

CHAPTER 2

Scales, Tonality, Key, Modes

TOPICS

Scale	Natural Minor Scale	Pentatonic Scale
Pitch Class	Harmonic Minor Scale	Nondiatonic Scales
Diatonic Scales	Melodic Minor Scale	Chromatic Scale
Tonic	Relative Minor	Whole-Tone Scale
Scale Degree Names	Relative Major	Blues Scale
Major Scale	Circle of Fifths	Octatonic or Diminished Scale
Tetrachord	Parallel Relationship	Mode
Transposition	Tonality	Solfeggio
Key Signature	Key	Pitch Inventory

IMPORTANT CONCEPTS

Performers often practice scales to develop their technique. The collections of pitches and recurring patterns performers use to focus attention on technical aspects are the same building blocks of musical composition.

Scale

A *scale* is a collection of pitches in ascending and descending order. Musicians use a scale as a convenient way of displaying the notes used in a melody or harmony. In Figure 2.1, the melody consists of 24 notes but only seven different letter names.

Pitch Class

A *pitch class* contains all notes of the same name regardless of octave. The pitch classes for the melody in the second part of Figure 2.1 on page 28 are arranged in ascending order to form a scale. The caret (^) above each number indicates that the number represents a scale degree.

Figure 2.1

Haydn: Symphony no. 94 in G Major (“Surprise”), III: Menuetto, mm. 1–8.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

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

Notes of the melody arranged as a scale:

A musical staff in treble clef with a key signature of one sharp (F#). The notes of the G major scale are shown as whole notes: G, A, B, C, D, E, F#, G. Above each note is a degree symbol (hat with a number). The first G is labeled '1̂', A is '2̂', B is '3̂', C is '4̂', D is '5̂', E is '6̂', F# is '7̂', and the final G is '8̂ = 1̂'. Below the staff, the letter names G, A, B, C, D, E, F#, G are aligned with their respective notes. The first G is labeled 'Tonic or Keynote' and the final G is labeled 'Octave of Tonic (duplicate of first letter)'.

Although an infinite variety of pitch combinations is available, the following scales represent those in most common use during the past 200 years.

Diatonic Scales

Diatonic (literally “across the tones”) defines a scale of mixed half and whole steps (and an occasional step and a half) in which each individual tone plays a role. The first tone of a scale, the *tonic*, is a point of rest and is considered to be the most stable. Other tones lead toward or away from it, creating varying degrees of tension or relaxation.

Since the tonic is the focal point of the scale, the most stable note, and the point of greatest relaxation, diatonic melodies frequently end on the tonic note. At times the word diatonic is used to indicate a tone that is part of a particular scale pattern—as distinguished from a nondiatonic tone that does not belong to the scale pattern.

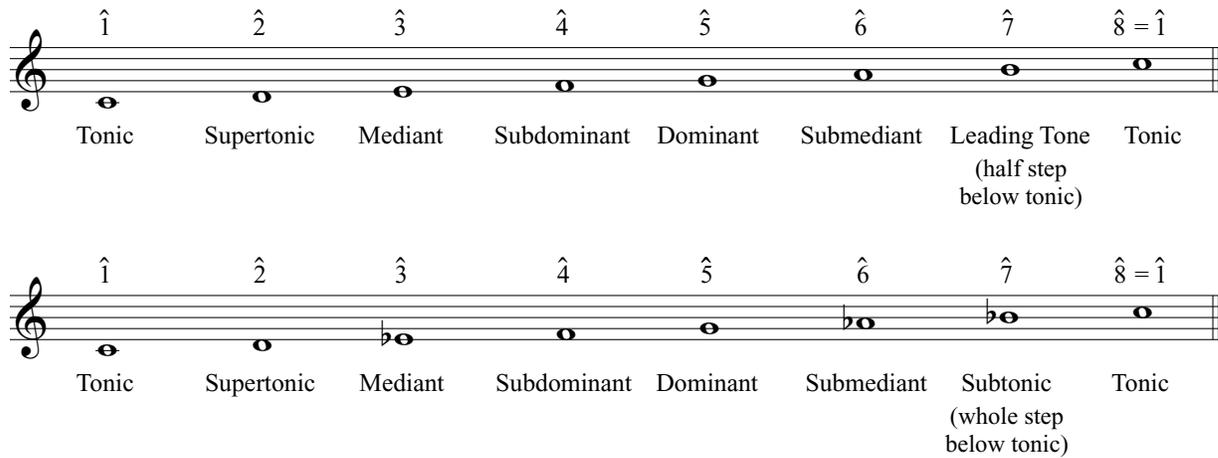
Scale Degree Names

Each degree of the seven-tone diatonic scale has a name that relates to its function.

Scale Degree	Name	Meaning
1st	Tonic	Tonal center—the final resolution tone.
2nd	Supertonic	One step above the tonic.
3rd	Mediant	Midway between tonic and dominant.
4th	Subdominant	The lower dominant—the fifth tone down from the tonic (also the fourth tone up from the tonic).
5th	Dominant	So called because its function is next in importance to the tonic.
6th	Submediant	The lower mediant—halfway between tonic and lower dominant (subdominant). The third tone down from the tonic (also the sixth tone up from the tonic).
7th	Leading Tone	Strong affinity for and leads melodically to the tonic. Used when the seventh tone appears a half step below the tonic.
7th	Subtonic	Used only to designate the seventh degree of the natural minor scale (a whole step below the tonic).

Two different scales are shown in Figure 2.2 to illustrate the application of scale degree names to diatonic tones.

