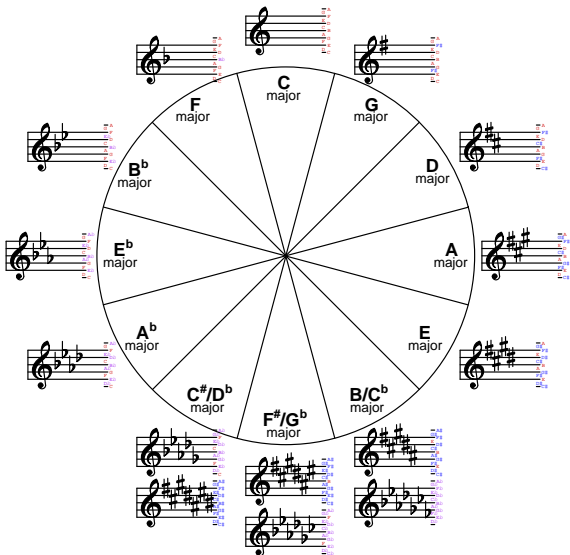


Tony R.
Kuphaldt

The Circle of Fifths



Why Study Music Theory?

Many *extremely* proficient musicians play quite well with little or no knowledge of music theory, so why study it?

The answer is very practical and very simple: *music theory saves you from having to learn by trial and error*, and that makes the learning process *faster!*

This tutorial begins with a review of *intervals*, *scales*, and *keys*. After that, it explores how the *Circle of Fifths* is constructed and what it means.

The Purpose of This Tutorial

This tutorial will teach you to understand the meaning of the *Circle of Fifths*. Mastering these concepts will enable you to:

- More easily find the right tones when playing by ear
- Identify the “key” of a tune or song from the number of sharps or flats in the key signature

You will maximize your learning by experimenting with all these concepts on your instrument(s) while you read the tutorial.

Any text set in *italicized red* denotes an exercise recommended for immediate application or a question for you to answer.

Starting Assumptions

This tutorial assumes prior knowledge of certain music theory topics, including *intervals*, *scales*, and *keys*. A review of these topics precedes the main tutorial on the Circle of Fifths.

This tutorial also assumes a context of Western music, particularly the common genres of folk and classical. In other words, nothing too crazy . . .


Intervals

A musical *interval* is the difference¹ in pitch between two tones. The basic unit of measurement for intervals is the *step*.

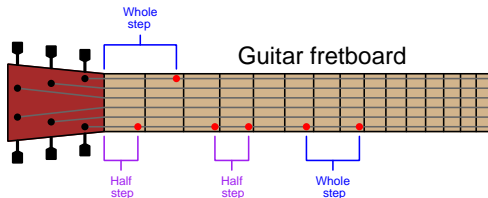
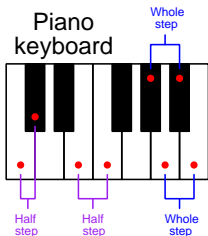
One half-step is the difference in pitch between two successive frets on a guitar, or between two immediately adjacent keys on a piano. When we modify a natural tone to make it either “sharp” or “flat” we are applying a half-step interval.

One whole-step is equal to two half-steps: a distance of two frets on a guitar, or two keys on a piano with one key in between.

Whole- and half-steps are alternatively referred to as *whole-tone* and *semi-tone* intervals.

¹Mathematically, an interval is a *ratio* of pitch frequencies. 

Half- and whole-step examples



Try playing half-step and whole-step intervals on your instrument to explore what they sound like!

How many steps are in one octave (i.e. the point at which the tone-letters repeat)? Prove it by playing a one-octave interval on your instrument!

Intervals² through one octave

Each octave is a *doubling* of pitch, which is why you get an octave tone when you fret a string at half-length.

Steps	Interval name	Symbol	Approximate pitch ratio
(none)	Perfect Unison	P1	$2^{0/12} = 1.000$ or 1:1
H	Minor Second	$\bar{m}2$	$2^{1/12} = 1.059 \approx 16:15$
W	Major Second	M2	$2^{2/12} = 1.122 \approx 9:8$
W+H	Minor Third	$\bar{m}3$	$2^{3/12} = 1.189 \approx 6:5$
2W	Major Third	M3	$2^{4/12} = 1.2599 \approx 5:4$
2W+H	Perfect Fourth	P4	$2^{5/12} = 1.335 \approx 4:3$
3W	Augmented Fourth (a.k.a. "tri-tone") Diminished Fifth	aug4 dim5	$2^{6/12} = 1.414 \approx 17:12$
3W+H	Perfect Fifth	P5	$2^{7/12} = 1.498 \approx 3:2$
4W	Minor Sixth	$\bar{m}6$	$2^{8/12} = 1.587 \approx 8:5$
4W+H	Major Sixth	M6	$2^{9/12} = 1.682 \approx 5:3$
5W	Minor Seventh	$\bar{m}7$	$2^{10/12} = 1.782 \approx 9:5$
5W+H	Major Seventh	M7	$2^{11/12} = 1.888 \approx 15:8$
6W	Perfect Octave	P8	$2^{12/12} = 2.000$ or 2:1

²Pitch ratios vary slightly according to how the instrument is constructed and tuned, an advanced concept called *temperament*.▶

Intervals define melodies

The defining tonal characteristic of any melody are the intervals between successive tones. The actual tones don't matter so long as the intervals remain unchanged.

*Try playing the first few tones of "Mary Had A Little Lamb" beginning with E: **E-D-C-D-E-E-E***

*Now try playing the same sequence of intervals beginning with B instead of E: **B-A-G-A-B-B-B***

In either case the melody is still "Mary Had A Little Lamb" despite using completely different tones because the same intervals (whole-steps) are used in each case!

Scales

A *scale* is a particular sequence of tones played in either ascending or descending order of pitch. *Any* such sequence is fair to call a “scale,” but some scales are more common than others.

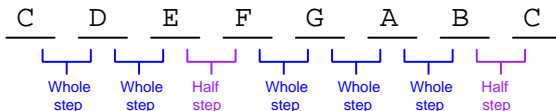
Examples of common scale types include *major*, *natural minor*, and *harmonic minor*.

The pattern of intervals between scale-tones defines the quality (major, minor) of that scale. Every major scale, for example, exhibits the exact same interval pattern between its tones.

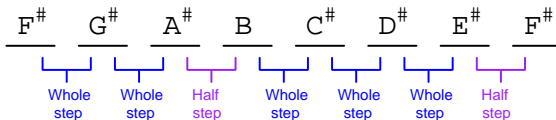
Major scales

Major scales follow the interval³ sequence W-W-H-W-W-W-H.
C major and F-sharp major are shown as examples:

C major scale:



F# major scale:

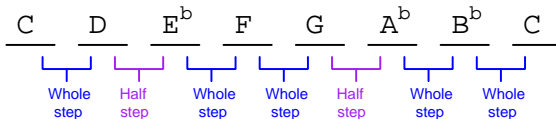


³W = Whole step ; H = Half step

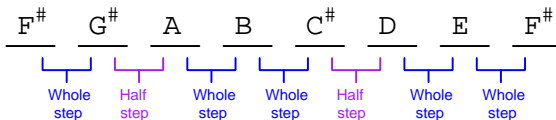
Natural minor scales

Natural minor scales follow the interval⁴ sequence W-H-W-W-H-W-W. Again, C and F-sharp are shown as scale examples:

C natural minor scale:



F[#] natural minor scale:

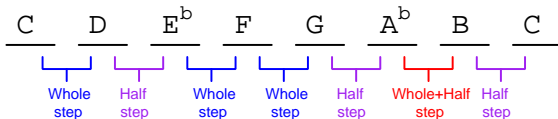


⁴W = Whole step ; H = Half step

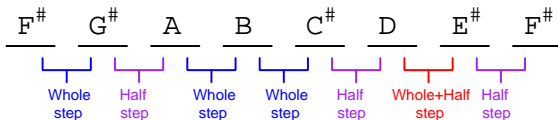
Harmonic minor scales

Harmonic minor scales follow the interval⁵ sequence W-H-W-W-H-(W+H)-H. Again, C and F-sharp are shown as scale examples:

C harmonic minor scale:



F[#] harmonic minor scale:



⁵W = Whole step ; H = Half step

Scale Degrees

A common way to describe tones within a scale is by their numerical order in the sequence. The beginning tone of any scale is called the *tonic* and is numbered as degree 1. Successive ascending tones are numbered accordingly.

For example, the scale of C major (C-D-E-F-G-A-B-C) would have its tones labeled 1-2-3-4-5-6-7-8 respectively. Notice that the last tone in this scale (C) is the eighth degree, which is why it is called the *octave*.

Since we know that intervals really define the tonal characteristic of any musical piece, we may describe a melody by its degree number rather than by tone letters. For example, the opening tones of “Mary Had A Little Lamb” could be described as 3-2-1-2-3-3-3 regardless of the starting tone (e.g. E-D-C-D-E-E-E, B-A-G-A-B-B-B, etc.):

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Two important concepts in music are *tension* and *resolution*. These are subjective terms, referring to sensations experienced by the listener when hearing different intervals within a scale or tune.

Resolution may be easily illustrated by playing a major scale.

For example, try playing the D major scale shown here:

D-E-F[#]-G-A-B-C[#]-D

That sense of *completion* or *satisfaction* upon returning to the octave D tone is the musical phenomenon of the scale *resolving to its tonic*. The scale begins on D, then increases pitch in whole- and half-steps, and finally “returns home” to D.

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Tension may be illustrated just as easily by playing a *partial* scale. *Try playing the D major scale again, but this time stop short of playing the entirety. Some examples are shown here:*

D-E-F[#]-G-A-B-C[#] . . .

