A **scale** is a collection of pitches that is used in a particular section of music. For convenience, scales are typically written as ascending seconds (whole steps and half steps) from a low note to a high note that shares the same letter name and is one octave higher. Basic diatonic scales have seven different pitches before returning to the duplicate octave. Unfortunately for musicians, our notation system gives the false impression that all lines and spaces on the staff are equal in distance. Because this is a false impression, it is critical to learn which adjacent pitches are separated by whole steps, and which are separated by half steps. Using a piano keyboard as a visual aid, it is easy to see where these whole and half steps lie between white-key (unaltered) pitches.

![Piano Keyboard with Whole and Half Steps](image)

The major scale is a particular arrangement of whole and half steps, and can most easily be remembered as the white notes from C to C. One easy way to think of a major scale is as two identical four-note segments (tetrachords) that are separated by a whole step. WWH W WWH

Major scales can be transposed to begin on any pitch, but they retain this whole and half step pattern through the application of accidentals.

![B Major Scale](image)

**Key signatures** are a notational convenience which allow music to be written without the clutter of accidentals that must be applied to every occurrence of a pitch class in a scale. The number and order of sharps and flats in each key signature must be memorized. The order of sharps in key signatures is always FCGDAEB. The order of flats is always BEADGCF. Notice that these are the reverse of each other. There are mnemonic devices that can aid in memorization, but eventually these must actually be memorized. One device for sharps is “Fat Charlie Goes Down And Eats Breakfast.” One for flats is “Big Elephants After Death Get Cold Feet.”
There are methods for identifying key signatures before they are memorized. The method illustrated here relies on the student’s knowledge of intervals, which will be covered in the next lesson. The method does not work for two major keys (C and F) and one minor key (c), which are easily memorized.

- For major keys with sharps: Count up a minor 2nd (one half step) \(^1\) from the last sharp in the signature, and that is the name of the key.
- For major keys with flats: The second-to-last flat is the name of the key. Also, if you count down a perfect 4th (five half steps) from the last flat, that is the name of the key.
- For minor keys with sharps: Count down a major 2nd (two half steps) from the last sharp in the signature, and that is the name of the key. Also, the third-to-last sharp is the name of the key.
- For minor keys with flats: Count up a major 3rd (four half steps) from the last flat in the signature, and that is the name of the key.

A method for writing key signatures is illustrated below. Notice the placement of sharps and flats in the printed key signatures from the previous example. flats must be written in the correct order, and in the correct octave on the treble and bass staves. Again, the keys of C major, F major, and a minor must be memorized, as this method does not apply in those cases.

- For major keys: Count down a minor 2nd (one half step) \(^2\) from the name of the key. If that note is a sharp, the key signature will be sharps. Write sharps (in order) until you reach that note. If that note is not a sharp, write flats until you reach the name of the key, then write one more.
- For minor keys: If the name of the key contains a sharp, or if the name is e or b, count up a major 2nd (two half steps) from the name of the key and write sharps until you reach that note. For all others, count down a major 3rd (four half steps), and write flats until you reach that note.

A second method for writing minor key signatures is to first memorize all of the major signatures, then figure the minor key signature for the same note name by adding three flats to the major signature. Note that adding flats is the same as taking away sharps. For example, if you know the key signature for F major is one flat, you can determine the signature for f minor by adding three flats, giving you four flats. Another example is adding three flats to the two sharps for D major, giving you one flat for the signature of d minor.

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\(^1\) A minor second must have a different letter name from the original. For example, one half step above C could be spelled as either C\(_{\flat}\) or D\(_{\natural}\). The minor second above C is D\(_{\natural}\), because it has a different letter name.

\(^2\) One half step below E could be spelled as either E\(_{\flat}\) or D\(_{\natural}\). The minor second below E is D\(_{\natural}\), because it has a different letter name.
Music Fundamentals Primer
Exercises for Lesson 2 (A)

I. Identify both the major AND minor keys represented by the given signature.

II. Write the specified MAJOR key signatures.

III. Write the specified MINOR key signatures.
Music Fundamentals Primer
Exercises for Lesson 2 (B)

I. Identify both the major AND minor keys represented by the given signature.

II. Write the specified MAJOR key signatures.

III. Write the specified MINOR key signatures.