

MUS115 Fundamentals of Music and Sound Design

Week 2

The Fundamentals of Music: Part I

- ***The Notation of Pitch***
- ***Rhythm***
- ***The Qualities of a Melody***
- ***Melodic Structure***
- ***Creating and Editing a Melody with a Score Editor***

The Notation of Pitch

As you may recall from a previous lesson, a ***melody*** is a linear succession of musical tones using a combination of the four properties of sound: pitch, intensity, duration, and timbre. The melody is often the foreground of any musical composition and is generally a distinctive feature in the soundtrack of an animation, live-action film, or video game. Melodies frequently represent recurring characters, ideas, or moods throughout a story.

The Legend of Zelda: Twilight Princess (Ordon Village)

J=144

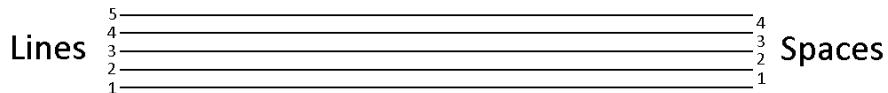
Pan Flute

12

Ex. 1

Musicians use special music symbols to notate and read the pitch, intensity, duration, and timbre of a melody. The following explanations and examples cover all of these basic symbols and their practical usage.

All music, including melodies, is written on a set of five parallel lines and four spaces called the ***staff***:



Pitches are written on the staff using symbols called **notes**.



Notes are written on the lines and spaces of the staff and are labeled using the first of seven letters of the alphabet.

A B C D E F G

Ex. 2



Clef Signs

Clef signs are symbols based on stylized Gothic letters and are written to the left of each staff. A clef assigns an alphabetical reference point to one specific pitch. In the example below, the **treble clef** or **G clef** is placed upon a staff and, its curly middle portion encircles the second line. When a G clef's curl encircles a line, it designates the note lying on this line as **G**. The rest of the notes on the staff follow in alphabetical order as they ascend the staff.

E F G A B C D E F

Ex. 3



In the next example, the **bass clef** or **F clef** lies on the staff with dots above and below the fourth line. When a line passes between the two dots, the note lying on this line is designated as **F**. The rest of the notes on the staff will follow in alphabetical order as they ascend the staff.

Ex. 4



Notice the line running through the middle of the ***alto clef*** or ***C clef***. A note lying on this line is designated as ***C***.

Ex. 5



On the ***percussion clef*** or ***neutral clef***, non-pitched percussion instruments such as cymbals, snare drums, tom-toms, and kick drums are written using a combination of notes and symbols such as an x.

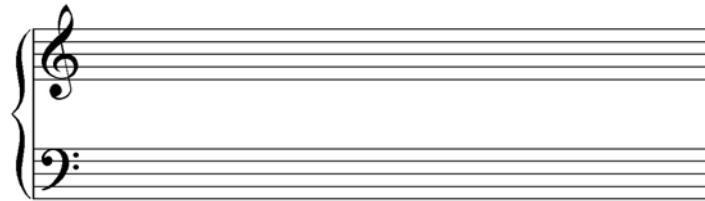
Ex. 6



Because the staff cannot display the entire range of notes available on any particular musical instrument, ***ledger lines*** are sometimes added above or below a staff.

The ***grand staff*** uses a combination of treble and bass clefs joined together with a brace and vertical bar line. The grand staff can accommodate the full range of

musical tones and is most commonly used for keyboard instruments such as the piano, organ, and harpsichord.



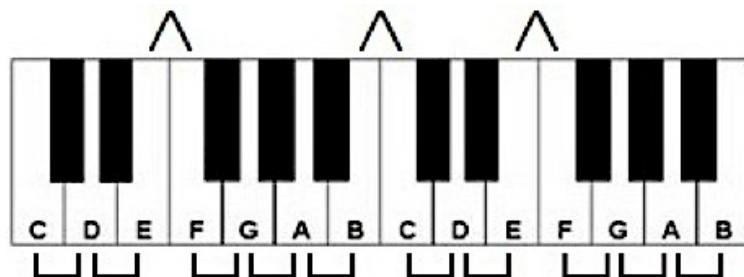
Half Steps and Whole Steps

Composers create melodies with the goal of expressing a feeling, mood, or idea. This unique feeling, mood, or idea is defined by a melody's ***melodic progression***. Melodic progression is the movement of notes by ***step-wise motion*** (line-space-line-space), by a ***skip*** (skipping a line or space), or by a ***leap*** (more than one line or space).