D-E-F[#]-G-A-B . . .

That sense of *incompleteness* or *irresolution* created by the partial scale is the musical phenomenon of *tension*.

In playing partial D major scales, which ending degrees of the scale result in the greatest tension?

Tension and Resolution

Tension and resolution make tunes interesting, much like storytelling: tension in a story builds to a climax, after which there is resolution.

Not all melodies end in perfect resolution, although many do. A compositional technique used in many folk tunes is to end the tune on a non-resolving note (i.e. end with a feeling of tension) but begin again either on the resolving tone or on one with less tension than the last. This makes everyone want to repeat the tune in order to make it seem “complete”.

An example of this is the traditional Irish slip jig *Drops Of Brandy* which ends on an E note although the tune is clearly centered around D. Another example is the traditional Irish reel *The Wind That Shakes The Barley* which is also centered around D but ends on a B note.

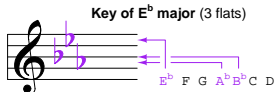
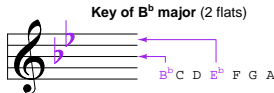
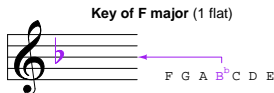
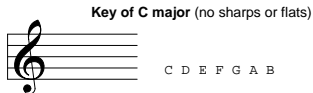
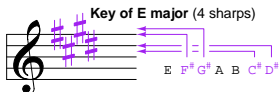
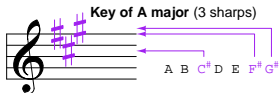
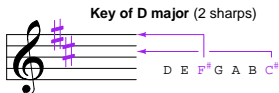
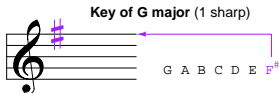
A *key* is a set of tones representing a musical “palette” from which tunes may be made, centered around one particular tone called the *tonic*. When played as a scale, the tonic will be the first and last tone of that scale and is the resolving tone for any melody constructed from that key.

For example, the key of A major consists of all the tones comprising an A major scale (A-B-C[#]-D-E-F[#]-G[#]-A). A *key*, however, does not imply any particular order of playing as does a *scale*; e.g. the key of A major is still the key of A major if the tones aren't played in strict ascending or descending order.

A musical piece written in a particular key need not begin on the tonic tone, but it often “resolves” to the tonic at the closure of the piece and at certain critical points between.

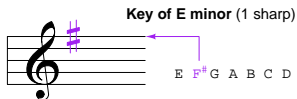
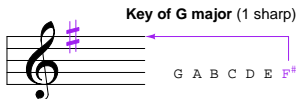
Key signatures

A cluster of sharp or flat symbols drawn near the clef in sheetmusic marks all the non-natural tones in that key. Some of the more common key signatures are shown here:



Key signatures

It is important to realize that a key signature alone does not define the key of a tune. All it defines are the tones used within that key. For example, compare these two different keys having the exact same signatures:



The difference between these two keys is the tonic: G major resolves “G” while E minor resolves to “E” despite using the exact same tones. *Try playing each of these keys as a simple scale to hear the difference!*

G-A-B-C-D-E-F[#]-G versus **E-F[#]-G-A-B-C-D-E**

Key resolution

As we saw in the previous example, simply having a particular set of tones is not enough to define a key. An additional, essential component of any key is a resolving tone (the “tonic”) providing a “home” or “focal point”.

Determining the key of any melody is therefore not as straight-forward as simply identifying the key signature. We must listen to the piece in order to determine which tone it resolves to, which then gives us the letter-name of that key.

Generally speaking, the resolving tone will be the letter-name of the last note played. However, bear in mind that some tunes don't end in perfect resolution, but rather purposely end in tension for artistic effect!

Key resolution

Try playing “Mary Had A Little Lamb” beginning on any tone you wish. After picking out all the tones making up this simple melody, see if you can determine which tone it resolves on. A good test is this: would the melody sound complete if it ended on that tone?

Does “Mary Had A Little Lamb resolve on its first tone?

Does “Mary Had A Little Lamb resolve on its last tone?

Try this same experiment playing any other tune that comes to mind. Attempt it with both major and minor tunes!

Building the Circle of Fifths

Too often the Circle of Fifths is simply presented to students with little or no explanation for why it exists. Here, we will *build* our own Circle of Fifths step-by-step so you can see how it is constructed.

This section of the tutorial is designed to be interactive: the following pages contain blanks for you to write tone letters as you build one major scale after another. You may do this by following the pattern of intervals (whole-steps and half-steps) comprising a major scale, and/or you may do this by finding the right tones on your instrument by ear, each time listening for the distinctive quality of a major scale.

Following each fill-in-the-blank page is another page showing the answer, so you may check your own work. Following that page is another analyzing the new major key and its place in the Circle of Fifths.

Building the Circle of Fifths (continued)

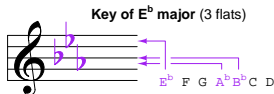
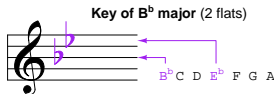
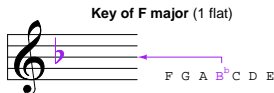
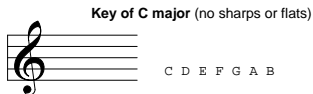
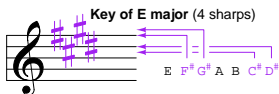
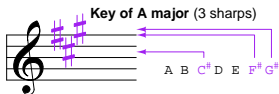
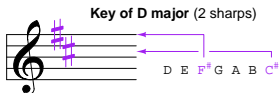
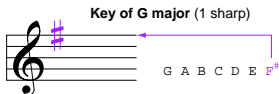
While this step-by-step exploration of the Circle of Fifths encompasses the entire Circle, this may not be strictly necessary for your practical use. If you are a folk musician, for example, the majority of tunes are written only using keys appearing in the upper-right quadrant of the Circle (keys of C, G, D, and A).

Feel free to ignore any portion(s) of the Circle that do not apply to the music you play, if you find the full exploration too tedious.

In each of these steps we will use a piano keyboard to reference tone-letters. This is done not out of a bias toward keyboard instruments, but rather because *keyboards make sense of those tone-letters*. It is not apparent, for example, why any tone should be called “sharp” or “flat” on a guitar fretboard, but on a keyboard it makes perfect sense: the sharps and flats are colored black while the “natural” tones are colored white.

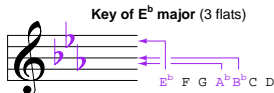
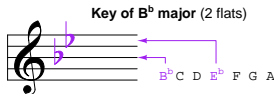
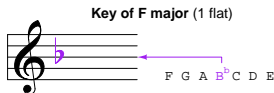
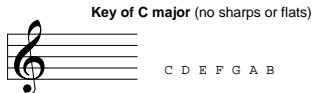
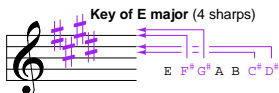
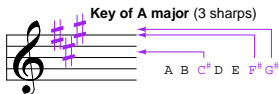
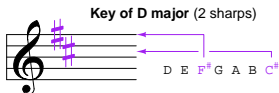
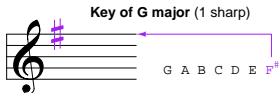
An Important Pattern

While reviewing key signatures earlier, you may have noticed a pattern as successive sharps or flats were added to each signature:



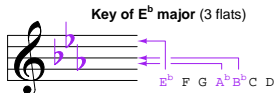
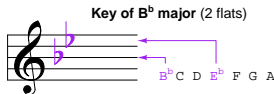
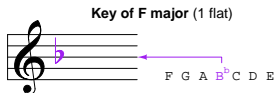
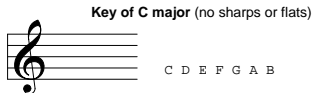
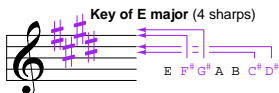
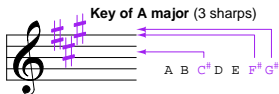
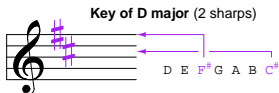
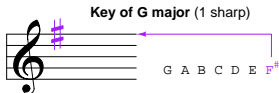
Adding Sharps

Start with G major. From there, how can we tell D major will be the next-sharper key? From D major, how may we identify A major as next? Do you see a pattern?



Adding Flats

Start with C major. From there, how can we tell F major will be the next-flatter key? From F major, how may we identify B-flat major as next? Do you see a pattern?



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Adding sharps: to identify the tonic of the next-sharper key, just look at the *fifth* degree of the major key you're currently in. This is why G major leads to D major: D is the fifth-degree tone in the G major key.

Adding flats: to identify the tonic of the next-flatter key, just look at the *fourth* degree of the major key you're currently in. This is why C major leads to F major: F is the fourth-degree tone in the C major key.

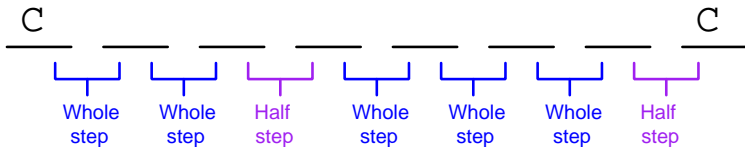
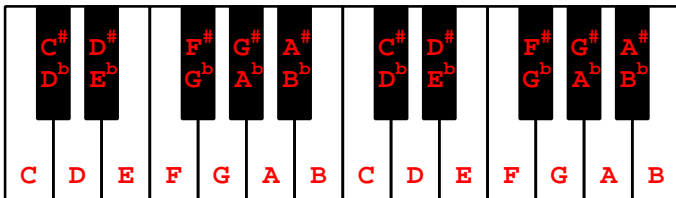
A Circle Revealed

If we keep following either of these patterns, we will end up covering all twelve major keys and return where we started. In other words, the sequence of major keys in order of number of sharps or flats in the key signature forms a *circle*. This is why we call it the *Circle of Fifths*: by picking the fifth-degree tone of each key as the tonic of the next-sharper key, we may plot a circle of all twelve keys (going clockwise). Of course, we could also form the same circle by picking fourth-degree tones and going counter-clockwise, which is why the same Circle is alternatively called the *Circle of Fourths*.