Figure 2.2

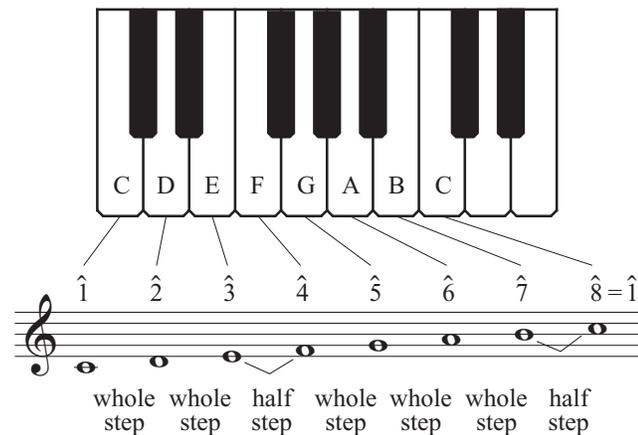


Major Scale

The *major scale* is a scale of seven different pitch classes with whole steps separating adjacent tones, except for half steps between the third and fourth degrees and between the seventh and eighth (or first) degrees. The eighth pitch has the same letter name as the first and thus is treated as a duplication.

All adjacent keys on the piano are a half step apart. Figure 2.3 shows that by beginning on C and playing in order only the white keys to the next C, you build a *C major scale*.

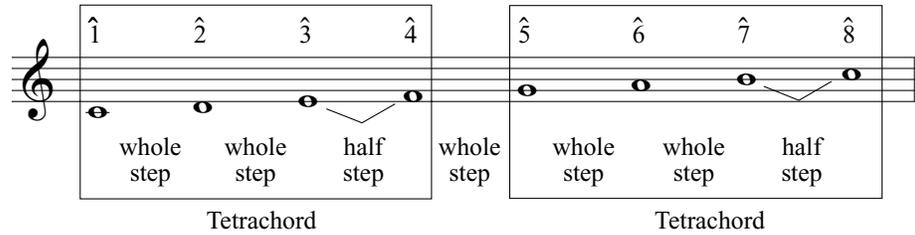
Figure 2.3



Tetrachord

The major scale includes two *tetrachords* (groups of four pitches) constructed with the same arrangement of intervals—two whole steps followed by a half step. The two tetrachords of the major scale are separated by a single whole step.

Figure 2.4



The melody in Figure 2.5 utilizes the notes of the C major scale.

Figure 2.5

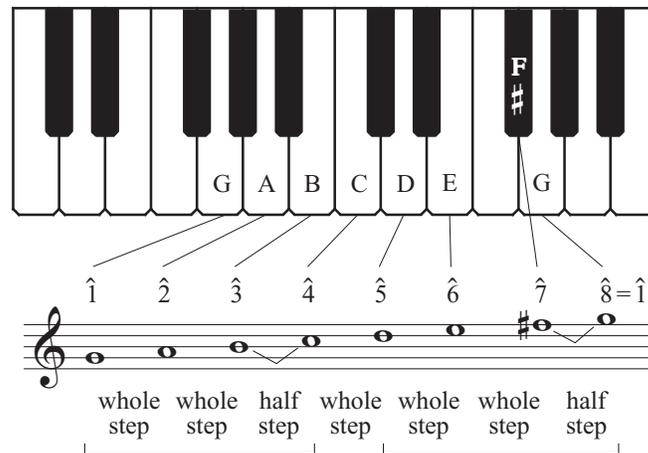
Hatton: "Duke Street."



Transposition

This same major scale pattern of half and whole steps can be duplicated at any pitch. Such rewriting is called *transposition*. In Figure 2.6, the major scale is transposed so that its first tone is G. This is the G major scale.

Figure 2.6



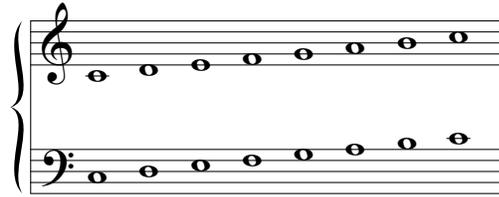
Key Signature

From Figure 2.6, it can be seen that a sharp is necessary if the major scale pattern of whole and half steps is to be carried out in the transposition. Figure 2.7 provides a convenient way to memorize the sharps or the flats needed when the scale begins on various pitches. The

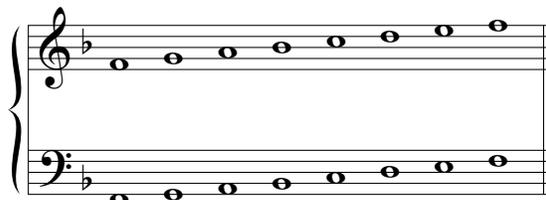
arrangement of the necessary sharps or flats is called a *key signature* and appears at the beginning of each staff in a composition after the clef. Notice that each successive tonic, or beginning note, is five scale degrees (called a perfect fifth) above or four scale degrees below the previous tonic. A new sharp is added to the key signature for each ascending perfect fifth (P5); in the flat signatures, a flat is dropped for each ascending P5 (see Figure 2.19).