Even though the notes may move up and down in step-wise motion, the actual pitch from one line or space to another is not proportional in frequency. In other words, the frequency's incremental change is not proportional between each of the notes that lie on the staff.

The difference in frequency (or ***interval***) between notes on the staff is commonly described by two terms: ***half steps*** and ***whole steps***. A ***half step*** (or ***semitone***) is the smallest interval from one tone to another in traditional Western classical music and is represented by the following symbol: \wedge . A ***whole step*** (or ***whole tone***) is an interval consisting of two half steps and is represented by a horizontal bracket: \sqcup

The Notes on A Musical Keyboard Showing the Position of the Note Names and Their Whole- and Half-Step Relationships



Ex. 7



Basic Notes and Accidentals

A rich variety in the character of a melody can be achieved by changing a basic note's frequency. **Basic notes** are notes that are not affected by any signs or symbols and named after the first seven letters of the alphabet: **A, B, C, D, E, F, and G**.

Accidentals are signs (or symbols) that raise and lower the basic notes by half and whole steps thereby changing a note's frequency:

Sharp	Flat	Natural	Double-sharp	Double-flat
#	b	h	x	bb

- A **sharp** sign raises a note one half step.
- A **flat** sign lowers a note one half step.
- A **natural** sign restores a sharped or flatted note to its basic note name.
- A **double sharp** sign raises a note one whole step.
- A **double flat** sign lowers a note one whole step.

Super Mario Bros. 'Underwater Theme'

$\text{♩} = 132$

A musical score for the Super Mario Bros. 'Underwater Theme'. The score begins at measure 10 in 3/4 time, treble clef, and G major. The key signature changes to F# major (one sharp) at measure 10. The music consists of eighth-note patterns and rests, primarily using quarter note stems. Measure 10 starts with a quarter note followed by a rest. Measures 11-12 show a pattern of eighth notes and rests. Measures 13-14 continue the pattern. Measures 15-16 show a more complex eighth-note pattern. Measures 17-18 end the excerpt with a final eighth-note pattern.

Continuation of the musical score for the Super Mario Bros. 'Underwater Theme' starting at measure 10. The score continues in 3/4 time, treble clef, and F# major. The music consists of eighth-note patterns and rests, primarily using quarter note stems. Measure 10 starts with a quarter note followed by a rest. Measures 11-12 show a pattern of eighth notes and rests. Measures 13-14 continue the pattern. Measures 15-16 show a more complex eighth-note pattern. Measures 17-18 end the excerpt with a final eighth-note pattern.

Continuation of the musical score for the Super Mario Bros. 'Underwater Theme' starting at measure 18. The score continues in 3/4 time, treble clef, and F# major. The music consists of eighth-note patterns and rests, primarily using quarter note stems. Measure 18 starts with a quarter note followed by a rest. Measures 19-20 show a pattern of eighth notes and rests. Measures 21-22 continue the pattern. Measures 23-24 end the excerpt with a final eighth-note pattern.

Ex. 8



Bar Lines, Measures, and Ties

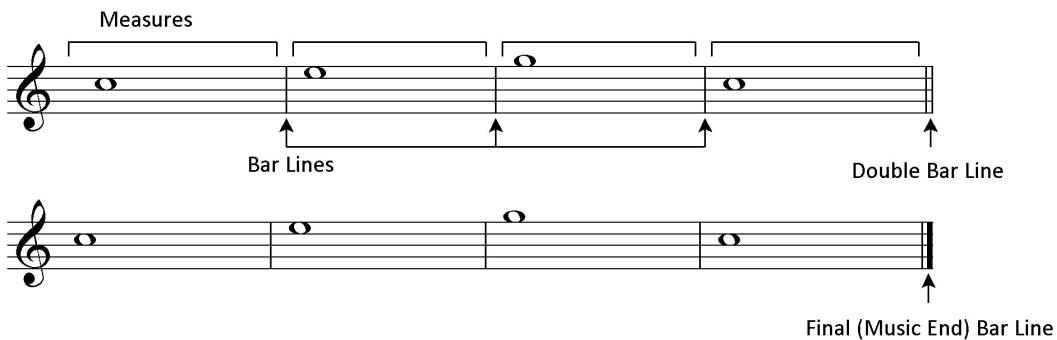
There are special music symbols that help organize the notes into logic sections and connect the duration of one note to another. Below are some of these basic symbols:

Bar lines: **Bar lines** are vertical lines that are drawn through the five horizontal lines of the staff.

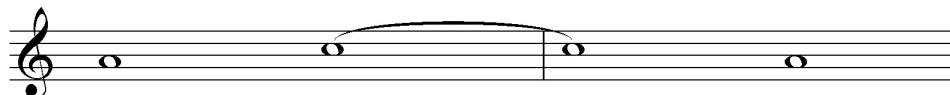
Measures: A **measure (bar)** is a segment of notes enclosed between two bar lines or a clef sign and a bar line.

Double bar line: A **double bar line** marks the end of a section of music consisting of two or more measures.

Final bar line: A **final (music end) bar line** marks the end of the music.



A **tie** is a curved line that connects two notes of the same pitch. Tying one note to another prolongs the duration of the first note into the second note of the tied pair.



Ex. 9



The Legend of Zelda: Twilight Princess (Ordon Village)

$\text{♩} = 144$

Pan Flute

12

Ex. 10



Scales

As you've learned in a previous lesson, a **scale** is a preset, consecutive series of tones that ascend and descend the staff. The word *scale* is actually derived from the Latin word, *scala*, or ladder. Remembering this will help to visualize the notes as they 'climb' up and down the lines and spaces as if ascending and descending the steps of a ladder. The following are the fundamental scales and terminology used in musical scale theory and composition.

The Chromatic Scale

A **chromatic scale** is a musical scale consisting of 12 pitches. In a *chromatic scale*, each pitch is one half step apart.

Sharps are typically used in the ascending form of the chromatic scale.

A musical staff with a treble clef and four sharps. The notes are: C, C♯, D, D♯, E, F, F♯, G, G♯, A, A♯, B, C. The sharps are placed under the notes D, A, and E respectively.

Ex. 11



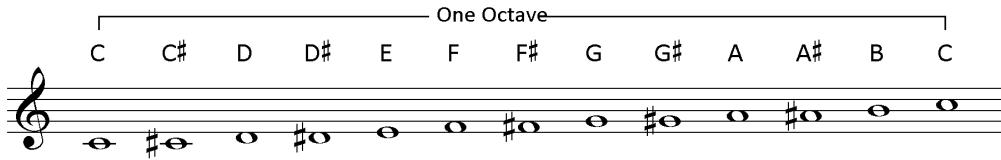
Flats are commonly used in the descending form of the chromatic scale.

A musical staff with a treble clef and seven flats. The notes are: C, C♭, B♭, A, A♭, G, G♭, F, E, E♭, D, D♭, C. The flats are placed under the notes C, G, D, A, E, B, and F respectively.

Ex. 12



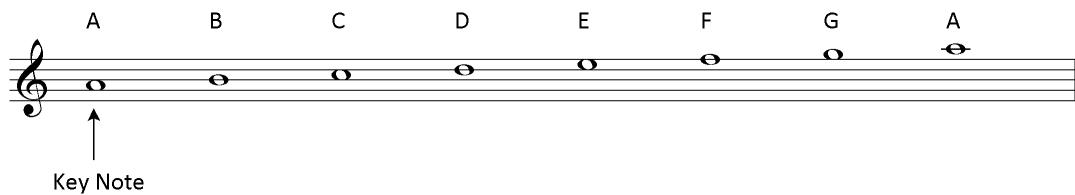
For reasons of expressiveness, a composer may choose to write a melody within a specific **range**. A melody's range is the distance, in lines and spaces, between the highest and lowest note on the staff. One of the most common types of ranges is that of an **octave**. An octave is a range consisting of six whole steps (or 12 half steps) up or down the staff. (Notice that the letter name for the higher and lower octave is the same.)