What comes next in this tutorial is a step-by-step construction of the Circle of Fifths, by picking the fifth-degree tone of each major key as the tonic of the next key. We will do this twelve times in order to prove that the sequence forms a complete circle.

The Key of C Major

Select the proper tone letters from the piano keyboard to form a C major scale:



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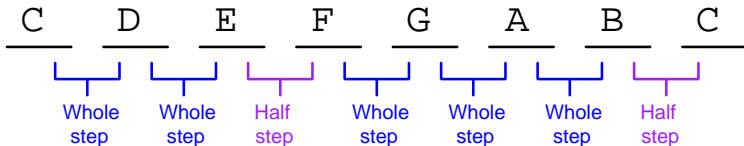
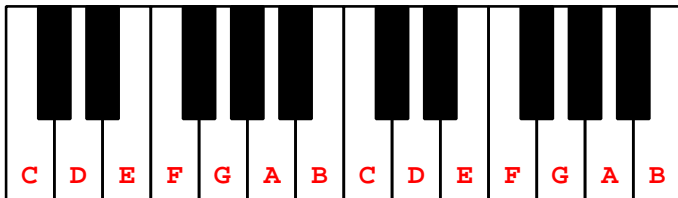
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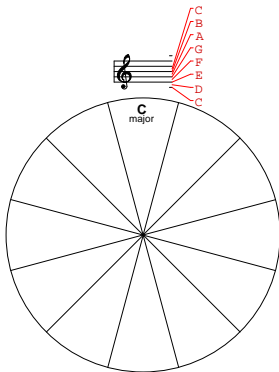
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The Key of C Major

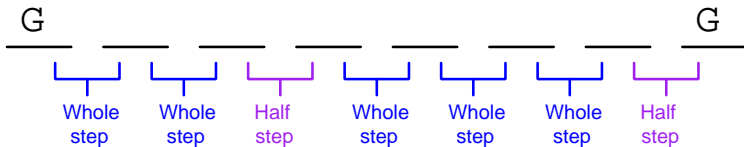
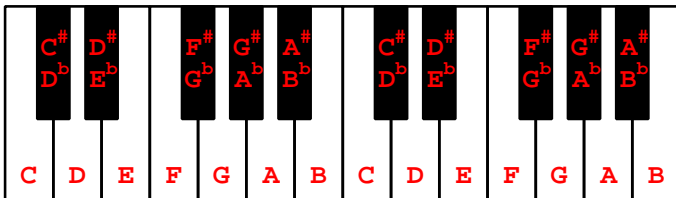
C major is the first key in the Circle. It contains no sharps or flats, only “natural” tones:



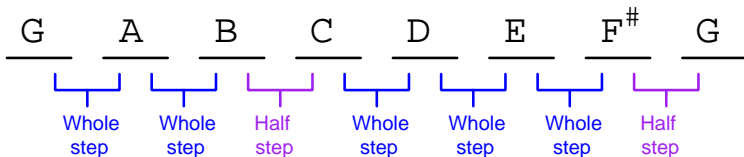
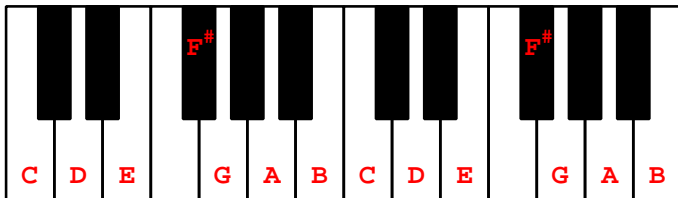
The next-clockwise key's tonic will be the *fifth* degree of this key: C-D-E-F-**G**-A-B-C

The Key of G Major

Select the proper tone letters from the piano keyboard to form a G major scale:

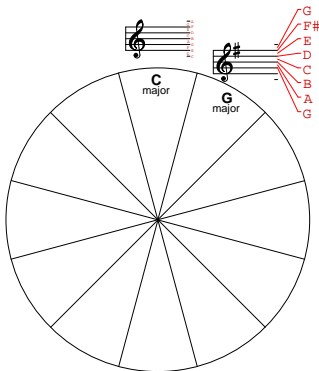


The Key of G Major (answer)



The Key of G Major

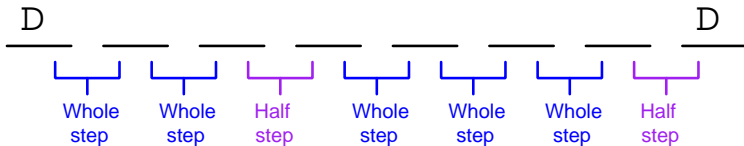
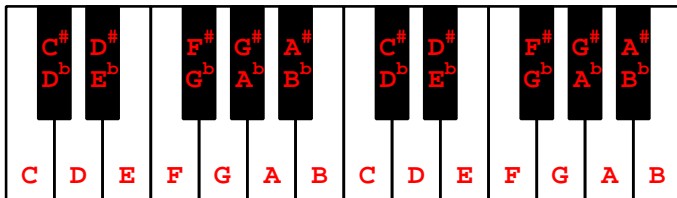
G major is one step clockwise from C major in the Circle. It contains one sharp tone (F#):



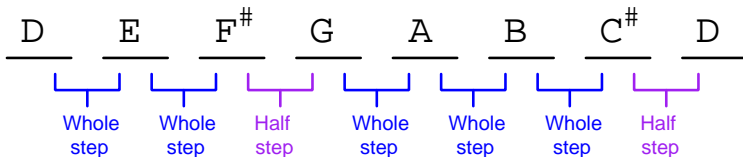
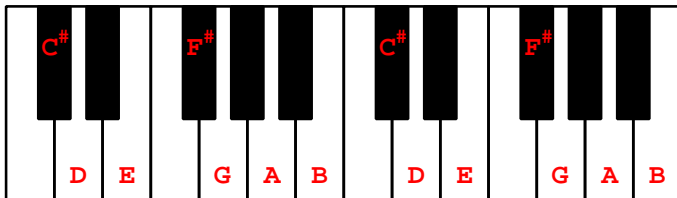
The next-clockwise key's tonic will be the *fifth* degree of this key: G-A-B-C-**D**-E-F#-G

The Key of D Major

Select the proper tone letters from the piano keyboard to form a D major scale:

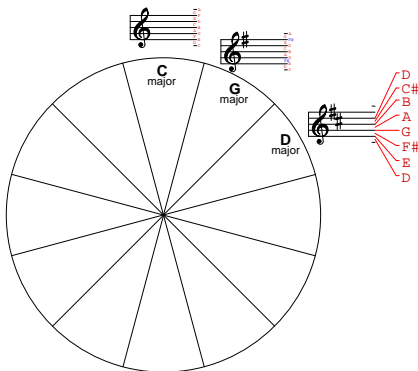


The Key of D Major (answer)



The Key of D Major

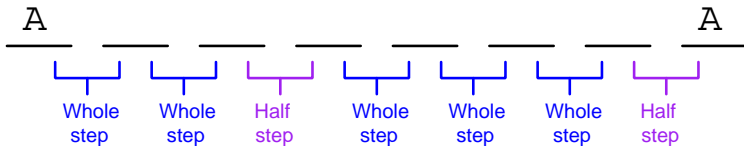
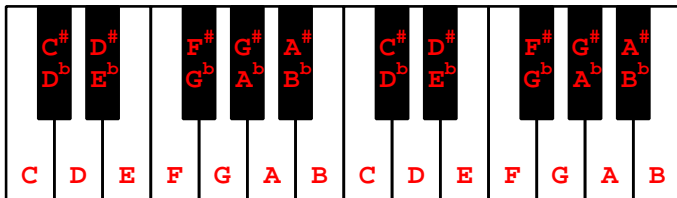
D major is one step clockwise from G major in the Circle. It contains two sharp tones (F \sharp and C \sharp):



The next-clockwise key's tonic will be the *fifth* degree of this key: D-E-F \sharp -G-**A**-B-C \sharp -D

The Key of A Major

Select the proper tone letters from the piano keyboard to form an A major scale:



The Key of A Major (answer)

The Circle
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Circle

So What?

