Basic Music Theory for Adult Beginner-Level Piano Players

With emphasis on half steps and whole steps

by Lawrence Martin
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Cover: First four measures of Minuet in G, from the Clavier Book of Anna Magdalena Bach. For centuries this famous piece was assumed to be by Johann Sebastian Bach, but authorship is now attributed to Christian Petzold (1677-1733), a Bach contemporary. For more on this piece, see Appendix C.

Acknowledgments
I would like to thank the following people for their meticulous review of this syllabus: Ruth Martin, Glenn Perry, Rosamond van der Linde, and Preston Davis. They have helped catch typos, mistakes, and confusing passages in earlier drafts. My goal is to make sure everything herein is clear to the beginner; if not, please let me know and I will make any necessary changes.
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Basic Music Theory for Adult Beginner-Level Piano Players
With emphasis on half steps and whole steps

Introduction

Music theory is a huge subject, one whose study can become quite complex. Basic Music Theory for Adult Beginner-Level Piano Players covers the subject selectively. The emphasis, as stated in the subtitle, is on the one aspect I believe MOST USEFUL for adults who wish to review some basic music theory: half steps and whole steps. (Some sources use the term semitones for whole steps and half tones for half steps; in this syllabus I will stick with half steps and whole steps.)

This syllabus does not cover some other important aspects of basic music theory, such as note durations, rhythm and time signatures. After the appendices you will find a list of Additional Recommended Resources related to basic music theory, for those who wish to delve further.

In studying music theory, I have been surprised and confounded that most written materials on the subject (books, monographs, websites) tend to under-emphasize the concept of half steps and whole steps. It’s surprising, because the simple method of counting half and whole steps can enhance understanding of music scales, chords and intervals, as well as “music keys” and “modes.”

I am a beginner-level player, not a trained pianist. This might be considered the ultimate ‘chutzpah’, to write a music theory syllabus when not a true musician. However, it’s not as crazy as it sounds. First, I am a professional writer, with 20 books to date, plus two other syllabuses on music theory, one for the ukulele and one for the Native American flute. Both are free and available online.


Second, as a beginner-level piano player and student of music theory, I recognize the confusion often generated by experts who write on the subject. I think the confusion arises because experts often don’t realize what beginners don’t know, and they don’t go to proper lengths to explain the subject. A good example of this is in the area of music modes. (See Appendix B for my explanation of modes.) Going to “proper lengths” in explaining music theory to beginner-level players should include repetition, questions with answers, and audio examples, and I have incorporated these elements into each section of the syllabus.

In summary, this syllabus is for a specific audience, adults who consider themselves at the beginner to near-intermediate level and seek a better understanding of music theory, specifically scales, chords, intervals, keys and modes. If you’re not sure what level you’re at, check out Appendix E. Of course, players of any skill level are welcome to peruse this syllabus; just keep in mind that it’s basic theory, stuff an advanced player probably knows backwards and forwards.
How To Use This Syllabus

This syllabus is for the beginner-level adult piano player with an interest in music theory. All the figures in this Syllabus are from free internet sources. In particular, I highly recommend www.basicmusictheory.com, for its excellent keyboard and clef figures of all the common chords and scales. The keyboard figures from this website have the design of letters in yellow boxes and numbers in red circles, such as the one below.

Appendix E gives several sources that explain the various piano-playing levels. I emphasize “beginner-level” because this Syllabus is really basic information, albeit in a format that may be new to the reader.

You can start from the beginning and read through the Sections in order, or skip around. You may already know much of what’s in here, but not seen it actually explained, in writing, or viewed any of the videos linked throughout the Syllabus. My goal is to explain every topic clearly, using piano and clef diagrams and, in various places, video from the internet.

This figure, found throughout the Syllabus, indicates Youtube links that demonstrate some scale, interval or musical passage, or give a concise video lecture. If you have a good understanding of basic theory but want to hear musical examples, or hear brief lectures on a particular topic, skip around to this symbol and click on the links.

Another approach, instead of reading the sections in order or viewing all the videos, is to take the multiple-choice quizzes at the end of each Section. If the questions seem simple, the answers readily apparent, you probably don’t need that Section.

Whatever approach you use, it’s good that you’re interested. That interest should make you a better player.

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November, 2019
The Villages, FL
Section 1: Half Steps and Whole Steps

Here is the middle section of the piano keyboard, with its series of white and black keys.

The piano is tuned based on sound frequencies of notes that have evolved over the centuries, in the Western tradition (some Eastern music has different notes and won’t be discussed here).

Below is the C chromatic scale, which includes every key between one C and the next higher C. That’s 13 keys in all: 8 white keys (including both Cs), and five black keys.

Click link below for demonstration of chromatic scale
https://www.youtube.com/watch?v=sr2rXe9Qu4A
Each of these notes has a specific sound frequency when struck, and this frequency is universal across all standard pianos. Middle C (the fourth C key from left on a standard 88-key piano keyboard, sometimes referred to as C4) is 261.6 hz, which means that when you strike middle C, a sound wave is generated that causes the air to vibrate back and forth 261.6 times a second. When you strike A above middle C, the sound wave generated is 440 hz.

The difference between any two adjacent keys, including all the black and white keys, is a half step. The difference between two keys when there is another key in between is a whole step.

Thus, for example, C to C# is a half step, C# to D is a half step, E to F is a half step, B to C is a half step, etc. C to D is a whole step, as are E to F#, G to A, and A# to C, etc.

If you look at the actual frequencies of each piano key, starting from middle C to the next higher C, you’ll see that notes a half step apart have about half the frequency difference as do notes a whole step apart. (The note frequencies are from https://www.seventhstring.com/resources/notefrequencies.html.)

<table>
<thead>
<tr>
<th>Start middle C --&gt;</th>
<th>C</th>
<th>C#</th>
<th>D</th>
<th>D#</th>
<th>E</th>
<th>F</th>
<th>F#</th>
<th>G</th>
<th>G#</th>
<th>A</th>
<th>A#</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hz</td>
<td>261.6</td>
<td>277.2</td>
<td>293.7</td>
<td>311.1</td>
<td>329.6</td>
<td>349.2</td>
<td>370.0</td>
<td>392.0</td>
<td>415.3</td>
<td>440.0</td>
<td>466.2</td>
<td>493.9</td>
<td>523.3</td>
</tr>
<tr>
<td>HZ difference to next higher note</td>
<td>15.6</td>
<td>16.5</td>
<td>17.4</td>
<td>18.5</td>
<td>19.6</td>
<td>20.8</td>
<td>22</td>
<td>23.3</td>
<td>24.7</td>
<td>26.2</td>
<td>27.7</td>
<td>29.4</td>
<td></td>
</tr>
</tbody>
</table>

Thus:
- C to D (whole step) difference = 42.1 hz, but from E to F (half step) difference = 19.6 hz
- E to F# (whole step) = 40.4 hz, but (again) from E to F (half step) = 19.6 hz
- A# to C (whole step) = 57.1 hz, but from B to C (half step) = 29.4 hz.

So the concept of half steps and whole steps is rooted in simple sound wave physics. Half steps have about half the frequency span as do whole steps. Playing these notes on the keyboard will quickly demonstrate the aural difference between half steps and whole steps.

Now let’s look at the C major scale, starting from one C to the next C. It has no black keys, so the scale is simply: C-D-E-F-G-A-B-C.
Note that all the adjacent white keys of the C major scale are a whole step apart except for E to F and B to C, which are a half step apart. This is visually apparent. In the C major scale, the white keys a whole step apart have a black key between them. The white keys that are a half step apart (E-F and B-C) do not have a black key between them.

Now try to visualize the keyboard in your mind, and while doing so write down the sequence of whole and half steps for the C major scale.

You should be able to write down the following sequence:

```
C  --whole
D  --whole
E  --half
F  --whole
G  --whole
A  --whole
B  --half
C
```

Writing down this C major scale – simply by visualizing the keyboard without actually looking at it – will help lay the foundation for the following sections on scales, chords, intervals, musical keys, and modes.
TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. Middle C on a standard 88-key keyboard is:
   a. C1
   b. C2
   c. C3
   d. C4

2. Based on the pattern of whole and half steps for a major scale, the number of *half steps* from one C to the next higher C is:
   a. one
   b. two
   c. three
   d. four

3. Based on the pattern of whole and half steps for a major scale, the number of *whole steps* from one C to the next higher C is:
   a. three
   b. four
   c. five
   d. six

4. In the C chromatic scale, the number of half steps from C to the next higher C is:
   a. eight
   b. ten
   c. eleven
   d. twelve

5. A half step in the C major scale occurs between:
   a. C and C#
   b. B and C
   c. E and F#
   d. D and E
Section 2: Music Scales – Definition of Major and Minor Scales

The C major scale, shown above, has the following series of whole (w) steps and half (h) steps.

w-w-h-w-w-h

This sequence of whole and half steps is the pattern for all major scales. Conversely, any series of 8 notes with this whole step-half step sequence is a major scale. It doesn’t matter if you start on D, E, F, G#, Bb or any other key, black or white. Proceed with this exact sequence of whole and half steps and you will be playing the major scale for that starting note.

Go to the keyboard, or if one is not immediately available, bring up a simulated keyboard from the internet. Here is one I recommend that does not require any downloading (see screen shot): https://virtualpiano.net/

Start on D and play the above sequence of whole and half steps; you will be playing the D major scale. Any black keys? Let’s see.
Demo of the D major scale:
https://www.youtube.com/watch?v=kHX3sUohaCU

Starting on D, the first step is a whole step, so we go from D to E
The next step is a whole step so we can’t go from E to F, since that would only be a half step;
instead, we have to go from E to F#.
The next step is a half step so it’s F# to G
The next step is a whole step so it’s G to A
The next step is a whole step so it’s A to B
The next step is a whole step so it’s B to C#
The next step is a half step so its C# to D
Thus we have the **D Major Scale**:

```
D – E – F# – G – A – B – C# – D
w w h w w w h
```

Here is another major scale, starting on the F key. Again, the whole-step, half-step sequence has to be: w-w-h-w-w-h

![F major scale](image)

Demo of the F major scale:
https://www.youtube.com/watch?v=UhXgnKoixdc

Starting on F, we get:

```
F – G – A – Bb – C – D – E – F
w w h w w w h
```

As you can see, B flat is necessary to preserve the major scale pattern of whole and half steps.
Thus the F major scale has a single Bb. It is the only major scale with a flat that doesn’t start on a flatted note (as do Bb, Eb, Ab, Db, Gb and Cb).
In the keyboard diagrams above, you’ll note that each black key has two names, one flat and one sharp. These notes are *enharmonic*, a term we’ll come upon again in discussing intervals and musical keys. It just means that the same note, interval or key can be named two different ways; the only thing different is the name or the spelling.

Referring to the F major scale, why isn’t the note after A called A#? Because in any sequence of notes of a scale, or notes of a chord for that matter, the convention is to never use the same letter twice. Thus it has to be Bb and not A#.

**Minor Scales**
A minor scale has a different sequence of half steps and whole steps than does a major scale. Let’s start with the A minor scale, which has no sharps or flats. Go to the keyboard (or a simulated one on the internet) and play the A minor scale: A - B - C - D - E - F - G - A.

![A minor scale diagram](https://www.basicmusictheory.com/images/scale/a-minor.png)

**Demo of the A minor scale:**
[https://www.youtube.com/watch?v=DEEqLoMasxs](https://www.youtube.com/watch?v=DEEqLoMasxs)

Now, figure out the sequence of half steps and whole steps you’ve just played.
A  
whole step
B  
half step
C  
whole step
D  
whole step
E  
half step
F  
whole step
G  
whole step
A
This sequence of half steps and whole steps for the A minor scale also defines the minor scale for all other starting notes:

\[ w - h - w - w - h - w - w \]

**Confusion Alert.** There are actually three types of minor scales. The above sequence defines the natural minor scale. The other two types are harmonic minor and melodic minor, which have a slightly different sequence of whole and half steps, and are discussed at the end of this section. When there is no adjective used before “minor scale,” as in the keyboard diagram below, the scale is taken to mean the natural minor, as shown in the above figure for the A minor scale.

Using the natural minor whole step-half step pattern, we can now figure out any minor scale. Here is the C natural minor scale.

![C minor scale diagram]

**Demo of C minor scales (natural, harmonic and melodic)**

https://www.youtube.com/watch?v=RWkNL176M2E

C  whole step
D  half step
Eb whole step
F  whole step
G  half step
Ab whole step
Bb whole step
C
The C minor scale has three flat notes: Eb, Ab and Bb. These flat notes are necessary to adhere to the whole-step half-step pattern that defines the natural minor scale. Note that the sequence requires going from D to Eb, and not to D#. This same Eb black key would be labeled D# in another scale (e.g., the A major scale), but here it is Eb. Why? Again, because you cannot use the same letter twice in defining any scale or chord.

A large chunk of western music is written in either a major or minor scale. Other 8-note scales (including repeat of the root note) that don’t adhere to the major or minor sequence of whole and half steps are called “modes,” such as the Mixolydian mode. (Modes are discussed briefly in the next chapter, and more in depth in Appendix B.)

***

To summarize, major scales have one series of whole and half steps, and minor scales have a different series of whole and half steps. You can memorize the patterns, or, alternatively, figure them out in your head, by visualizing the keyboard and counting out the white keys in either the C major scale (from C to next C) or the A minor scale (from A to next A).

One way to quickly recall the major scale sequence is to remember that it has two identical patterns of w and h, joined by a whole step.

```
w-w-h-w-w-h
```

For the first w-w-h, you know C to D is a whole step (visualize it) and D to E is a whole step (visualize it) and E to F is a half step (ditto). And, to end with w-w-h, you have G to A, A to B, and B to C. The middle whole step is F to G.

For the natural minor scale, the sequence w-h-w repeats, followed by a whole step.

```
w-h-w-w-h-w
```

For the first w-h-w, you know A to B is a whole step, B to C is a half step, and C to D is a whole step. The next sequence is the same w-h-w pattern: D to E is a whole step, E to F a half step and F to G is a whole step. The scale ends with G to A, a whole step.

This Youtube link analyzes several examples of music in the natural minor scale
https://www.youtube.com/watch?v=PbH3ifEvBTs
Harmonic Minor and Melodic Minor Scales

The two other minor scales, called the harmonic minor and melodic minor, are slight variations of the natural minor scale.

The harmonic minor scale sharp the 7th note of the natural minor scale. Its pattern of whole and half steps is thus \textbf{w-h-w-h-w\frac{1}{2}-h}.

![A harmonic minor scale](https://example.com/harmonic_minor.png)

Demo of the A harmonic minor scale

[https://www.youtube.com/watch?v=xZttOW2jd7U](https://www.youtube.com/watch?v=xZttOW2jd7U)

The harmonic minor is of some importance to beginning piano players, because a lot of music written in the “minor scale” is actually in the harmonic minor. That is, the key signature will show a minor key, but the 7th note will be raised a half step. This creates what in music theory is called a “leading tone.” A leading tone is the 7th note of a scale one-half step below the octave. It wants resolution to the octave, and is said to be more satisfying than a 7th note a full-step below the octave.

The 7th note of A natural minor is G, which is a full step below the next A, and so is not a leading tone. G# in the natural minor scale is only a half step below A, so it is a leading tone, and therefore is more often used in music written in the “G minor” scale. This aspect will be discussed further in the section on chords.

Melodic minor scales raise both the 6th and 7th notes one half step when ascending, but when descending, the 6th and 7th notes are flatted, same as the natural minor scale. However, this pattern is not always followed. In some jazz music, for example, the 6th and 7th notes stay flatted when descending. Either way, the melodic minor scale is of more interest to composers than beginning piano players, so it will not be discussed further.
This 14-minute video provides an excellent discussion of differences between natural minor, harmonic minor, and melodic minor scales
https://www.youtube.com/watch?v=Q7WqKpD7w4Q&t=14s

TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer. Ideally, try to figure out the answers by playing notes on the keyboard.

1. The series of whole and half steps for the E major scale is:
   a. w-w-h-w-w-h
   b. w-h-w-w-h-w
   c. w-h-w-h-w-w
   d. w-h-w-w-h-w

2. The series of whole and half steps for the E (natural) minor scale is:
   a. w-w-h-w-w-h
   b. w-w-h-w-h-w
   c. w-h-w-w-h-w
   d. w-h-w-h-w-w

3. Based on the series of whole and half steps that define the major scale, how many sharps are in the A major scale?
   a. one
   b. two
   c. three
   d. four
4. Based on the series of whole and half steps that define the minor scale, how many flats are in the C minor scale?
   a. one
   b. two
   c. three
   d. four

5. In the F minor scale, what is the first occurrence of a half step?
   a. F to Bb
   b. Gb to G
   c. G to Ab
   d. A to Bb
Section 3: Music Scales – Relation of Major to Minor

Piano scales are simply a series of black and white piano keys (or only white piano keys for C major and A minor). The sequences of sharps and flats for each scale are always indicated in the treble and bass clefs, as shown below (figure is from https://www.piano-keyboard-guide.com/key-signatures.html).

This number of sharps and flats defines the “key signature” for that scale. The key signature will have either no sharps or flats (indicating C major or A minor), or show one or more sharps or one of more flats (no mixing of sharps and flats).

Note that for every major scale, there is an associated minor scale, with the same number and position of sharps and flats. The associated minor scale is called the relative minor of the major scale. Thus the relative minor scale of the C major scale is A minor; both have only white keys and no sharps or flats.

The C major scale starts on C and has this series of whole and half steps: w-w-h-w-w-h

The A minor scale starts on A and has this series of whole and half steps. w-h-w-h-w-w

The relative minor of the G major scale is E minor; both have only one sharp in their key signature, the F#. The relative minor scale of F major is D minor; both have only one flat in their key signature, the B flat. The relative minor scale of D major is B minor; both have two sharps in their key signature.
There are two ways to quickly determine the relative minor scale without having to memorize anything. One is to just count down 3 half steps from the tonic (first) note of the major scale; that piano key will be the tonic note of the relative minor scale. The other method is to count up to the 6th note of the major scale; that piano key will also be the tonic of the minor scale.