Basic Scales

One of the earliest types of scales used by composers is the **basic scale**. The basic scale is a one-octave, alphabetical, stepwise (line-space-line-space) arrangement of scale tones on the staff that contains no sharps or flats.

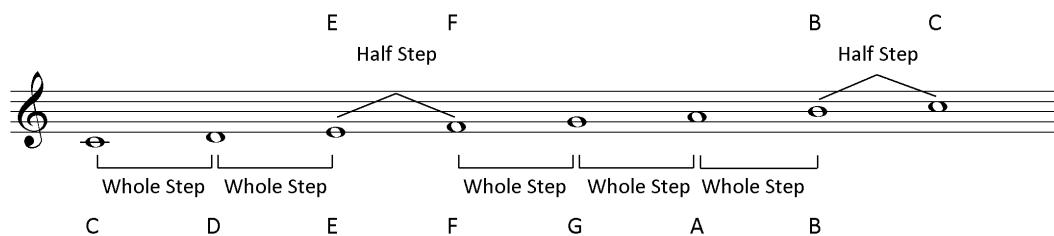
The **keynote** is the first note of the scale. The keynote provides a central reference point that serves as the ‘home base’ of a musical composition.



The Major Scale

The **major scale's** character is light and cheerful. The formula for the major scale consists of the following pattern of whole and half steps:

W – W – H – W – W – W – H



Ex. 13

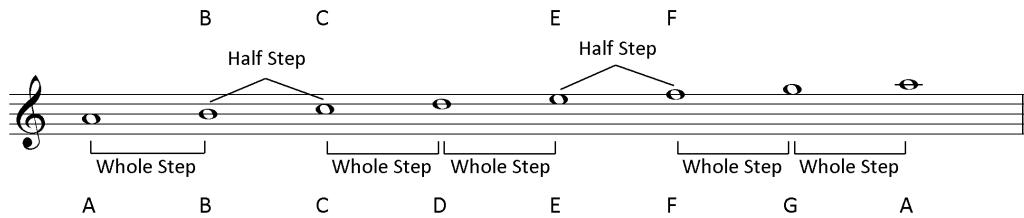


The Natural Minor Scale

The **natural minor scale's** character is often described as sad or mournful. It can

create a strong sense of despair. The formula for the minor scale consists of the following pattern of whole and half steps:

W – H – W – W – H – W – W



Ex. 14



Rhythm

As mentioned in an earlier lesson, ***rhythm*** is the temporal organization in which patterns of long and short durations of sound are used to create motion and energy within a musical composition. These long and short durations of sound occur regularly within the framework of a steady, undulating pulse.

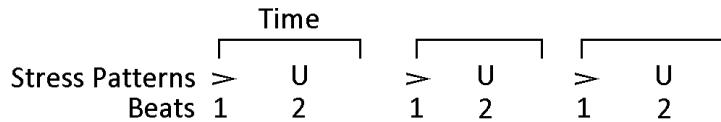
The importance of rhythm in music cannot be over emphasized because it is not only at the core of every musical composition but dramatically affects our immersion in music. It is rooted in nearly all of the body's activities such as breathing, walking, the heartbeat, or brainwaves. Rhythm can affect states of relaxation, tension, and can also alter the mental state. The repetitiveness of a rhythm can draw the listener inward to a meditative state or it can reinforce learning and familiarity with the sounds and images heard in the music. Rhythm, when forced against the natural rhythm of the body can create tension and energy. Silence within rhythm (rests) can help deliver a strong rhythmic and temporal message. Anticipation of rhythmic elements effect and engage the emotions and interactivity of the listener. To fully understand the inner workings of rhythm, a study of basic rhythm terminology must be explored. The following terminology and concepts will allow you to gain a firmer grasp of one of music's most important elements:

Beat

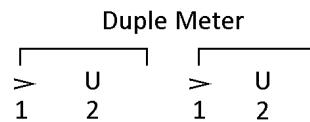
A ***beat*** is a regular, recurring pulse that divides a period of time within the music. Stressed (strong) and unstressed (weak) beats provide tension and relaxation.

