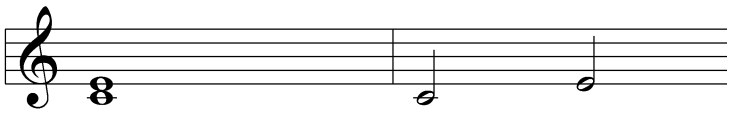
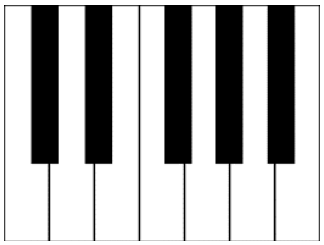
Understanding Intervals

The term *interval* refers to the distance between two pitches. This distance could be understood aurally (the sound of one pitch moving up or down to a second pitch, or two different pitches sound simultaneously), visually (on the staff and on the keyboard, for example), and even spatially, such as the distance from one pitch to another as played on some instruments, such the piano or guitar. Two pitches sounding simultaneously are referred to as *harmonic* intervals; two pitches sounding successively, one after the other, are referred to as *melodic* intervals.



Harmonic Interval **Melodic Interval**

Typically, intervals are explained and understood using a keyboard instrument, both to hear the quality of the interval's sound and observe the visual and spatial distances between the two keys.

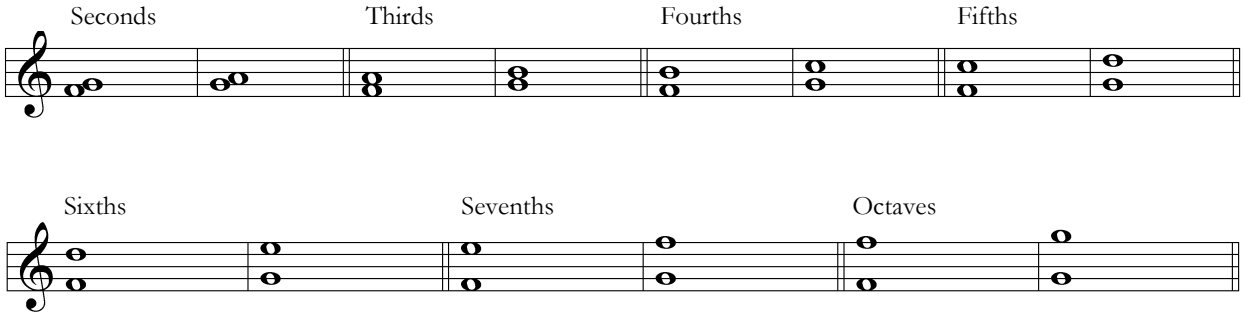


1 2 3 4 5 6 7

The *basic* interval relationship is understood and labeled as an *alphabetical* relationship. Accordingly, by moving up or down from one letter to another, such as A up to B, or F down to D, for example, we can label the basic interval distance as a second (up), or a third (down), respectively. All seconds, for example, involve two notes that are alphabetically adjacent, such as A up to B or G down to F. All thirds, for example, involve two notes that are separated by a single letter in between, such as A up to C or F down to D. All fourths, for example, involve two notes that are separated by two letters in between, such as C up to F or A down to E. This principle applies to all basic interval labels from the unison (C to C, for example) to the thirteenth, the largest basic interval label.

Intervals are also represented on the musical staff, with the interval appearing as the distance, in terms of lines and spaces that separate the two notes. Notice, for example, that all *seconds* involve two notes that move from a space to the very next line or from a line to the very next space. All *thirds* consist of two notes that occupy two adjacent spaces, or two adjacent lines. All fourths involve two notes that move from a space to a line (or a line to a space), while skipping a line and a space. All *fifths* move from a space to a space (or a line to a line), skipping a space (or a line). All *sixths* involve two notes that move from a space to a line (or a line to a space), while skipping two lines and two spaces. All *sevenths* move from a space to a space (or a line to a line), skipping two spaces (or two lines). Finally, *octaves* embody two notes that move from a space to a line (or a line to