For example, 3 half steps down from C in the C major scale is A, so A minor is the relative minor of C major. The 6th note of the C major scale is also A; this is shown in the following figure from http://www.masakiokamoto.com/tag/music-theory-2/page/5/

The next two examples show the piano keyboard for a major scale and its relative minor.

- Three half steps down from D in the D major scale is B; B minor is the relative minor of D major. B is also the 6th note up from D. The key signature for both scales is the same: an F# and a C#.
Three half steps down from F in the F major scale is D; D minor is the relative minor of F major. D is also the 6th note up from F. The key signature for both scales is the same: a Bb.

A device familiar to musicians, known as the Circle of Fifths, shows the relationships between all the major and relative minor keys. This Circle, pictured below, is discussed in Appendix A.

https://commons.wikimedia.org/w/index.php?curid=4463183
TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. The relative minor of the Bb major scale is:
   a. D minor
   b. G minor
   c. E minor
   d. F minor

2. Three sharps in the key signature defines which pair of scales?
   a. A major and F# minor
   b. F major and D minor
   c. B major and G# minor
   d. D major and B minor

3. As sharps are added to the key signature, the sequence is always (see Circle of Fifths):
   a. C#, F#, D#, A#, G#
   b. A#, B#, C#, D#, E#
   c. C#, D#, E#, F#, G#
   d. F#, C#, G#, D#, A#

4. As flats are added to the key signature, the sequence is always (see Circle of Fifths):
   a. Bb, Eb, Ab, Db, Gb
   b. Ab, Bb, Cb, Db, Eb
   c. Cb, Db, Eb, Fb, Gb
   d. Fb, Cb, Gb, Db, Ab

5. The relative minor scale of E major is:
   a. C minor
   b. C# minor
   c. D minor
   d. D# minor
Section 4: More on Scales and Modes

By now you should be familiar with the definition of major and minor scales. These make up the vast bulk of popular and classical music, but there are many other scales, and words to describe them. And there’s the rub. Books and websites and blogs about music theory can easily confuse the beginner, because terms like “scale,” “mode,” “diatonic,” and “pentatonic” are often used without crystal-clear definition. This section can be skipped if you have a good understanding of these terms, but if not, I recommend reviewing it before proceeding.

The building blocks of all scales are found in the 12 notes of the chromatic scale. Two examples of the chromatic scale are shown below, starting on C and on D. All chromatic scales play the same 12 notes, the only difference being the sequence based on the starting note.

All western music scales (shorter than the chromatic scale) use some sequence of these 12 notes, typically 5, 6 or 7. The major and natural minor scales are two different 7-note scales.

Confusion Alert. When we say the scale is 7 notes, we mean 7 different notes, so don’t be confused when the demonstrated scale contains 8 notes; in a 7-note scale the 8th note is always a repeat of the first or root note.

The major scale sequence is the pattern of half steps and whole steps obtained when you start on C, and play just the white notes up to the next C.

\[ w - w - h - w - w - w - h \]

The minor scale sequence is the pattern of half steps and whole steps obtained when you start on A, and play just the white notes up to the next A.

\[ w - h - w - w - h - w - w \]

But what if you start on D, E, F, G, or B, and play the 8 white keys, starting with each letter? Those sequences are scales also, but with a different pattern of half and whole steps than the major and natural minor scales. For no good, rational reason, these 5 other whole-step, half-step patterns are commonly referred to as modes and not scales. The terminology is thus not consistent, which is an endless source of confusion for beginners. To make matters worse, some
explanations of modes dwell on the ancient or medieval definitions, which are different from how they are defined today.

Below is a table with all 7 modes or scales. In this table W = whole step, h = half step. The Ionian mode is the same as the major scale, the Aeolian mode is the same as the natural minor scale. For a more in depth discussion of modes, see Appendix B.

<table>
<thead>
<tr>
<th>MODE</th>
<th>SEQUENCE OF NOTES</th>
<th>STEPS</th>
<th>Another name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ionian</td>
<td>C D E F G A B C</td>
<td>W-W-h-W-W-h</td>
<td>Major scale</td>
</tr>
<tr>
<td>Dorian</td>
<td>D E F G A B C D</td>
<td>W-h-W-W-h-W</td>
<td></td>
</tr>
<tr>
<td>Phrygian</td>
<td>E F G A B C D E</td>
<td>h-W-W-W-h-W-W</td>
<td></td>
</tr>
<tr>
<td>Lydian</td>
<td>F G A B C D E F</td>
<td>W-W-W-h-W-W-h</td>
<td></td>
</tr>
<tr>
<td>Mixolydian</td>
<td>G A B C D E F G</td>
<td>W-W-h-W-W-h-W</td>
<td></td>
</tr>
<tr>
<td>Aeolian</td>
<td>A B C D E F G A</td>
<td>W-h-W-h-W-h-W</td>
<td>Natural minor scale</td>
</tr>
<tr>
<td>Locrian</td>
<td>B C D E F G A B</td>
<td>h-W-W-h-W-W-W</td>
<td></td>
</tr>
</tbody>
</table>

**Diatonic Scales**

“Diatonic” is a general term for any 7-note scale that includes five whole steps and two half steps in each octave (the 7 notes plus a repeat of the root note). As part of the definition, the two half steps are separated from each other by either two or three whole steps, depending on their position in the scale. All of the modes above are diatonic scales. Note that all diatonic scales are also heptatonic, i.e., they contain 7 notes, not counting repeat of the root note. However, not all heptatonic scales are diatonic. A 7-note scale that went from C to F# would not be diatonic.

**Non-diatonic scales**

What is not diatonic? The most common non-diatonic scales are the pentatonic or 5-note scales, of which there are many. The two types we most often encounter are the major and minor pentatonic scale. They are derived from the diatonic scale.

The major pentatonic scale consists of the 1st, 2nd, 3rd, 5th, and 6th notes of a major scale. Thus the 4th and 7th notes are omitted. The C major scale is C – D – E – F – G – A – B. The C major pentatonic scale is C – D – E – G – A.
The minor pentatonic scale consists of the 1st, 3rd, 4th, 5th and 7th notes of the natural minor scale. Thus the 2nd and 6th notes are omitted. The A minor pentatonic scale is A – C – D – E – G.

Pentatonic scales are very common in folk and country music, and in jazz. Also, most commercially-available Native American flutes (both 5-hole and 6-hole types) are designed to play music in the minor pentatonic scale. A brief review of this scale for the Native American flute is at https://www.flutopedia.com/int3_penta_minor.htm.

Overview and demonstration of major and minor pentatonic scales. https://www.youtube.com/watch?v=71dDH_Q4Bjg

Demo of songs using just the pentatonic scale https://www.youtube.com/watch?v=fdi-93yEcGs

***

More on the Leading Tone
As previously stated, the leading tone is one half-step below the octave; it gets the name from the fact that it wants to resolve to the octave. In a major scale, it would be the 7th degree or 7th note of the scale, which is always one-half step below the octave. Something in our brain wants resolution when we hear this note.

Go to the piano and play any major scale, and stop after the 7th note. For example, in F major (see below) stop after E. Note how you want it to resolve, to go to the F. Any music in F major that stopped on E would seem unfinished, unsatisfying. In the key of F major, shown below, E is a leading tone.
Leading tone videos
2-minutes:  https://www.youtube.com/watch?v=m85qyA4Xekw
4.5 minutes:  https://www.youtube.com/watch?v=gM01663tNuE

***

So to recap, a diatonic scale has 7 notes; when you add in a repeat of the first note, the resulting octave has 5 whole steps and 2 half-steps. The half steps are separated by either 2 or 3 whole steps. The whole-half step pattern of diatonic scale obtained when you start on C and play only white keys up to the next C is a major scale. The whole-half step pattern of diatonic scale obtained when you start on A and play only white keys up to the next A is a natural minor scale.

A pentatonic scale is 5 notes derived from either the major scale or the minor scale, as defined above.

Mode is but another name for a diatonic scale, and includes the major and minor scales, plus 5 others: Dorian, Phrygian, Lydian, Mixolydian, and Locrian. Each of the 7 modes has a different pattern of half and whole steps. The specific pattern can be quickly discerned by playing 8 consecutive notes using only white keys. If you start on C you will play Ionian mode, start on D it will be Dorian mode, etc. (see the table of modes in this Section). The whole step, half step pattern obtained in this manner may be applied to any note of the chromatic scale. Given that there are 12 notes in an octave, and 7 different modes, that comes to 84 different scales!

Confusion Alert. Irrespective of this modern definition of “mode,” in common parlance the Ionian and Aeolian modes are commonly referred to as the major and natural minor scale, respectively, leaving the term “mode” to refer to the other five scales. Just keep in mind that each mode or scale is but a different arrangement of half steps and whole steps for the 7 notes of the diatonic scale.

There are many other scales, most or all of which will not be encountered by the piano beginner, e.g., the blues scale and the whole tone scale. Each is fascinating in its own way, and used by various musicians. The rest of this syllabus will concentrate on the major and minor scales.
TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. w-w-h-w-w-h is the pattern seen in which mode?
   a. Ionian
   b. Dorian
   c. Myxylodian
   d. Aeolian

2. The minor pentatonic scale is formed from the natural minor scale by eliminating which notes?
   a. 1st and 3rd
   b. 2nd and 5th
   c. 2nd and 6th
   d. 4th and 7th

3. The major pentatonic scale is formed from the major scale by eliminating which notes?
   a. 1st and 3rd
   b. 2nd and 5th
   c. 2nd and 6th
   d. 4th and 7th

4. If you start on F and play only the white keys a full octave, which mode will you be playing?
   a. Ionian
   b. Lydian
   c. Phrygian
   d. Aeolian

5. In the D major scale, which note is the leading tone?
   a. B
   b. C
   c. C#
   d. D
Section 5: Music Intervals

Intervals are an important part of basic music theory. I will spread their discussion over two sections.

Scales, as well as chords, are a series of intervals between notes. At their most basic level, intervals are the number of half steps between notes. A single half step between notes is one interval (minor 2\textsuperscript{nd}), a whole step between notes is a different interval (major 2\textsuperscript{nd}), etc.

There are two fundamental types of intervals, harmonic and melodic. A harmonic interval is when the two notes are played at the same time. A melodic interval is when they are played separately.

Interval naming is based in part on the alphabet and in part on how many half steps are between the notes. Thus each and every interval has two names, e.g., minor third, perfect fourth, major sixth, etc. Their nomenclature can be very confusing, because the number of half steps does not appear in the naming.

To explain this nomenclature, consider the first triad of the C major scale, the C major chord. It consists of the first, third and fifth letter of the scale, shown below on the keyboard and in the treble clef.

![C major chord](image)

The interval between C and E is called a third because E is the third letter up from C. The interval E to G is a third because G is the third letter up from E. Thus, when the three notes of the chord are played at the same time, you are playing one third stacked on another third.

But what about the C minor chord? Here the letters are C-Eb-G. From C to Eb is still a third, because it consists of the first and third letters of the scale. And Eb to G is also a third, because G is the third letter up from E.
It is apparent that musical intervals need some “qualifier” in order, for example, to distinguish one third from another third. Hence each interval has two names or adjectives. One is the number, based solely on the distance apart in the alphabet; the other is a qualifier, based on the number of half steps between the notes.

If you play the same note twice, e.g., A-A, there is no letter difference, so the “number” for that interval is called one or “unison.” If you play A-B, the number name for the interval is two or a “second.” Since there are 8 letters in a scale, the numbers go from 1 (unison) to 8 (eighth). So that’s part of the interval naming. Every interval has a number. The second part of the name, the qualifier, has five possibilities, listed below.

**Interval Qualifiers**
- Diminished
- Minor
- Perfect
- Major
- Augmented

The following table shows the number of the interval in the vertical column, and the qualifier names across the top.

<table>
<thead>
<tr>
<th>No. of half steps in each specific interval</th>
<th>Diminished</th>
<th>Minor</th>
<th>Perfect</th>
<th>Major</th>
<th>Augmented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unison</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Second</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Third</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Fourth</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
</tr>
<tr>
<td>Fifth</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Sixth</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Seventh</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Here are some of the intervals in the treble clef. These examples are harmonic intervals, as the two notes of each interval would be played together.
The next table gives examples of each type of interval in the C chromatic scale. The highlighted intervals are all the intervals of the C major scale.

<table>
<thead>
<tr>
<th>No. of half steps in each specific interval</th>
<th>Diminished</th>
<th>Minor</th>
<th>Perfect</th>
<th>Major</th>
<th>Augmented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unison</td>
<td>C-C</td>
<td>C-C</td>
<td>C-C</td>
<td>C-C</td>
<td></td>
</tr>
<tr>
<td>Second</td>
<td>C-Dbb</td>
<td>C-Db</td>
<td>C-D</td>
<td>C-D#</td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>C-Ebb</td>
<td>C-Eb</td>
<td>C-E</td>
<td>C-E#</td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>C-Fb</td>
<td>C-F</td>
<td>C-F</td>
<td>C-F#</td>
<td></td>
</tr>
<tr>
<td>Fifth</td>
<td>C-Gb</td>
<td>C-G</td>
<td>C-G</td>
<td>C-G#</td>
<td></td>
</tr>
<tr>
<td>Sixth</td>
<td>C-Abb</td>
<td>C-Ab</td>
<td>C-A</td>
<td>C-A#</td>
<td></td>
</tr>
<tr>
<td>Seventh</td>
<td>C-Bbb</td>
<td>C-Bb</td>
<td>C-B</td>
<td>C-B#</td>
<td></td>
</tr>
<tr>
<td>Eighth</td>
<td>C-C'b</td>
<td>C-C'</td>
<td>C-C'</td>
<td>C-C'#</td>
<td></td>
</tr>
</tbody>
</table>

Confusion Alert. Don’t be confused by the awkward naming, such as C-Ebb for a diminished 3rd. The rule is that the number reflects how far apart the letter names are. Thus a third interval can’t be called C-D; that would have to be some type of second interval. A third interval has to have a letter in between the two notes, so in this case it has to be some C to some E. So, on the keyboard you would play this diminished 3rd as C-D, but in interval nomenclature it is labeled C-Ebb.
Note in the above table that the intervals from C to any other note of the C major scale are either a perfect or a major interval. This is also true of the other major scales. All intervals from the root note are either major or perfect.

What about the natural minor scale? Natural minor scales each include one major, 4 perfect, and 3 minor intervals. The table below gives examples of each type of interval in the A chromatic scale. The highlighted intervals are all the intervals of the A natural minor scale.

<table>
<thead>
<tr>
<th>No. of half steps in each specific interval</th>
<th>Diminished</th>
<th>Minor</th>
<th>Perfect</th>
<th>Major</th>
<th>Augmented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unison</td>
<td>A-A</td>
<td></td>
<td></td>
<td></td>
<td>A -A#</td>
</tr>
<tr>
<td>Second</td>
<td>A -Bbb</td>
<td>A-Bb</td>
<td>A-B</td>
<td>A-B#</td>
<td></td>
</tr>
<tr>
<td>Third</td>
<td>A-Cb</td>
<td>A-C</td>
<td>A-C#</td>
<td>A-C##</td>
<td></td>
</tr>
<tr>
<td>Fourth</td>
<td>A-Db</td>
<td>A-D</td>
<td></td>
<td>A-D#</td>
<td></td>
</tr>
<tr>
<td>Fifth</td>
<td>A-Eb</td>
<td>A-E</td>
<td></td>
<td>A-E#</td>
<td></td>
</tr>
<tr>
<td>Sixth</td>
<td>A-Fb</td>
<td>A-F</td>
<td>A-F#</td>
<td>A-F##</td>
<td></td>
</tr>
<tr>
<td>Seventh</td>
<td>A-Gb</td>
<td>A-G</td>
<td>A-G#</td>
<td>A-G##</td>
<td></td>
</tr>
<tr>
<td>Eighth</td>
<td>A-A'b</td>
<td>A-A'</td>
<td></td>
<td>A-A'#</td>
<td></td>
</tr>
</tbody>
</table>

**NOMENCLATURE**

By this point you may be wondering, why all the complexity in a syllabus aimed at beginner-level piano players? Do we really need to know that a diminished 2nd is C-Db? The short answer is no. What’s really important is an understanding of interval nomenclature, because (if for no other reason) it is germane to learning about chords, which are nothing more than a combination of intervals. If you have a basic understanding of the interval structure, as outlined in the above tables, you should feel much more comfortable when encountering chord names like C major, D minor, F diminished, etc. To help further this understanding, the following examples of interval nomenclature are offered.
The interval C-F, shown here in the treble clef, is a “Perfect 4th” because, as is evident from the chromatic scale above, it spans four letters and encompasses five half steps, C-C#, C#-D, D-D#, D#-E, E-F. Any interval that meets these criteria – a 4-letter span and 5 half steps – is a perfect 4th. An Augmented 3rd also has 5 half steps, and (starting at the root C) goes from C to E#, which is identical to C to F. However, since it is formed by increasing (“augmenting”) a half step on the E, to E#, it is technically an augmented 3rd and not a perfect 4th. It spans 3 letters, not 4. These two intervals are said to be “enharmonic,” i.e., labeled differently but sounding the same. You are already familiar with this concept from the black keys, each of which can be labeled as a flat or a sharp, depending on the musical key.

The interval C-G, shown here in the treble clef, is a “Perfect 5th” because it spans five letters and encompasses seven half steps, C-C#, C#-D, D-D#, D#-E, E-F, F-F#, F#-G. Any interval that meets these criteria – a 5-letter span and 7 half steps – is a perfect 5th. A diminished 6th also has 7 half steps, and goes from C to A double flat, or Abb, which is identical to the interval C to F. However, since it is formed by decreasing a whole step, from A to Abb, it is technically a diminished 6th and not a perfect 5th. It spans 6 letters, not 5. Again, these intervals are said to be “enharmonic,” i.e., labeled differently but sounding the same.

There are many Youtube videos about intervals. Below are several, from short all the way to a 4 part course. Also listed are two videos on recognizing intervals by ear, something musicians learn early on, but may be a challenge for adult beginner-level piano players.