Meter

Meter is a recurring pattern of strong (>) and weak (U) beats.



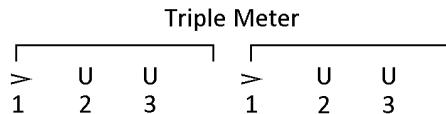
Duple meter is the recurring pattern of one strong and one weak beat.



Ex. 15



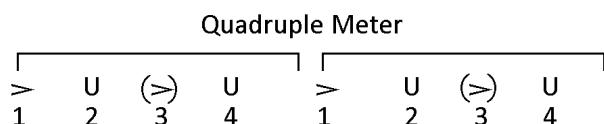
Triple meter is the recurring pattern of one strong beat followed by two weak beats.



Ex. 16



Quadruple meter is a four beat stress pattern with a strong beat on 1; a secondary strong beat on 3, and successively weaker beats on 2 and 4.

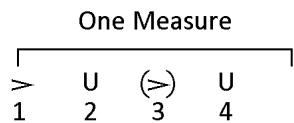


Ex. 17



Measure

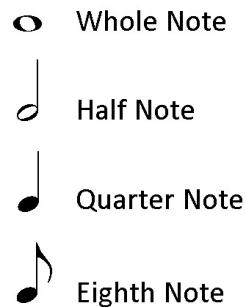
A **measure** (or **bar**) is one complete stress pattern.



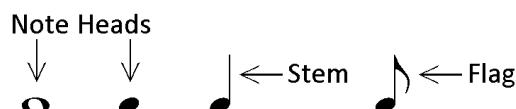
Note and Rest Values

Musicians use a variety of symbols to regulate the long and short durations of notes. These symbols are called ***note and rest values***. The following is a discussion of some of the most basic types of note and rest values used in music along with subtle variations brought about through the use of dots.

A ***note value*** is a symbol that represents the relative duration of a pitch.

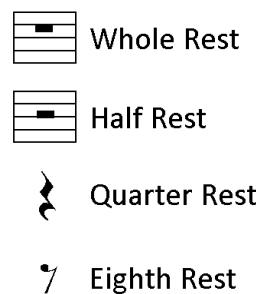


The ***parts of a note*** consist of the ***head***, ***stem***, and/or ***flag***.



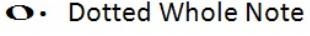
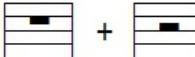
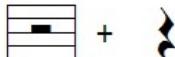
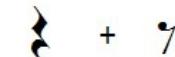
Rest Values

A ***rest value*** (or ***rest***) is a symbol that represents a relative duration of silence.



Dotted Note Values

Dots lengthen the duration of a primary note value by $\frac{1}{2}$.

 Dotted Whole Note	=	
 Dotted Half Note	=	
 Dotted Quarter Note	=	
 Dotted Whole Rest	=	
 Dotted Half Rest	=	
 Dotted Quarter Rest	=	

Rhythm Practice

To practice the duration of a note value(s) or rhythm(s), keep in mind that each note value consists of a finite number of beats or portion of a beat.

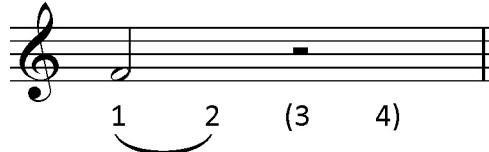
To sound a whole note:

- Sing a note on beat 1.
- Continue singing the note through beats 2, 3 and 4.



To sound a half note:

- a) Sing a note on beat 1.
- b) Continue singing the note through beat 2.