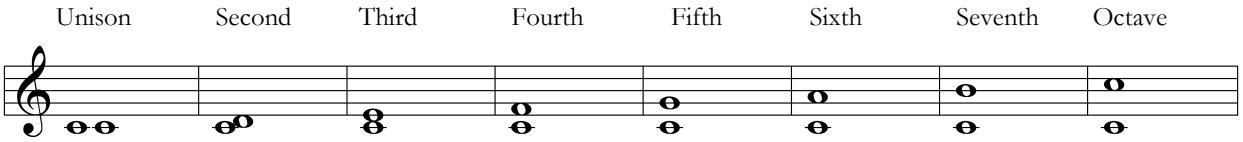
a space), while skipping three spaces and three lines. The visual note relationship on the staff for each of these intervals is shown below:



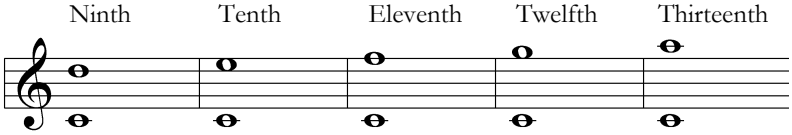
Examples of Various Intervals

The starting point for learning intervals is the major scale. Typically, the C major scale is used because of its ease and its direct correlation with the white keys of the piano. This will give us both the basic interval labels from the unison to the thirteenth, as well as the more specific labels for the precise distances of intervals beyond their basic alphabetical relationship.

As you can see, each of the basic intervals can appear above a chosen note. All of the basic intervals, from the unison to the thirteenth, above middle C, are given below. Intervals that are an octave or smaller in size are *simple* intervals; intervals greater than an octave are *compound* intervals:

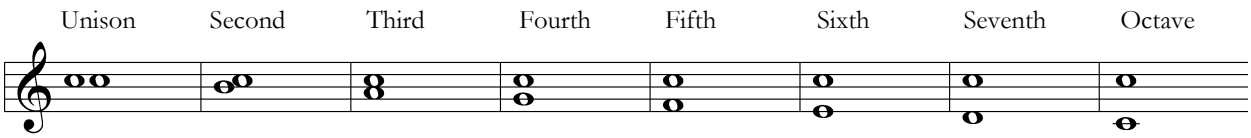


Simple Intervals Up From Middle C (C4)

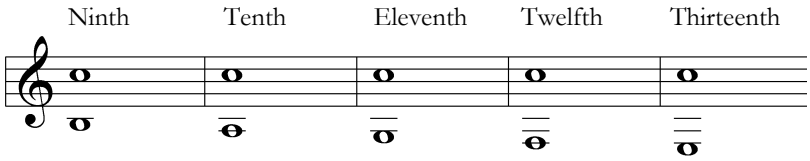


Compound Intervals Up From Middle C (C4)

Intervals can also be created and understood as the downward distance of one note to another. Since an interval measures the *distance* from one note or another, however, an interval like a third, for example, is a third regardless of whether you measure from the bottom note to the top, or the top note to the bottom. In the two examples below, each of the basic intervals are given below C5 as a starting point, but each of the intervals would have the same basic label if the bottom notes was the starting point:



Simple Intervals Down From C5



Compound Intervals Down From C5

The bottom note, as a reference, is the more common and practical way of measuring intervals, given that it is the bottom note that gives a chord its root when the chord is in root position.