**How intervals work – Music Theory Crash course – 6 minutes**
https://www.youtube.com/watch?v=2V3bvZu2Xqo

**Reading and Understanding Intervals – 22 minutes**
https://www.youtube.com/watch?v=LCCH-RGvoqw

**Music Theory – Understanding Intervals – 4 Parts (British – uses term “semitone” for half step)**
Part 1 https://www.youtube.com/watch?v=GgbiO6c72ww
Part 2 https://www.youtube.com/watch?v=4pWYXN80tco
Part 3 https://www.youtube.com/watch?v=tv8b4FhW09A
Part 4 https://www.youtube.com/watch?v=vRoYrNnUY3o

**Why Learning Intervals by Ear is Important (And How To Do It)**
https://www.youtube.com/watch?v=6EqZPtUYaco

**Ear training for intervals**
https://www.youtube.com/watch?v=_aDCO3h_xik
Famous intervals in song writing
There are many. The perfect 8\textsuperscript{th} (octave) is used in “Over The Rainbow,” the perfect 4\textsuperscript{th} in “Here Comes The Bride,” the minor 2\textsuperscript{nd} in the theme from “Jaws,” and the major 2\textsuperscript{nd} in “Happy Birthday.” For a comprehensive list of intervals in popular music, check out the following website.
http://www.people.vcu.edu/~bhammel/theory/new_menu/resources/interval_songs.htm

Hear some examples of intervals at this Youtube site.
https://www.youtube.com/watch?v=rVyzzCijXSA

This five minute video covers both intervals and interval inversions, the latter being the subject of Section 6. It also provides aural examples of intervals.
https://www.youtube.com/watch?v=YgxPUyGZKug

TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. C to C# is what interval?
   a. Minor second
   b. Major second
   c. Minor third
   d. Unison

2. How many half steps are in a major 7\textsuperscript{th} interval?
   a. 7
   b. 9
   c. 11
   d. 12

3. Which two intervals are enharmonic?
   a. Perfect 4\textsuperscript{th} and augmented 3\textsuperscript{rd}
   b. Diminished 4\textsuperscript{th} and augmented 3\textsuperscript{rd}
   c. Perfect 5\textsuperscript{th} and minor 6\textsuperscript{th}
   d. Minor 7\textsuperscript{th} and augmented 6\textsuperscript{th}

4. How many half steps are in an augmented 7\textsuperscript{th}?
   a. 10
   b. 11
   c. 12
   d. 13

5. An interval with 6 half steps could be:
   a. A major 6\textsuperscript{th}
   b. A minor 6\textsuperscript{th}
   c. An augmented 5\textsuperscript{th}
   d. A diminished 5\textsuperscript{th}
Section 6: Tritones, Compound Intervals, and Interval Inversions

What is a tritone?
A tritone is a music interval composed of six half steps, which is 3 whole steps or whole tones (hence, tritone; a whole step and a tone are synonymous). For example in the key of C major, F to B is a tritone, since it encompasses three whole tones: F–G, G–A, and A–B.

Each major scale has only one tritone per octave, as shown below for C major, where the sole tritone is F to B. Start on any note other than F, count 6 half-steps up, and you won’t end on a scale note.

If we consider the key of C major, which can include more than one octave, we find two different tritones: F to B and B to F. This is shown below for two octaves of C major. No matter how many octaves of C major you include, you will find just two different tritones.

Confusion Alert. When reading about tritones (if you do), don’t confuse statements about there being a single tritone of the major scale with other statements about there being two tritones of the major key. They are both correct.
There is also one tritone in the natural minor scale, between the 2nd and 6th notes, as shown below for C minor. The tritone is D to Ab. If we consider more than a single octave for C minor, i.e., the C minor key, then you encounter two different tritones: D to Ab and Ab to D.

The tritone is considered a dissonant interval, in contrast to others, like the perfect 4th and perfect 5th, and for this reason it was rarely used in the Middle Ages. Some sources say it was outright banned from music during this period, and was considered the “devil in music,” but that is apparently not true. Considered unpleasant, it was simply used infrequently. For an interesting history of this interval, view the following 10-minute Youtube video, “The Devil in music.”

Also note that the tritone is an interval in dominant chords, like C7 and D7, when in their root position, i.e., not inverted. It occurs between the third and seventh note above the root, so in C7 the tritone is E to Bb. This interval of course doesn’t hold if the chord is inverted (see Chord Inversions, Section 9). Below is the C7 chord. E to Bb is 6 half steps and is a tritone.
Tritone is E to Bb in D7 chord

Today the tritone is commonly used to create tension. The tritone seeks “resolution”, so in tonal music is always followed by another chord or chords to resolve the tension. The typical resolution for a dominant 7th chord is to move to a major or minor chord, e.g., G7 resolves to C Major or minor, D7 resolves to G Major or minor, F7 resolves to Bb Major or minor (https://pianowithwillie.com/tritones-and-chord-substitutions/).

Finally, a word about nomenclature. Below is the table of intervals with their half steps, presented in Section 5 of this syllabus. Note a 6-step interval can be either a diminished 5th or an augmented 4th (both highlighted in yellow). So, every tritone is either a D5 or an A4. Also, note that in any given octave, D5 and A4 are enharmonic. They are different names applied in different situations, but the intervals — 6-half steps each — are the same.

<table>
<thead>
<tr>
<th>No. of half steps in each specific interval</th>
<th>Diminished</th>
<th>Minor</th>
<th>Perfect</th>
<th>Major</th>
<th>Augmented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unison</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Second</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Third</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Fourth</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Fifth</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Sixth</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Seventh</td>
<td>9</td>
<td>10</td>
<td>11</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Eighth</td>
<td>11</td>
<td>12</td>
<td>13</td>
<td>13</td>
<td>13</td>
</tr>
</tbody>
</table>
Below is the chromatic scale staring on C. The tritone C to F# is an augmented 4th, because it spans 4 letters (C to F) and contains 6 half steps, one *more* than a perfect 4th. The tritone C to Gb is a diminished 5th, because it spans 5 letters (C to G), and contains 6 half steps, one *less* than a perfect 5th. The two intervals are identical, or enharmonic, but named differently depending on the circumstances. (See more examples of this type at end of Section 5 on interval naming.)

Music theory about tritones can become quite complex, and this is more than enough for beginner-level piano players. There are many more tritone videos on Youtube. The four below range from 2 to 10 minutes. If you only have time for one, I recommend the 6-minute video from PianoTV.

2-minute video: The tritone: the devil’s interval? [https://www.youtube.com/watch?v=wKFlpJ3gTKA](https://www.youtube.com/watch?v=wKFlpJ3gTKA)
4-minute video: What is a tritone? [https://www.youtube.com/watch?v=lQhkAzmomc](https://www.youtube.com/watch?v=lQhkAzmomc)
6-minute video from PianoTV: [https://www.youtube.com/watch?v=I7YGQ2EIEg](https://www.youtube.com/watch?v=I7YGQ2EIEg)
10-minute video: Understanding tritones: [https://www.youtube.com/watch?v=ziZpQhTYG80](https://www.youtube.com/watch?v=ziZpQhTYG80)

**Compound Intervals**

The above table of interval half steps maxes out with the octave, an interval of 12 half steps. Compound intervals go beyond 12 half steps, e.g., C to D above the octave, which is 14 half steps and is called a major 9th.

You might occasionally encounter compound intervals. As a practical matter most adults probably can’t stretch more than 9 or 10 keys (if that), so when compound interval is played with both notes together, it usually requires two hands.

Each compound interval is related to a simple interval. Subtract 7 from the compound interval and you get the related simple interval. The compound interval below is C-D, which is a 9th because it spans 9 letters. Subtract 7 and you have a major 2nd.

![Major 9th / Major 2nd](https://example.com/image.png)
Remember, this is only one-half the name of an interval. For the other half, the quality, you need to know the number of half steps. C to D in the next octave is 14 half steps, which is a major ninth. C to D in the same octave is 2 half steps, so it is a major second. An easier way to keep this straight is to remember that the subtracted interval will have the same quality as the first one. Major will stay major, minor will stay minor, etc. Here are two more examples, from http://www.teoria.com/en/reference/c/comp-simp.php.

![Perfect 11th / Perfect 4th](image)

Interval Inversions

Interval inversion simply means taking the bottom note of an interval and putting it on top. The result is a new name and interval. Interval inversions are an integral part of basic music theory, and form the basis for all chord inversions, discussed in Section 8.

Interval inversions shown here, in the treble clef, are from https://www.essential-music-theory.com/inverted-intervals.html.
The table below shows the resulting interval for each inversion.

<table>
<thead>
<tr>
<th>Initial Interval</th>
<th>Inverted Interval</th>
<th>Addition of Interval Numbers</th>
<th>Total No. half steps in both intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prime</td>
<td>Octave</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>2nd</td>
<td>7th</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>3rd</td>
<td>6th</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>4th</td>
<td>5th</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>5th</td>
<td>4th</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>6th</td>
<td>3rd</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>7th</td>
<td>2nd</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>Octave</td>
<td>Prime</td>
<td>9</td>
<td>12</td>
</tr>
</tbody>
</table>

In this table, note the following patterns. (Treble clef figures from [https://www.essential-music-theory.com/inverted-intervals.html](https://www.essential-music-theory.com/inverted-intervals.html))
• The number of half steps of the initial and inverted interval always adds up to 12. Thus, if there are 7 half steps in a perfect 5th, its inversion – a perfect 4th -- will have 5 half steps.

• The number name of the interval and its inversion (2nd, 3rd, 4th, etc.) -- will always add up to 9. In the above example, 5+4 = 9. In this example of Minor 3rd to Major 6th, 3+6 = 9.

There are several instructional videos on compound intervals and interval inversions

**Compound intervals**
https://www.youtube.com/watch?v=QOi5nz1_a6M
https://www.youtube.com/watch?v=vRoyrNnUY3o&t=64s

**Interval inversions**
https://www.youtube.com/watch?v=RkvUiiwLtxk
https://www.youtube.com/watch?v=xyWJ0cnJoQo

TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. A perfect 4th inverts to a:
   a. perfect 5th
   b. minor 4th
   c. major 4th
   d. augmented 3rd

2. A Minor 3rd inverts to a:
   a. perfect 4th
   b. major 4th
   c. major 6th
   d. minor 6th

3. An interval plus its inversion together contain how many half steps?
   a. 9
   b. 10
   c. 11
   d. 12
4. A diminished interval inverts to what type of interval?
   a. major
   b. minor
   c. augmented
   d. perfect

5. A major interval inverts to what type of interval?
   a. minor
   b. perfect
   c. diminished
   d. augmented
Section 7: Three-Note Chords: Major, Minor & Diminished

Now on to chords. Chords are three or more notes played together, or in sequence, that are formed from a specific scale. When the scale is identified in the key signature, as shown above, we say the chords are part of the “musical key.”

The phrase “formed from a specific scale” means the notes of the chord are in the scale. Starting from the root note for each chord, the chords are formed from alternate keys; there are no adjacent piano keys. In the C major scale, C-D-E is not a scale chord, but C-E-G is. Similarly, in the D major scale, D-E-F# is not a scale chord, but D-F#-A is.

3-note chords – also called triads – are classified as major or minor by the number of half steps between the notes.

3-Note Chords of Major Scales
Below are piano diagrams of all the 3-note chords or triads of the C major scale.

Here are the 3 note triads on the treble clef, starting and ending with the C major triad.
Note that each chord is either a major or minor triad, except B, which is labeled “diminished.” The naming is based on how many half steps are between the first and second notes, and between the second and third notes.

**Major 3-note chords or triads:** 4 half steps between 1st and 2nd note, 3 half steps between 2nd and 3rd note. The pattern is 4-3.

**Minor 3-note chords or triads:** 3 half steps between 1st and 2nd note, 3 half steps between 2nd and 3rd note. The pattern is 3-4.

**Diminished 3-note chords or triads:** 3 half steps between 1st and 2nd note, 3 half steps between 2nd and 3rd note. The pattern is 3-3.

Each 3-note chord or triad also has a Roman numeral designation, to show the nature of the chord: capitals for the major chords, and lower case for minor chords. Diminished chords are lower case and have a superscript ⁰. Thus the Roman numeral sequence for the seven 3-note triads is: I, ii, iii, IV, V, vi, vii⁰.

Below are the 3-note triads or chords of the C major scale, with the corresponding Roman numeral (RN), and the number of half steps between the notes. Check this against the keyboard diagrams above.

<table>
<thead>
<tr>
<th>C major triads</th>
<th>Notes</th>
<th>RN</th>
<th>Half Steps between notes of chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>C major</td>
<td>C-E-G</td>
<td>I</td>
<td>4 between C and E, 3 between E and G</td>
</tr>
<tr>
<td>D minor</td>
<td>D-F-A</td>
<td>ii</td>
<td>3 between D and F, 4 between F and A</td>
</tr>
<tr>
<td>E minor</td>
<td>E-G-B</td>
<td>iii</td>
<td>3 between E and G, 4 between G and B</td>
</tr>
<tr>
<td>F major</td>
<td>F-A-C</td>
<td>IV</td>
<td>4 between F and A, 3 between A and C</td>
</tr>
<tr>
<td>G major</td>
<td>G-B-D</td>
<td>V</td>
<td>4 between G and B, 3 between B, and D</td>
</tr>
<tr>
<td>A minor</td>
<td>A-C-E</td>
<td>vi</td>
<td>3 between A and C, 4 between C and E</td>
</tr>
<tr>
<td>B diminished</td>
<td>B-D-F</td>
<td>vii⁰</td>
<td>3 between B and D, 3 between D and F</td>
</tr>
</tbody>
</table>

Below are the 3-note triads or chords for the F major scale.
Below are the 3-note triads for the A major scale. Notice that the pattern of major-minor-diminished is the same as for C major and F major. In fact, the 3-note chord or triad sequence in every major scale is the same: I, ii, iii, IV, V, vi, viiO.

Two videos that teach and demonstrate playing triads.
https://www.youtube.com/watch?v=c5w0GHRWK10
https://www.youtube.com/watch?v=cepQVdpZB5U

This video shows how to “play hundreds of songs with 4 chords: C, G, Amin, F.”
https://www.youtube.com/watch?v=gmvwZRwn-j0
3-Note Chords of Minor Scales
There is also a common pattern of triads or 3-note chords for the minor scales, which is: i, ii°, III, iv, v, VI, VII. Below are the 3-note chords for both the A minor and C minor scales.

### A minor scale

<table>
<thead>
<tr>
<th>A minor triads</th>
<th>Notes</th>
<th>RN</th>
<th>Half Steps between notes of chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>A minor</td>
<td>A-C-E</td>
<td>i</td>
<td>3 between A and C, 4 between C and E</td>
</tr>
<tr>
<td>B diminished</td>
<td>B-D-F</td>
<td>ii°</td>
<td>3 between B and D, 3 between D and F</td>
</tr>
<tr>
<td>C major</td>
<td>C-E-G</td>
<td>III</td>
<td>4 between C and E, 3 between E and G</td>
</tr>
<tr>
<td>D minor</td>
<td>D-F-A</td>
<td>iv</td>
<td>3 between D and F, 4 between F and A</td>
</tr>
<tr>
<td>E minor</td>
<td>E-G-B</td>
<td>v</td>
<td>3 between E and G, 4 between G and B</td>
</tr>
<tr>
<td>F major</td>
<td>F-A-C</td>
<td>VI</td>
<td>4 between F and A, 3 between A and C</td>
</tr>
<tr>
<td>G major</td>
<td>G-B-D</td>
<td>VII</td>
<td>4 between G and B, 3 between B and D</td>
</tr>
</tbody>
</table>

### C minor scale

<table>
<thead>
<tr>
<th>C minor triads</th>
<th>Notes</th>
<th>RN</th>
<th>Half Steps between notes of chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>C minor</td>
<td>C-Eb-G</td>
<td>i</td>
<td>3 between C and Eb, 4 between Eb and G</td>
</tr>
<tr>
<td>D diminished</td>
<td>D-F-Ab</td>
<td>ii°</td>
<td>3 between D and F, 3 between F and Ab</td>
</tr>
<tr>
<td>Eb major</td>
<td>Eb-G-Bb</td>
<td>III</td>
<td>4 between Eb and G, 3 between G and Bb</td>
</tr>
<tr>
<td>F minor</td>
<td>F-Ab-C</td>
<td>iv</td>
<td>3 between F and Ab, 4 between Ab and C</td>
</tr>
<tr>
<td>G minor</td>
<td>G-Bb-D</td>
<td>v</td>
<td>3 between G and Bb, 4 between Bb and D</td>
</tr>
<tr>
<td>Ab major</td>
<td>Ab-C-Eb</td>
<td>VI</td>
<td>4 between Ab and C, 3 between C and Eb</td>
</tr>
<tr>
<td>Bb major</td>
<td>Bb-D-F</td>
<td>VII</td>
<td>4 between Bb and D, 3 between D and F</td>
</tr>
</tbody>
</table>

At this point it is fair to ask, why is this information important? There are several reasons why adults relatively new to piano can benefit from knowledge of half steps in intervals and chords.
• **Major to minor triad.** You are probably familiar with “formulas” for these triads, e.g., 1-3-5 for major triads and 1-3b-5 for minor triads (the middle key is flatted). The basis for these and other chord formulas is the number of half steps between notes, and I would argue that understanding this half-step basis is a better way to learn. For example, when playing music from lead sheets, where the chords are notated above the treble clef (discussed in Section 11), it is not uncommon to come upon the major and minor chord of the same root note close together, e.g., Cmaj followed by Cmin. Just knowing the major and minor triad half steps tells you to play Cmin by going down one half step from E, i.e., go from a 4-3 half step arrangement, to a 3-4. That change only requires moving your middle finger down one half step.

![Middle finger down ½ step →](image1.png)

But doesn’t the formula 1-3b-5 tell you to do the same thing? Yes, but knowing the basis for the formula is better. For example, consider music with a Dmaj triad followed by a Dmin triad.

![Middle finger down ½ step →](image2.png)

You know the formula: go from 1-3-5 for Dmaj to 1-3b-5 for Dmin, i.e., flatten the middle note, F#, to an F. F is not a flat note; the reason for going there may not be obvious if you just memorize a formula. In summary of this point, understanding the basic theory regarding half steps will allow you to apply any shortcuts you’ve learned – formulas – much more reliably and efficiently.

