to be practicing or performing with a keyboard player.

Obviously, this method is not useful when a keyboard is not available. But there is also the issue of exactly how you want your guitar to be tuned. Keyboards use **equal temperament**, which is basically the official tuning system of modern Western[43] music. This tuning system became so popluar and widely used, in fact, precisely because it is so good for keyboard instruments; it is designed so that an instrument that uses it will play equally in tune no matter what key it plays in. This is very important for instruments like pianos and harps which cannot retune easily or quickly.

There is a trade-off, though. In order for equal temperament to work, the only interval that is true to natural harmonics (Section 2.19) is the octave. All other intervals are a little off from the pure intervals[44] found in the harmonic series (Section 2.19) (in other words, in nature, in the physics of sounds). For example, a perfect fifth (p. 207) in equal temperament is just a little smaller than a pure perfect fifth.

Because the piano is such a popular instrument, most listeners are comfortable with equal temperament. And yet, there is the fact that the intervals are not exactly "in tune". Musicians who can make small tuning adjustments very quickly (vocalists, woodwind and brass players, and even players of unfretted strings, like the violin), often find themselves abandoning equal temperament when they can, and adopting the pure thirds and fifths of just intonation[45].

You cannot tune a guitar instantly, as you can a voice, or even a (non-open-string) note on the violin. But you can tune a guitar relatively quickly; say in between songs. And guitar players rarely need or want to play equally in tune in all keys. Many styles of guitar music favors easy-to-play keys, like E minor or D major, and avoids keys that require lots of barre chords, like A flat major or C sharp minor. So most guitarists do not use equal temperament tuning.

[43] "What Kind of Music is That?" <http://cnx.org/content/m11421/latest/>
[44] "Tuning Systems": Section Pythagorean Intonation <http://cnx.org/content/m11639/latest/#s11>
[45] "Tuning Systems" <http://cnx.org/content/m11639/latest/#p12a>

3.4.5 Tuning fork

Tuning forks that sound the popular tuning note "A" (which can be used to tune the fifth string) are very easy to find; tuning forks that sound an "E" (which can be used to tune the first and sixth strings) are also pretty easy to find and are more useful for guitars.

A tuning fork is inexpensive and can easily be brought along. Another advantage is that if you touch it to the sounding board of an acoustic guitar, you will get a sound similar in color[46] to the sound of that guitar being played. This can make using a tuning fork easier and more accurate than tuning to a sound that is a very different color (like a pitch pipe or electronic tuner). Some guitarists prefer to use a tuning fork.

Using a tuning fork

1. Hold the fork by the stem only, leaving the tines free to vibrate.
2. Rap the tines once against something that is hard enough to start them vibrating. (But try not to rap them on something that they will dent or mark; your knee is a good choice.)
3. Immediately (but without touching the tines) set the stem lightly on the body of the guitar. Tune the string to the sound the guitar makes.

Using a tuning fork well requires a little practice and is slightly cumbersome. It may be difficult for young players, and even experienced players won't want to bring along five or six different tuning forks. This brings us to the preferred methods for tuning guitars.

3.4.6 Intervals

As discussed above (p. 316), guitar players, like vocalists and wind players, don't have to use equal temperament. Many prefer instead to tune the guitar so that it sounds good in keys that are easy to play. One popular way to do this is to tune each string to the one below it, giving pure fourths between most open strings, and a (close to pure) major third between the second and third strings. (You don't need to know about fourths and thirds to tune your guitar, but if you want to know, please see Interval (Section 2.11).)

The advantage of this method is that the pure intervals give the guitar a very pleasing, resonant, in-tune sound on chords that have plenty of open strings, like E minor and G major. Tuning strings to other strings is also pretty easy once you've practiced a little.

The disadvantage is that, since you are not using equal temperament, some chords are going to sound more in tune than others. Experienced guitarists simply tweak the tuning by ear as they change keys (Section 2.10) (for example, one might adjust the third string to give a better E major chord when playing in A major or E major). You may also find that your guitar sounds slightly out of tune when playing with a piano.

[46] "Timbre: The Color of Music" <http://cnx.org/content/m11059/latest/>

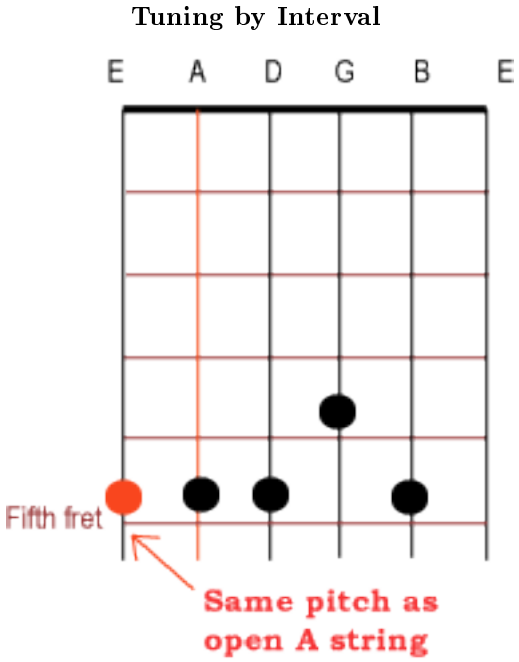

Figure 3.14: Each string is tuned to the string below it. The lower string is held at the correct fret, and the (open) higher string is tuned to it.