Figure 2.7

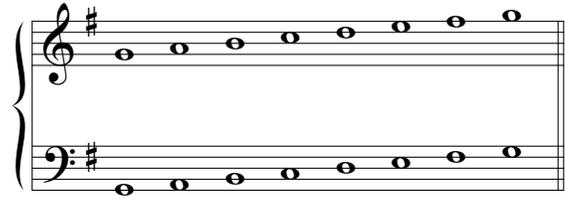
Major Key Signatures



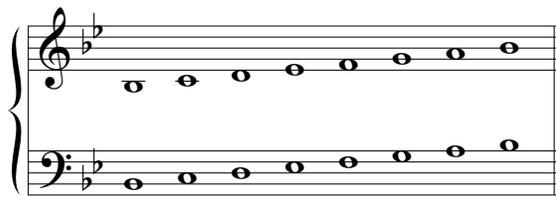
C major



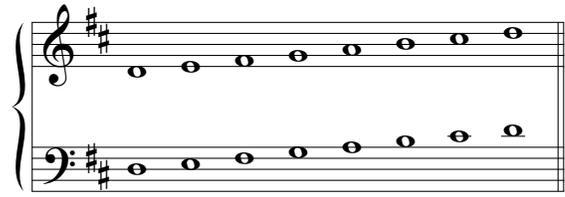
F major



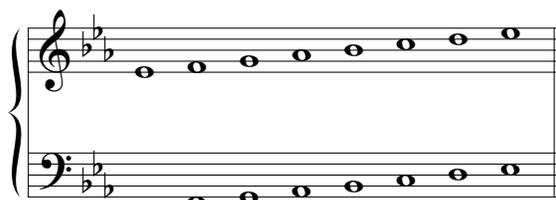
G major



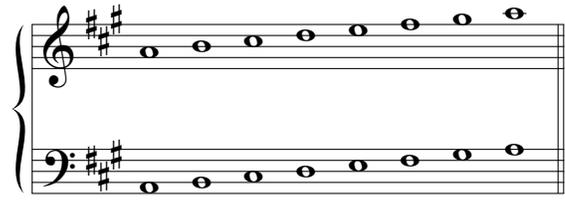
B \flat major



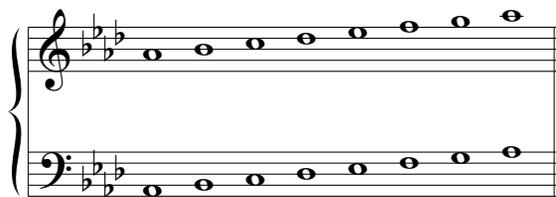
D major



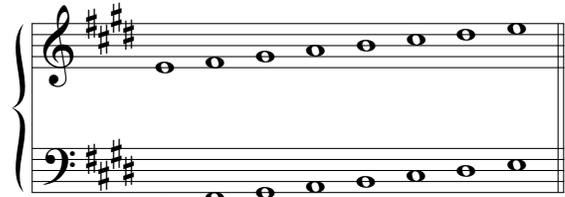
E \flat major



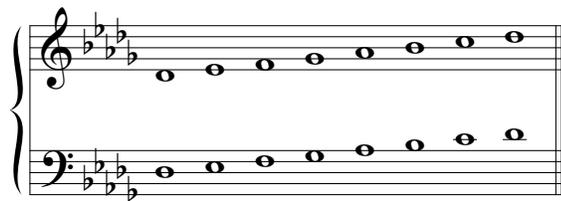
A major



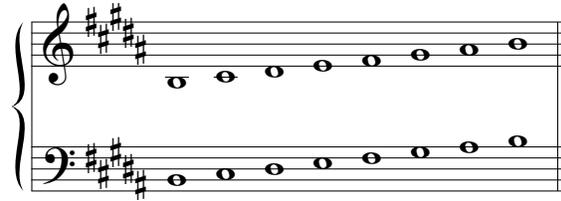
A \flat major



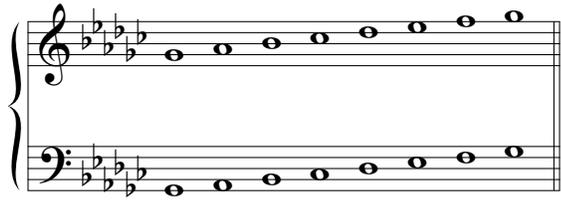
E major



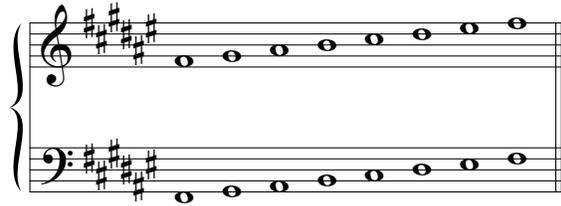
D \flat major



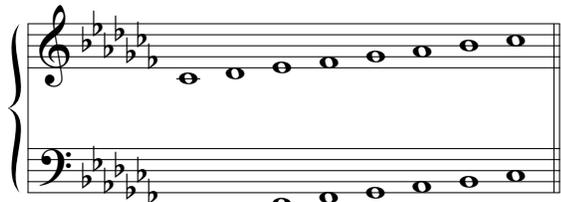
B major



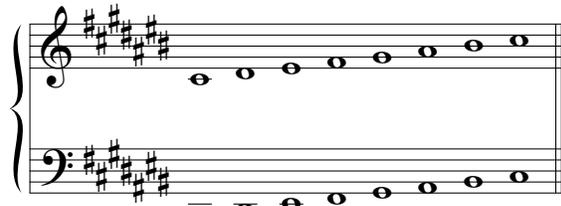
G \flat major



F \sharp major



C \flat major



C \sharp major

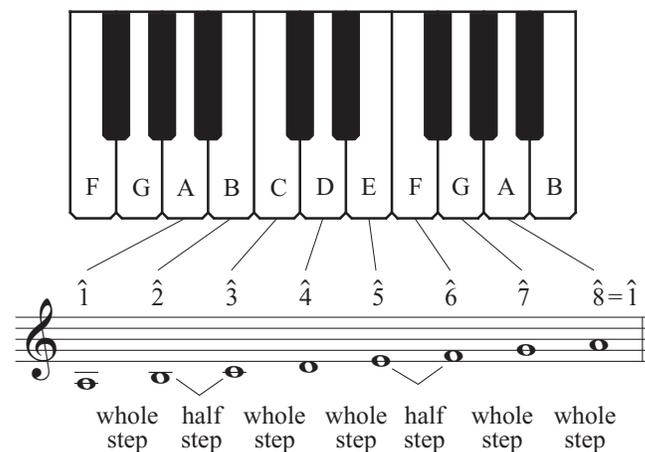
Minor Scale

The *minor scale* is another common diatonic scale. It is more varied in pitch material because there are two different versions of both the sixth and seventh scale degrees. Traditionally, the minor scales have been described as having three distinct forms, but in practice, composers use all the scale resources of the minor scale within a single composition. The three traditional forms of the minor scale are called natural, harmonic, and melodic.