Circle of tones

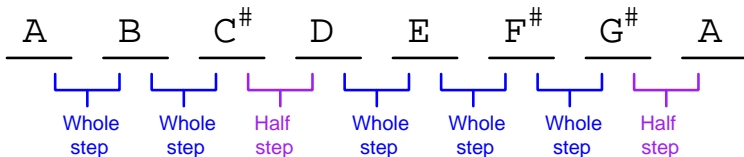
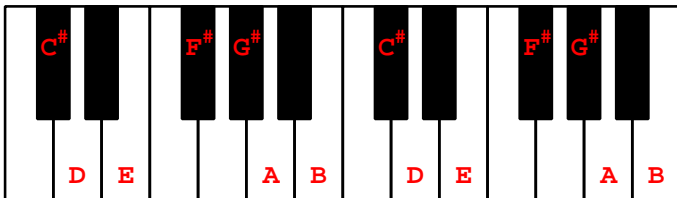
Circle of
chords

Circle of keys

Practice Ideas

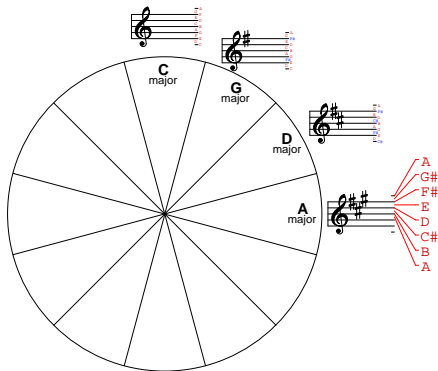
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The Key of A Major

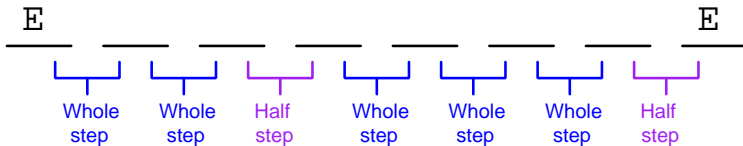
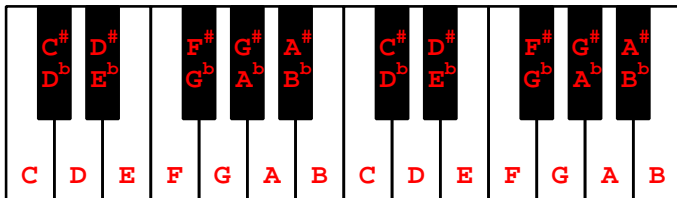
A major is one step clockwise from D major in the Circle. It contains three sharp tones (F[♯], C[♯], and G[♯]):



The next-clockwise key's tonic will be the *fifth* degree of this key: A-B-C[♯]-D-**E**-F[♯]-G[♯]-A

The Key of E Major

Select the proper tone letters from the piano keyboard to form an E major scale:



The Key of E Major (answer)

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So What?

Circle of tones

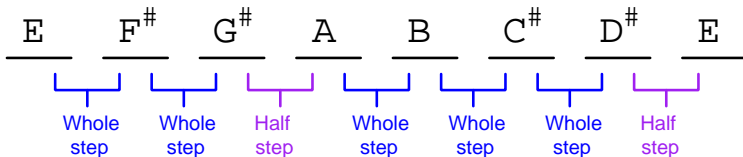
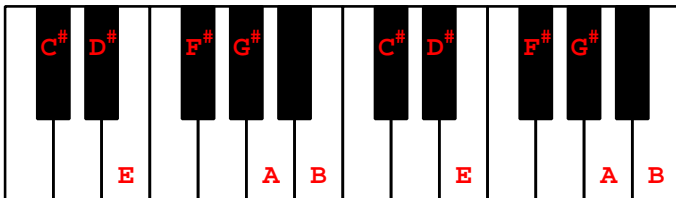
Circle of
chords

Circle of keys

Practice Ideas

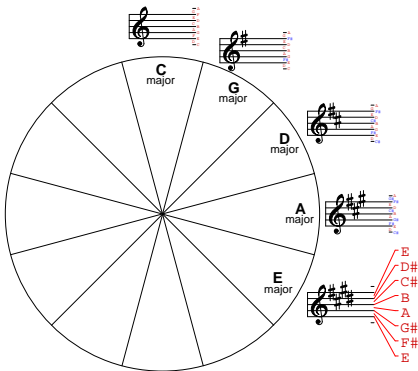
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The Key of E Major

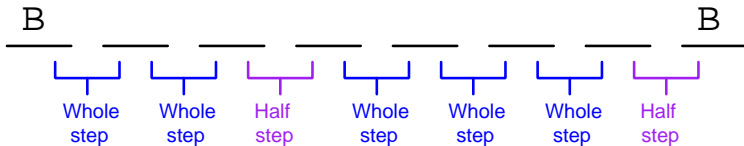
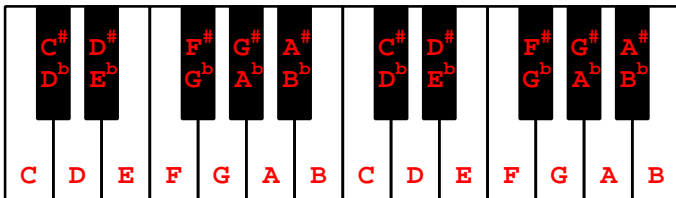
E major is one step clockwise from A major in the Circle. It contains four sharp tones (F[#], C[#], G[#], and D[#]):



The next-clockwise key's tonic will be the *fifth* degree of this key: E-F[#]-G[#]-A-**B**-C[#]-D[#]-E

The Key of B Major

Select the proper tone letters from the piano keyboard to form a B major scale:



The Key of B Major (answer)

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Circle

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Circle of tones

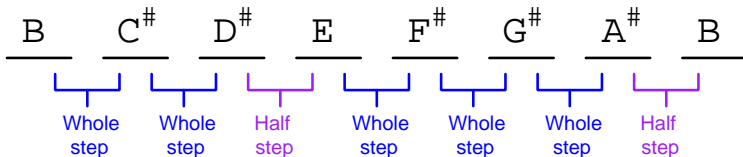
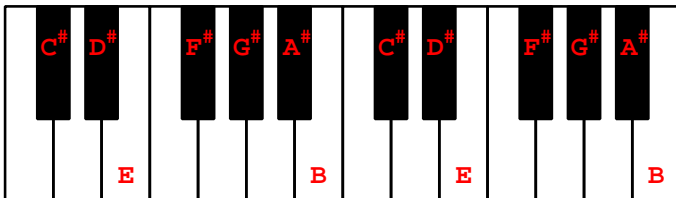
Circle of
chords

Circle of keys

Practice Ideas

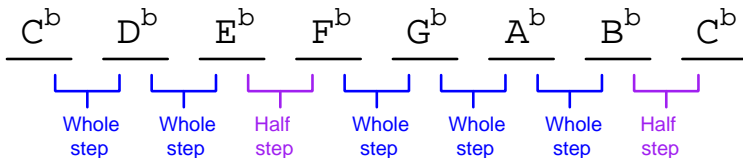
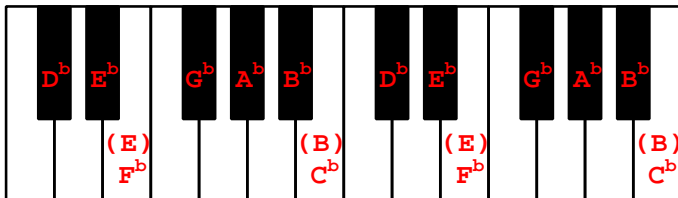
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The Key of C^b Major (answer)

A *second* set of tone-letters is also possible for this key, making B major synonymous with C-flat major:



The Key of B/C^b Major (continued)

It may seem very strange to refer to the B tone as C-flat, but remember that all a “flat” represents is a half-step interval downward in pitch. Following our convention of using each of the seven tone letters just once within an octave, either way is valid to represent the B major / C-flat major key:

Represented as B major:

B-C[#]-D[#]-E-F[#]-G[#]-A[#]-B

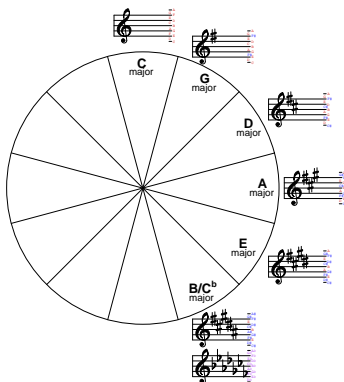
Represented as C-flat major:

C^b-D^b-E^b-F^b-G^b-A^b-B^b-C^b

This is one of three so-called *enharmonic keys* in the Circle of Fifths with dual possible namings. In case you're wondering if this dual-naming might be possible in any of the previous keys, *go try it!* You will find it won't work.

The Key of B/C^b Major

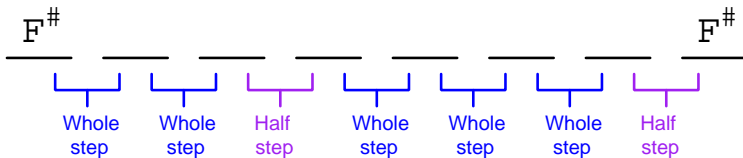
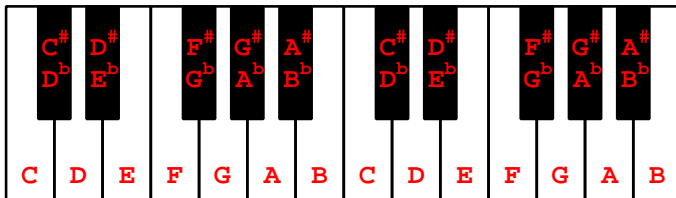
B major is one step clockwise from E major in the Circle. It contains five sharp tones (F[#], C[#], G[#], D[#], and A[#]):



The next-clockwise key's tonic will be the *fifth* degree of this key: B-C[#]-D[#]-E-**F[#]**-G[#]-A[#]-B

The Key of F[#] Major

Select the proper tone letters from the piano keyboard to form an F-sharp major scale:



The Key of F[#] Major (answer)

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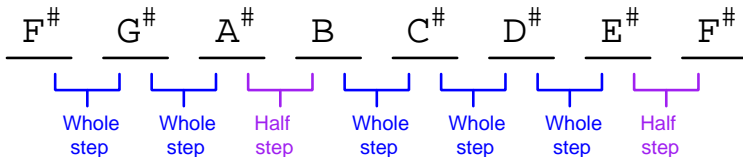
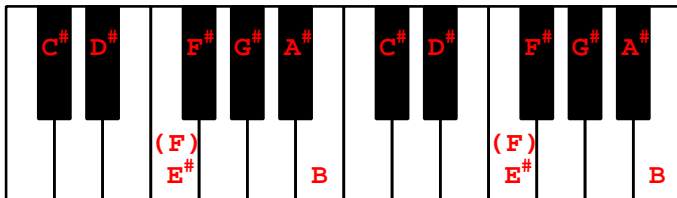
Circle of
chords