Tuning by Interval

1. Tune the 6th string (the low E string), using a tuning fork, keyboard, piano, pitchpipe, or whatever is handy.
2. To find an A, hold the 6th string down at the 5th fret. Tune the open A string (the 5th string) to this A.
3. Tune the open D string (the 4th string) to the D at the 5th fret of the 5th string.
4. Tune the open G string (the 3rd string) to the G at the 5th fret of the 4th string.
5. Tune the open B string (the 2nd string) to the B at the **4th fret** of the 3rd string. This is the only one that is not 5th fret.
6. Tune the open E string (the 1st string) to the E at the 5th fret of the 2nd string.
7. Check your tuning by playing a chord of only E's and B's, listening carefully to see if all the octaves are in tune. Make small adjustments, if needed.

Chord to Check Tuning

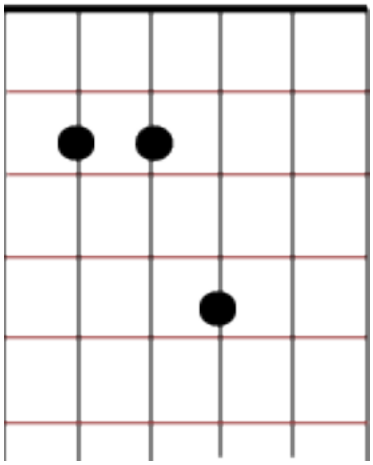

Figure 3.15: Check your tuning by playing a chord of E's and B's. Listen carefully to see that all the octaves are in tune with each other, and that the fourth/fifth intervals between the E's and B's also sound good. Retune if necessary.

Many experienced guitarists become so comfortable with hearing the pure fourths and third that they can tune simply by listening to the interval between the strings, rather than using the fifth-fret/open string unisons (p. 207).

3.4.7 Harmonics

Some advanced guitarists prefer to tune using string harmonics (p. 261), which cut out some of the string overtones (p. 254), leaving a clear, easy-to-hear pitch (Section 2.6). This is a little tricky to learn, but it gives a very accurate, resonant, pure-interval-based tuning.

Because it is very easy to hear the pitch of the high, clear string harmonics, this tuning method gives a very accurate, pleasing tuning that takes advantage of pure intervals (fourths) to give the instrument a more resonant, vibrant sound (because pure intervals support and resonate with each other better).

> NOTE: For those interested in tuning theory: As far as I can tell, this tuning, based on a series of pure fourths, is not an official tuning system like Pythagorean tuning[47], which is based on a series of pure fifths. Like the Pythagorean system, though, if all the intervals were in fact pure, the result would not add up to pure octaves between the two E strings. I believe that most of the (slight) "fudging" necessary takes place around the B string, which is tuned with the third rather than the fourth.

Harmonics are played by touching the string very lightly at the fret, rather than holding it down just below the fret. You must be comfortable with playing harmonics to use this tuning method; it is not recommended for beginners.

[47] "Tuning Systems" <http://cnx.org/content/m11639/latest/#p11a>

Tuning Using Harmonics

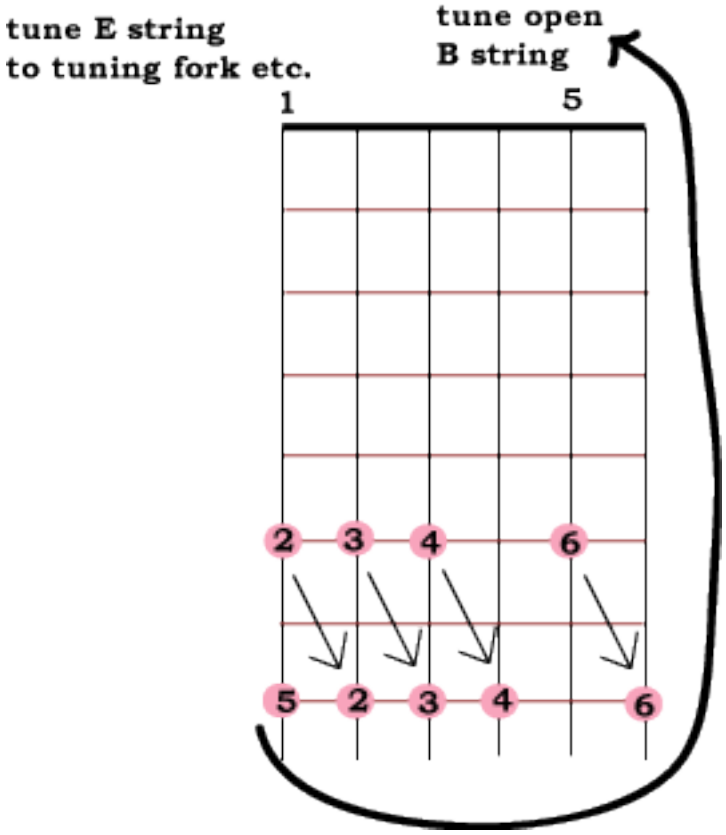

Figure 3.16

Tuning Using Harmonics

1. Tune the low E string using a tuning fork, keyboard, etc.
2. Tune the A string by matching the harmonic at the fifth fret of the 6th string to the harmonic at the 7th fret of the 5th string.
3. Tune the D string to the A string and the G string to the D string using the same procedure (matching the 7th fret harmonic of the higher string to the 5th fret harmonic of the lower string).
4. Tune the B string by matching the **open B string** to the harmonic at the 7th fret of the 6th string. Some guitarists match the harmonic at the 5th fret of the B string to the one at the 9th fret of the G string, but this is more difficult and also gives a less satisfactory tuning.
5. Tune the top E string to the B string using the 5th fret/7th fret harmonics.
6. Check the tuning using an E's and B's only chord (see above (Figure 3.15: Chord to Check Tuning), and adjust as necessary.