• **Harmonic 5th major triad used in minor key.** In Section 3 I noted that a lot of music written in “the minor scale” is actually in the harmonic minor scale, i.e., where the 7th note of the natural minor scale is raised a half step. In the key of A minor, raising the 7th note changes G to G#. This makes the fifth triad major, not minor.

Triad on the 5th note of the A natural minor scale: E-G-B is minor triad, labeled v
Triad on the 5\textsuperscript{th} note of the A harmonic minor scale: E-G#-B is major triad, labeled V

You will see this major 5 chord (V or V7) played a lot in minor scale music, and may wonder why a major chord is being played in a minor key. The reason is because it’s based on the harmonic minor scale.

- **Chord progressions.** The first, fourth and fifth triads, always major chords in a major scale, are a very common chord progression or chord sequence in popular music, i.e., I-IV-V. Thus, in the key of C, the song typically opens with a C chord, then progresses to F (IV) and at some point to G (V), with eventual resolution back to C. Similarly, in the key of F, there will be an opening F chord (I), followed at some point by Bb (IV) and then C (V), with eventual resolution back to F. There are other common “chord progressions” in popular songs, and having some appreciation of the chords for each scale will provide a better understanding of the music you’re playing.

   [Click here for short video on chord progressions.](https://www.youtube.com/watch?v=H8o22AiT-fl&t=57s)

   Three chords to know (in every key)
   [https://www.pianotv.net/2016/08/three-chords-to-know-piano/](https://www.pianotv.net/2016/08/three-chords-to-know-piano/)

- **Broken chords.** Chords in the base clef are often “broken,” that is, the individual chord notes are in sequence rather than stacked. Knowing the basic chords can help you name these chords in the bass clef, so when you see the pattern repeat, you can more easily find the notes — because you recognize the chord. Below is an example of C Major and A minor as broken chords. This aspect is discussed further with a piece of classical music, in Section 10.

   [https://musescore.com/user/26377/scores/5185405](https://musescore.com/user/26377/scores/5185405)
Broken chords piano lessons

3-minute video: https://www.youtube.com/watch?v=04UGtSJE0Q0
10-minute video: https://www.youtube.com/watch?v=-XOnl8NDClc
24-minute video: https://www.youtube.com/watch?v=dllhv-RgIK4

TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. How many major triads are in a major scale?
   a. 2
   b. 3
   c. 4
   d. 5

2. How many minor triads are in a minor scale?
   a. 2
   b. 3
   c. 4
   d. 5

3. The seven 3-note triads in a major scale have which Roman numeral nomenclature?
   a. I, ii, III, IV, v, vi, vii°
   b. I, ii, iii, IV, V, vi, vii°
   c. I, III, iv, V, VI, vii°
   d. I, II, iii, iv, V, VI, vii°

4. The seven 3-note triads in a minor scale have which Roman numeral nomenclature?
   a. I, ii, III, IV, v, vi, vii°
   b. I, ii, III, iv°, v, VI, VII
   c. i, II, iii°, iv, v, VI, VII
   d. i, ii°, III, iv, v, VI, VII

5. A diminished triad has what pattern of half steps between notes?
   a. 3-4
   b. 4-3
   c. 3-3
   d. 4-4
Section 8: Three-Note Chord Inversions

Chord inversions are simply a rearrangement of the chord notes in a different sequence. The half steps that characterize major and minor chords, discussed earlier, only apply to chords in the root position, not to their inversions.

In the C Major chord, C-E-G, C is the root note and is in the bass or bottom position. E-G-C is the same chord, but inverted so C is now on top and E is in the bottom position; this is called the *first inversion* of the C chord. G-C-E is also the same chord, with C in the middle and G in the bottom position; this is called the *second inversion* of the C chord. The inversions are notated with the first letter indicating the chord, and the second letter indicating the bottom note.

![C Major Diagram](image)

Inverted chords allow you to minimize hand movements and play faster and smoother. Chord inversions are common, both in standard piano sheet music (treble and bass clefs) and in lead sheets (treble clef only, chords on top).

On the next two pages are lists of major and minor triads, with inversions. For the first chord in each list, the notes are shown on both the keyboard and on the treble clef.

Confusion Alert: In these triads keep in mind the nomenclature. C/E means the C chord with E as the bass note, so it is E-G-C; D/A means the D chord, with A the bass note, so it is A-D-F#, etc.

The following Youtube videos provide demonstrations of chord inversions. The 6.5 minute video is particularly recommended.

2 minutes: [https://www.youtube.com/watch?v=QJRkG9ZBDmE](https://www.youtube.com/watch?v=QJRkG9ZBDmE)
6.5 minutes: [https://www.youtube.com/watch?v=v0nhQfLhPjc](https://www.youtube.com/watch?v=v0nhQfLhPjc)
12 minutes: [https://www.youtube.com/watch?v=Rp1JHaqYOqM](https://www.youtube.com/watch?v=Rp1JHaqYOqM)
## Major triads with inversions

<table>
<thead>
<tr>
<th></th>
<th>1st inversion</th>
<th>2nd inversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>C/E</td>
<td>C/G</td>
</tr>
<tr>
<td>C#</td>
<td>C#/F</td>
<td>C#/G#</td>
</tr>
<tr>
<td>D</td>
<td>D/F#</td>
<td>D/A</td>
</tr>
<tr>
<td>D#</td>
<td>D/G</td>
<td>D/A#</td>
</tr>
<tr>
<td>E</td>
<td>E/G#</td>
<td>E/B</td>
</tr>
<tr>
<td>F</td>
<td>F/C</td>
<td>F/A</td>
</tr>
<tr>
<td>F#</td>
<td>F#/A#</td>
<td>F#/C#</td>
</tr>
<tr>
<td>G</td>
<td>G/B</td>
<td>G/D</td>
</tr>
<tr>
<td>G#</td>
<td>G#/C</td>
<td>G#/D#</td>
</tr>
<tr>
<td>A</td>
<td>A/C#</td>
<td>A/E</td>
</tr>
<tr>
<td>A#</td>
<td>A#/D</td>
<td>A#/F</td>
</tr>
<tr>
<td>B</td>
<td>B/D#</td>
<td>B/F#</td>
</tr>
</tbody>
</table>

**C major chord 1 is C major**

**C major 1st inversion**

**C major 2nd inversion**
### Minor triads with inversions

<table>
<thead>
<tr>
<th></th>
<th>1st inversion</th>
<th>2nd inversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cm</td>
<td>Cm/Eb</td>
<td>Cm/G</td>
</tr>
<tr>
<td>C#m</td>
<td>C#m/E</td>
<td>C#m/G#</td>
</tr>
<tr>
<td>Dm</td>
<td>Dm/F</td>
<td>Dm/A</td>
</tr>
<tr>
<td>D#m</td>
<td>Dm/F#</td>
<td>Dm/A#</td>
</tr>
<tr>
<td>Em</td>
<td>Em/G</td>
<td>Em/B</td>
</tr>
<tr>
<td>Fm</td>
<td>Fm/B</td>
<td>Fm/A</td>
</tr>
<tr>
<td>F#m</td>
<td>F#m/A</td>
<td>F#m/C#</td>
</tr>
<tr>
<td>Gm</td>
<td>Gm/A#</td>
<td>Gm/D</td>
</tr>
<tr>
<td>G#m</td>
<td>G#m/B</td>
<td>G#m/D#</td>
</tr>
<tr>
<td>Am</td>
<td>Am/C</td>
<td>Am/E</td>
</tr>
<tr>
<td>A#m</td>
<td>A#m/C#</td>
<td>A#m/F</td>
</tr>
<tr>
<td>Bm</td>
<td>Bm/D</td>
<td>Bm/F#</td>
</tr>
</tbody>
</table>
TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. The 2\textsuperscript{nd} inversion of C major is:
   a. C-E-G
   b. E-C-G
   c. G-C-E
   d. None of the above

2. The 2\textsuperscript{nd} inversion of D\textsubscript{m} is:
   a. D-F-A
   b. F-A-D
   c. A-D-F
   d. None of the above

3. The 3 note chord shown on the keyboard is:
   a. C minor, 1\textsuperscript{st} inversion
   b. C minor, 2\textsuperscript{nd} inversion
   c. G minor
   d. G minor, 1\textsuperscript{st} inversion

4. This 3-note chord is shown in the bass clef is:
   a. A major
   b. A major, 1\textsuperscript{st} inversion
   c. A major, 2\textsuperscript{nd} inversion
   d. C# major

5. The 3-note chord shown in the bass clef is:
   a. F major
   b. F major, 1\textsuperscript{st} inversion
   c. Bb major
   d. Bb Major, 2\textsuperscript{nd} inversion
Section 9: Four-Note Chords: Sevenths

Four-note chords have a 1-3-5-7 pattern, and are called “seventh chords.” Starting at C in the C major scale, the “C seven” chord would thus be C-E-G-B. Starting at D in the D major scale, the “D seven” chord would be D-F#-A-C, and so forth.

Except it’s not that simple. There are actually many “seventh” chords for every root note. The website musictheory.com lists eleven 7th chords:

7th chords
Major
Dominant
Minor
Diminished
Half-diminished
Augmented
Augmented major 7th
Dominant sus4
Major sus2
Major sus4
Minor-major

In popular music, the ones we are most likely to encounter are the major seventh, dominant seventh and minor seventh. The best way to learn them is to consider the number of half steps between the notes.

- The major seventh chord builds on the major triad, with the fourth note of the chord a major third – 4 half-steps – above the third note. The fourth note is also a single half step below the octave. The C major seventh chord is thus C-E-G-B, where G-B is a major triad (4 half steps), and B is a half-step below C. This chord is labeled Cmaj7. The pattern for half steps of a major seventh is 4-3-4.

  ![C major 7th chord](image)

  4-3-4 is the half-step pattern for major 7th chords

- The dominant seventh chord also builds on the major triad, with the fourth note a minor third – 3 half-steps – above the third note. The fourth note is also 2 half steps (or one
whole step) below the octave. The C dominant seventh chord is thus C-E-G-Bb, where Bb is a half-step below C. This chord is labeled C7. The pattern for half steps of a dominant seventh is 4-3-3.

![C dominant 7th chord diagram](https://basicmusictheory.com/
4-3-3 is the half-step pattern for dominant 7th chords.

- The fourth note of a minor seventh chord builds on the minor triad, with the fourth note two half steps (a whole step) below the octave. The A minor seventh chord is thus A-C-E-G, where G is a whole step below A. This chord is labeled Amin7. The pattern for half steps of a minor seventh is 3-4-3.

![A minor 7th chord diagram](https://basicmusictheory.com/
3-4-3 is the half-step pattern for minor 7th chords.

**Confusion Alert.** Note that C7, D7, E7, etc., without a modifier, means a dominant seventh chord, not a major 7th or a minor 7th chord To signify a major 7th chord, use “M”, “maj” or “major” before the number 7. To signify a minor 7th chord, use “m”, “min” or “minor” before the number 7.

Tutorials on 7th chords
https://www.youtube.com/watch?v=OAJUCFFOEt0
https://www.youtube.com/watch?v=InBCuYsqnxk

Tutorial on playing dominant 7th chords
https://www.pianotv.net/2018/10/how-to-play-dominant-7th-chords/
TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. Starting on F#, what are the next 3 notes for the F# minor seventh chord (hint: use the pattern of half steps for this chord, 3-4-3):
   a. A#-C-D
   b. A-C-E
   c. G#-A#-C
   d. A-C#-E

2. Starting on A, what are the next 3 notes for the A major 7th chord (hint: use the pattern of half steps for this chord, 4-3-4):
   a. C-E-G
   b. C#-E-G
   c. C-E#-F#
   d. C#-E-G#

3. Starting on B, what are the next 3 notes for the B dominant 7th chord (hint: use the pattern of half steps for this chord, 4-3-3):
   a. D#-F#-A
   b. D#-F-A
   c. D-F-A
   d. D-F#-A

4. The chord “F7” has what pattern of half steps between notes?
   a. 3-4-4
   b. 4-3-3
   c. 4-3-4
   d. 3-4-3

5. Another name for “C7” is:
   a. C major 7
   b. C minor 7
   c. C dominant 7
   d. C augmented 7
Section 10: More on Seventh Chords – 3-Note Sevenths and Inversions

Playing 7th chords – Omitting the “5” note
You’ve probably noticed that piano instruction books for beginners typically omit the “5” note when showing 7th chords in one of the clefs. Since the 7 chord is composed of the 1-3-5-7 notes of the scale, the omitted “5” is the third note. In the case of C major 7th chord, this would be the note G.

![C major 7th chord diagram]


Cmaj7 is C-E-G-B. It is commonly played without the G, as shown here in the treble clef: C-E-B. Even though it has only 3 notes, it is still a 7 chord, because it contains the 1-3-7 notes of Cmaj7.

Confusion Alert. Numbers for musical notes can be confusing because the same note on the keyboard can be numbered differently, depending on the context. Thus in the above keyboard example, G is the 5th note of the C major scale, but the 3rd note of the C major 7 chord. Whenever you come across a note number, pay careful attention to the context in which the number is assigned.

In any seventh chord, the “5” is considered least essential to the harmony. The “1” is the tonic, the “3” note determines if the chord is major or minor, and the “7” is what makes it a seventh chord, so those are all important. Since the “5” doesn’t have an essential role, it is often omitted, making the 4-note chord easier to play as just 3 notes. It is still a “seventh” chord, even though you are only playing 3 of the 4 notes in that chord. Below is a quote from one website about shortened 7-chords. Regarding the “5” in a 7-chord:

“It does not contribute to the sense of major or minor, nor does it add any interest (tension, dissonance or sense of forward movement) to the sound. Therefore, it can typically be omitted quite safely without affecting the stability or tonality of the chord.” ([http://www.tyquinn.com/2010/chord-theory-6-omitting-notes/](http://www.tyquinn.com/2010/chord-theory-6-omitting-notes/))
**4-note chord inversions**

Three-note chords or triads have a first and a second inversion, as discussed in a previous section. Four-note chords have one more inversion, a third inversion. Below is a table of inversions for dominant 7ths, with some examples. The nomenclature is the same as for 3-note triads. C7/E means the C chord is C7, with E as the bass note, so it is E-G-C-Bb; D7/A means the D7 chord, with A the bass note, so it is A-D-F#-C; etc.

<table>
<thead>
<tr>
<th></th>
<th>1st inversion</th>
<th>2nd inversion</th>
<th>3rd inversion</th>
</tr>
</thead>
<tbody>
<tr>
<td>C7</td>
<td>C7/E</td>
<td>C7/G</td>
<td>C7/Bb</td>
</tr>
<tr>
<td>C#7</td>
<td>C#7/F</td>
<td>C#7/G#</td>
<td>C#7/B</td>
</tr>
<tr>
<td>D7</td>
<td>D7/F#</td>
<td>D7/A</td>
<td>D7/C</td>
</tr>
<tr>
<td>D#7</td>
<td>D7/G</td>
<td>D7/A#</td>
<td>D7/C#</td>
</tr>
<tr>
<td>E7</td>
<td>E7/G#</td>
<td>E7/B</td>
<td>E7/D</td>
</tr>
<tr>
<td>F7</td>
<td>F7/C</td>
<td>F7/A</td>
<td>F7/Eb</td>
</tr>
<tr>
<td>F#7</td>
<td>F#7/A#</td>
<td>F#7/C#</td>
<td>F#7/E</td>
</tr>
<tr>
<td>G7</td>
<td>G7/B</td>
<td>G7/D</td>
<td>G7/F</td>
</tr>
<tr>
<td>G#7</td>
<td>G#7/C</td>
<td>G#7/D#</td>
<td>G#7/A#</td>
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<td>A7/G</td>
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<td>A#7/D</td>
<td>A#7/F</td>
<td>A#7/G#</td>
</tr>
<tr>
<td>B7</td>
<td>B7/D#</td>
<td>B7/F#</td>
<td>B7/A</td>
</tr>
</tbody>
</table>
TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. What is the bass note for the 2\textsuperscript{nd} inversion of E7?
   a. E
   b. G#
   c. B
   d. D

2. What is the bass note for the 1\textsuperscript{st} inversion of A7?
   a. A7
   b. C#
   c. E
   d. G

3. If Bb-D-G are played together, what chord is it?
   a. Bbmin
   b. Gmin
   c. Gmin 1\textsuperscript{st} inversion
   d. Gmin 2\textsuperscript{nd} inversion

4. If A-C-Eb-F are played together, what chord is it?
   a. F7
   b. F7 1\textsuperscript{st} inversion
   c. F7 2\textsuperscript{nd} inversion
   d. F7 3\textsuperscript{rd} inversion

5. The notes C-E-Bb play what chord?
   a. C major
   b. C7 major
   c. C7
   d. C minor
Section 11: Chords in the Bass Clef

Most chords are played in the bass clef, where they may be stacked or broken. Another name for broken chords is arpeggio. The bass clef below shows the C major chord, first as 3 successive notes (broken), then all played together (stacked).

Piano teachers emphasize students should learn to read music not note by note, but by patterns or groups of notes. The oft-quoted analogy is that you don’t read a book letter by letter, but by words or groups of words. Not sure if this analogy is really germane, but it is true that experienced pianists read chord patterns without having to worry about individual notes. It is obviously much better to instinctively “know” that the notes in the bass clef above are the C major chord, and where to find them on the keyboard, than to take time to read them separately as C, E and G. (Chord patterns are also important to recognize in the treble clef, but since most harmony in piano music is played in the bass clef, this section will put its focus there.)

In the above example, note that the C major chord occupies three successive spaces. The second chord of the C major scale, D minor, occupies 3 successive lines. Going through all 7 triads or 3-note chords of the C major scale, we see that the pattern alternates: 3 spaces followed by 3 lines, ending with the B diminished chord on three lines, B-D-F.
There are two points to make about this pattern. First, identify the bottom note and you know the triad pattern will be *alternating* letters. For example, identify D in the base clef of the C major scale, and you know the chord is D – F – A. Identify A in this scale and you know that the chord is A – C – E. So there is no need to read note by note, just the pattern.