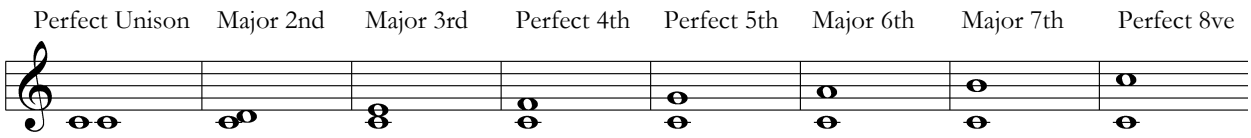
It is also important to note that not all basic interval labels are identical. For example, although the term "second" as a basic description can be used to label both the distance from A to B, and B to C, it can be easily seen by looking at these two notes on a keyboard (as well as hearing them) that the second from A to B is double the distance from B to C. A to B is two half steps (or one whole step), while the B to C is a half step. This is the case with all intervals: although the alphabetical relationship defines all basic interval labels, not all seconds, thirds, fourths, fifths, sixths, sevenths, and larger basic intervals are the same.

Keep in mind that the basic interval label would still apply, even if one or both of the two letters that form the basic interval are changed using sharps, flats, and or naturals. Accordingly, in the example above (A up to B), the basic interval label of a second would apply, even if the two notes were A# and B, A and Bb, Ab and Bb, or A# and B#. There are many other examples with A and B, the basic interval of a second, with various accidental combinations that alter the original interval in size and/or location.

When accidentals such as sharps, flats, double-sharps, and/or double-flats are applied to the letters that define the basic interval, this will, most likely, change the distance between the two notes that comprise the basic interval. It is the *combination* of the basic interval with any change to one or both of its notes through the use of sharps, flats, or other accidentals that defines the exact or precise interval.

In order to understand the *precise* measure of intervals, we can start with an exact measurement that is used to label the basic intervals. Typically, a precise or exact measurement of intervals can be done by observing the number of half steps, in distance, from the bottom note to the top (or the top note to the bottom). In the case of the basic intervals (discussed above) besides the basic label that is determined by their alphabetical relationship (unison, second, third, fourth, and so on), we can more narrowly define their exact distance that takes into account *both* their alphabetical relationship *and* the number of half steps or semitones that the interval encompasses.

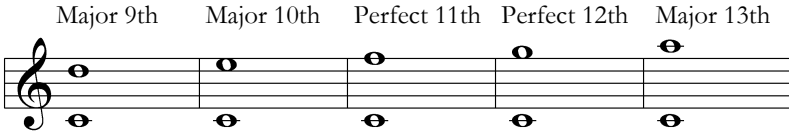
Starting with the major scale, the precise interval labels are given below:



Major Scale Intervals (Simple)

The intervals formed by the first (unison), fourth, fifth, and eighth (octave) notes of the major scale are referred to as *perfect* intervals. The perfect fourth is always comprised of five half steps. The perfect fifth is always comprised of seven half steps. Finally, the perfect octave is always comprised of twelve half steps. Again, the alphabetical relationship defines the basic interval label as a fourth, fifth, or octave. The number of half steps the interval comprises defines the precise interval.

The intervals formed by the second, third, six, and seventh notes of the major scale are referred to as *major* intervals. The major second is always comprised of a distance of two half steps. The major third is always comprised of seven half steps. The major sixth comprises a distance of nine half steps, and the major seventh always comprises a distance of eleven half steps.

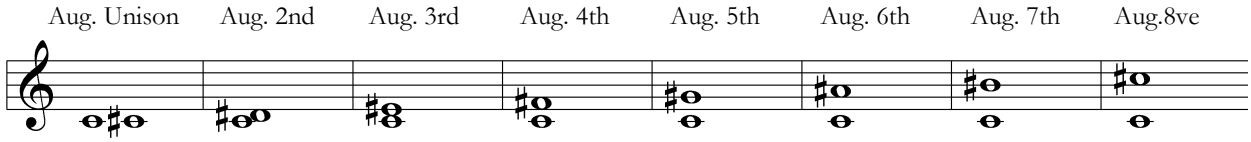


Major Scale Intervals (Compound)