3.4.8 Other Popular Guitar Tunings

All of the above discussion assumes that you want a standard guitar tuning, but there are many other possible ways to tune a guitar. For example, **Slack key** tuning, popularized by Hawaiian guitarists, involves tuning some of the strings lower (or "slack", because they are looser when lower) than standard tuning. The resulting tuning often (but not always) gives a major chord (Section 2.15) when all of the open strings are played. For example, one popular slack key tuning involves lowering both E strings to D and lowering the A string to G. The result (DGDGBD) is a G major chord. Slack key tunings will usually sound best using pure[48] fifths and thirds, rather than equal temperament[49]. The major chord will be easy for most experienced guitarists to hear accurately, so many players will be able to do this tuning by ear.

Another popular tuning, found in styles as different as classical and rock guitar, is **D tuning**. This involves tuning the lowest string to D instead of E, which gives an unusually resonant sound when playing in the key of D. Tune the guitar as usual, then retune the lowest string using the open 4th string D. (Tune the 6th string to an octave below the 4th string.) Check your tuning using a chord of D's and A's.

Chord to Check D Tuning

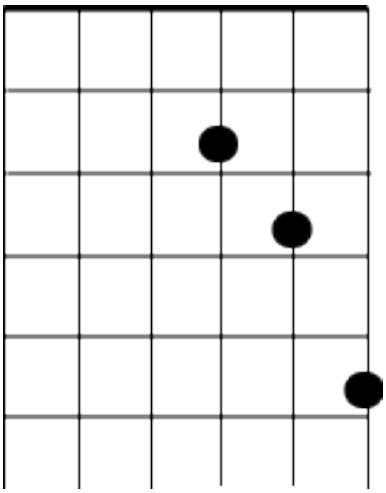

Figure 3.17

3.5 Reading a Chord Diagram[50]

A chord diagram shows you where to put your fingers to make a chord[51] on a fretted, stringed instrument. It is a simplified picture of the strings, frets, and fingers involved.

[48] "Tuning Systems": Section Pythagorean Intonation <http://cnx.org/content/m11639/latest/#s11>
[49] "Tuning Systems": Section Equal Temperament <http://cnx.org/content/m11639/latest/#s22>
[50] This content is available online at <http://cnx.org/content/m11892/1.1/>.
[51] "Harmony": Chords <http://cnx.org/content/m11654/latest/#l0b>

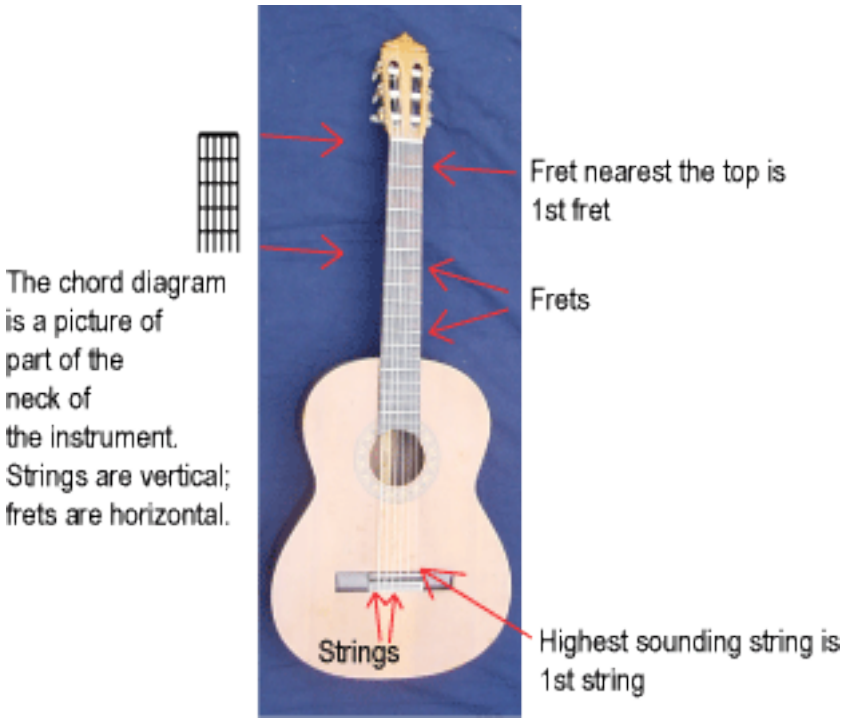

Figure 3.18

The instrument shown is a guitar, but chord diagrams for similar stringed instruments can be read in the same way. In the diagram, the strings are vertical (top to bottom). The highest-sounding string is on the right.