Circle of keys

Practice Ideas

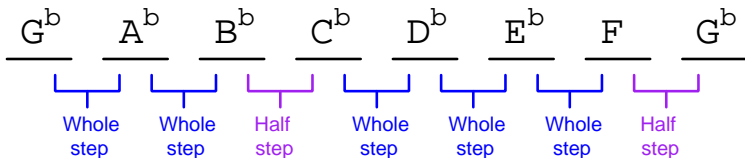
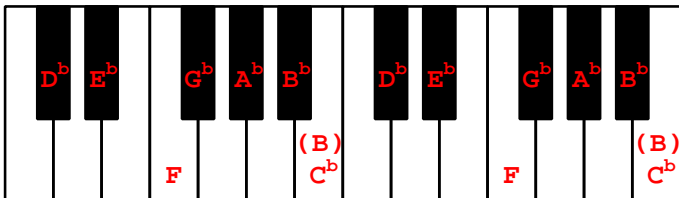
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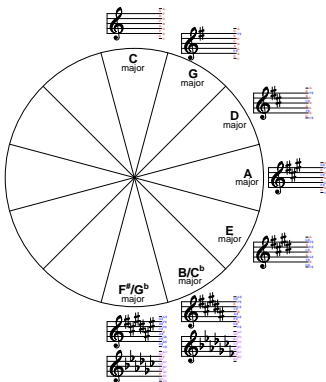
The Key of G^b Major (answer)

A *second* set of tone-letters is also possible for this key, making F-sharp major synonymous with G-flat major:



The Key of F[#]/G^b Major

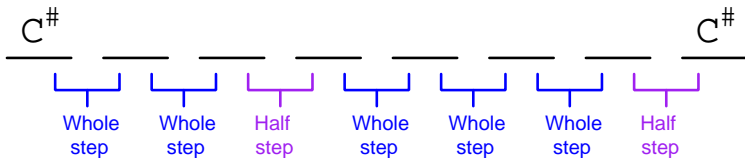
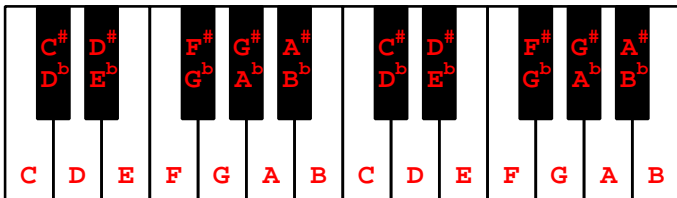
F-sharp major is one step clockwise from B major in the Circle. It contains six sharp tones (F[#], C[#], G[#], D[#], A[#], and E[#]):



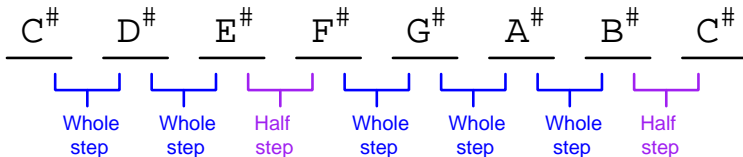
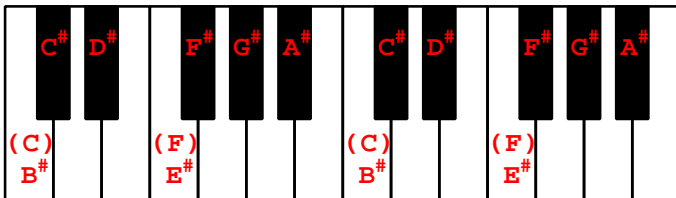
The next-clockwise key's tonic will be the *fifth* degree of this key: F[#]-G[#]-A[#]-B-**C[#]**-D[#]-E[#]-F[#]

The Key of C[#] Major

Select the proper tone letters from the piano keyboard to form a C-sharp major scale:

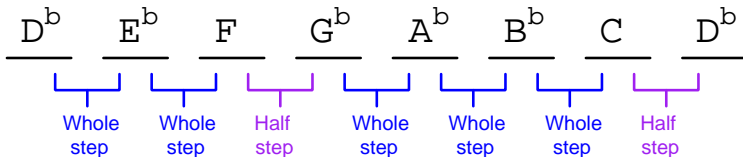
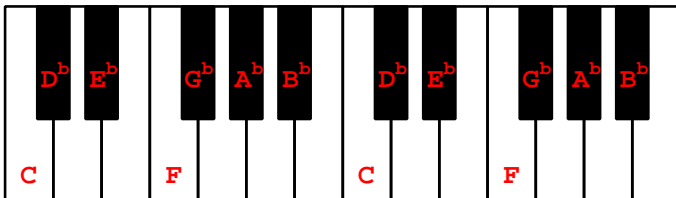


The Key of C[#] Major (answer)



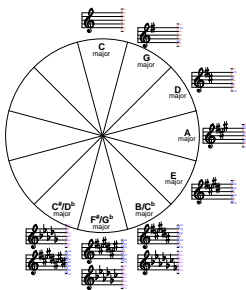
The Key of D^b Major (answer)

A *second* set of tone-letters is also possible for this key, making C-sharp synonymous with D-flat major:



The Key of C[#]/D^b Major

C-sharp major is one step clockwise from F-sharp major in the Circle, with seven sharp tones (F[#], C[#], G[#], D[#], A[#], E[#], and B[#]):



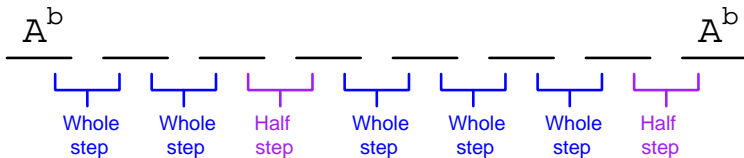
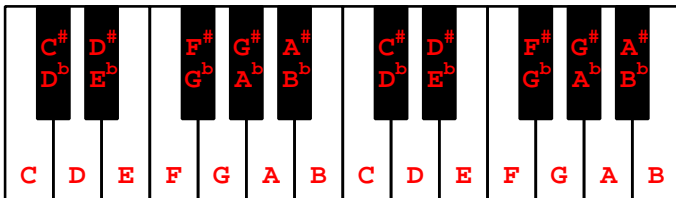
The next-clockwise key's tonic will be the *fifth* degree of this key: C[#]-D[#]-E[#]-F[#]-**G[#]**-A[#]-B[#]-C[#]. However, for reasons revealed in the next exercise, we cannot call the next key *G-sharp major*.

The Key of C[#]/D^b Major

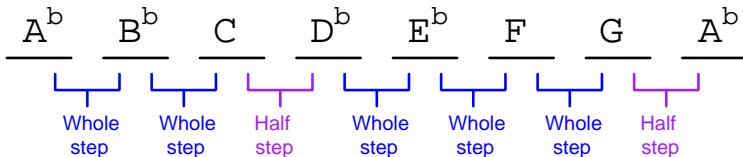
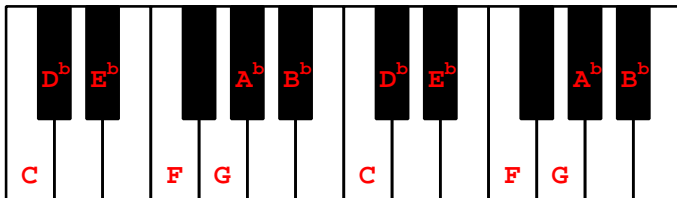
The next-clockwise key's tonic must still be the *fifth* degree of this key, but for reasons we will soon understand we must base this progression off of the enharmonic name of the present key (D-flat major): D^b-E^b-F-G^b-**A^b**-B^b-C-D^b

The Key of A^b Major

Select the proper tone letters from the piano keyboard to form an A-flat major scale:



The Key of A^b Major (answer)



The Key of A^b Major (answer)

A *second* set of tone-letters is not possible for this key as it was with B major, F-sharp major, and C-sharp major. Those are the only three *enharmonic keys* in the Circle of Fifths.

A^b major written correctly:

A^b-B^b-C-D^b-E^b-F-G-A^b

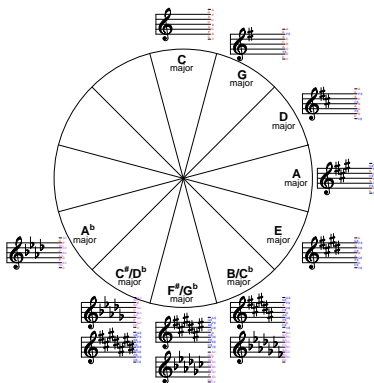
A failed attempt to write it as G[#] major:

G[#]-A[#]-B[#]-C[#]-D[#]-E[#]-**G**-G[#]

Note how the letter G is repeated and the letter F is omitted in the failed attempt. This is why the key of A-flat has no enharmonic equivalent: one cannot be correctly named following the convention of using all seven tone-letters.

