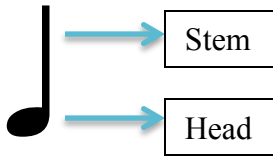


Music Notes and the Staff



- The head of the note indicates what the note is.
- The direction of the stem (pointing up or down) does not affect the note.
- The scale (progression of notes) going up is C-D-E-F-G-A-B, then begins over at C.
- The number (C2, D4, E3, G2, etc.) indicates how high or low the note is (octave 2 is low, 6 is high).

These are the same note. Middle C. C4.

A musical staff in 4/4 time showing a sequence of notes. The notes are labeled with their scientific pitch notation and frequency codes. The top staff (treble clef) has notes labeled D3 E3 F3 G3 A3 B3. The bottom staff (bass clef) has notes labeled C2 D2 E2 F2 G2 A2 B2 C3. A blue arrow points from the text 'These are the same note. Middle C. C4.' to a note on the top staff labeled C4. Other notes are circled in blue and labeled C5 and C6. Frequency codes are written below the notes: C2 D2 E2 F2 G2 A2 B2 C3, D3 E3 F3 G3 A3 B3, C4 D4 E4 F4 G4 A4 B4 C5, and D3 E3 F3 G3 A3 B3.

Accidentals

Occasionally, you will see sharps (#) or flats (♭). These indicate that the main note (D, E, F, G, etc.) is altered in pitch, halfway *above* (sharp, indicated #) or halfway *below* (flat, indicated ♭) the given note. The notes are written in the correct place on the staff, and the sharp or flat is indicated either at the beginning of the piece, or next to the note (illustrated below).

This is a *key signature*, which indicates that in this song, all of the B notes will be played a half-step lower than regular B. In your coding, then, you would look up the frequency for B ♭ each time you see a B. *Note: accidentals override key signatures, when both are present.*

A musical staff in 4/4 time with a key signature of one flat (B♭). Two B notes are circled in blue. One is on the top staff and the other is on the bottom staff. Blue arrows point from a text box to these two notes.

Both of these B notes will be coded as B ♭. The top one is B ♭ 4; the bottom one is B ♭ 3.



This piece of music indicates sharps and flats prior to each note. In your coding, you would look up the frequency for each note as it appears in the song.

**Duration of Notes**

The speed of the song and the duration of each note is set by a time signature, indicated at the beginning of the piece. Use the guide below to determine timing for the duration of the notes for your song.

Name	Note	Rest	Time Value (# beats or counts)
Whole Note			4
Half Note			2
Quarter Note			1
Eighth Note	or		1/2
Sixteenth Note	or  or		1/4

To demonstrate this mathematically, let's look at an example. Let's say in this piece of music we timed a whole note to be 4 full seconds. The rest of the notes as written would be coded with the following time values:

## Unit 7: Programming (Electronic Music)

### Lesson 2: Programming in Minibloq

### U07\_L02\_04-H1\_Music\_Theory

Half note: 2000 ms each    Whole note: 4000 ms    Quarter note: 1000 ms each    Whole note: 4000 ms

The image shows a musical staff in 4/4 time. The first measure contains two half notes. The second measure contains a whole note. The third measure contains four quarter notes. The fourth measure contains a whole note. Blue arrows point from the text labels above to the corresponding notes on the staff.

In this piece, how many ms would be assigned to an eighth note? ( $1/2$  of 1000 ms = 500 ms)

You can determine how many milliseconds to assign to this value by singing/playing/thinking of the song as you know it. Try to determine how many seconds will equal one whole note. Then you will be able to determine the value of time (in milliseconds) for a half note, a quarter note, and any other note values that may be indicated.