NOTE: The highest-sounding string is the first string. On a guitar, the lowest-sounding string is the sixth string.

The frets are horizontal (side-to-side). The fret nearest the tuning pegs is the first fret. If there is no number at the side of the diagram, then the highest fret shown in the diagram is the first fret.

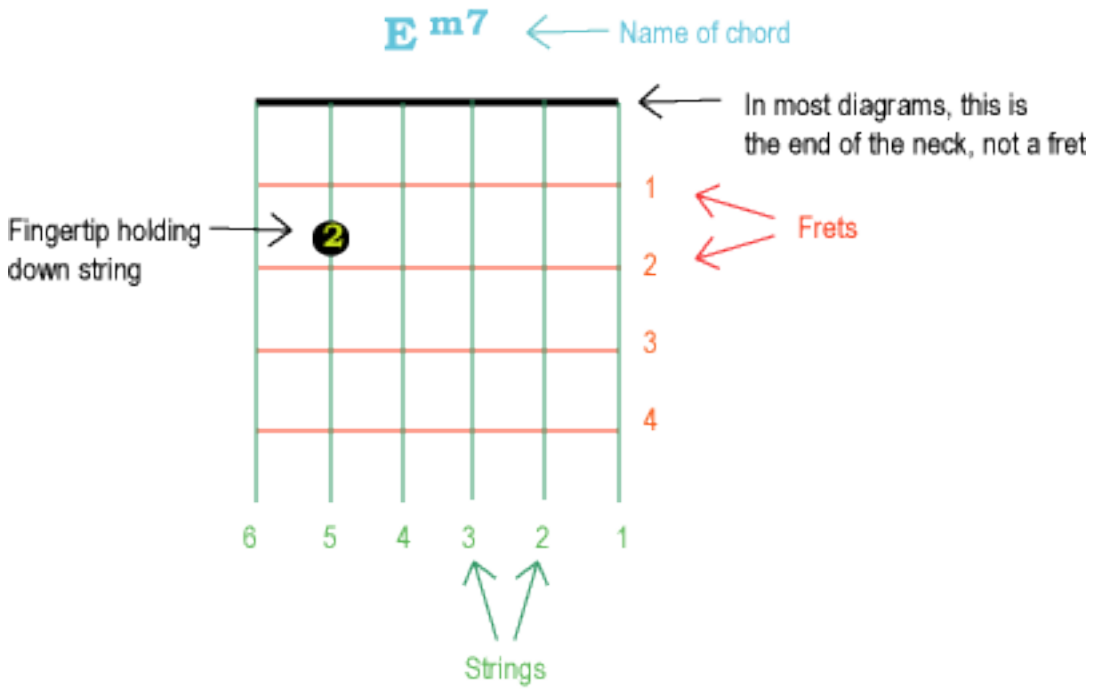

Figure 3.19: The black dot with the number "2" is the tip of the second finger, holding the string down (tightly). To get a good sound, the fingertip should be very close to the fret, but not touching it, as the dot is here.

Chord diagrams from different publishers may look a little different

- An "X" by or on a string means not to play it.
- An "0" by a string means to play it **open**, with no fingers holding it down anywhere.
- An arc from one dot to another indicates the side of a finger (not a fingertip!) holding down more than one string at the same time; but the arc does not have to be there. If the same finger number is on more than one string, the side of the finger must be used. These **bar chords** are the most difficult chords and require plenty of practice - don't get discouraged!
- A number at the side of the chord diagram means that the highest fret shown in the diagram is not the first fret.