The Key of A^b Major

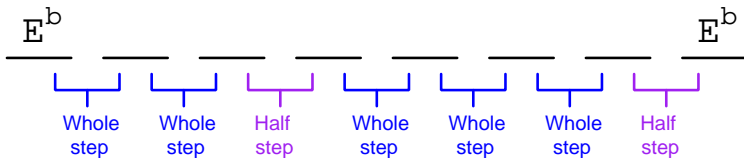
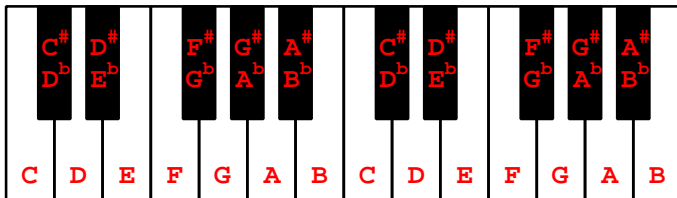
A-flat major is one step clockwise from D-flat major (C-sharp major) in the Circle, with 4 flat tones (A^b, B^b, D^b, and E^b):



The next-clockwise key's tonic will be the *fifth* degree of this key: A^b-B^b-C-D^b-**E^b**-F-G-A^b

The Key of E^b Major

Select the proper tone letters from the piano keyboard to form an E-flat major scale:



The Key of E^b Major (answer)

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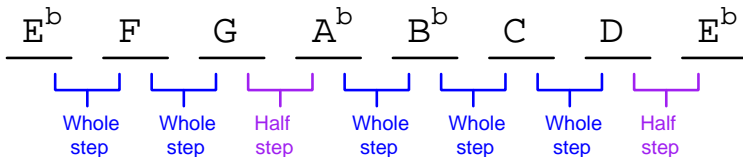
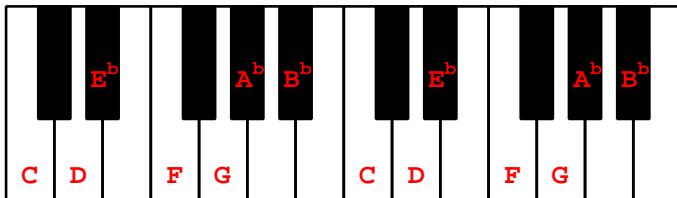
Circle of
chords

Circle of keys

Practice Ideas

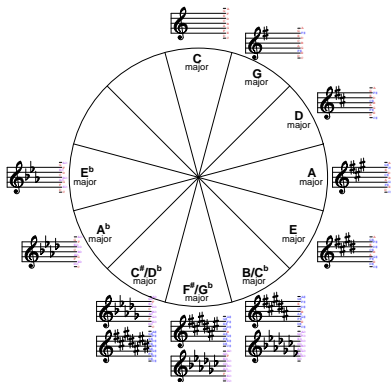
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The Key of E^b Major

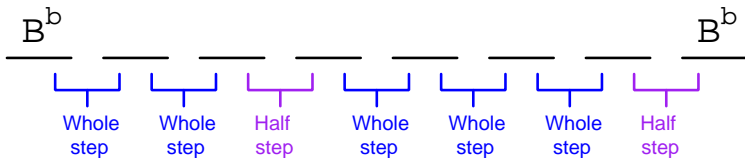
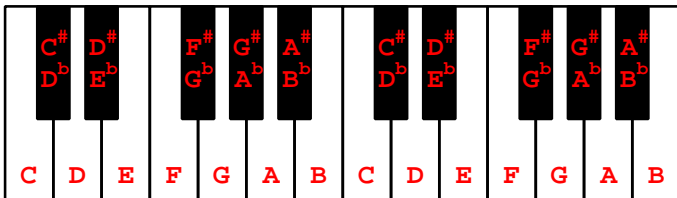
E-flat major is one step clockwise from A-flat major in the Circle, with 3 flat tones (A^b, B^b, and E^b):



The next-clockwise key's tonic will be the *fifth* degree of this key: E^b-F-G-A^b-**B^b**-C-D-E^b

The Key of B^b Major

Select the proper tone letters from the piano keyboard to form a B-flat major scale:



The Key of B^b Major (answer)

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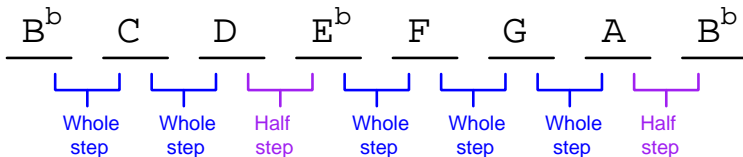
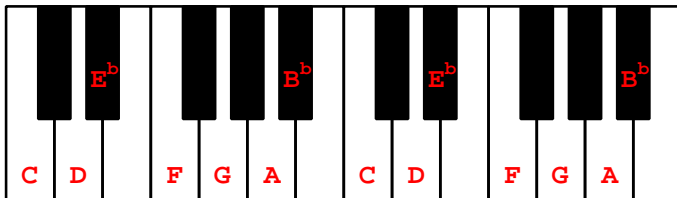
Circle of
chords

Circle of keys

Practice Ideas

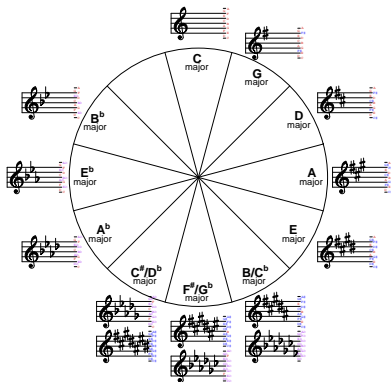
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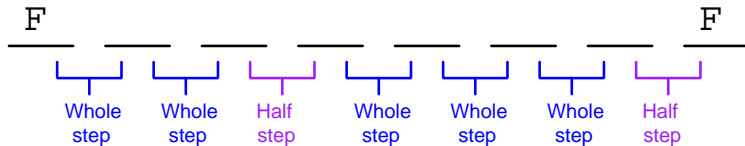
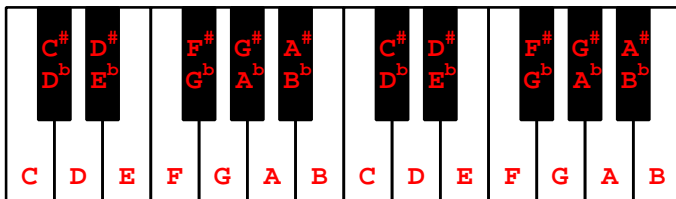
The Key of B^b Major

B-flat major is one step clockwise from E-flat major in the Circle, with 2 flat tones (B^b, and E^b):



The next-clockwise key's tonic will be the *fifth* degree of this key: B^b-C-D-E^b-**F**-G-A-B^b

Select the proper tone letters from the piano keyboard to form an F major scale:



The Key of F Major (answer)

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Circle of tones

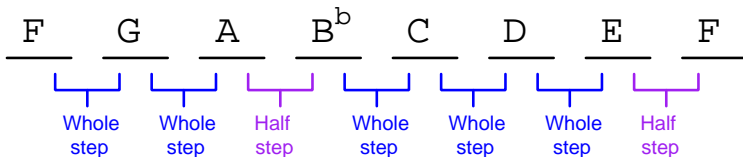
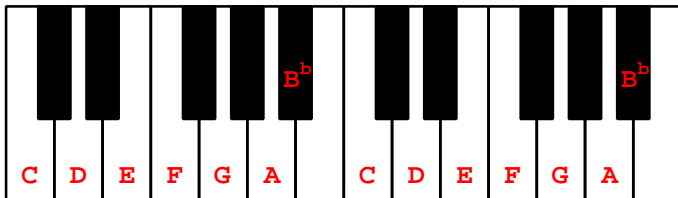
Circle of
chords

Circle of keys

Practice Ideas

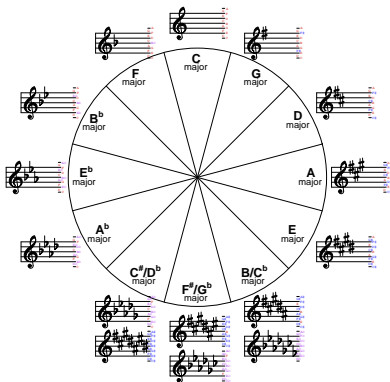
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The Key of F Major

F major is one step clockwise from B-flat major in the Circle, with only 1 flat tone (B^b):



The next-clockwise key's tonic will be the *fifth* degree of this key: F-G-A-B^b-**C**-D-E-F

The Circle is Complete!

At this point we see why the Circle of Fifths is a *circle*: if we follow this progression of fifths far enough, it leads us back to the key we started with (C major).

We see there are *twelve* keys represented by the Circle. This stands to reason because there are exactly 12 unique tones in the Western chromatic scale, and it is possible to build a major key from *any* given tone following the same set of whole- and half-step intervals:

Whole - Whole - Half - Whole - Whole - Whole - Half

Thus, the Circle of Fifths maps every “major” key in the Western music system. The significance of these keys’ order around the Circle is their number of sharp or flat tones.

So What?

We have invested a lot of effort mapping out all the major keys. A logical question now is, “Why did we do all that work?” In answer to this question I have good news and bad news.

First, figuring out all the key-tones for each of the twelve major keys is helpful because once you remember all these keys you will be able to quickly identify the tones used within any tune or song of a given major key. This is extremely helpful when playing by ear: instead of having to correctly select from twelve possible tones, you need only select from seven.

Second, remembering the order of major keys around the Circle is helpful because it allows you to quickly reference the key name by the number of sharp or flat tones contained therein. Every time you see a key signature on sheetmusic (that cluster of sharps or flats near clef) you will be able to identify the corresponding major key.

Other benefits of the Circle of Fifths include the ability to very quickly identify and shift between different *modes* of a key. This is a whole subject unto itself, to be covered in another tutorial, but in certain music genres commonly using modes other than “major” it becomes necessary to navigate these key-variations fluently. The Circle of Fifths provides a way to do that, mapping each of the seven modes (Lydian, Ionian-Major, Mixolydian, Dorian, Aeolian-Natural Minor, Phrygian, Locrian) to each other by simple clockwise and counter-clockwise shifts around the Circle.