Of course you always have to be mindful of the key signature, i.e., the keys with sharps or flats. In the two D major and A major chords from the D major scale (next page), the pattern is the same – alternating letters – but you have to keep in mind that F and C are sharped notes.
The second point is that when there are two notes adjacent on the clef, i.e., line-space or space-line, the notes are *adjacent letters* in the scale. This is illustrated below with the first inversion of C dominant 7th chord. Note that adjacent letters does not mean the same thing as adjacent keys. Bb is not adjacent to C; there is a B in between them. Space-line and line-space does indicate that the two keys are adjacent letters, and if you know the key signature, you’ll know if either or both is a sharp or a flat.
A good example of broken chords, or arpeggios, is seen in the opening bars of the Andante movement from Sonatina, Op. 36, No. 1, by Muzio Clemente. This movement is in F major, 3/4 time. Here are the first 8 measures.

![Musical notation](https://www.mutopia.org/images/285/285285002.png)

The following points relate to the bass clef of these 8 measures, which contains only broken chords.

- In each of the first two measures the F major chord, F-A-C, is played 3 times. Since the time signature is 3/4, each chord is played as if was a quarter note in length.
- In the third measure the F major chord is again played 3 times, but as the 2nd inversion, C-F-A.
- In the fourth measure F-A-C is played once, followed by two quarter note rests.
- In the fifth measure the notes F-Bb-D, the 2nd inversion of the Bb major chord, are played once; this is followed by two quarter note rests.
- The sixth measure repeats the first measure, i.e., 3 F major chords.
- The seventh measure has 3 descending notes, Bb-A-F, which are not a chord of F major.
- The eighth measure has the 2nd inversion of F major, C-F-A, followed by two C major chords, C-E-G.

Clementi’s Op. 36, No. 1 is played at half speed in the first link and at full speed in the second link.

[https://www.youtube.com/watch?v=D_O2jp8gcpo](https://www.youtube.com/watch?v=D_O2jp8gcpo)
[https://www.youtube.com/watch?v=0_Ksi2qmW0A](https://www.youtube.com/watch?v=0_Ksi2qmW0A)
Knowing the key is F major, you shouldn’t have to “read” the chord notes separately, but instead can learn to recognize the chord patterns. The bass note in the first two measures for each chord is F, and the notes are on lines, which means alternating letters: F-A-C. This is a little more complicated in the third measure, where you have the 2nd inversion of F major, C-F-A. However, seeing how the three notes are placed (2nd space, 4th line, 5th line) tells you this is not a root triad, but instead an inversion of some sort.

None of this is intuitive for beginners, unless you are some sort of piano prodigy. It takes work, and practice. But once you have gone through a piece like this several times, you will learn to appreciate reading chords rather than struggling to figure out the individual notes.

TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. Which of the following occupies 3 successive spaces in the bass clef?
   a. F-A-C
   b. G-B-D
   c. C-E-A
   d. D-F-G

2. What is this bass clef chord?
   a. A major
   b. C major
   c. G major
   d. F major

3. What is this bass clef chord?
   a. A major
   b. 1st inversion of F major
   c. Bb major
   d. 2nd inversion of Bb major

4. What is 4th note of the C7 chord?
   a. B
   b. Bb
   c. B#
   d. A

5. What is the 4th note of C7 in first inversion?
   a. C
   b. E
   c. G
   d. B
Section 12: Chords in Lead Sheets and Song Sheets

There are two basic approaches to teaching piano to beginning adults. One is the ‘classical’ method, which teaches how to play both treble and bass clefs. This is the standard approach used to teach children, and it provides the most flexibility. Within this approach are several different teaching methods, such as Bastien, Faber, and Alfred, but they all teach the student to read and play both clefs.

The other approach uses lead sheets, which have just the treble clef, plus the harmony – chord names – written above the treble clef notes. Lead sheets are favored by adults who just want to play popular songs, and not spend precious time learning the bass clef.

A collection of lead sheets in book form has long been known as a “fake book,” because experienced players could “fake” the complex harmony of the bass clef by just learning a series of chords. (For the history of fake books, see https://blog.sheetmusicplus.com/2014/07/23/how-to-read-a-fake-book/.)

The lead sheet approach was popularized by Scott Houston, who has produced shows about the method on PBS, and sells his books and course materials on the internet. Houston also has over 100 Youtube videos, accessed at https://www.youtube.com/user/pianoguytv. The cover of one of his instruction books is shown below, beside a picture of chords from his website (https://www.scotthouston.com/products/the-piano-guy-starter-set). The idea is that if you learn a bunch of chords played with your left hand, you can do away with the bass clef, so this is a short cut compared to the classical teaching method.
**Lead Sheets**

Below left is sheet music showing the treble and bass clefs, with some chords written above the treble clef. In this piece of music, the bass clef notes aren’t all that difficult, but do require you to know how to read that clef, and many adult beginners don’t want to bother learning that. The same music without the bass clef is a lead sheet, shown below right.

With the lead sheet you can play Beauty and the Beast just by learning a few chords, without having to worry about reading the bass clef. You play the melody with your right hand and the chords with your left hand. Except for the C7sus4, the chords in this particular lead sheet are common, ones you already likely know. And if playing this piece of music was really your goal, it would not be hard to look up and learn the C7sus4. Or, alternatively, you could “fake” it and just play C7 instead.

On the next page is a lead sheet geared toward ukulele players. It shows uke chords at the top, and then the treble clef with chord names displayed above the notes. In a typical uke session, players strum the chords and sing the melody. This same lead sheet could be played by a pianist, using the left hand for the chords and right hand for the melody.
Song Sheets
Yet another format for playing music is the song sheet. Song sheets have only the words and chords, no treble or bass clef, as shown below for “Wagon Wheel” and “Love Me Tender”.

Song sheets are commonly used in music sessions where the melody is sung, and the harmony is provided by string instruments – guitar, mandolin, ukulele, banjo, etc. While song sheets are not used to teach piano, they are useful for examining chord progressions, and will be discussed further in the section on music keys.
Wagon Wheel
C G Am F
4/4 SN -

INTRO: C G Am F C G F F
C G
Headed down south to the land of the pines
Am F
And I'm thumbin' my way into North Carolina
C G F
Staring' up the road and pray to God I see headlights
C G
I made it down the coast in seventeen hours
Am F
Pickin' me a bouquet of dogwood flowers
C G F
And I'm a-hopin' for Raleigh I can see my baby to-night.
C G
So rock me mama like a wagon wheel
Am F
Rock me mama any way you feel
C G F
Hey, hey mama rock me.
C G
Rock me mama like the wind and the rain
Am F
Rock me mama like a south-bound train
C G F
Hey, hey mama rock me.

Love Me Tender
C D7 G7 E7 Am C7 F Fm A7
4/4 SN -

INTRO: C//// D7//// G7//// C////
C D7 G7 C
Love me tender, love me sweet. Never let me go.
C D7 G7 C
You have made my life complete and I love you so.
C E7 Am C7 F Fm C
Love me tender, love me true, all my dreams ful - filled.
A7 D7 G7 C
For my darling I love you and I always will.
TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. If the Wagon Wheel song sheet was transformed into traditional piano music, what notes would be in the first measure of the bass clef?
   a. C-F-A
   b. C-D-E
   c. C-F-G#
   d. C-E-G

2. If the Broadway song sheet was transformed into traditional piano music, what notes would be in the third measure of the bass clef?
   a. A-C-E
   b. A-C#-E
   c. A#-C-E
   d. Ab-C-E

3. In Scott Houston’s Quick Start chord sheet, which type of chord is not represented?
   a. Major triad
   b. Minor triad
   c. Dominant 7th
   d. Major 7th

4. What is this chord?
   a. C major
   b. C minor
   c. C diminished
   d. C augmented

5. What is this chord?
   a. D major
   b. D minor 7th
   c. D7
   d. D major 7
Section 13: Chord Progressions

A chord progression is simply the sequence of chords used to harmonize the melody, such as I-IV-V, or I-vi-IV-V. Review the triads below for C major. If the music is in this key, and the chord progression is I-IV-V, the chords in sequence will be C maj, F maj, G maj.

### C major triads

<table>
<thead>
<tr>
<th>C major</th>
<th>Notes</th>
<th>RN</th>
<th>Half Steps between notes of chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>C major</td>
<td>C-E-G</td>
<td>I</td>
<td>4 between C and E, 3 between E and G</td>
</tr>
<tr>
<td>D minor</td>
<td>D-F-A</td>
<td>ii</td>
<td>3 between D and F, 4 between F and A</td>
</tr>
<tr>
<td>E minor</td>
<td>E-G-B</td>
<td>iii</td>
<td>3 between E and G, 4 between G and B</td>
</tr>
<tr>
<td>F major</td>
<td>F-A-C</td>
<td>IV</td>
<td>4 between F and A, 3 between A and C</td>
</tr>
<tr>
<td>G major</td>
<td>G-B-D</td>
<td>V</td>
<td>4 between G and B, 3 between B and D</td>
</tr>
<tr>
<td>A minor</td>
<td>A-C-E</td>
<td>vi</td>
<td>3 between A and C, 4 between C and E</td>
</tr>
<tr>
<td>B diminished</td>
<td>B-D-F</td>
<td>vii°</td>
<td>3 between B and D, 3 between D and F</td>
</tr>
</tbody>
</table>

The Roman numeral sequence for triads is the same in every major key: I, ii, iii, IV, V, vi, vii°. The I-IV-V chord progression in the key of F maj would be F maj, Bb major, C major.

### F major triads

<table>
<thead>
<tr>
<th>F major</th>
<th>Notes</th>
<th>RN</th>
<th>Half Steps between notes of the chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>F major</td>
<td>F-A-C</td>
<td>I</td>
<td>4 between F and A, between A and C</td>
</tr>
<tr>
<td>G minor</td>
<td>G-Bb-C</td>
<td>ii</td>
<td>3 between G and Bb, 4 between Bb and C</td>
</tr>
<tr>
<td>A minor</td>
<td>A-C-E</td>
<td>iii</td>
<td>3 between A and C, 4 between C and E</td>
</tr>
<tr>
<td>Bb major</td>
<td>Bb-D-F</td>
<td>IV</td>
<td>4 between Bb and D, 3 between D and F</td>
</tr>
<tr>
<td>C major</td>
<td>C-E-G</td>
<td>V</td>
<td>4 between C and E, 3 between E and G</td>
</tr>
<tr>
<td>D minor</td>
<td>D-F-A</td>
<td>vi</td>
<td>3 between D and F, 4 between F and A</td>
</tr>
<tr>
<td>E diminished</td>
<td>E-G-Bb</td>
<td>vii°</td>
<td>3 between E and G, 3 between G and Bb</td>
</tr>
</tbody>
</table>

Popular music in particular is based on a common chord progressions, known to every musician. Below are two songs with just two chords each.

This song sheet for Jambalaya, in the key of C, uses C and G7 chords — the I and V7 of the C major scale.
This song sheet for Achy Breaky Heart, in the key of F, uses the I (F) and V (C) chords of the F major scale.

Achy Breaky Heart - Billy Ray Cyrus 1992

[F] You can tell the world you never was my girl
You can burn my clothes when I’m [C] gone
Or you can tell your friends just what a fool I’ve been
And laugh and joke about me on the [F] phone
[F] You can tell my arms to go back to the farm
You can tell my feet to hit the [C] door
Or you can tell my lips to tell my fingertips
They won’t be reaching out for you no more
(Chorus)
[F] But don’t tell my heart, my achy breaky heart
I just don’t think it’d under [C] stand
And if you tell my heart, my achy breaky heart
He might blow up and kill this [F] man.....Ooooo
[F] You can tell your Ma I moved to Arkansas
Or you can tell your dog to bite my [C] leg
Or you can tell your brother Cliff who’s fist can tell my lips
He never really liked me any [F] way
[F] Oh tell your Aunt Louise, tell anything you please
Myself already knows that I’m [C] okay
Oh you can tell your eyes to watch out for my mind
It might be walking out on me [F] today

In popular music one of the most common chord progressions is I-IV-V. In the key of C major this is C, F and G. When 1300 popular songs were analyzed, these 3 chords, or their counterparts in other keys (i.e., the I, IV, V in other keys) were by far the most used. http://www.hooktheory.com/blog/i-analyzed-the-chords-of-1300-popular-songs-for-patterns-this-is-what-i-found/

You will find many videos on Youtube teaching the I, IV, V chords. In Section 7 I provided a link to PianoTV video Three Chords to Know. Links to two other videos on these important chords are listed below.

Piano Chord Progressions: I-IV-V-IV Quick Tutorial
7.5 minutes: https://www.youtube.com/watch?v=idjDY6rTVTE

Having fun with the I, IV, V Chord Progression
21 minutes: https://www.youtube.com/watch?v=Sxfze1CKA8c
The fourth most common chord in the above graph is vi, or A minor (am) in the key of C. After that there is a rapid fall off in chord frequency.

Below is a song sheet for the popular Johnny Cash song I Walk The Line, with a I-IV-V7 chord progression. Note that the song starts on G7, but the basic progression is C (I) to IV (F) to V7 (G7). The song ends on the tonic chord, which is C.

In this and other progressions you often see the dominant seventh chord substituted for one or more of the triads. Substituting G7 for G, or any other dominant chord for its respective triad, does not change the chord progression.

I Walk The Line

C G7 F C7

Intro: G7 /// C ///

G7 C
I keep a close watch on this heart of mine
C C7
G7 C
I keep my eyes wide open all the time...
F C
G7 C
I keep the ends out for the tie that birds
Because you’re mine, I walk the line.

G7 C
I find it very, very easy to be true.
G7 C C7
I find myself alone when day is through...
F C
Yes, I’ll ad - mit that I’m a fool for you
G7 C
Because you’re mine, I walk the line.

G7 C
As sure as night is dark and day is light.
C C7
G7 C
I keep you on my mind both day and night...
C F C
And happiness I’ve known proves that it’s right
G7 C
Because you’re mine, I walk the line.

G7 C
You’ve got a way to keep me on your side
G7 C C7
You give me cause for love that I can’t hide...
F C
For you I know I’d even try to turn the tide
G7 C
Because you’re mine, I walk the line.
G7 C
Because you’re mine, I walk the line.
Minor Scale Progressions
Just like the major scales, all minor scales share the same order of triads. They are listed below, with the specific triads shown for A natural minor and A harmonic minor scales. The harmonic minor scale is formed by raising the 7th note of the natural minor scale one half step. As result, in the A minor scale, G is raised to G#; this changes three chords. C major becomes C augmented (III+), E minor becomes E major (V), and G major becomes G# diminished. (Treble clef figures from https://www.musical-u.com/learn/discovering-minor-chord-progressions-minor-chords-part-one/.)

<table>
<thead>
<tr>
<th>A natural minor</th>
<th>Notes</th>
<th>RN</th>
<th>Half Steps between notes of chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>A minor</td>
<td>A-C-E</td>
<td>i</td>
<td>3 between A and C, 4 between C and E</td>
</tr>
<tr>
<td>B diminished</td>
<td>B-D-F</td>
<td>ii⁰</td>
<td>3 between B and D, 3 between D and F</td>
</tr>
<tr>
<td>C major</td>
<td>C-E-G</td>
<td>III</td>
<td>4 between C and E, 3 between E and G</td>
</tr>
<tr>
<td>D minor</td>
<td>D-F-A</td>
<td>iv</td>
<td>3 between D and F, 4 between F and A</td>
</tr>
<tr>
<td>E minor</td>
<td>E-G-B</td>
<td>V</td>
<td>3 between E and G, 4 between G and B</td>
</tr>
<tr>
<td>F major</td>
<td>F-A-C</td>
<td>VI</td>
<td>4 between F and A, 3 between A and C</td>
</tr>
<tr>
<td>G major</td>
<td>G-B-D</td>
<td>VII</td>
<td>4 between G and B, 3 between B and D</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A harmonic minor</th>
<th>Notes</th>
<th>RN</th>
<th>Half Steps between notes of chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>A minor</td>
<td>A-C-E</td>
<td>i</td>
<td>3 between A and C, 4 between C and E</td>
</tr>
<tr>
<td>B diminished</td>
<td>B-D-F</td>
<td>ii⁰</td>
<td>3 between B and D, 3 between D and F</td>
</tr>
<tr>
<td>C augmented</td>
<td>C-E-G#</td>
<td>III⁺</td>
<td>4 between C and E, 4 between E and G#</td>
</tr>
<tr>
<td>D minor</td>
<td>D-F-A</td>
<td>iv</td>
<td>3 between D and F, 4 between F and A</td>
</tr>
<tr>
<td>E major</td>
<td>E-G#-B</td>
<td>V</td>
<td>4 between E and G#, 3 between G# and B</td>
</tr>
<tr>
<td>F major</td>
<td>F-A-C</td>
<td>VI</td>
<td>4 between F and A, 3 between A and C</td>
</tr>
<tr>
<td>G# diminished</td>
<td>G#-B-D</td>
<td>vii⁰</td>
<td>3 between G# and B, 3 between B and D</td>
</tr>
</tbody>
</table>

As a practical matter (at least for beginner-level piano players), the most important aspect of the harmonic minor scale is the fifth chord, which is major (V), as opposed to minor (v) in the natural minor scale. Much music written in a natural minor key uses the V or V7 chord lifted from the harmonic minor.