Different Styles of Diagram

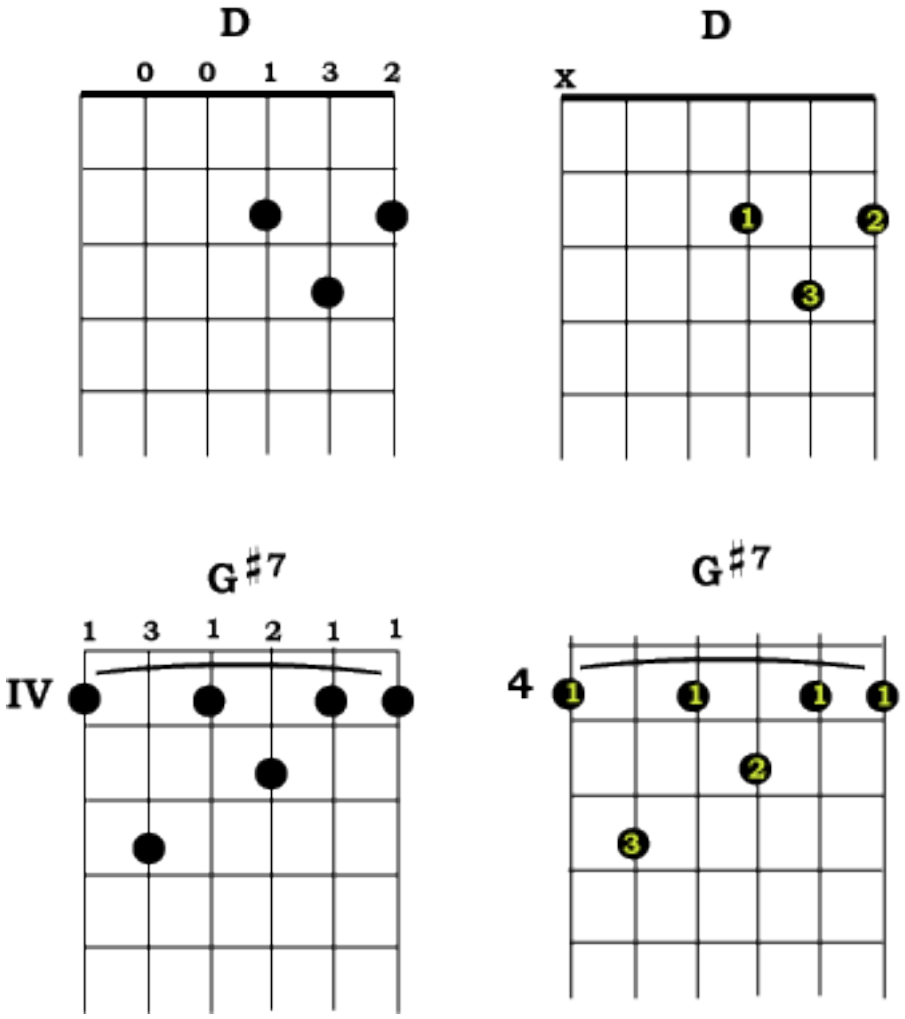

Figure 3.20: Both of the "D" chord diagrams mean the same thing: hold down the first string at the second fret with the second finger; the second string, third fret, third finger; third string, second fret, first finger; play the fourth and fifth strings open; and do not play the sixth string at all. The "G sharp seventh" chord diagrams both indicate a bar chord at the fourth fret.

The best way to practice reading chord diagrams is to get out your instrument, make the chords in the diagrams, and play them. Listen to see if they sound right. (Make sure your instrument is in tune and you are holding the strings down properly, or it will not sound good even if you have all the fingers in the right place.) Make sure you are using the correct fingers, even if it seems to you that there is an easier way to make the chord. The suggested fingerings are the ones that will make it easiest for you to change chords quickly and smoothly.

3.6 A Parents' Guide to Music Lessons[52]

3.6.1 When Should Children Start Music Lessons?

Introducing children to music, like introducing them to reading, should not wait for formal classes to start. Just as you read to your very young children, you should sing to them (whether you consider yourself a decent singer or not), dance with them, teach them singing games like "Ring Around the Rosy", and share with them the music that you like. Exposing them to classical music, using the many videos, books, and tapes available, can't hurt, either, but at a very young age they will be most engaged by what engages you. In some communities, there are parent/child group classes that introduce children to the basic concepts of music. To find out what's available in your area, check with any group that organizes extra-curricular activities for young children. This may be your local park district, YMCA, public library, music academy, community college, or local university. The emphasis at a very young age should be on how fun music is.

The ideal time to start formal music training can be anywhere from age two to age twelve, depending on what you want.

> NOTE: Motivated teenagers - i.e. teenagers who tell you that they really want to learn to play an instrument - are, of course, also very good candidates for beginning music lessons. But, the teenage years being what they are, this is usually not a good time for you to start insisting on lessons and practice if the teen is not interested.

If you want your child to begin before about age 6, it is likely (depending on the teachers available in your area) she will be encouraged to begin with the Suzuki method. Very young children are usually not developmentally ready to learn to read music, for the same reason that they are not yet ready to learn to read books. The Suzuki method is specifically designed to teach children from a very young age, by focusing on ear training[53] and memorization, and on the proper physical techniques for playing the instrument. Reading music notation[54] is introduced only as the student is ready for it. Of course, older students can benefit from the Suzuki approach, also. If your child has vision problems or simply responds to audial and physical approaches to learning better than he does to visual teaching methods, Suzuki may be best. Children who might be prone to performance anxiety[55] may thrive with Suzuki, also, as the method encourages frequent group performances and stresses cooperation over competition.

Violin[56] and piano[57] are by far the most common instruments offered using this method, but you may also be able to find Suzuki instruction in viola, cello, string bass[58], guitar (Section 3.1), harp, organ, recorder, flute[59], or voice. These instruments are all either playable by children who are not yet nearly adult-sized, or are available in small sizes or with adaptations for small players. Note that some teachers will start very young students using methods and approaches other than Suzuki. As long as the approach is appropriate to very young children, it is more important to find a good teacher than to use a particular method. Also note that starting an instrument at a very young age usually requires intense involvement by at least one parent. Your child may need you to sit in on most lessons and actively help with practice sessions.

Between the ages of six and ten, your child can begin any of the instruments mentioned above, with just about any teaching method; just be certain that both the instrument and the teacher are suited to younger children. If your child is determined to play a different instrument (saxophone[60], for example), beginning on a different instrument at an early age and switching later will not hurt the young instrumentalist, and may give her more experience and confidence reading and playing music than the student who does not begin until age ten. It is certainly not necessary to begin early, however, particularly if the child does not want

[52] This content is available online at <http://cnx.org/content/m11640/1.11/>.
[53] "Ear Training" <http://cnx.org/content/m12401/latest/>
[54] "The Staff" <http://cnx.org/content/m10880/latest/>
[55] "Stage Fright and the Young Instrumentalist" <http://cnx.org/content/m14437/latest/>
[56] "Introduction to the Violin and FAQ" <http://cnx.org/content/m13437/latest/>
[57] "Keyboard Instruments" <http://cnx.org/content/m14567/latest/#p11a>
[58] "The Double Bass" <http://cnx.org/content/m14624/latest/>
[59] "Flutes" <http://cnx.org/content/m12603/latest/>
[60] "Saxophones" <http://cnx.org/content/m12611/latest/>

to study a different instrument; the motivated student who begins at age ten will quickly catch up to those who began their musical training earlier.