Shifts around the Circle are also used in music genres where key-changes occur within a single tune. Jazz is rather famous for this. Certain key changes sound more pleasing to the ear than others, and the Circle of Fifths is a tool useful for finding those “correct” key changes. Shifts around the Circle are also useful for building *sets* of complementary tunes in traditional Irish music.

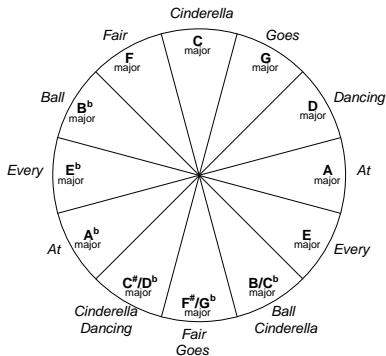
So now comes the bad news: *you're going to have to commit all the key-tones to memory, as well as the order of keys around the Circle, if you ever plan on realizing these benefits during a live music session.*

This is a lot like learning to multiply numbers without a calculator. Someone can demonstrate and explain to you that $4 \times 5 = 20$ because 4×5 simply means 4 added to itself 5 times (i.e. $4 + 4 + 4 + 4 + 4 = 20$), but in real life it would be a waste of time to multiply numbers like this. Repeated addition may *explain* why multiplication works, but to use it in any practical way demands that you commit “multiplication tables” to memory so you can quickly recall that $4 \times 5 = 20$.

What we did in building up our Circle of Fifths key by key was analogous to creating an entire multiplication table by repeated addition. Now comes the hard work of internalizing this table in your mind so that you may recall it when needed.

Fair Cinderella

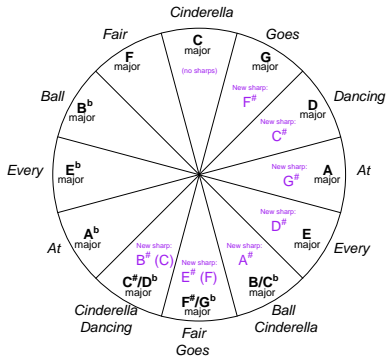
A way to remember the clockwise order of keys is the phrase
"Fair Cinderella Goes Dancing At Every Ball"



As you can see, there is a bit of confusion around the enharmonic keys, but the order F-C-G-D-A-E-B holds true if you back up a bit and resume.

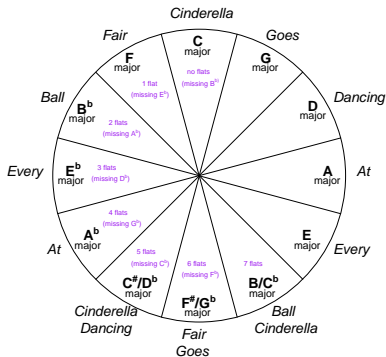
Fair Cinderella

You'll also notice that the phrase "*Fair Cinderella Goes Dancing At Every Ball*" works to remember the order in which new sharp tones are added to keys going clockwise around the Circle:



Fair Cinderella

The phrase *"Fair Cinderella Goes Dancing At Every Ball"* even works to remember the order in which flat tones disappear from keys going clockwise around the Circle:



Circle of tones

The Circle of Fifths may be used to determine relationships between *tones*, relationships between *chords*, and/or relationships between *keys*.

In this section we will explore some applications of the Circle to tones, or more precisely, to *intervals* between tones.

The strings of stringed instruments are typically tuned in specific intervals such as *fourths* or *fifths*, and since the Circle has its tone-letters arranged in these same intervals, the Circle becomes a good reference for the proper tunings of successive strings.

Tuned in Fifths

Violin and mandolin strings are typically *tuned in fifths*:

Key of G major (1 sharp)

1	2	3	4	5	6	7
G	A	B	C	D	E	F [#]

Key of D major (2 sharps)

1	2	3	4	5	6	7
D	E	F [#]	G	A	B	C [#]

Key of A major (3 sharps)

1	2	3	4	5	6	7
A	B	C [#]	D	E	F [#]	G [#]

Key of E major (4 sharps)

1	2	3	4	5	6	7
E	F [#]	G [#]	A	B	C [#]	D [#]

Labels: G string, D string, A string, E string, Nut, Violin fingerboard

Note how the tonic of each key is the fifth degree of the key before it.

Tuned in Fifths

Cello strings are also typically *tuned in fifths*, starting one fifth below violins and mandolins:

Key of C major (no sharps)

1	2	3	4	5	6	7
C	D	E	F	G	A	B

Key of G major (1 sharp)

1	2	3	4	5	6	7
G	A	B	C	D	E	F [#]

Key of D major (2 sharps)

1	2	3	4	5	6	7
D	E	F [#]	G	A	B	C [#]

Key of A major (3 sharps)

1	2	3	4	5	6	7
A	B	C [#]	D	E	F [#]	G [#]

C string
G string
D string
A string

Nut
Cello fingerboard

The string tones follow a clockwise sequence around the Circle of Fifths.

Tuned in Fourths

Bass strings are typically *tuned in fourths*, and so their string tones are reverse of a violin:

Key of E major (4 sharps)

1	2	3	4	5	6	7
E	F [#]	G [#]	A	B	C [#]	D [#]

E string

Key of A major (3 sharps)

1	2	3	4	5	6	7
A	B	C [#]	D	E	F [#]	G [#]

A string

Key of D major (2 sharps)

1	2	3	4	5	6	7
D	E	F [#]	G	A	B	C [#]

D string

Key of G major (1 sharp)

1	2	3	4	5	6	7
G	A	B	C	D	E	F [#]

G string

Nut

Bass fingerboard

The string tones follow a counter-clockwise sequence around the Circle of Fifths.

Locating tritones

Another tone relationship applicable to the Circle of Fifths is the *tritone*. A tritone, otherwise known as an *augmented fourth* or a *diminished fifth*, is an interval of three whole-steps. Tritones are known for their dissonant quality, used often in Western music to build tension prior to a resolution. If you know your Circle of Fifths well enough, you won't need to count whole-steps to find a tritone interval – you may simply look *across* the Circle to find the tone-letter directly on the opposite side!

For example, C and F[♯] together represent a tritone interval. So do E^b and A. So do F and B, or any other pair of tones located on opposite sides of the Circle.

Which tone forms a tritone interval with C[♯]?

Locating dominant sevenths

Another tone relationship applicable to the Circle of Fifths is the *dominant seventh*. This is one half-step lower than the regular seventh degree tone of the major scale, and is used to create tension in chord progressions. When you see a chord written as a tone-letter plus the number 7 (e.g. A7, D^b7), this means that chord includes an added dominant seventh tone. The dominant seventh also happens to be the tone exactly *two steps counter-clockwise* from the tonic on the Circle of Fifths.

For example, B^b is the dominant seventh tone in a C major scale. Likewise, D is the dominant seventh tone in an E major scale.

Which tone is the dominant seventh in an E^b major scale?

Locating pentatonic tones

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Yet another application of the Circle of Fifths with regard to tones is locating *pentatonic* scale tones. A pentatonic scale is one comprised of just five tones, a major pentatonic scale consisting of degrees 1, 2, 3, 5, and 6 of that major scale. Interestingly, the Circle of Fifths may be used to identify pentatonic tones for any tonic, as an alternative to counting degrees. Given a certain tonic tone, the other tones of a major pentatonic scale are simply the next four tones going clockwise around the Circle.

For example, the C major pentatonic scale consists of C, G, D, A, E, and B. The A^b major pentatonic scale consists of A^b, E^b, B^b, F, and C. The E major pentatonic scale consists of E, B, F[♯], C[♯], and G[♯] (A^b).

Which tones comprise a G^b pentatonic scale?

Making double-stop “chords”

Basic chords consist of a tonic tone plus a *fifth* played simultaneously along with other tones which define the chord's *quality* (e.g. major, minor, suspended, etc.). If you are playing a melody instrument and wish to play a double-stop (two tones) that fit with a given chord, playing the first (tonic) and fifth is a good pair to choose because this interval fits most chords.

The Circle of Fifths helps quickly identify the fifth for any given tonic: just look *one step clockwise*. So, if the tonic is a D tone, then you can play a D together with an A to create this perfect fifth interval. Rock musicians often refer to this interval as a *power chord*. Power chords are really useful for accompaniment, because they are compatible with either major or minor chords.

Which tones comprise an E^b power chord?

Circle of chords

The Circle of Fifths may be used to determine relationships between *tones*, relationships between *chords*, and/or relationships between *keys*.

In this section we will explore some applications of the Circle to chords.

Progressions of chords in tunes typically follow set patterns, and these patterns often involve the use of IV and V chords (i.e. chords whose tonic tones are the fourth and fifth tones in that key's scale). Thus, the Circle may be used as a reference for identifying IV and V chords given the I chord.

I-IV-V chord identification

For musicians who play chords, you are probably already aware of how common I-IV-V chords are in a great many tunes and songs. These Roman numerals refer to the tone-degree numbers within a major key. So, for example, if you are playing a tune in the key of C major, C major would be the I chord because C is the 1st-degree tone in that key, F major would be the IV chord because F is the 4th-degree tone, and G major would be the V chord because G is the 5th degree tone.

The challenge is how to quickly identify the I, IV, and V chords for any given key that gets called out at a jam session. If the tune will be played in A major . . . *QUICK! What will the I, IV, and V chords be??* You will sometimes see musicians counting on their fingers to identify the IV and V chord letters given the key letter (I chord).

I-IV-V chord identification

If you know the Circle of Fifths well, however, there is a faster way to identify these chords than counting. The major key of the tune is of course the I chord. The IV chord is simply the name of the key *one step counter-clockwise* on the Circle. The V chord is simply the name of the key *one step clockwise* on the Circle.