For example, music written in A minor will use the III and the VII major chords from the natural minor scale, and substitute V or V7 for the minor fifth. Essentially, composers in the minor key borrow the harmonic minor fifth, which is V or V7, but otherwise stick to the natural minor...
chords. Below are the first two lines from Malaguena, in the key of A minor. In this music the
chords are played in the treble clef. Note in the first measure the 3-note chords are G♯-B-E. This
is a V chord from the A harmonic minor scale.

https://www.8notes.com/scores/17312.asp

Below is a table showing common chord progressions, with the specific chords for major keys C,
D, F, G and A. For any of these chords, you may also use the dominant 7th chord. Note that the
chords in the list for ii-V-I progressions are all dominant 7th chords. Also note that there are
numerous variations within these patterns. A common one is simply to repeat one of the chords,
e.g., for the I-IV-V progression use I-IV-V-V.
Transposition
Musicians are adept at transposition while playing. Transposition is the ability to play a specific chord progression in one of several keys. Thus a musician may know a song in C that has the I-IV-V progression (C major – F major – G major). Then, in a jam session, the leader may say “let’s play it in F.” The musician knows – and can play – the same I, IV, V progression in F: F major, Bb major, C major. Sometimes a song sheet is written in a way to show only the chord numbers, without notating any letters. Again, the musician adept at transposition can play whatever chords are dictated by the announced key. Below is a chart showing the chords for each major key “by the number.”

https://www.praisecharts.com/blog/the-nashville-number-system-chart-for-bands/
TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. Which of the following is not a I- IV- V chord progression?
   a. C-F-G
   b. E-A-B
   c. F-B-C
   d. B-E-F#

2. The harmonic minor scale raises which note of the natural minor scale a half step?
   a. 2nd
   b. 4th
   c. 5th
   d. 7th

3. Which degrees of the natural minor scale are the roots of major chords?
   a. 1, 4, 5
   b. 2, 5, 7
   c. 3, 4, 6
   d. 3, 6, 7

4. What is the half step pattern of diminished 3-note chords?
   a. 3-4
   b. 4-3
   c. 3-3
   d. 4-2

5. To transpose C-F-G chord progression into the key of G, what would you play?
   a. G-C-D
   b. G-A-B
   c. G-Bm-Em
   d. G-Am-D
Section 14. Music Keys

As you’ve no doubt noticed, the word “key” is pervasive throughout basic music theory. “Key” can refer to the:

- piano key, the piece of ivory pressed for each note
- key signature, denoted by the series of flats or sharps that appear at the beginning of each line in the treble and bass clefs
- “music key,” the scale indicated by the key signature and its associated harmony, which is largely made up of chords; the chords can be notes played together, or “broken,” i.e., played in sequence. For beginner-level pieces, harmony is typically confined to the bass clef of piano sheet music.

There are as many music keys as there are major and minor scales (and more when you take into account other music modes, as discussed in Appendix B). This graph shows the most common keys in a series of 1300 popular songs. [http://www.hooktheory.com/blog/i-analyzed-the-chords-of-1300-popular-songs-for-patterns-this-is-what-i-found/](http://www.hooktheory.com/blog/i-analyzed-the-chords-of-1300-popular-songs-for-patterns-this-is-what-i-found/) (There is a slight inconsistency in the figure. Bb is shown as 5% in the graph and stated as 4% in the legend; either way, Bb is an uncommon music key.)

It is not surprising that the keys of C and A minor are the most common as they are simplest, having no sharps or flats. Other musical keys common in popular songs are G (one sharp), F (one flat), and D (two sharps). It is somewhat surprising that Eb outranks F and D, as it has 3 flats, whereas F has one flat and D has two sharps.

Much classical music is also written in these common keys, but you are more likely to find less common keys, such as C# major, in classical music. Here are the musical keys for Beethoven’s 9 symphonies and his 16 string quartets. (For a list of symphonies by musical key, see [https://en.wikipedia.org/wiki/List_of_symphonies_by_key](https://en.wikipedia.org/wiki/List_of_symphonies_by_key).)

**Beethoven Symphonies**

No. 1 in C major
No. 2 in D major
No. 3 in E flat major
No. 4 in B flat major
No. 5 in C minor
No. 6 in F major
No. 7 in A major
No. 8 in F major
No. 9 in D minor
Beethoven String Quartets
No. 1 in F major
No. 2 in G major
No. 3 in D major
No. 4 in C minor
No. 5 in A major
No. 6 in Bb major
No. 7 in F major
No. 8 in E minor
No. 9 in C major
No. 10 in Eb major
No. 11 in F minor
No. 12 in Eb major
No. 13 in Bb major
No. 14 in C# minor
No. 15 in A minor
No. 16 in F major

As stated, a music key is a scale and its associated harmony. The key word is “associated” — the harmony for the music is based on the designated scale. For example there are specific chords of the C major scale that are different from chords of D major, F major, etc.

When we say “play in the key of C,” we are referring to notes of the C scale and chords associated with that scale. In “tonal music,” which is most of Western music, the first note of the scale is the “tonic” or home note, and the chords revolve around that tonic and eventually return to it in some manner. Composers talk about “resolution to the tonic,” which is another way of saying that the music sounds good when the chords come back to the tonic. Another term often used is “chord progression,” the sequence of chords that, eventually, progress back to the tonic note. (Chord progressions are discussed in Section 13.)

Musical composition can be much more complex of course, since keys can change within a piece, new chords and notes unassociated with the key can be added, etc. However, from a simplistic viewpoint (one recommended for beginning piano players), it’s best to think of a music key as a specific scale with all or most of the harmony coming from notes of that scale.

To illustrate this point I’ll discuss two common music keys, C major (no sharps or flats) and then F major (one Bb).

Here are the triads or 3-note chords of C major, followed by music for Over The Rainbow, in that key.

C major triads | Notes | RN | Half Steps between notes of chord
--- | --- | --- | ---
C major | C-E-G | I | 4 between C and E, 3 between E and G
D minor | D-F-A | ii | 3 between D and F, 4 between F and A
E minor | E-G-B | iii | 3 between E and G, 4 between G and B
F major | F-A-C | IV | 4 between F and A, 3 between A and C
G major | G-B-D | V | 4 between G and B, 3 between B and D
A minor | A-C-E | vi | 3 between A and C, 4 between C and E
B diminished | B-D-F | vii° | 3 between B and D, 3 between D and F

After the initial “pickup note,” the first measure contains I or C major chord for this key, C-E-G. It is followed by the IV chord, F, in measure 2, then another C major in measure 3. Next is D minor, which is the ii chord in this key. After Dm is G, the V chord, then back to C. So the progression here is I-IV-ii-V, a common progression in popular music. If this same progression was in some other key, say F major, the chords would be different. They would be Fmaj-Bb-Gmin-Cmaj. To restate this point, the key defines the harmony that will be used to accompany the melody.
Here are the triads or 3-note chords of F major, followed by music for Yankee Doodle, in this key.

<table>
<thead>
<tr>
<th>F major triads</th>
<th>Notes</th>
<th>RN</th>
<th>Half Steps between notes of the chord</th>
</tr>
</thead>
<tbody>
<tr>
<td>F major</td>
<td>F-A-C</td>
<td>I</td>
<td>4 between F and A, between A and C</td>
</tr>
<tr>
<td>G minor</td>
<td>G-Bb-C</td>
<td>ii</td>
<td>3 between G and Bb, 4 between Bb and C</td>
</tr>
<tr>
<td>A minor</td>
<td>A-C-E</td>
<td>iii</td>
<td>3 between A and C, 4 between C and E</td>
</tr>
<tr>
<td>Bb major</td>
<td>Bb-D-F</td>
<td>IV</td>
<td>4 between Bb and D, 3 between D and F</td>
</tr>
<tr>
<td>C major</td>
<td>C-E-G</td>
<td>V</td>
<td>4 between C and E, 3 between E and G</td>
</tr>
<tr>
<td>D minor</td>
<td>D-F-A</td>
<td>vi</td>
<td>3 between D and F, 4 between F and A</td>
</tr>
<tr>
<td>E diminished</td>
<td>E-G-Bb</td>
<td>vii°</td>
<td>3 between E and G, 3 between G and Bb</td>
</tr>
</tbody>
</table>

Yankee Doodle

Yankee Doodle came to town, a-riding on his pony, Stuck a feather in his cap and called it mac-a-roni. Yankee Doodle, keep it up! Yankee Doodle dandy! Mind the music and your step, and with the girls be handy!

©MichaelKozlowski.com
The music opens with the I chord for this key, F major (F-A-C). It is followed by the V chord, C major, then back to F major. Next is C, then F, then the IV chord, Bb. The basic progression here is I-V-IV. If this same progression was in some other key, e.g., C major, the chords would be different. The key defines the harmony used, in this case some basic chords.

**Same song, different keys**
To further illustrate this point, look at these three song sheets for Silent Night, used by various ukulele clubs (the fret diagrams in the first example are for uke chords). Each is in a different key: D, F or G. Note how the key determines the chords that are played.

**Key of D**
- Silent Night
  - Intro: D /// A7 /// B /// Bb ///
  - Key: D
  - Silent night, holy night
  - D: All is calm, all is bright
  - G: Round you Virgin Mother and Child
  - A7: Holy infant, so tender and mild
  - D: Sleep in heavenly peace
  - D: Shepherds quake at the sight
  - G: Glories stream from heaven afar
  - A7: Heavenly hosts sing Alleluia
  - D: Christ the Saviour is born

**Key of F**
- Silent Night
  - Intro: F /// C /// G ///
  - Key: F
  - Silent night holy night
  - C: All is calm, all is bright
  - G: Round you Virgin Mother and Child
  - A7: Holy infant, so tender and mild
  - D: Sleep in heavenly peace
  - A7: Sleep in heavenly peace
  - C: Sleep in heavenly peace
  - C: Shepherds quake at the sight
  - F: Glories stream from heaven afar
  - A7: Heavenly hosts sing Alleluia
  - C: Christ the Saviour is born
  - A7: Christ the Saviour is born

**Key of G**
- Silent Night
  - Intro: G /// C /// F ///
  - Key: G
  - Silent night holy night
  - C: All is calm, all is bright
  - F: Round you Virgin Mother and Child
  - A7: Holy infant, so tender and mild
  - D: Sleep in heavenly peace
  - Em: Sleep in heavenly peace
  - G: Sleep in heavenly peace
  - G: Shepherds quake at the sight
  - C: Glories stream from heaven afar
  - F: Heavenly hosts sing Alleluia
  - C: Christ the Saviour is born
  - G: Christ the Saviour is born
  - Em: Em

- In the key of D, the IV chord is G and the V chord is A7.
- In the key of F, the IV chord is Bb and the V chord is C
- In the key of G, the IV chord is C and the V chord is D; an Em (vi in this key) is also thrown in for variety.

In summary, the key determines the harmony. Harmony can be quite complex, but in tonal music it is based on the notes (and resulting chords) determined by the key.

**Identifying the music key**
In traditional piano sheet music (treble and bass clefs) and in lead sheets (treble clef only), the key is shown by the key signature, discussed in Section 3 and other sections of this syllabus. The key signature shows the number of sharps and flats (or none, as in the case of C major and A minor), which defines the key signature. Here again is the table of some key signatures also shown in Section 3, from [https://www.piano-keyboard-guide.com/key-signatures.html](https://www.piano-keyboard-guide.com/key-signatures.html).
But what about song sheets, that have no treble or bass clef? In song sheets you can usually identify the key of the music by the first and last chords. When the first and last chords are the same, e.g., D and D, then that is the music key. This is evident in all three pieces of Silent Night shown above. When the first and last chords differ, generally the last chord indicates the key of the music.

TEST YOUR UNDERSTANDING OF THIS SECTION. Choose the single best answer.

1. Music in the key of F would use which I-IV-V progression?
   a. F-A-C
   b. Bb-F-A
   c. F-Bb-C
   d. F-A-C#

2. A I-ii-IV-V progression in the key of C major would use which chords?
   a. C-Dm-F-G
   b. C-Em-F-G
   c. C-Fm-G-A
   d. C-Fm-A-B
3. What major key is this key signature?
   a. B major
   b. E major
   c. C sharp major
   d. F sharp major

4. What minor key is this key signature?
   a. A minor
   b. B minor
   c. C minor
   d. F minor

5. The best way to determine the key of music in song sheet format is from:
   a. the chord progression
   b. the first and last chords
   c. the IV chord
   d. the V chord
Appendix A: Circle of Fifths

If you study music theory, sooner or later you’ll come across the Circle of Fifths. It is a visual presentation of key signatures in a circle, and shows the relationships of major and natural minor scales. Starting at C major, it goes clockwise through the major keys by intervals of a fifth. After 7 sharps are reached (key signature C# major), it continues in counterclockwise fashion through keys with flats, ending back at C major.

NOTE:

- It’s a Circle of Fifths if you start at the top (C major) and go clockwise. If you start at the top and go counterclockwise, it’s a Circle of Fourths, so another name for this device is Circle of Fourths.
- The fifths are perfect fifths, so 7 half steps. The fourths are perfect fourths, so 5 half steps.
- In any discussion of the Circle of Fifths, keep in mind that the letters shown, such as C or G or D, could represent a scale, a key, or a chord. The discussion should always make clear which of the three possibilities the letter represents.

https://commons.wikimedia.org/w/index.php?curid=4463183
Each major key is associated with a relative minor key, which shares the same key signature. (To repeat, these are the natural minor scales.) For example: the relative minor of C major is A minor; both play only the piano’s white keys, and have no sharps or flats; the relative minor of D major is b minor; both have two sharps, F# and C#; the relative minor of Eb is C minor; both have 3 flats, Cb, Bb and Eb; etc.

Note that at the bottom of the Circle of Fifths, there are 3 sets of enharmonic key signatures: B Major and Cb Major; C# Major and Db Major; Gb Major and F# Major. Though labeled differently, they play the exact same notes on the keyboard.

Per Wikipedia: “Musicians and composers use the circle of fifths to understand and describe the musical relationships among some selection of those pitches. The circle’s design is helpful in composing and harmonizing melodies, building chords, and modulating to different keys within a composition.”

So, the Circle of Fifths is not something needed by beginning piano players, which is why I put this subject in the Appendix. Nonetheless, the Circle does help explain key signature relationships, and I recommend a review for this reason alone.

**Constructing the Circle of Fifths**

Clockwise
For instructive purposes, the Circle of Fifths starts at the top, on C. The C major scale has no sharps or flats. The sequence of whole and half steps for all major scales is shown below.

Major Scale: W W H W W W H

The relative minor scale of C major is A minor, noted as “a” below the C at the top. A minor has the same key signature as C major, but a different sequence of whole and half steps. (Remember, the relative minor of each major scale starts on the 6th note of the major scale.)

Minor Scale: W H W W H W W
The Circle of Fifths is constructed by proceeding clockwise by *ascending* fifths; these are perfect fifths, so 7 whole steps. A fifth up from C is G. The G major scale has one sharp, F#. Its relative minor is E minor, notated “e” in the above diagram.

The next fifth is D, with 2 sharps: F# and C#; its relative minor is B minor, notated “b”.

The circle proceeds clockwise until C# (7 sharps) is reached; its relative minor scale is Bb. Note the order of sharps as they are added: F-C-G-D-A-E-B. The mnemonic often recommended for this sequence is *Father Charles Goes Down and Engages Battle*.

You could continue going clockwise to reach the flat key signatures. For example, a fifth up from C# is Ab, with four flats. A fifth up from Ab is Eb, with three flats, etc. However, most descriptions of the Circle, after laying out all the sharp key signatures, prefer to go back to the top and then move counterclockwise.

**Confusion Alert.** Keep in mind that if you move to the right on the circle, you move by ascending fifths up the scale. If you move to the *left on the circle*, you move by ascending fourths up the scale.

**Counterclockwise**

From C major, proceed counterclockwise by ascending *fourths*, until Cb is reached (7 flats). Just as with sharps, flats are added so that intervals conform to the major scale structure of whole and half steps.

Going counterclockwise from C, each successive scale flats the 7th note, so the order of flats, as they are added to the key signatures, is B-E-A-D-G-C-F. The recommended mnemonic for successive flats is *Battle Engaged And Down Goes Charles’ Father*.

**Enharmonic keys in the Circle of Fifths**

The bottom of the circle can be confusing, because it shows enharmonic scales that are not intuitive. Let’s examine them more closely (refer to figure of Circle of Fifths).

**B major and Cb major**

When you get to 5 sharps you have the B major scale or key signature. When you get to 7 flats you have the Cb major scale or key signature. *They are the same*, just labeled differently. Thus, for example, B in the B major scale is labeled Cb in the Cb major scale.
F# major and Gb major

F# major has 6 sharps and Gb major has 6 flats. Again, the two scales have the same notes, but they are labeled differently.

At this point it is fair to ask why the labeling is different. The simple answer is: because you can’t use the same letter twice in any scale. If we start on F# and follow the whole step-half step pattern for the major scale (W-W-H-W-W-H), the next note has to be the next black key. If we called it Ab, then the next note would have to be Bb, and the note after that couldn’t be labeled B!

Similarly, if we start on Gb on the flat side of the Circle, the next note has to be the next black key; we can’t label it G#, since that would be two G’s in a row, so it has to be Ab.

Continuing on with enharmonic major scales, we have C# major and Db major: Same notes, different labeling. They are the last of the enharmonic major scales in the Circle of Fifths

Note that there is only one pair of enharmonic natural minor scales in the Circle, eb and d#. Here are those two scales on the keyboard. Again, same notes, different labeling.
How is the Circle of Fifths Used?
Musicians and song writers find the Circle of Fifths helpful in finding chords for harmony, in modulation of keys within a song, and in transposing from one key to another.

As Chord Finder
One of the commonest chord progressions in popular music is I-IV-V; these are the three major chords in any major scale. To find these 3 chords quickly, just look to the right and left of any key in the Circle of Fifths.

In the key of C, the IV chord is F, the V chord is G.
In the key of G, the IV chord is C, the V chord is D.
In the key of F, the IV chord is Bb, the V chord is C.
Etc.

To quickly find the minor chords in any major scale, look for the next four chords after the V chord; they are that scale’s 3 minor chords and single diminished chord. Here are examples for C major, G major and D major. The Roman numerals pertain to the degree of that chord on the scale.

<table>
<thead>
<tr>
<th></th>
<th>ii</th>
<th>vi</th>
<th>iii</th>
<th>vii°</th>
</tr>
</thead>
<tbody>
<tr>
<td>C major:</td>
<td>D minor</td>
<td>A minor</td>
<td>E minor</td>
<td>B diminished</td>
</tr>
<tr>
<td>G major:</td>
<td>A minor</td>
<td>E minor</td>
<td>B minor</td>
<td>F# diminished</td>
</tr>
<tr>
<td>D major:</td>
<td>E minor</td>
<td>B minor</td>
<td>F# minor</td>
<td>C# diminished</td>
</tr>
</tbody>
</table>

Of course, one could also memorize the chords that go with each scale, but with a Circle of Fifths handy, that shouldn’t be necessary. It readily tells you which chords go with which key.
Modulation and Transposition
In addition to finding chords, the Circle is useful for changing keys, i.e., from one key to another. When done within a song, this is known as modulation. If you're in the key of C, and want to modulate, or change part of your song to another key that works well, look to the right (key of G) and to the left (key of F) for keys whose chords will work well with C. If you're in the key of Eb, and want to modulate, Bb and Ab are keys that will work well.