Many instruments do not come in child sizes and are physically too much for a small child to handle. At about the age of ten, most children become big enough to begin playing most instruments. If you have been waiting to start your child on trumpet[61], clarinet[62], or trombone[63], for example, now is a good time to start. Most school band[64] and string programs begin at about this age. If you or your child is very determined on a particular instrument, you may want to begin lessons before school instruction begins, in order to ensure that she is not assigned a different instrument. However, if your child is either not highly motivated to practice or does not care greatly about instrument choice, it will be better for your child to cooperate with the director in taking up an instrument needed for a well-balanced ensemble. Beginner-ensemble instructors are experienced at matching students with instruments that they will be happy and successful with.

Remember, it's never too late to start music lessons. If you are an adult and wish you had had piano lessons as a child, find yourself a piano teacher! If your high school sophomore wishes he could be in the band, have him talk to the band director. Most will be happy to suggest an instrument (probably one that the band does not have enough of) and a teacher. Just a few months of lessons and practice will find most sixteen-year-olds playing at a level that is acceptable in most high school bands.

3.6.2 Does My Child Have Enough Talent for This?

The short answer to this question is "yes". All children can benefit from music instruction, and many of the children who enjoy it the most are not the ones who have enough talent to be the next Itzhak Perlman. Much research suggests that students who receive music instruction do better in their other classes, particularly math and reading.

If you still don't want to bother with music lessons unless your child shows some natural aptitude, consider the following questions:

- When your young child sings alone, is the tune accurate?
- Does your young child sing and/or dance with an accurate beat (Section 2.2.1: Beats and Measures) and/or with accurate rhythms[65]?
- When he sings with recordings, or with others, does he follow the contour[66] (the ups-and-downs) of the melody[67] correctly? Does he try to find correct pitches (Section 2.6), even if the song is being sung too high or low for his voice? Does he ever try to sing along with parts that are not the melody (a harmony[68] or bass line[69], for example, or instrumental part)?
- Does her play-time include singing and dancing even when an adult doesn't suggest it?
- Does he learn a song more quickly than the other children in his class? Does he still remember many songs a long time after learning them?

3.6.3 What Instrument is Right for My Child?

There are so many instruments to choose from, and so many reasons to choose one or the other. Here are some things to consider:

- **Age** - As mentioned above (p. 325), very young children have a more limited choice of instruments.

[61] "Trumpets and Cornets" <http://cnx.org/content/m12606/latest/>
[62] "Clarinets" <http://cnx.org/content/m12604/latest/>
[63] "Trombones" <http://cnx.org/content/m12602/latest/>
[64] "A Parent's Guide to School Band Programs" <http://cnx.org/content/m14266/latest/>
[65] "Rhythm" <http://cnx.org/content/m11646/latest/>
[66] "The Shape of a Melody" <http://cnx.org/content/m11832/latest/>
[67] "Melody" <http://cnx.org/content/m11647/latest/>
[68] "Harmony" <http://cnx.org/content/m11654/latest/>
[69] "Harmony": Accompaniment <http://cnx.org/content/m11654/latest/#l0c>