If you're going to play a tune in G major, what are the I, IV, and V chords?

If you're going to play a tune in E major, what are the I, IV, and V chords?

If you're going to play a tune in A-flat major, what are the I, IV, and V chords?

Circle of keys

The Circle of Fifths may be used to determine relationships between *tones*, relationships between *chords*, and/or relationships between *keys*.

In this section we will explore some applications of the Circle to keys. Specifically, we will examine how the Circle may be used to identify the key signature of a *mode*.

What is a Mode?

A mode is a modification made to a key by raising or lowering specific scale-tones. If we identify the degrees of a major ("Ionian"-mode) scale by number, and then selectively raise or lower certain degrees of that scale one at a time, we can generate six other modes:

	↑	1	2	3	#4	5	6	7	Lydian
"Brighter"		1	2	3	4	5	6	7	Ionian (Major)
		1	2	3	4	5	6	^b 7	Mixolydian
		1	2	^b 3	4	5	6	^b 7	Dorian
		1	2	^b 3	4	5	^b 6	^b 7	Aeolian (Minor)
"Darker"		1	^b 2	^b 3	4	5	^b 6	^b 7	Phrygian
	↓	1	^b 2	^b 3	4	^b 5	^b 6	^b 7	Locrian

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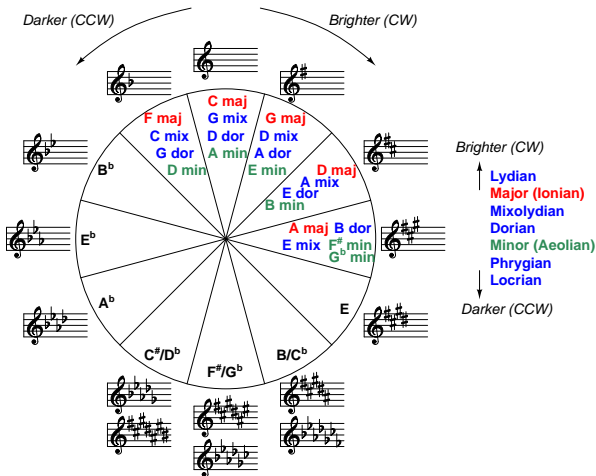
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If we don't wish to remember the sequence of degree-tones to raise or lower in order to “brighten” or “darken” a key, we may simply use the Circle of Fifths. The key signatures represented by a Circle of Fifths just happen to follow this exact same raising/lowering pattern. This means we may very quickly identify the key signature of a desired mode by first finding the major key of the tonic we want, then stepping around the circle clockwise to “brighten” the mode or counter-clockwise to “darken” the mode.

A Brighter/Darker Circle

A few of the major keys common to folk music are shown with their relative modes:



Practice Ideas

Just like memorizing multiplication tables, committing key-tones and key-orders to memory requires much practice. This section outlines multiple ways to internalize these concepts. Commit to incorporating these concepts into every practice session, and you will soon find them becoming more and more comfortable to you.

Remember that there are *twelve* major keys represented by the Circle of Fifths. Mastery of all keys necessitates practicing each and every one of them. However, some of these keys are far more common than others in certain genres of music such as folk. For all you folk musicians reading this, feel free to concentrate on the following keys in order to simplify your task:

Major keys of C, G, D, and A (from 0 to 3 sharps)

Playing scales

A time-honored way of learning tones in each key is to practice each key's scale in linear order, both up and down, always beginning and ending on the tonic. Whenever possible, do this over multiple octaves so as to cover the broadest range on your instrument. This helps familiarize you with all the positions used for playing tones.



One disadvantage of linear scales is that they tend to be boring. When you hear musicians lament the practice of scales, this is what they're complaining about. Fortunately, there are more interesting ways to practice key-tones! (Read on . . .)

Playing tone-clusters

Since our real goal is to internalize each *key* rather than simply memorize each *scale*, it becomes useful (and more engaging!) to play the tones of a key in non-linear orders. For example, you may play clusters of four ascending or descending key-tones, each successive cluster starting one degree higher:



Playing in random order

A more advanced way to internalize the tones of a key is to practice playing them in *totally random order*. Begin with the tonic tone, and return to that tone periodically to “re-orient” your sequence to it, but play all the other tones at random.

This, of course, will be very challenging at first. If you find yourself wondering if the tones you’re playing really belong to that key, feel free to return to linear scales. In fact, you might wish to alternate linear scales with random-order tones in your practice sessions, using the linear scales to remind yourself what the correct tones are for that key before trying to play those tones randomly again.

Remember that your goal is to *master the key*, not merely to master the *scales* of each key. Fluency with key-tones enables you to play with much more confidence and accuracy.

Composition

The next logical step beyond playing key-tones in random order is to come up with an order that actually sounds like a melody. Your compositions don't have to be fancy. In fact, really primitive melodies are perfectly acceptable!

What you're aiming for here is the use of intervals to create different aural sensations. Once you have become familiar with the tones comprising a key, you may freely experiment with the intervals between those tones, purposely creating tension and resolution to convey musical "ideas" through your playing.

This is essentially what musicians do when they *improvise*: use their knowledge of the tune's key to select creative tone sequences that sound good and complement the melody. One really cannot be a good improviser without being very familiar with that tune's key-tones!

Transposing familiar tunes

A fun way to learn new keys is to take a familiar tune in a key you know well, and *transpose* that tune to a less-familiar key. This is what we saw earlier with “Mary Had A Little Lamb”:

In the key of C major: **E-D-C-D-E-E-E**

In the key of G major: **B-A-G-A-B-B-B**

A paint-by-numbers approach to transposition is to assign a degree number to each tone based on the original key (e.g. 3-2-1-2-3-3-3 for the opening of “Mary Had A Little Lamb”) and then use those degree numbers to identify the correct tones in the new key.

Your familiarity with the melody will guide your selection of the correct tones in the new key, thereby helping to familiarize yourself with that new key.

Glossary

Interval – The ratio of pitch between two different tones, corresponding to the distance separating tones on a keyboard or a fretboard. One fret's distance on a guitar is a *half-step* interval, while two frets' distance is a *whole step*. Intervals may also be described in terms of the tones' numbered position on a scale (e.g. a “perfect fourth” interval is the distance between the 1 and 4 tones of a major scale). **This is part of the essential vocabulary for music. you will find that the “feel” of music depends more on the intervals *between* notes than the notes themselves!**

Octave – A two-to-one ratio of musical pitch. Octave tones sound remarkably similar to each other, and use the same letter designators. “Middle C” on a piano keyboard represents a tone vibration of 261.6 cycles per second, while the next “C” an octave above that is precisely twice as fast (523.2 cycle per second) and the next “C” an octave below “middle C” is half as fast (130.8 cycles per second). **Octaves are why tones seem to repeat themselves up and down the scale of any wide-range instrument.**

Diagram illustrating the notes of the C major scale (C D E F G A B) and the C minor scale (C D E F G A B), showing the relationship between the two scales.

The diagram shows a piano keyboard with the following notes labeled above and below the keys:

C Major Scale (C D E F G A B):

- C (white key)
- D (white key)
- E (white key)
- F (white key)
- G (white key)
- A (white key)
- B (white key)

C Minor Scale (C D E F G A B):

- C (white key)
- D (white key)
- E^b (black key)
- F (white key)
- G (white key)
- A^b (black key)
- B (white key)

The diagram highlights the difference in the third and sixth degrees of the scales: E (major) vs. E^b (minor) and A (major) vs. A^b (minor).

← "Natural" (♮) tones

Scale – A sequence of tones, usually played in ascending or descending order, constituting a musical “palette” useful for creating tunes or phrases. A closely related concept is that of a **Key**, which in Western music typically consists of the tones comprising a specific class of seven-note scale. [Mastery of scales and keys allows you to quickly find tones that sound well with any other tone, which is obviously useful \(e.g. jamming, composing\).](#)

Degree – A number label given to each of the seven tones comprising a key. For example, in the C major key, C would be 1, D would be 2, E would be 3, etc. [Musicians often refer to intervals by these degree numbers.](#)

Major versus **Minor** – These terms refer to two different qualities of tone-clusters (e.g. keys or chords) defined by the intervals between those tones. Major and minor are not the only types of quality in Western music, but they tend to be the most common. These qualities stand independent of the starting tone, which is why there are twelve “major keys” in Western music as well as twelve “minor keys” (i.e. each of these keys starting from one of twelve distinct tones within an octave). [Knowing all the major keys by heart gives you a great starting point to build any of the minor or “modal” keys.](#)

Mode – A variation on a key, created by altering the step-distances (**intervals**) separating tones in that key. Traditionally, there are seven modes, each given a Greek name. Major (ionian) and Natural Minor (aeolian) are two of them. [Some musical genres, especially Irish music and Jazz, make use of modes to create different “qualities” for tunes lying between major and minor.](#)

Chord – A set of three or more tones played simultaneously. Some instruments (e.g. autoharps) play nothing but chords, and others (e.g. guitars) are often played solely to form chords. Chords are used extensively to accompany melodies, and are often notated by simple letter symbols near lyrics which makes them easy to document in song music. [Knowing which tones make up a chord gives you multiple options to sing and/or play harmony to any melody.](#)

Arpeggio – Italian for “chord played as on a harp,” this is simply the different tones making up a chord played one at a time instead of simultaneously. Guitar players: hold a chord pattern with your left hand while *picking* individual notes with your right hand instead of *strumming* the strings, and you will be playing an arpeggio! [Many melodies contain arpeggios, making them easy to play for anyone familiar with chords. Arpeggios sound more sophisticated and interesting than chords played in block-fashion. Any chord player need only play the notes individually to create a respectable harmony from a set of given chords.](#)

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