Natural Minor Scale

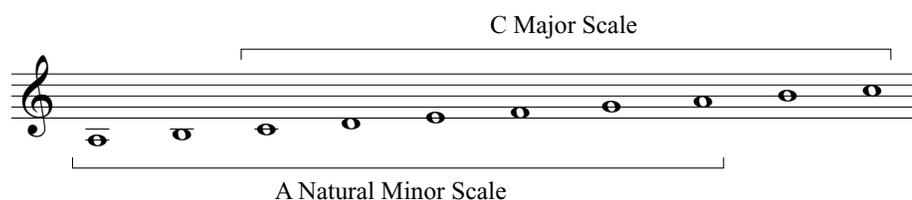
The *natural minor scale* contains seven different pitches with whole steps separating adjacent tones, except for half steps between the second and third degrees and between the fifth and sixth degrees. Its pitches are those of the white keys of the piano from A to A:

Figure 2.8



The natural minor scale can be thought of as a major scale from the sixth to the sixth degree.

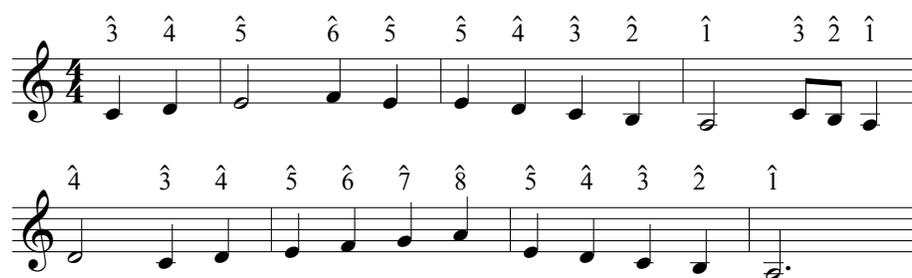
Figure 2.9



The excerpt from a familiar carol in Figure 2.10 employs the natural minor scale.

Figure 2.10

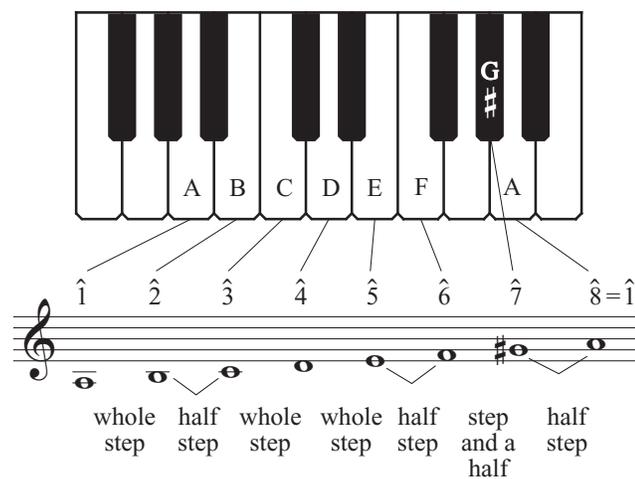
Carol: “God Rest Ye Merry, Gentlemen” (Refrain).



Harmonic Minor Scale

The *harmonic minor scale* has a raised seventh degree. The added impetus of a raised seventh degree gives more melodic thrust toward the tonic. Raising the seventh degree creates a step and a half between the sixth and seventh degrees, and a half step between the seventh and eighth degrees. Accidentals used to raise the seventh degree do not appear in the key signature. The pattern of half steps ($\hat{2}-\hat{3}$, $\hat{5}-\hat{6}$, $\hat{7}-\hat{8}$) is shown in Figure 2.11.

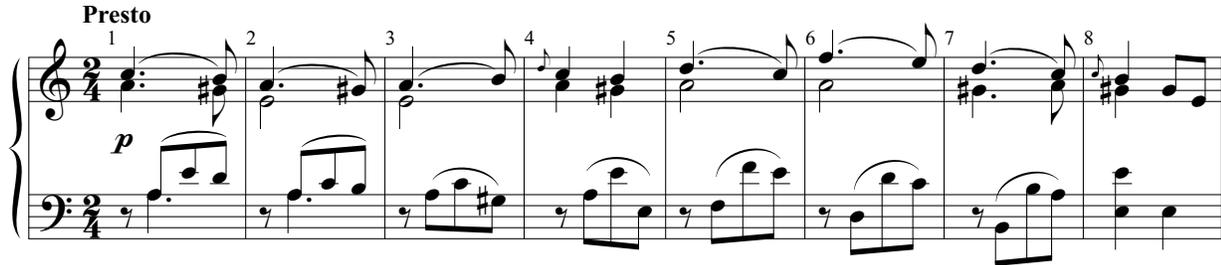
Figure 2.11



The Mozart excerpt in Figure 2.12 utilizes the harmonic minor scale. Notice the presence of G-sharps in every measure except 5 and 6.

Figure 2.12

Mozart: Sonata in A Minor, K. 310, III, mm. 1–8.