Suppose you have a song that's in the key of C, and your singer wants to sing it in E? Your sheet music has all the C chords, not the E chords. Now you have to transpose the key of C, with its associated chords, to the key of E, with a different set of chords. To find the chords for the key of E, go to the Circle.

All you need to do is change all chords by the same distance as C to E. Thus, where you have C chord now becomes an E chord; where you have an F chord now becomes an A chord; where you have a G chord now becomes a B chord; etc.

So the Circle of Fifths is all about relationships, what works well in harmony. It provides a quick visual reference to this information.

Excellent discussions of Circle of Fifths
20-minutes: https://www.youtube.com/watch?v=_UxzDjU3-hM
27-minutes: https://www.youtube.com/watch?v=1swhMTSFayI

Circle of Fifths: Choose the one best answer:

1. Which of the following is not represented by the letters on the Circle of Fifths?
   a. Scale
   b. Key
   c. Chord
   d. Interval
2. From the Circle of Fifths, the IV and V chords of Eb major are, respectively:
   a. Ab and Bb
   b. Bb and Ab
   c. g and f
   d. f and g

3. The key signatures in the Circle of Fifths increase counterclockwise by:
   a. Major fifths
   b. Major fourths
   c. Perfect fifths
   d. Perfect fourths

4. The relative minor scale of Db major is:
   a. F
   b. Bb
   c. Eb
   d. C

5. Enharmonic with the key of C# major is:
   a. Bb major
   b. F# major
   c. Db major
   d. Ab major
Appendix B. Music Modes Explained

Understanding music modes is not essential to playing the piano; they are really of more interest to composers. However, I kept coming across the term, and in trying to understand modes, found the online and printed book explanations confusing and convoluted. So I wrote my own explanation, using the concept of whole and half steps to make sense of the subject. Since modes is not a subject beginning (or even advanced) piano players need to bother with, I put my explanation in the Appendix. But if it interests you, read on.

Modes are confusing to many non-musicians and people new to music, not least because practically everything written about them is either overly complex, or so simplistic that nothing is really explained. The Wikipedia entry for modes spends most of its verbiage on arcane historical aspects, and only at the end does it get to “Modern Western Modes,” but by then the non-musician is apt to feel bewildered. On the other extreme, many web sites – including Youtube videos on the subject – fail to clarify the differences and similarities among terms like “modes,” “scales,” “minor scale,” “major scale,” etc. Instead these terms are thrown out willy-nilly, without clear explanation.

Modes have encompassed a lot of musical patterns over the centuries of musical history, but today the term “mode” is generally used to mean one of seven specific sequences of musical notes. In this context a mode is a specific sequence of whole steps and half steps that begins on one note and ends on the same note an octave higher, e.g., C to C or D to D.

There are 7 commonly-recognized music modes, each with a different sequence of half steps and whole steps. They are best demonstrated by starting on a specific white note of the keyboard and playing only white notes until you get to the same note an octave higher. These sequences are listed in the table below the keyboard (W refers to “whole step” and h to “half step”).

<table>
<thead>
<tr>
<th>MODE</th>
<th>SEQUENCE OF NOTES</th>
<th>STEPS</th>
<th>Another name:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ionian</td>
<td>C D E F G A B C</td>
<td>W-W-h-W-W-W-h</td>
<td>Major scale</td>
</tr>
<tr>
<td>Dorian</td>
<td>D E F G A B C D</td>
<td>W-h-W-W-h-W</td>
<td></td>
</tr>
<tr>
<td>Phrygian</td>
<td>E F G A B C D E</td>
<td>h-W-W-W-h-W</td>
<td></td>
</tr>
<tr>
<td>Lydian</td>
<td>F G A B C D E F</td>
<td>W-W-W-h-W-H</td>
<td></td>
</tr>
<tr>
<td>Mixolydian</td>
<td>G A B C D E F G</td>
<td>W-W-h-W-W-h-W</td>
<td></td>
</tr>
<tr>
<td>Aeolian</td>
<td>A B C D E F G A</td>
<td>W-h-W-W-h-W-W</td>
<td>Natural Minor scale</td>
</tr>
<tr>
<td>Locrian</td>
<td>B C D E F G A B</td>
<td>h-W-W-h-W-W-W</td>
<td></td>
</tr>
</tbody>
</table>
Note that *any* two adjacent keys – black or white – are a half step apart. For example, C-C# are a half step apart, as are E-F and B-C. Any two keys with one key in between them are a whole step apart. For example, C-D are a whole step apart, as are E-F# and B-C#. What you really have with each new mode is a different sequence of half steps and whole steps, and it is this specific sequence that defines each mode.

Historically, the term “mode” and not “scale” was used for all these note sequences, going back to the ancient Greeks. Over time, the term for two particular modes – ionian and aeolian – came to be called “scales.” Today we call the ionian mode the major scale, and the aeolian mode the minor scale (more specifically, the natural minor scale). The term “mode” is still used for the other note sequences.

**Confusion alert.** This variation in terminology is one reason for confusion generated by many articles and web videos about modes. Although all 7 modes are variations on whole-step half-step sequences, only two of the variations are now called “scales”; the other five are still called “modes.”

So both “mode” and “scale” are simply a sequence of 7 notes. When you add in the repeat of the first note, you get the distinctive pattern of whole steps and half steps shown in the table above. Whole steps and half steps are best appreciated on the piano keyboard, shown above. (Each black key can be labeled as a sharp or a flat.)

The seven modes, with their sequence of whole steps and half steps, are shown in another table, below. Note that the **ionian mode** is also the **major scale**, and the **aeolian mode** is the **minor scale**. (Again, the aeolian mode is the natural minor scale. There are two other minor scales, the harmonic minor and melodic minor, which are not represented by any of these modes.)

![Mode Chart](http://www.lotusmusic.com/lm_modes.html)

This table emphasizes the point that each mode can be determined by starting on a successive note of the C major scale (white keys only). In this way all the half steps are B-C and E-F. Again, the term “minor scale” in this table is the natural minor scale. (Table is from [http://www.lotusmusic.com/lm_modes.html](http://www.lotusmusic.com/lm_modes.html))

- If you start on C and play C-D-E-F-G-A-B-C you will get the C ionian mode sequence, which is W-W-h-W-W-W-h. This is also the sequence for the major scale. The ionian mode and the major scale are synonymous.
- If you start on D and play D-E-F-G-A-B-C-D you will get the D dorian mode sequence, which is W-h-W-W-W-W-h. This mode does not have another scale name. It goes by the name of the root note and “dorian.” Thus if you start the scale on D it is “D dorian”; if you start on E it is “E dorian,” etc.
- If you start on E and play E-F-G-A-B-C-D-E you will get the E phrygian Mode sequence, which is h-W-W-W-W-W-W. This mode does not have another scale name. It goes by the name of the root note and “phrygian.” Thus if you start the scale on E it is “E phrygian”; if you start on F it is “F phrygian,” etc.
- If you start on A and play A-B-C-D-E-F-G-A you will get the aeolian mode sequence, which is W-h-W-W-W-W-W-W. This is also the sequence for the natural minor scale. The aeolian mode and natural minor scale are synonymous.
Similarly, the other four modes have a unique sequence of half steps and whole steps.

***

So that’s how the modes are derived and named. Once you understand that each mode has a specific pattern of whole steps and half steps, it should be easy to see that within each mode there are 12 possible scales or “keys”. That’s because, within any octave there are 12 possible notes. The full octave that includes all the keys is called the chromatic scale, and is best visualized on the piano keyboard. From C to C are 13 notes (including the 2nd C).

To create the 12 possible scales for any given mode, all you do is take that mode’s specific sequence of whole steps and half steps and start it on each of the 12 chromatic scale keys. For example, by moving the ionian pattern so that it starts on D, you now have the D ionian mode (D major scale). In order to keep the same pattern of whole steps and half steps, this D major scale includes both F# and C#.

So there are 12 possible major scales, or keys, for the ionian mode. These major scales are listed on the next page, with four examples shown on the treble clef. They all have the ionian (major scale) sequence of whole notes and half notes: W-W-h-W-W-h.

Note the terminology in the treble clef examples. The C major ionian mode is called simply “ionian mode.” The D major scale is called “D ionian”. The E major scale is called “E ionian.” The F major scale is called “F ionian.” By convention, we now use the major scale names for these ionian modes: C major, D major, E major and F major.
**Ionian modes = Major scales**

W-W-h-W-W-W-h

C major
Db major
D major
Eb major
E major
Fb major
F major
Gb major
G major
Ab major
A major
B major

**Four Ionian Modes on the Treble Clef**

1. **C major**
   - Ionian mode
   - C D E F G A B C

2. **D major**
   - Dorian mode
   - D E #F G A B C D

3. **E major**
   - Phrygian mode
   - E #F G A B C D E

4. **F major**
   - Lydian mode
   - F G A B C D E F
There are also 12 possible natural minor scales, or keys, which is identical to saying there are 12 possible aeolian modes. These natural minor scales are listed below, with four examples shown on the treble clef. They all have the aeolian (minor scale) sequence of whole notes and half notes: W-h-W-W-h-W-W.

**Aeolian modes =**

**Four Aeolian Modes on the Treble Clef**

**Natural minor scales**

- W-h-W-W-h-W-W
- C minor
- Db minor
- D minor
- Eb minor
- E minor
- Fb minor
- F minor
- Gb minor
- G minor
- Ab minor
- A minor
- B minor

You can do this exercise for the other five modes as well. Each mode has 12 possible keys, because there are 12 keys of the chromatic scale. Below are listed all the keys for the other five modes, starting on C of the chromatic scale. Also shown, on the treble clef, is the key of C for *that particular mode.*
**Dorian modes**

**Sequence:** W-h-W-W-h-W

C Dorian ➔
C# Dorian
D Dorian
D# Dorian
E Dorian
F Dorian
F# Dorian
G Dorian
G# Dorian
A Dorian
A# Dorian
B Dorian

**Phrygian modes**

**Sequence:** h-W-W-h-W-W

C Phrygian ➔
C# Phrygian
D Phrygian
D# Phrygian
E Phrygian
F Phrygian
F# Phrygian
G Phrygian
G# Phrygian
A Phrygian
A# Phrygian
B Phrygian
**Lydian modes**

Sequence: W-W-W-W-h-W

- C Lydian →
- C# Lydian
- D Lydian
- D# Lydian
- E Lydian
- F Lydian
- F# Lydian
- G Lydian
- G# Lydian
- A Lydian
- A# Lydian
- B Lydian

**Mixolydian modes**

Sequence: W-W-h-W-W-W

- C Mixolydian →
- C# Mixolydian
- D Mixolydian
- D# Mixolydian
- E Mixolydian
- F Mixolydian
- F# Mixolydian
- G Mixolydian
- G# Mixolydian
- A Mixolydian
- A# Mixolydian
- B Mixolydian
**Locrian modes**

Sequence: h-W-h-W-W-W

C Locrian →
C# Locrian
D Locrian
D# Locrian
E Locrian
F Locrian
F# Locrian
G Locrian
G# Locrian
A Locrian
A# Locrian
B Locrian

Confusion Alert. Again, note the difference in nomenclature between ionian/aeolian modes and the other modes. Ionian modes are called by the names of the major scale, e.g., C major, D major, etc.; they are not called C ionian, D ionian, etc. Aeolian modes are called by names of the minor scale, e.g., C minor, D minor, etc., and not C aeolian or D aeolian. The other modes are called by their modal name.

**Music in the Various Modes**

While most music played today is in either ionian or aeolian mode (or the other minor scales, harmonic and melodic), there are many pieces of music in the other modes. Below are some examples of music in each of the modes. The majority of popular music is written in one of the major scales (i.e., ionian mode), but there is also much popular music in the minor scale. Classical music often combines major and minor scales. One interesting category included below is music written in all 24 major and minor keys (i.e., the 12 major scales and the 12 minor scales).

Musical composition is very complex, and classical music as well as popular songs may use more than one mode. This list is simply to show examples gleaned from the internet. Web sources specific to a mode are listed under the mode. Websites that cover more than one mode include:

http://www.classicfm.com/discover/music/guide-to-musical-modes/#JWZIAq0MTi6oZY0A.99
http://www.dreamtheaterforums.org/boards/index.php?topic=27396.0
http://www.classicfm.com/discover/music/guide-to-musical-modes/#3WDI8cadHmB6Rfiz.97
**Major scale (ionian mode)**

“Happy Birthday”
“God Bless America”
“Star Spangled Banner”
“Yankee Doodle”
“You Are My Sunshine”
Mozart symphony #23 in D major
Beethoven Symphony #1 in C major
Beethoven Symphony #7 in A major
Schubert Symphony #9 in C major

**Minor scale**

The aeolian mode is the natural minor scale. Much minor scale music is also in harmonic minor scale, and some is in the melodic minor scale; these are variations of the natural minor and technically not the aeolian mode.

**Classical**

Beethoven Symphony #5 in C minor
Mozart symphony #40 in G minor
Brahms Symphony #1 in C minor
Brahms Symphony #4 in E minor
Tchaikovsky Symphony #1 in G minor

**Popular**

Bob Dylan - All Along the Watchtower
https://www.youtube.com/watch?v=bT7Hj-ea0VE

R.E.M. - Losing My Religion (R.E.M.)
https://www.youtube.com/watch?v=xwtdhWltSIg

Animals – House Of The Rising Sun (Animals version)
https://www.youtube.com/watch?v=MgTSfJEf_jM

**Music written in all 24 major and minor keys**

https://en.wikipedia.org/wiki/Music_written_in_all_major_and/or_minor_keys

- Johann Sebastian Bach: *The Well-Tempered Clavier* (1722 and 1742; two separate sets of 24 Preludes and Fugues, together known as "the 48")
- Frédéric Chopin: 24 Preludes, Op. 28 (1835–39)
- Charles-Valentin Alkan: 25 Preludes, Op. 31 (1847), 24 Études in all the major and minor keys, Opp. 35 and 39 (1848 and 1857)
- Sergei Rachmaninoff: 24 Preludes, Opp. 3/2, 23 and 32 (1892; 1901–03; and 1910)
- Paul Hindemith: *Ludus Tonalis* (1942, twelve keys)
- Dmitri Shostakovich: 24 Preludes and Fugues, Op. 87 (1950–51). He also wrote a separate set of 24 Preludes, Op. 34, in 1933
Dorian mode
Smoke on the Water by Deep Purple
Scarborough Fair
Eleanor Rigby (The Beatles)
Dear Old Stockholm - (Miles Davis)
Bach - Toccata and Fugue in D minor, BWV 538 (NOT the famous one, which is BWV 565)
“Drunken Sailor”

Phrygian mode
[https://en.wikipedia.org/wiki/Phrygian_mode](https://en.wikipedia.org/wiki/Phrygian_mode)
Liszt’s Hungarian Rhapsody No.2
Rimsky Korsakov’s Scheherezade
Vaughan Williams’s Fantasia on a Theme of Thomas Tallis
Final aria of Philip Glass’s Satyagraha.
Samuel Barber’s [Adagio for Strings](https://www.reddit.com/r/musictheory/comments/1l2fsr/any_good_suggestions_for_lydian_mode_pieces/), op. 11

Lydian mode
[https://www.reddit.com/r/musictheory/comments/1l2fsr/any_good_suggestions_for_lydian_mode_pieces/](https://www.reddit.com/r/musictheory/comments/1l2fsr/any_good_suggestions_for_lydian_mode_pieces/)
Chopin’s Mazurka No. 15
Theme to “The Simpsons”
Stravinsky – Prelude in the Lydian Mode
Third movement of Beethoven’s String Quartet No. 15 in A minor
Os Justi by Bruckner
Mixolydian mode
https://en.wikipedia.org/wiki/Mixolydian_mode
“Norwegian Wood” by The Beatles (some verses in Dorian mode)
Theme to the TV series Star Trek
Debussy’s “The Sunken Cathedral”
“The Wreck of the Edmund Fitzgerald” by Gordon Lightfoot
“Hey Jude” by the Beatles
“Express Yourself” by Madonna
“Let it Loose” by The Rolling Stones
“Old Joe Clark”

Old Joe Clark

Key of A Mixolydian
Played A A B B

<table>
<thead>
<tr>
<th>Old Joe Clark, the preacher’s son</th>
<th>Preached all over the plain</th>
</tr>
</thead>
<tbody>
<tr>
<td>The only text he ever knew</td>
<td>Was high low jack and the game</td>
</tr>
</tbody>
</table>

[Chorus] Fare thee well Old Joe Clark Fare thee well I’m bound
Fare thee well Old Joe Clark Goodbye Betsy Brown

2. Old Joe Clark had a mule
And every tooth in that mule’s head
[Chorus]

3. Old Joe Clark had a yellow cat
Stuck her head in a buttermilk jar
She would neither sing nor pray
And washed her sins away
[Chorus]

4. Old Joe Clark had a house
And every story in that house
Fifteen stories high
Was filled with chicken pie
[Chorus]

5. I went down to Old Joe’s house
I bumped my toe on the table leg
He invited me to supper
And stuck my nose in the butter
[Chorus]

6. Wish’d I had a sweetheart
And every time she’d smile at me
Put her on the shelf
I’d get up there myself
[Chorus]
Locrian mode
[https://en.wikipedia.org/wiki/Locrian_mode](https://en.wikipedia.org/wiki/Locrian_mode)

John Kirkpatrick's song “Dust to Dust”

Brief passages of Sibelius Rachmaninov (Prelude in B minor, op. 32, no. 10), Hindemith (Ludus Tonalis), and Sibelius (Symphony no. 4 in A minor, op. 63) “may be regarded as in the Locrian mode.”

Debussy's Jeux has three extended passages in the Locrian mode.