The compound intervals, which include the three extensions (the ninth, eleventh, and thirteenth), are labeled the same as their octave equivalent simple interval counterparts. Accordingly, the intervals formed by the ninth, tenth, and thirteenth of the major scale (like the second, third, and sixth) are *major* intervals. The eleventh, and twelfth are *perfect* intervals. While there are differences in function and harmonic content between the second and the ninth, the fourth and the eleventh, and the sixth and the thirteenth, the tenth and the twelfth are essentially only different than the third and fifth in the size of the interval—not in function or harmonic content. The fourteenth and fifteenth are not described or distinguished in discussions of theory and/or harmony, but may be used as labels to describe specific distances on the staff or keyboard, for example.

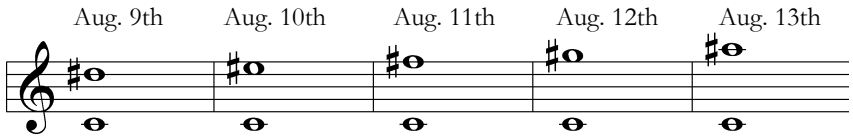
It is also worth pointing out that the principle of *octave equivalence* supports the idea that in most instances, note relationships usually function the same way regardless of the octave that they appear in. So while it is important to distinguish the exact size of an interval in discussions or descriptions solely pertaining to intervals, in discussions of harmony, chords, chord voicing, and voice leading, the octave placement of a note in a chord does not determine how that note functions or how it is labeled. Stated more simply, a thirteenth, for example, might appear at a distance of a sixth above the root/bass note, but it may function as a thirteenth depending on the other chord components that it appears alongside. Similarly, a sixth may appear at the intervallic distance of a thirteenth above the root/bass note, but may, in certain cases, be correctly labeled as a sixth. So in summary, intervals can be understood as specific distances between two notes *and* as chord components, where the octave placement of the note in the chord does not determine its function or its label.

When the major scale intervals are altered through the introduction of accidentals (sharps, flats, or naturals) that affect the key signature, the intervals that naturally occur are changed. If the upper note of any of the seven naturally occurring major scale intervals is raised by a half step—without changing the letter spelling of either note—the interval is made larger. These seven new intervals are now labeled as *augmented*. The word "augmented" denotes the increased size of the original interval by a half step. The augmented intervals are given below.



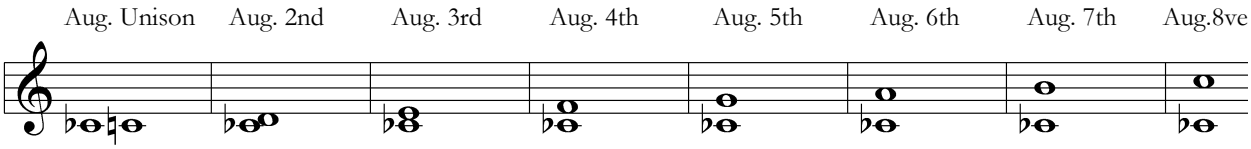
Augmented Major Scale Intervals (Simple)

This is also the case with the compound intervals, which includes the three extensions (the ninth, eleventh, and thirteenth). If the interval is made larger, by raising the upper note by a half step, the interval becomes augmented:

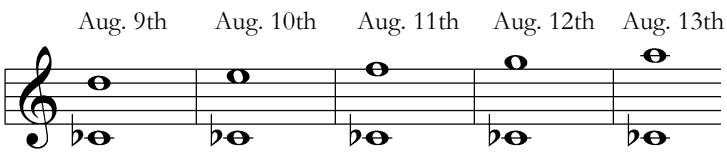


Augmented Major Scale Intervals (Compound)

An augmented interval may also occur if the lower note is lowered by a half step without changing the basic interval spelling. (These would be augmented intervals in the Cb major scale):