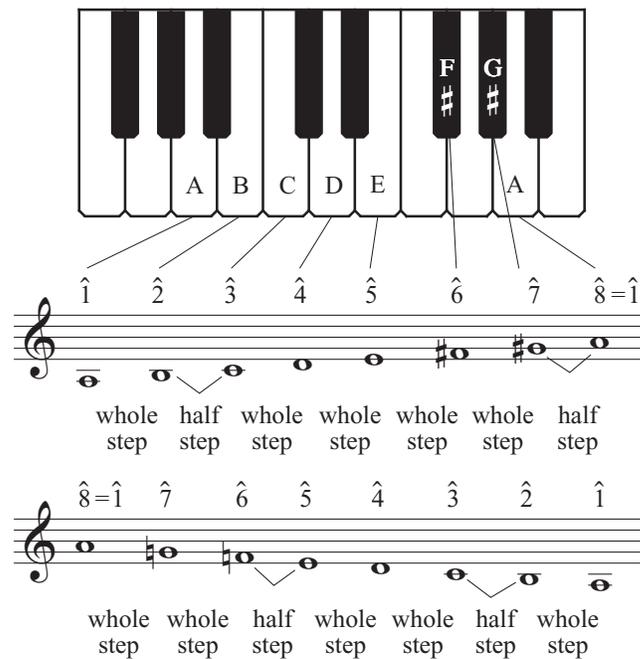


Melodic Minor Scale

The *melodic minor scale* appears in both ascending and descending form. Besides the half step between the second and third degrees, the ascending form includes raised sixth and seventh scale degrees, producing a half step between the seventh and eighth degrees. The descending form is the same as the natural minor.

The melodic minor scale developed because composers liked the urgency of the raised seventh, but found the step-and-a-half interval between the sixth and seventh degrees of the harmonic minor scale too harsh, especially for smooth vocal writing. In descending melodic passages, no need exists for the raised seventh, so composers most often used the natural minor with the lowered seventh and sixth degrees.

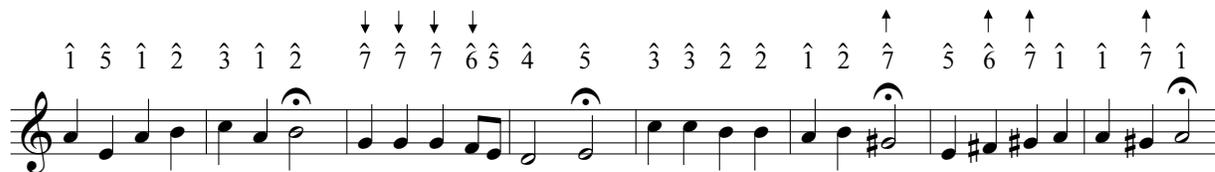
Figure 2.13



The excerpt in Figure 2.14 includes the ascending and descending forms of the melodic minor scale.

Figure 2.14

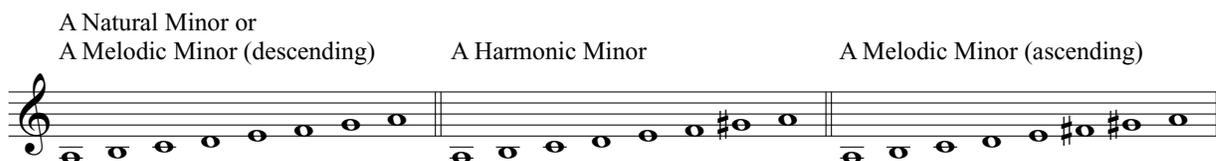
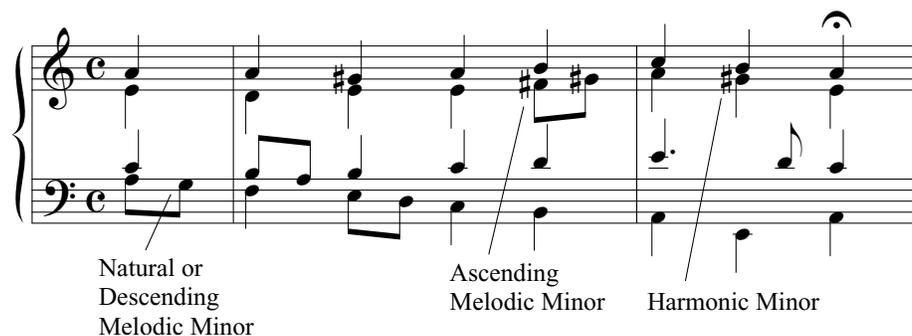
Chorale Melody: “Schwing’ dich auf zu deinem Gott,” (“Soar Upward to Thy God”), mm. 5–12 (transposed).



An examination of music literature, especially vocal and choral, reveals that composers consider the natural, harmonic, and melodic minors as arrangements of the same scale, with each form to be used according to need. This excerpt by Bach utilizes the various forms of the A minor scale in a single phrase of music:

Figure 2.15

Bach: “Herr Jesu Christ, du höchstes Gut” (“Lord Jesus Christ, Thou Highest Good”), BWV 113, mm. 1–2 (transposed).



Scale Relationships

It is important to associate and compare the patterns present in major and minor scales. Two significant associations are byproducts of the overall organizational scheme: the relative and parallel relationships.

Relative Relationship

A major and a minor scale that have the same key signature are said to be in a relative relationship. To find the *relative minor* of any major scale, proceed to the sixth degree of that scale. This tone is the tonic of the relative minor.

Figure 2.16

C Major Scale

A Natural Minor Scale

✓ = half steps

To find the *relative major* of a minor key, proceed to the third degree of the minor scale. This tone is the tonic of the relative major key.

Figure 2.17

D Minor Scale

Its Relative Major (F)

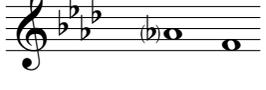
Figure 2.18 summarizes the relative relationships between all of the major and minor scales. The organizational pattern perpetuating the major scale key signatures is also present in minor scales. Each minor key tonic is five scale degrees above (or four scale degrees below) the previous tonic.