**Modes: Choose the one best answer:**

1. The mode names for the major and natural minor scale are, respectively:
   a. Ionian and Dorian
   b. Aeolian and Ionian
   c. Ionian and Aeolian
   d. Dorian and Ionian

2. The whole-step half-step pattern for the Dorian mode can be determined by the white keys on the piano, from which key to which key?
   a. D to C
   b. C to D
   c. D to D
   d. D to C

3. W-W-h-W-W-h-W is the whole-step half-step pattern for which mode?
   a. Lydian
   b. Myxolydian
   c. Phrygian
   d. Aeolian

4. How many Ionian scales can be derived from the chromatic scale?
   a. 1
   b. 2
   c. 12
   d. 13

5. Aeolian mode is another name for:
   a. Natural minor scale
   b. Natural and harmonic minor scales
   c. Natural, harmonic and melodic minor scales
   d. Major scale
Appendix C: Q & A on Petzold’s Minuet in G

The Minuet in G that appears in the Clavier Book of Anna Magdalena Bach is considered one of the easier pieces for beginners, usually placed in level 2. It was originally ascribed to Bach, but research decades ago determined it was actually written by a contemporary, Christian Petzold (1677-1733). Now you’ll often see it with both names listed, or just Petzold’s. There are many recordings of this piece on Youtube, each about 2-minutes long, including the following two.

https://www.youtube.com/watch?v=icZob9-1MDw
https://www.youtube.com/watch?v=X7nOOFCDg

For several variations of this piece (in style of Mozart, Chopin, Scott Joplin, others), by the Brazilian virtuoso Vinheteiro, see:
https://www.youtube.com/watch?v=-AKxRFr6E00

There is also a pop tune with this melody, recorded by the female vocal group The Toys, in 1965, titled “A Lover’s Concerto.” Wikipedia has an article about the song at https://en.wikipedia.org/wiki/A_Lover%27s_Concerto.

There are several Youtube recordings of “A Lover’s Concerto,” but the one I most recommend is the original televised recording:

https://www.youtube.com/watch?v=p7fQSlvd0so&list=RDp7fQSlvd0so&start_radio=1.

***

The questions refer to the Bach/Petzold sheet music, shown on the next page (from www.pianostreet.com).
1. The 3-note chord in the bass clef, first measure, is:
   a. C
   b. D
   c. G
   d. F

2. How many times are the first 16 measures played?
   a. One
   b. Two
   c. Three
   d. Four

3. The first two notes of the 8th measure, base clef, are what interval?
   a. 5th
   b. 6th
   c. 7th
   d. octave

4. The small note before the C in the treble clef, measure 8, is a/an:
   a. grace note
   b. trill
   c. accidental
   d. 8th note

5. The wiggly sign above the C in measure 5 signifies a/an:
   a. grace note
   b. trill
   c. accidental
   d. accented note

6. The chord in the treble clef of the last measure is:
   a. B
   b. D
   c. G
   d. C
Appendix D: Q & A on Clementi Sonatina Op. 36, No. 1

The next 3 pages display the 3 movements of Clementi’s Sonatina Op. 36, No. 1. Depending on what source you use, this piano music is either for advanced beginners or early intermediate players, definitely at a level above Petzold’s Minuet in G. As it is popular teaching piece, you will find lots of renditions and videos on the internet. Piano World has a forum on the piece, at: http://forum.pianoworld.com/ubbthreads.php/topics/2809588/study-group-clementi-sonatina-in-c-major-op-36-no-1.html#Post2809588

PianoTV teacher Allysia Van Betuw has a Youtube tutorial of the Sonatina at: https://www.youtube.com/watch?v=m4tYu2IdkAY

For each movement I have created a multiple choice quiz for beginner-level players. The questions are based on information either in this Syllabus, or provided in Ms. Betuw’s tutorial.
1. This movement in in the key of:
   a. C
   b. A minor
   c. F
   d. G

2. The first two notes in the treble clef are what interval?
   a. Major 2\textsuperscript{nd}
   b. Major 3\textsuperscript{rd}
   c. Diminished 4\textsuperscript{th}
   d. Augmented 3\textsuperscript{rd}

2. The first accidental introduced into this movement is:
   a. Eb
   b. F# 
   c. Bb
   d. Gb

3. This accidental represents modulation to the key of:
   a. D
   b. E
   c. G
   d. A

5. The interval of the first two notes in measure 9, treble clef, is:
   a. Major 6\textsuperscript{th}
   b. Major 7\textsuperscript{th}
   c. Octave
   d. Major 9\textsuperscript{th}

7. The first 3 notes in the bass clef, last measure, are what broken chord?
   a. F major
   b. D major
   c. C major
   d. E flat major
Second Movement - Andante

1. This Andante movement is in key of
   a. C
   b. F
   c. G
   d. A minor

2. The broken chord in first measure is:
   a. C major
   b. F major
   c. D major
   d. E minor

3. The curved lines over the first measure means the notes are to be played:
   a. Staccato
   b. Legato
   c. Dolce
   d. With gusto

4. The treble clef in the third line starts with a series of eighth note intervals. The first set, D-F, are:
   a. Minor seconds
   b. Major seconds
   c. Major thirds
   d. Minor thirds

5. The second set of eighth note intervals in this same treble clef, C-E, are:
   a. Minor seconds
   b. Major seconds
   c. Major thirds
   d. Minor thirds

6. The last measure of the Andante movement, bass clef, plays what broken chord?
   a. C major
   b. G major
   c. F major
   d. D major
1. The broken chord in the bass clef, first measure, is:
   a. F major
   b. C major
   c. A minor
   d. G major

2. In the first 18 measures (first two lines) how many times is the C chord played?
   a. 8
   b. 10
   c. 12
   d. 14

3. What is the interval of the bass clef note pairs, G-C, first measure of line 4?
   a. Major 3rd
   b. Major 4th
   c. Perfect 4th
   d. Perfect 5th

4. What is the interval of the bass clef note pairs, G-B, second measure of line 4?
   a. Major 3rd
   b. Minor 3rd
   c. Diminished 4th
   d. Perfect 4th

5. There is modulation in the third line, to what key?
   a. F
   b. G
   c. A
   d. E

6. Which aspect of this movement is distinct from either of the other two movements?
   a. Modulation to a different key
   b. Sharps or flats outside the musical key
   c. Broken chords
   d. 16th notes
Appendix E: Skill Levels of Piano Players – What Level Are You?

There’s no universal standard for defining skill levels. The most formalized standards are from two British organizations, The Associated Board of the Royal Schools of Music (ABRSM) and the Royal Conservatory of Music (RCM). Both are widely used in Great Britain and Canada, and also to some extent in the U.S.

**ABRSM**
ABRSM tests for 8 levels or grades of piano playing. Their manual lists many pieces for each grade; you can download the complete list at:

https://www.mymusictheory.com/
This British website gives syllabus information and video instruction on the 8 ABRSM levels.

**RCM**
https://www.pianotv.net/about-musical-grades/
There are 10 grades in the RCM, with additional preparatory grades (kind of like kindergarten), and an ARCT level, which is the most advanced step of the RCM system. RCM’s 112 page syllabus is downloadable at:

In addition to standards set by ABRSM and RCM, the following videos and websites can give some idea of where you are in the skill level spectrum.

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Brazilian pianist Fabricio Vinheteiro has short videos on Youtube, each demonstrating 10 levels of playing difficulty, from easy to hard. Below are the song lists he plays in three different videos.

https://www.youtube.com/watch?v=p7rPHVkcRLI

Level 1 – Czerny No. 1  
Level 2 – Bach Minuet in G  
Level 3 – Clementi – Sonatina in C Major  
Level 4 – Bach – Prelude BWV 999  
Level 5 – Mozart – Sonata in C, K. 545  
Level 6 – Bach – 2 Part Invention No. 8  
Level 7 – Bach – 3 Part Invention, No. 3  
Level 8 – Bach – Well Tempered Clavier, Fugue 2  
Level 10 – Liszt – Hungarian Rhapsody, No. 2
**Level 1** – Ah! Vous dirai-je, maman
**Level 2** – Bach Minuet in G [A different minuet than in the first video]
**Level 3** – Mozart – Minute in G, K1
**Level 4** – Beethoven – Moonlight Sonata, 1<sup>st</sup> movement
**Level 5** – Mozart – Rondo Alla Turca
**Level 6** – Bach – 2 Part Invention, No. 4
**Level 7** – Scarlatti – Sonata K 531
**Level 8** – Bach – Well Tempered Clavier, Prelude No. 3
**Level 9** – Chopin – Great Brilliant Waltz
**Level 10** – Beethoven – Moonlight Sonata, 3<sup>rd</sup> Movement

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**Level 1** – London Bridge is Falling Down
**Level 2** – Happy Birthday to You
**Level 3** – Bach – Minuet in G Anh 115
**Level 4** – Beethoven – Fur Elise
**Level 5** – Bach – Invention 1 BWV 772
**Level 6** – Satie – Gymnopedie, No. 2
**Level 7** – S. Joplin – The Entertainer
**Level 8** – Bach – Prelude No. 6
**Level 9** – Debussy – Arabesque No. 1
**Level 10** – Chopin – Fantasie Impromptu

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[https://www.experiencepiano.com/whats-my-level/](https://www.experiencepiano.com/whats-my-level/)
This website gives the definitions below for early beginner, beginner, and early intermediate players.

**Early Beginner**

- May not know any note names or be able to find them on the keyboard
- Can read neither treble nor bass clef
- May be able to play by ear

**Repertoire**: none

**Beginner**

- Knows the notes and can find them on the keyboard
- May be able to read treble or bass clef, familiar with relative note values and some dynamic and tempo notations
- May know some major or minor scales and arpeggios

**Repertoire**: piano method books
**Early Intermediate**

- Can read treble and bass clefs together
- Understands key and time signatures and is familiar with basic dynamic and tempo notations
- Knows major scales and arpeggios at least up to A and E flat, may know related minor scales and can play at least two octaves (hands together or separate) at a moderate tempo

**Repertoire Examples:**
Minuet in G major, BWV 115 from *Notebooks for Anna Magdalena* by J.S. Bach/C. Petzold

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The website [www.8notes.com](http://www.8notes.com) provides sheet music based on piano skill level.

**Level 1** – Beginner: [https://www.8notes.com/piano/adults/sheet_music/?difficulty=1](https://www.8notes.com/piano/adults/sheet_music/?difficulty=1)
**Level 2** - Between Beginner and Intermediate:  
[https://www.8notes.com/piano/sheet_music/?difficulty=2](https://www.8notes.com/piano/sheet_music/?difficulty=2)
**Level 3** – Intermediate: [https://www.8notes.com/piano/adults/sheet_music/?difficulty=3](https://www.8notes.com/piano/adults/sheet_music/?difficulty=3)
All levels: [https://www.8notes.com/piano/adults/sheet_music/](https://www.8notes.com/piano/adults/sheet_music/)

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This 4-minute video has excerpts from pieces “too easy to nearly impossible.”  
[https://www.youtube.com/watch?v=cmfJBSVz3-U](https://www.youtube.com/watch?v=cmfJBSVz3-U)

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**PianoTV: Musical Grade Levels**

Allysia Van Betuw, the creator of PianoTV ([www.pianotv.com](http://www.pianotv.com)), offers a multitude of teaching videos from her studio in Saskatchewan. Several deal with piano skill levels.

[https://www.pianotv.net/about-musical-grades/](https://www.pianotv.net/about-musical-grades/)

This link is to several different videos dealing with musical grades. Grades 1, 2 and 3 should be of particular interest to Adult beginners. Clicking on each level will take you to a discussion and links to other related videos.

Ms. Van Betuw discusses the Henle Level System in another Youtube video.  
[https://www.youtube.com/watch?v=zJF9QJMFpAc](https://www.youtube.com/watch?v=zJF9QJMFpAc)

The Henle system covers only classical music, and divides pieces into easy, medium and difficult. Within each category are 3 levels, so 9 levels altogether. Examples below are from the Henle website.
https://www.henle.de/us/about-us/levels-of-difficulty-piano/

https://www.pianotv.net/2019/01/alfreds-basic-adult-piano-course-method-guide-review/
In this Youtube video Ms. Betuw discusses the popular Alfred Adult Teaching series. After going through the three books – covers shown below – she states you’ll be around a grade 2 level piano player.
Additional Recommended Resources

**Basic Music Theory Syllabuses by the author**

**Printed Books, of which there are many; below are just a few**
*Music Theory for Dummies*. A comprehensive guide, which includes all aspects of basic theory, including those not covered in this syllabus

*Idiot’s Guide to Music Theory* is in the same genre as the Dummies book: Comprehensive and basic.

*Basic Music Theory 4th Edition* also comes as an audio book, though without musical passages. Audio serves more as a refresher after you’ve read the book.
Music Theory: From Absolute Beginner to Expert, is another book that comes with an audio version.  

Alfred’s Essential of Music Theory  
If you like a workbook approach, Alfred’s text is highly recommended. The answers come in a separate volume.  

Encyclopedic Sources - websites  
- Highly recommended is www.basicmusictheory.com. There you can look up any scale, chord or interval, and have a full explanation.  
- Another comprehensive website is www.musictheory.net  
- Piano World is a website for everything piano. It includes piano forum, an online discussion of every conceivable topic related to pianos and piano playing  
https://pianoworld.com/
PianotTV.net - Comprehensive set of Youtube videos

- www.pianotv.net is gateway to hundreds of instructional videos by Allysia Van Butew, an excellent teacher in Saskatchewan. I’ve also included several of her video links in Appendix E. Two other links, to her online courses and multiple videos, are listed below.
  
  https://www.pianotv.net/pianotvcourses/
  https://www.youtube.com/channel/UCz0PmHG0RvQHzlEsFU-4uQ

Among her many videos are those that address the following questions/subjects:

- Do you need a piano teacher?
  https://www.youtube.com/watch?v=09N3FUs46eU

- Piano books for adult beginners
  https://www.youtube.com/watch?v=b6cGELJwfDQ

- How long does it take to learn to play piano?
  https://www.youtube.com/watch?v=liPKxl8SdM

- Adult beginners at the piano – 12 problems and solutions
  Part 2:  https://www.pianotv.net/2017/02/adult-beginners-at-the-piano/

- Am I too old to learn piano?
  https://www.youtube.com/watch?v=liPKxl8SdM

Music Theory Youtube Videos

There are many Youtube videos explaining various aspects of theory, including those in the pianotv series above, plus several listed in the syllabus sections. Also check out:

- Multipart free music theory course that covers all instruments
  https://www.youtube.com/watch?v=6gHEIF0rT2w&list=PLB585CE43B02669C3

- Understanding Music Theory in One Hour – Animated Music Lesson
  https://www.youtube.com/watch?v=kvGY18SQBJ0

Live Online Piano Lessons for Adults

https://mccarthypiano.com/

McCarthy Piano will match you with an online teacher

Internet-based Piano Instruction for Adults

THE MUSICAL WEBB: https://www.themusicalwebb.com/
The founder, New Jersey pianist Ayana Webb, has a comprehensive web-based program aimed at beginners.
  https://www.themusicalwebb.com/p/piano-lessons-beginner

PIANO CAREER ACADEMY: https://www.pianocareeracademy.com/
The founder, Russian pianist Ilincia Vartic, has a 23-minute Youtube video for beginners is at
  https://www.youtube.com/watch?v=_So-VEyBZ3w
Music Theory Courses
There are several free or low-cost online music theory courses designed for beginners. The three I am familiar with are listed below.

https://www.coursera.org/learn/edinburgh-music-theory

https://www.coursera.org/learn/music-theory

https://www.coursera.org/specializations/musicianship-specialization

Piano Marvel
https://www.pianomarvel.com/
Piano is a unique online teaching program, which requires a computer or iPad. It is available by monthly or yearly subscription. You play what’s on the screen. If you have a digital piano or keyboard, you get instant visual feedback on missed notes on any piece you play.
Sheet music based on piano skill level
www.8notes.com

Piano Simulator on Internet (no download required)
https://virtualpiano.net/

Social Media – Facebook Groups
Music Theory: https://www.facebook.com/groups/musictheory/
FB Music Theory: https://www.facebook.com/groups/169792463833954/
Music Theory Buffs: https://www.facebook.com/groups/382885618771737/
Adult Piano Learners: https://www.facebook.com/groups/adultpianolearners/learning_content/

Pianist Magazine
In addition to articles about pianists and piano playing, this British publication includes 40 pages of sheet music, along with a CD demonstrating several of them. The pieces are arranged from beginner to advanced level. Individual print copies can be purchased at some Barnes & Noble bookstores, and digital copies online at https://www.pianistmagazine.com/. Their website also includes several short videos aimed at beginners
Answers to Multiple Choice Questions

Sections 1-14

Section 1: Half Steps and Whole Steps

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Section 2: Music Scales – Definition of Major and Minor Scales

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Section 3: Music Scales – Relation of Major to Minor

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Section 4: More on Scales and Modes

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Section 5: Music Intervals

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### Section 6: Tritones, Compound Intervals, and Interval Inversions

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### Section 7: Three-note Chords: Major, minor & diminished

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### Section 8: Three-note chord inversions

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### Section 9: Four-note chords: sevenths

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### Section 10: More on seventh chords – 3-note sevenths and Inversions

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### Section 11: Chords in the bass clef

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Section 12: Chords in lead sheets and song sheets

1  d
2  a
3  d
4  b
5  c

Section 13: Chord progressions

1  c
2  d
3  d
4  c
5  a

Section 14: Music Keys

1  c
2  a
3  a
4  b
5  b
Appendix A: Circle of Fifths

1  d
2  a
3  d
4  b
5  c

Appendix B: Music Modes

1  c
2  c
3  b
4  c
5  a

Appendix C: Petzold Minuet in G

1  c
2  b
3  b
4  a
5  b
6  c

Appendix D: Clementi Sonatina

First Movement - Spiritoso

1  a
2  b
3  b
4  c
5  c
6  c

Second Movement - Andante

1  b
2  b
3  b
4  d
5  c
6  c
Third Movement - Vivace

1       b
2       c
3       c
4       a
5       b
6       d

END OF SYLLABUS