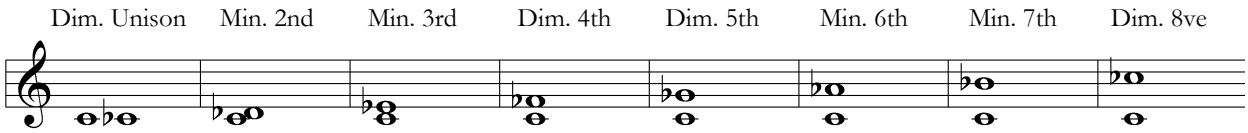
Augmented Major Scale Intervals (Simple)



Augmented Major Scale Intervals (Compound)

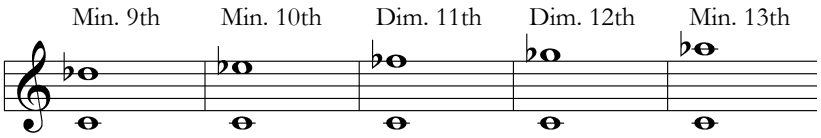
The term augmented, as can be seen, means the interval is made larger by either raising the upper tone by a half step or lowering the lower tone by a half step, *without changing the basic interval spelling.* Although intervals cal also be made larger by changing the spelling of the upper or lower note (for example, changing a major second like C to D, to C to E),

The major scale intervals may also be altered by lowering the upper note of each interval by a half step. In this case, the major intervals become minor, and the perfect intervals become diminished:



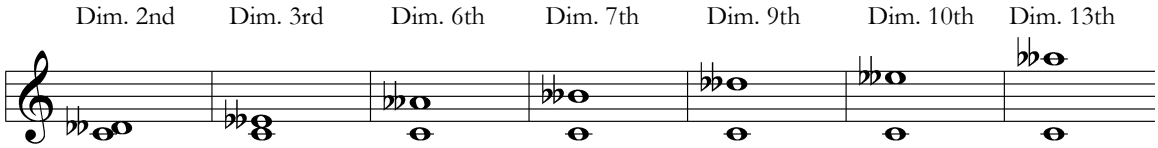
Minor and Diminished Major Scale Intervals (Simple)

Again, this is also the case with the compound intervals, where the major intervals become minor, and the perfect intervals become diminished:



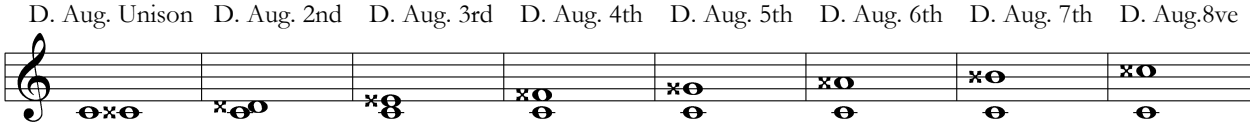
Minor and Diminished Major Scale Intervals (Compound)

If a minor interval is made a half step smaller, or if a major interval is made two half steps smaller (both without changing the spelling of the interval), a diminished interval is the result:

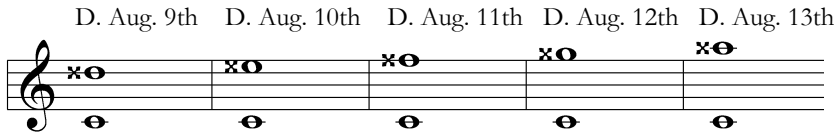


Diminished Major Scale Intervals (Simple and Compound)

When an augmented interval is made a half step larger, the interval is referred to as *doubly augmented.*

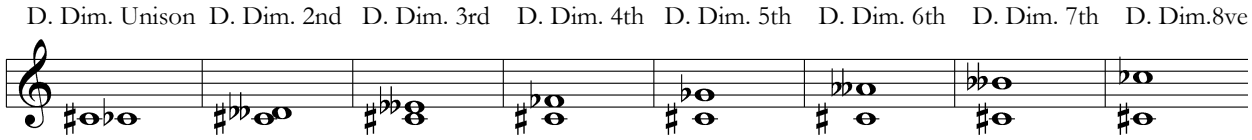


Doubly Augmented Major Scale Intervals (Simple)