Figure 2.18

Relative Major and Minor Relationships

Major	Relative Minor	Number of Sharps or Flats	Letter Names	Key Signatures and Key Notes
C	a	None		
G	e	1 Sharp	F#	
D	b	2 Sharps	F#, C#	

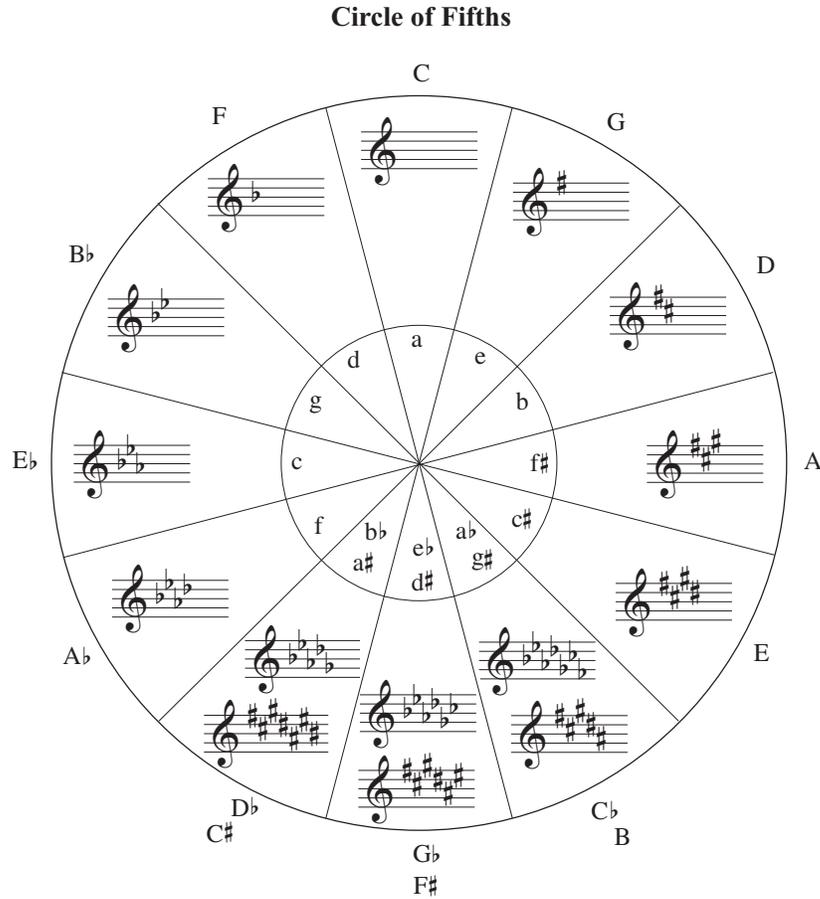
Relative Major and Minor Relationships

Major	Relative Minor	Number of Sharps or Flats	Letter Names	Key Signatures and Key Notes
A	f#	3 Sharps	F#, C#, G#	
E	c#	4 Sharps	F#, C#, G#, D#	
B = Cb	g# = ab	5 Sharps 7 Flats	F#, C#, G#, D#, A# Bb, Eb, Ab, Db, Gb, Cb, Fb	 = 
F# = Gb	d# = eb	6 Sharps 6 Flats	F#, C#, G#, D#, A#, E# Bb, Eb, Ab, Db, Gb, Cb	 = 
C# = Db	a# = bb	7 Sharps 5 Flats	F#, C#, G#, D#, A#, E#, B# Bb, Eb, Ab, Db, Gb	 = 
Ab	f	4 Flats	Bb, Eb, Ab, Db	
Eb	c	3 Flats	Bb, Eb, Ab	
Bb	g	2 Flats	Bb, Eb	
F	d	1 Flat	Bb	

Circle of Fifths

Another way to visualize the relationship between the major scales and their relative minors is with the *circle of fifths* (Figure 2.19). All of the key signatures are given within the circle. The major scale tonics are listed outside the perimeter of the circle. The relative minors appear within the inner circle.

Figure 2.19

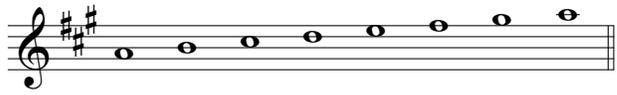
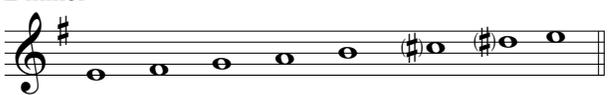
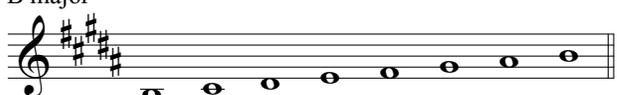
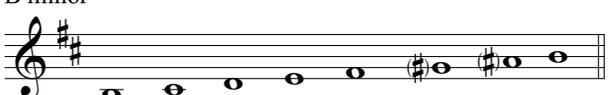
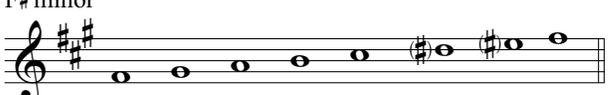
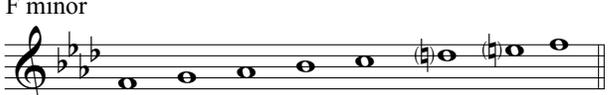


Parallel Relationship

A major and a minor scale that begin on the same tonic note are said to be in *parallel relationship*. Figure 2.20 shows the major scales and their parallel minors.