- **Size** - Larger people will find tuba[70] easier to play than will smaller people; string bass[71] requires quite a bit of hand strength. Also, consider the size of the instrument from a practical viewpoint. Is she going to have to walk to school with that big baritone sax case and a book bag, too? Are you going to be able to get the harp to wherever he needs to play it? Does your home have room for a piano?
- **Personality** - An outgoing child who is unhappy practicing piano by himself every day may love the camaraderie of band rehearsals. A shy child may be more comfortable playing cello than trumpet.
- **Instrumental preferences** - Many children do not have strong feelings about one instrument or another, but if your child insists she wants to learn guitar, it may be better to let her take guitar than to insist that she take up an orchestral instrument. A child who really wants to play a particular instrument is much more motivated to practice. If your child doesn't know what he wants to play, but you think it might make a big difference, try to find events (like the local orchestra's "young person's concert" or "instrument petting zoo time") where he can watch various instruments being played and hear the sounds they make.
- **Musical preferences** - If your child loves jazz, trumpet may be a better choice for her than flute. If he strongly resists being exposed to classical music, consider lessons in guitar, fiddle, or dulcimer. If your family is already involved in the local Renaissance festival, recorder may be a good place to start.
- **Your expectations and goals** - You and your child should make this decision together. Be honest with yourself, and forthright with your child, about what you want and expect. Is it very important to you that she learn classical music? Are you hoping the family can play string quartets together eventually? Can you not stand the sound of bagpipes? If you find yourself disagreeing strongly with your child, explain your reasons clearly and try to come up with a compromise if you can. For example, agree on a drum set in two years if he can learn piano well enough to convince you that he will be able to play the drums musically and not just make noise on them. (This is actually a very practical solution, since familiarity with a keyboard will help him play melody percussion.)
- **Local availability and opportunity** - Your community may or may not have an accordion teacher, steel drum ensemble, or Russian or Peruvian folk music club; but if it does, what a great opportunity! Or there may be more opportunities locally for a young string player, or your community may have a thriving band, jazz, or folk tradition. If the high school band program is bristling with clarinets and short on horns and the community youth orchestra has several star violin players but a weak viola section, your child may have a better chance to make the top band or the youth orchestra if she takes up horn or viola.
- **Cost** - A tight budget does not mean your child can't take up an instrument, but it may affect your choices. If cost is an issue, look through the want ads for a used instrument that is within your budget (but make sure to have a teacher, ensemble director, or other knowledgeable musician check it out before you buy it), or check with family and friends to see if you can borrow an instrument that is not being used much. Even new, some instruments (trumpet and clarinet, for example) cost much less than others. Also, consider what instrument your child could get free or low-cost instruction in. For example, is there a band or strings program at your public school? Most of these programs include a year of "beginners" instruction. Probably all you'll need to pay for are the instrument and an instruction book. If even that is a burden, talk to the band or strings director at the school; the school may have instruments available to borrow or rent for a very low fee. Some music clubs, charities, conservatories, or other organizations may also offer low-cost group lessons and/or free instrument rental to income-qualified students who participate in a certain ensemble. An amateur musician who is, say, dedicated to preserving a local folk tradition may also be willing to offer low-cost lessons to someone who is really interested.
- **Piano** - Probably more students take piano than any other instrument. There are a couple of reasons for this. A beginner can get a good tone and play in tune easily. (But be advised, it takes just as much work to become very accomplished on the piano as it does on French horn or oboe.) Piano is also a wonderful instrument to use to begin learning about music, because the basic theory and practice of

[70] "Tubas" <http://cnx.org/content/m12617/latest/>
[71] "The Double Bass" <http://cnx.org/content/m14624/latest/>

music are so easy to see on a keyboard. The student can see very clearly that scales follow certain predictable patterns and that intervals have a certain size. They become familiar with chords and harmonic structure in a way that is not as easily available on other instruments. A competent piano player can also play more than one part simultaneously, so that composers find keyboard[72] skills to be very useful. If you think music theory or composition may interest your child, or if you have no idea what instrument to start on (your child can always switch instruments later as she learns more about it), or if you want your child to have a few years of basic music instruction before he takes up his preferred instrument (some band directors reserve the most popular instruments for students who have already had some piano instruction), consider the piano.

For an introduction to just a few of the other instruments available, please see Classifying Musical Instruments[73], Orchestral Instruments[74], Keyboard Instruments[75], Guitars (Section 3.1), The Violin[76], Double Bass[77], Flutes[78], The Oboe and its Relatives[79], Clarinets[80], Bassoons[81], Saxophones[82], Trumpets and Cornets[83], The French Horn[84], Baritones and Euphoniums[85], Trombones[86], and Tubas[87].

3.6.4 Finding a Teacher

If you can, get teacher recommendations from others whose children who are taking music lessons. Find out what their teachers charge, how long and how often lessons are, and why they are happy with them. One parent may be happy with the teacher who is demanding and produces award-winning players; another may be happy with the low-key, unintimidating teacher who makes lessons and practice-time fun. What do you want? What will your child respond to?

If you can't get recommendations from friends, a local store that sells musical instruments often will keep a list of area teachers; many even offer lessons through the store. You can also try contacting the music director at the local high school or the music department at the local college. They may know some music teachers in the area. Also, college students, and even some older high school students, may offer lessons. These should cost quite a bit less than lessons from a professional, but be aware that the instruction may also not be at a professional level. Try to get specific recommendations from a director or professor who has worked with the student if you take this route.

When interviewing a prospective teacher, find out the practical stuff: cost, length of lessons, availability of lesson time slots, her education and experience, and so on. But also ask some questions that will help you decide if the teacher's philosophy and approach are right for your child. What method does he use, and why? What styles and types of music will your child be learning? What are the teacher's expectations concerning how much time your child will practice each week and how fast she will progress? There are no right or wrong answers to these questions; what you are looking for is someone whose approach and expectations make sense to you and to your child.

If your child doesn't seem to be responding well with a teacher, don't be afraid to share your concerns. Be as specific as possible concerning what doesn't seem to be working, and ask what can be done about it. The problem may be solved using a different method book, music that is more appealing to your child,

[72] "Keyboard Instruments" <http://cnx.org/content/m14567/latest/>
[73] "Classifying Musical Instruments" <http://cnx.org/content/m11896/latest/>
[74] "Orchestral Instruments" <http://cnx.org/content/m11897/latest/>
[75] "Keyboard Instruments" <http://cnx.org/content/m14567/latest/>
[76] "Introduction to the Violin and FAQ" <http://cnx.org/content/m13437/latest/>
[77] "The Double Bass" <http://cnx.org/content/m14624/latest/>
[78] "Flutes" <http://cnx.org/content/m12603/latest/>
[79] "The Oboe and its Relatives" <http://cnx.org/content/m12615/latest/>
[80] "Clarinets" <http://cnx.org/content/m12604/latest/>
[81] "Bassoons" <http://cnx.org/content/m12612/latest/>
[82] "Saxophones" <http://cnx.org/content/m12611/latest/>
[83] "Trumpets and Cornets" <http://cnx.org/content/m12606/latest/>
[84] "The French Horn" <http://cnx.org/content/m11617/latest/>
[85] "Baritones and Euphoniums" <http://cnx.org/content/m12650/latest/>
[86] "Trombones" <http://cnx.org/content/m12602/latest/>
[87] "Tubas" <http://cnx.org/content/m12617/latest/>