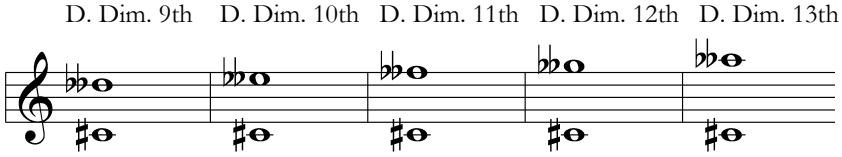


Doubly Augmented Major Scale Intervals (Compound)

When a diminished interval is made a half step smaller, the interval is referred to as *doubly diminished*: Doubly diminished intervals are somewhat rare, but they can occur melodically when abrupt modulations from one key to another occur. In the doubly diminished interval examples above, using C# as the lower note allows for the avoidance of rare and unwieldy notation, such as the use of triple flats.



Doubly Diminished Major Scale Intervals (Simple)



Doubly Diminished Major Scale Intervals (Compound)

As you may have noticed from the discussion above, intervals of the same size can have more than one name or label. Understanding the spelling of intervals and the orthography of written intervals and chords is essential, as it is a way to understand and interpret how the notes are meant to be heard in terms of their movement and resolution in the context of melodies and chord progressions. The spelling and sound of an interval is not unlike the spelling and the sound of a word. If you hear the sound of a word outside of the context of a phrase or sentence, it is impossible to understand its spelling or how it is meant to be interpreted in terms of its meaning and its relationship to the other words in the sentence.

Although almost the entire discussion above describes written intervals—which is an important topic in music theory that allows for a good understanding of melody, chords, and chord progressions—perhaps even more important is the ability to *identify* the basic intervals aurally when they are sounded as melodic and harmonic intervals. In this case, simple generic descriptions of the basic interval—outside the written context where how the interval is spelled is important and reflects both melodic and harmonic relationships—are adequate. Accordingly, all we need are interval names that reflect, in half steps, the distance between the two notes. The terms that are typically used to label these distances are given below:

One half step: *minor second* or *half step*.
Two half steps: *major second* or *whole step*.
Three half steps: *minor third*
Four half steps: *major third*
Five half steps: *perfect fourth*
Six half steps: *augmented fourth* or *diminished fifth*
Seven half steps: *perfect fifth*
Eight half steps: *minor sixth*
Nine half steps: *major sixth*
Ten half steps: *minor seventh*
Eleven half steps: *major seventh*
Twelve half steps: *octave*

In music that is written, understanding written intervals is important. Here the spelling of the interval denotes the harmonic and melodic relationship on paper as a way to label the sounds *and* understand the intention, theory, and relationship behind or between the sounds. In music that exists mainly or solely in the aural domain (in styles such as jazz, pop, rock), the various labels for a particular interval are not as important as the ability to hear and identify the basic quality of the interval inside or outside its musical context. The notated relationships are important to consider if the music is written down, but the priority of the notation here is mainly to make the music easy to read and play. Accordingly (As a result), intervals are sometimes written with a simpler, easier to read notation, even if it the notational spelling not technically correct.

If you hear a piece played in the key of Gb major, it's going to sound exactly the same as if it were written and played in F# major. You're not concerned with how the piece is written as you are with what it sounds like, how the principle of tension and resolution manifest aurally, and so forth. But once the composer chooses to notate the piece and chooses a key, the notation must take into consideration the key signature and how its spellings conform to it. Accordingly, the notation is then guided by theoretical principles, notational relationships, and orthography.

Sometimes the choice of two enharmonically equivalent keys can actually affect the way the piece is perceived. There is a reason why composers write some pieces in F# major, and other pieces in Gb major beyond the educational purpose.