If the half note begins on beat 3, let the note sound through beat 4 (do not sing on the beats enclosed in parenthesis):



To sound a quarter note:

- a) Sing a note on beat 1.
- b) After one full beat (one foot or hand tap), proceed to the next note:

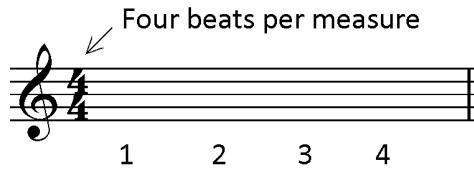


Time Signatures

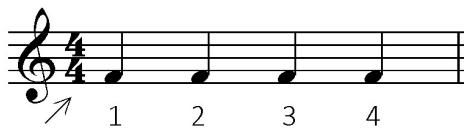
Written music uses a symbol that dictates the temporal organization of note and rest values within each measure. This symbol is known as the **time signature**. A time signature is a pair of numbers that appear at the beginning of a composition. Time signatures appear only once at the beginning of the composition and give information about the composition's metrical organization.



The *upper number* of a time signature indicates the number of beats within each measure (exception 6/8, 9/8, and 12/8 time). In the example above, the upper number 4 indicates that there are four beats per measure (1 2 3 4).

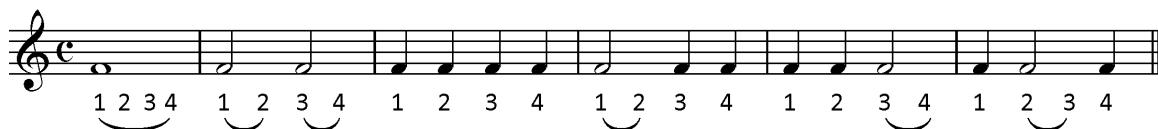


The *lower number* of a time signature indicates which type of note value represents the beat. In the example below, the lower number **4** indicates the type of note value that will serve as the basic beat in each measure. A number **4**, in this case, means that the beat is represented by a quarter note.



Quarter note represents the value of each beat

In **4/4 time**, you must count four beats per measure with a quarter note serving as the basic beat. Within a measure, any combination of note values may be used as long as each measure contains the equivalent of four quarter-note beats. When counting, always begin the measure by counting '1'. Then, continue on by counting '2, 3, 4' in sequence through each measure in 4/4 time regardless upon which beat the quarter and half notes fall. Below are examples of the possible combinations of note values within a measure of 4/4 time:



The Common Time Signature

Common Time is a time signature from early notation systems. It is the equivalent of 4/4 time and is represented by the letter **C**. For historical and religious reasons, triple meter was considered 'perfect' time and was represented by a circle. 4/4 time was considered 'imperfect' and was represented by an incomplete circle (C).



Division and Subdivision of the Beat

Division of the Beat

For rhythmic variety, tones sounding on a beat may be divided into two equal parts. When a quarter note represents the beat, two eighth notes would be the division of a beat. This would cause the notes to sound twice as fast, thereby creating more rhythmic energy.

Division of the Beat in Two Parts

1 and 2 and

Subdivision of the Beat

For more rhythmic variety and complexity, the beat may be subdivided into four equal parts.

When a quarter note represents the beat, four sixteenth notes would be the subdivision of a beat. This would cause the notes to sound four times as fast, thereby creating even more rhythmic energy.

Division of the Beat in Four Parts

1 e + a 2 e + a 3 e + a 4 e + a
(ee) (and) (ah)

Beams

Beams join two or more notes together by beat, beat division, or beat subdivision thereby eliminating the use of flags.



The Qualities of Melody

As previously mentioned, composers frequently write melodies that create a specific mood or emotion. The notes of these melodies, therefore, must be arranged in an order that will best enhance a film or game's story, character, onscreen action, or game play. Recall that this arrangement of notes is often referred to as the melody's ***melodic progression***.

Remember that a melodic progression is the movement of notes (pitches) by step-wise motion (line-space-line-space), by a skip (skipping a line or space), or by a leap (more than one line or space). The melodic progression will be most effective when it has a distinct ***contour***. The contour of a melody is the rise, fall, or static movement of the notes within a melodic line. There are two basic types of contour:

Conjunct Motion

In ***conjunct motion*** the pitches move by step-wise motion (line-space-line-space).



Ex. 18



Disjunct Motion

In ***disjunct motion*** the pitches move by skips and leaps.