Figure 2.20

C major	C minor
G major	G minor
D major	D minor

A major 	A minor 
E major 	E minor 
B major 	B minor 
F# major 	F# minor 
C# major 	C# minor 
F major 	F minor 
Bb major 	Bb minor 
Eb major 	Eb minor 
Ab major 	Ab minor 

Tonality

Tonality refers to an organized system of tones (e.g., the tones of a major or minor scale) in which one tone (the tonic) becomes the central point to which the remaining tones are related. In tonality, the tonic (tonal center) is the tone of complete relaxation, the target toward which other tones lead.

Key

The term *key* refers to the tonal system based on the major and minor scales. This system is by far the most common tonal system, but tonality can be present in music not based on the major and minor scales (see the later chapters of volume 2).

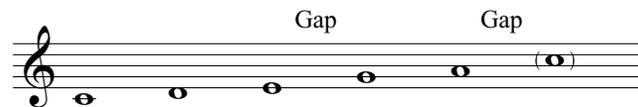
Other Scales

Although the great majority of western European music written from the seventeenth through the nineteenth centuries is based on the major and minor scales, a number of other scales are found occasionally. The following descriptions are some of these scales.

Pentatonic Scale

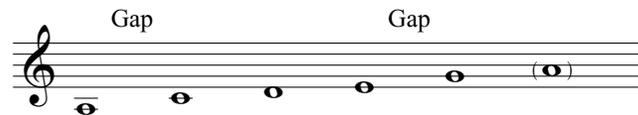
As its name suggests, the *pentatonic scale* is a five-tone scale. It is an example of a gapped scale, one that contains intervals of more than a step between adjacent pitches. It is convenient to think of the common pentatonic scale as an incomplete major scale.

Figure 2.21



Other arrangements of the gaps are also found in music. The pentatonic scale in Figure 2.22 is based on the natural minor scale.

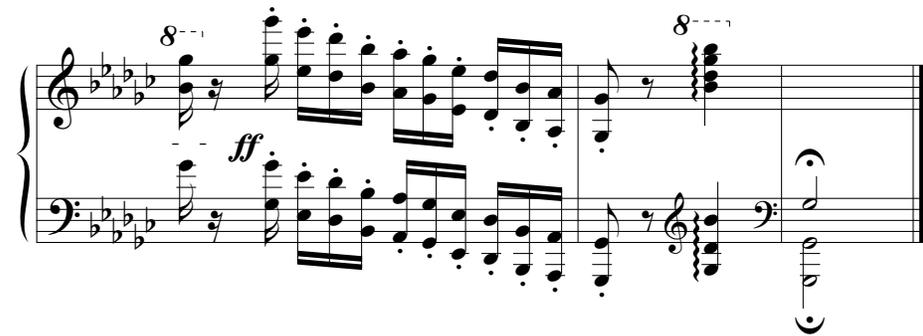
Figure 2.22



The sequence of black keys on the keyboard coincides with the interval relationships of the pentatonic scale. A brilliant use of the pentatonic scale occurs at the end of Chopin's Etude in G-flat Major, op. 10, no. 5, the popular "Black Key" Etude.

Figure 2.23

Chopin: Etude in G-flat Major ("Black Key"), op. 10, no. 5, mm. 83–85.



Ravel also used pentatonic material in his *Ma mère l'Oye* (Mother Goose) suite. The pitches in Figure 2.24 also correlate with the piano black keys.

Figure 2.24

Ravel: “Laideronnette, Imperatrice des Pagodes” from *Ma mère l’Oye* (Mother Goose), mm. 9–13.



The first two phrases of the following familiar tune are based on a pentatonic scale.

Figure 2.25

Foster: “Oh, Susanna,” mm. 1–8.



Although all the preceding examples illustrate gapped scales typical of Western music, nongapped pentatonic scales (all adjacent intervals of the same size) occur in the music of other cultures. One such culture is Java, where a pentatonic scale consisting of five nearly equal intervals (whole plus a quarter step) forms the basis for a large body of music literature.

Nondiatonic Scales

A scale that does not observe the interval sequence of the diatonic or pentatonic scales is called a *nondiatonic scale*. Many nondiatonic scales have no identifiable tonic.

Chromatic Scale

A *chromatic scale* is a nondiatonic scale consisting entirely of half-step intervals. Since each tone of the scale is equidistant from the next, it has no tonic.

Figure 2.26

Ascending Chromatic Scale



Descending Chromatic Scale



Chromaticism in Diatonic Music

Sometimes, however, a melody based on a regular diatonic scale (major or minor) is laced with many accidentals, and although all 12 tones of the chromatic scale may appear, the tonal characteristics of the diatonic scale are maintained. The following excerpt from

Purcell's *Dido and Aeneas* demonstrates this use of chromatic half steps by including 11 of the 12 tones in its gradual descent.

Figure 2.27

Purcell: "Thy Hand, Belinda" from *Dido and Aeneas*, Z. 626, mm. 1–10.

DIDO

Thy hand, Be - lin - da; dark - - - - ness shades me, On thy

bo - som let me rest; More I would, but Death in -

vades me; Death is now a wel - come guest.

*Note the chromatic descent.

Whole-Tone Scale

A *whole-tone scale* is a six-tone scale made up entirely of whole steps between adjacent scale degrees.

Figure 2.28

Whole-Tone Scale

Examples of whole-tone material are found in music from the late romantic and impressionistic periods:

Figure 2.29

Debussy: *Voiles* (Sails) from Preludes, Book I, no. 2, mm. 1–2.

Modéré (♩ = 88)

p très doux

Blues Scale

The *blues scale* is a chromatic variant of the major scale with flat third and flat seventh. These notes, alternating with the normal third and seventh scale degrees, create the blues inflection. These “blue notes” represent the influence of African scales on this music. [See Gunther Schuller’s *Early Jazz: Its Roots and Musical Development* (New York: Oxford University Press, 1968), pp. 46–52, for a complete discussion of the blue notes.]