or more guidance from you during practice time. Be sure you allow a reasonable amount of time to work through bumpy spots and allow for learning plateaus and personality phases that your child may be going through. In general, switching teachers will slow your child's progress. But if your child seems to actively and specifically dislike the teacher, doesn't seem to understand what or how to practice, feels unchallenged, or fears or dreads going to lessons, a different teacher may suit his needs or personality better. Don't be afraid to try a different teacher if the first one you choose is truly not working out.

3.6.5 Finding an Instrument

This section comes after "finding a teacher" because it is often a good idea to get in touch with your child's prospective teacher before you get an instrument. The teacher may have definite ideas about what is an acceptable student instrument, will probably know the best sources of reasonable-quality/reasonable-price instruments, may have brand recommendations, and in any case should be able to help you decide whether to purchase a particular instrument. This includes band and orchestra directors and other ensemble instructors. If money is an issue, don't hesitate to let the instructor know. The school may be able to let you borrow or rent an instrument at a low cost, or the instructor may be able to help you locate a low-price used instrument.

If your teacher does not recommend a particular place to look for an instrument, good sources of instruments include your local music shops, local want-ads, and national music companies and other reputable sellers who are willing both to ship instruments to you and to take back instruments that are not acceptable. Both local and national music stores will generally try very hard to sell you an instrument that you will be happy with, so that you will return to them for music stands, mutes, repairs, and other extras. Let the salesperson know you need a student-quality instrument, and of course let them know if a small-size instrument is needed.

> NOTE: Student-quality instruments are usually reasonably priced (although some instruments are simply more expensive to make than others), and this is really all a beginner needs. Even if your child does end up having great interest and ability, it will probably be a few years before she needs a higher-quality instrument. By then, she will probably also have very definite ideas about what instrument she wants.

Mention any other requirements your teacher has. Check warranties and return policies carefully. Ask if there is any way for you to take the instrument to be okayed by your child's teacher before final purchase, particularly if you are buying a used instrument through a want ad. If they can, ask the salesperson or previous owner to play it for you. Consider whether renting an instrument for a few months would make sense. This can be a good way to put off purchasing the instrument until you are certain of your child's interest, and your child will be able to test-play instruments before you purchase one.

> NOTE: Buying low-cost instruments at stores that do not specialize in music can be an expensive mistake. Some of these instruments are of such poor materials and workmanship that it is very difficult to keep them in working order; your repair bills may end up costing more than a decent instrument would have cost.

Once you have purchased the instrument, make sure you follow the care instructions that come with it, or find out from the teacher how to care properly for it. A musical instrument, like a car, will be a source of constant frustration and repair bills if it is not kept in good condition.

3.6.6 What You Should Do Once Lessons Have Begun

Your child's teacher should clarify things like how often and how long your child should practice, as well as practical things like payment schedules and no-show policies. If not, ask! (You may find some useful suggestions in A Guide to Great Home Music Practice[88].)

[88] "A Guide to Great Home Music Practice" <http://cnx.org/content/m11883/latest/>

If you are considering Suzuki lessons, or starting a very young child, be aware that you will be expected to actively participate in your child's daily practices. No musical knowledge is required on your part, just time. Once children are a little older, most methods only require you to make sure that your child does practice. You are the best judge of how to do this; whether incentives, reminders, or regular schedules are the way to go varies from one child to the next. Remember that keeping to the teacher's suggested practice schedule is very important. Nobody can learn to play an instrument well if they play only once or twice a week; if this is what is happening, there is not much the teacher will be able to do to help your child improve.

You don't need to complement every sound that comes from your child's instrument, but do try to be encouraging, especially when you do hear something you like. It is the teacher's job, not yours, to listen critically. Be aware that many children who happily accept helpful criticism from a teacher may expect parents (even those knowledgeable about music) to take an encouraging rather than a critical role, and will not respond well to suggestions from you.

Don't be afraid to discuss potential problems with the teacher, especially if your child can't or won't. Most children will have some resistance to practicing and some "performance anxiety" about lessons. But it is not normal for practice time to be miserable or for your child to be terrified of the teacher; if this is the case, insist on some changes or find a different teacher or even a different instrument. Music lessons can and should be an introduction to a lifelong enjoyment of music.

Index of Keywords and Terms

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Connexions's modular, interactive courses are in use worldwide by universities, community colleges, K-12 schools, distance learners, and lifelong learners. Connexions materials are in many languages, including English, Spanish, Chinese, Japanese, Italian, Vietnamese, French, Portuguese, and Thai. Connexions is part of an exciting new information distribution system that allows for **Print on Demand Books**. Connexions has partnered with innovative on-demand publisher QOOP to accelerate the delivery of printed course materials and textbooks into classrooms worldwide at lower prices than traditional academic publishers.