Ex. 19



Other factors such as ***range*** and ***articulation*** can change the character of the overall quality of a melody. (Recall that range is the distance, in lines and spaces, between

the highest and lowest note on the staff.) The melody below is somewhat narrow in range and spans a distance of only five notes.

5

6

Ex. 20



Articulation

Articulation is the way in which a note is attacked (e.g., struck, blown, or plucked) by the performer. There are two basic types of articulation:

- 1) **Legato:** **Legato** is the smooth, connected flow from one sound to another.
- 2) **Staccato:** **Staccato** is a break or detachment between one or more sounds.

The example below begins with a **staccato** articulation in the violins (Pizzicato Strings) followed by the contrasting **legato** articulation in the flute (Pan Flute).

Pan Flute

Pizzicato Strings

6

Ex. 21



Melodic Structure

Composers often write their melodies using a structural organization that provides coherency and balance. Using the following melodic components will assure a finely crafted melody that can be adaptable to a variety of musical situations:

1. A **motive** is a short rhythmic/melodic grouping of notes that represent the smallest unit of musical meaning.
2. A **phrase** is a combination of two or more motives that constitute one complete musical thought.
3. A **half cadence** is the identifying motive that gives the phrase a sense of temporary repose. The point of repose usually occurs on any scale degree other than the keynote.
4. A **(full) cadence** is the identifying motive that gives the phrase a sense of finality. The point of finality usually occurs on the keynote.
5. An **antecedent phrase** is a type of phrase that presents a musical question and ends with a *half cadence*.
6. A **consequent phrase** is a type of phrase that presents a musical answer to the *antecedent phrase* and ends with a *full cadence*.
7. A **period** is a group of phrases that usually consist of an *antecedent phrase* and a *consequent phrase*.

Structural Melodic Analysis of Ludwig van Beethoven's 'Ode to Joy'
 (theme from the final movement of Symphony No. 9)

The musical score consists of four staves of music in G major (indicated by a treble clef) and common time (indicated by a 'C'). The music is divided into several sections with annotations:

- Staff 1:** Measures 1-8. Annotations: "Period (8 measures)" (blue line), "Motive (2 measures)" (red bracket), "Conjunct Motion" (blue line), "Articulation: Legato" (red bracket). The range is P5.
- Staff 2:** Measures 9-12. Annotations: "Antecedent Phrase (4 measures)" (blue line), "Range: P5". The section ends with a "Half Cadence (ends on the 2nd scale degree)".
- Staff 3:** Measures 13-16. Annotations: "Conjunct Motion" (blue line). The range is P5.
- Staff 4:** Measures 17-20. Annotations: "Consequent Phrase (4 measures)" (blue line), "Range: P5". The section ends with a "Full Cadence (ends on the 1st scale degree)".
- Staff 5:** Measures 21-24. Annotations: "Disunct Motion" (blue line). The range is m7.
- Staff 6:** Measures 25-28. Annotations: "Antecedent Phrase" (blue line), "Range: m7". The section ends with a "Half Cadence (ends on the 5th scale degree)".
- Staff 7:** Measures 29-32. Annotations: "Conjunct Motion" (blue line). The range is P5.
- Staff 8:** Measures 33-36. Annotations: "Consequent Phrase" (blue line), "Range: P5". The section ends with a "Full Cadence (ends on the 1st scale degree)".

Ex. 22

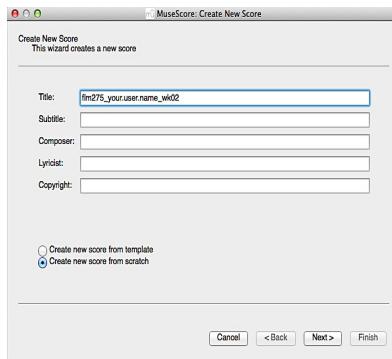


Creating and Editing a Melody with a Score Editor

Creating a Music Score

- Click on the **File Folder** icon in the **MuseScore Toolbar**.
- In the **Create New Score** type the title ***mus115_your.user.name_wk02*** in the