Figure 2.30

Blues Scale in C

Non-Western Scales

Other cultures have many scales that are not diatonic. Figure 2.31 shows one of the *thaats*, or seven-note scales, of northern Indian music.

Figure 2.31

Todi (a northern Indian mode)

Octatonic or Diminished Scale

The *octatonic scale* is an eight-note scale composed of alternating whole steps and half steps. Jazz musicians refer to this scale as *diminished* because the chords resulting from this scale’s pitches are diminished.

Figure 2.32

Octatonic or Diminished Scale

Plagal Name	Number	Range	Final	Half Steps Between	Tonal Scale Comparison
Hypodorian	II			$\hat{2}-\hat{3}, \hat{6}-\hat{7}$	Natural minor scale with raised sixth degree
Hypophrygian	IV			$\hat{1}-\hat{2}, \hat{5}-\hat{6}$	Natural minor scale with lowered second degree
Hypolydian	VI			$\hat{4}-\hat{5}, \hat{7}-\hat{8}$	Major scale with raised fourth degree
Hypomixolydian	VIII			$\hat{3}-\hat{4}, \hat{6}-\hat{7}$	Major scale with lowered seventh degree

Early in the Renaissance period (1450–1600), other modes were recognized. The Aeolian is the same as the natural minor scale, and the Ionian is the same as the major scale.

Figure 2.35

Authentic Name	Number	Range	Final	Half Steps Between	Tonal Scale Comparison
Aeolian	IX			$\hat{2}-\hat{3}, \hat{5}-\hat{6}$	Same as natural minor scale
Ionian	XI			$\hat{3}-\hat{4}, \hat{7}-\hat{8}$	Same as major scale
Plagal Name	Number	Range	Final	Half Steps Between	Tonal Scale Comparison
Hypoaolian	X			$\hat{2}-\hat{3}, \hat{5}-\hat{6}$	Same as natural minor scale
Hypoionian	XII			$\hat{3}-\hat{4}, \hat{7}-\hat{8}$	Same as major scale

For a more complete explanation of the modal scales, see Chapter 8 of this volume.

Solfeggio Syllables

Certain systems of *solfeccio* (vocal exercises sung to a vowel, syllables, or words) use the syllables *do, re, mi, fa, sol, la, ti* to indicate scale degrees. The present-day movable-*do* and fixed-*do* systems are derived from Guido d'Arezzo, an eleventh-century monk who sought to teach sight singing through the use of a well-known hymn to Saint John, *Ut queant laxis* (Figure 2.36). The beginning notes of the first six phrases of Guido's melody form the first six notes of the scale: C, D, E, F, G, A. The syllables beginning these phrases are *ut, re, mi, fa, sol, la*.

Scale degree:	C	D	E	F	G	A
Syllable:	<i>ut</i>	<i>re</i>	<i>mi</i>	<i>fa</i>	<i>sol</i>	<i>la</i>

Figure 2.36

Hymn to Saint John (*Ut queant laxis*).

Ut que-ant la - xis re-so-na-re fi-bris Mi - ra ge-sto - rum fa-mu-li tu - o - rum,
Sol - ve pol - lu - ti La - bi - i re - a - tum, San - cte Jo - an - nes.

Tonal Scales

The tonal system of major and minor scales developed during the early part of the baroque period. This coincided with the emergence of key consciousness in music. By the end of the baroque period, the church modes had generally ceased to have any influence in music.

The major and minor keys were the basis of music in the classical period. Chromaticism was decorative for the most part, and shifts from one key to another (see Chapter 15) were used to create formal divisions (see Chapters 16 and 17).

During the romantic period, chromaticism increased to the point that the major-minor key system began to be threatened. By the end of the period, composers often shifted keys so rapidly over the course of a composition that tonality itself began to break down.

Expanded Scale Use

With the breakdown of the major-minor key system, impressionist composers began to experiment with other scales. They were particularly fond of pentatonic, modal, and whole-tone scales.

Twentieth-century composers have continued to expand the scale basis of their music. The chromatic scale has predominated in much of the music of our period, but a number of composers have experimented with nontraditional scales and microtonal scales (scales with intervals smaller than a half step).

Twentieth-century popular music has remained the last bastion of the major-minor key system. Until the 1960s, the great majority of popular songs were written in major keys. This preference for the major keys persists today, but songs in minor keys have become somewhat more common. The blues scale is often found in jazz and popular music with blues influence, and the modes are an integral part of jazz composition and improvisation.

APPLICATIONS

As a first step in understanding the structure of a composition, determining its scale basis is important. You can do this by forming a pitch inventory.

Pitch Inventory

A *pitch inventory* is a scalewise list of the tones used in a composition or section thereof. For purposes of organization, the pitch inventories in this text always begin with the pitch A. Many students will have no need to prepare a pitch inventory, but for those students who have yet to develop a “hearing eye” that would allow instantaneous recognition of keys and tonal centers, a pitch inventory may be a necessity. A pitch inventory permits quick assessment of the selected pitches without prejudice to key or tonality. From there you can make a fairly accurate determination of key by observing the location of half and whole steps, accidentals such as raised sevenths, etc., and particular notes of the melody that are emphasized.

With practice, the need for a pitch inventory will diminish and the calculations will become automatic. The following illustration provides a melody, its pitch inventory, and finally its scale.

Figure 2.37

Dvorák: Symphony no. 9 in E Minor, op. 95 (“From the New World”), I, mm. 149–156.

The figure displays three musical staves. The top staff is a melody in 2/4 time, starting with a piano (*p*) dynamic. The notes are G4, A4, B4, C5, B4, A4, G4, F4, E4, D4, C4. The bottom two staves are labeled "Pitch Inventory" and "Scale". Both show the notes G, A, B, C, D, E, F, G, with a sharp sign (#) above the F, indicating the key signature of E minor.