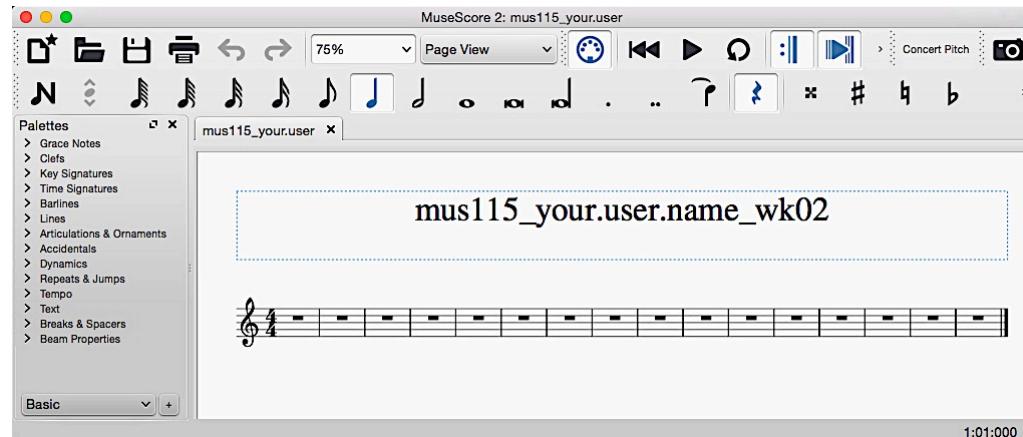
- Type in the **Title** box.
- Click **Next**.



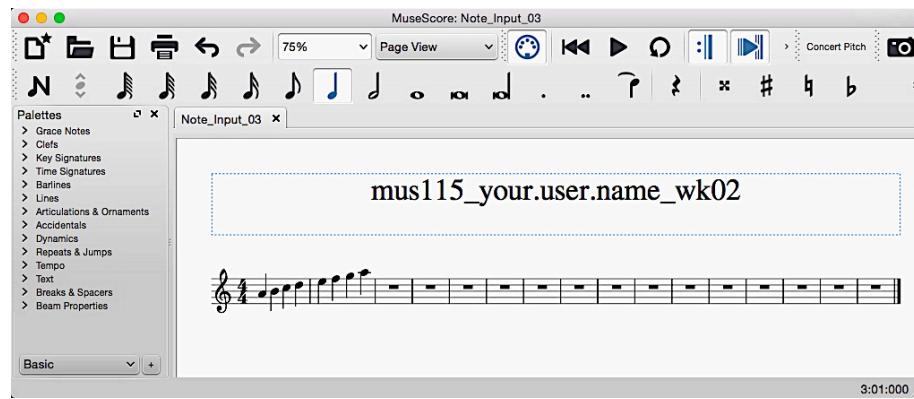
- Select **Treble Clef**
- Click **Next**.
- Leave the **Key Signature** set to its default: **C major** (no sharps or flats)
- Click **Next**.
- In the **Enter Number of Measures** box, enter **16**
- Click **Finish**

Changing the Pitch of the Music Through Note Input

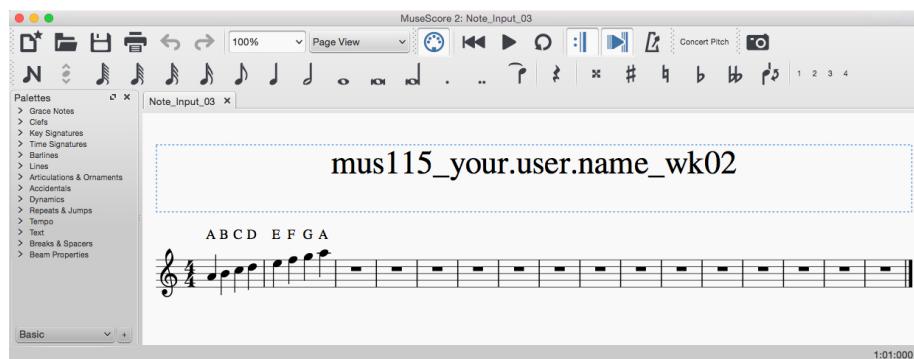
- In the **Magnification** drop down menu, click on **75%**.
- For *note input*, select the *bar rest* in the first measure.



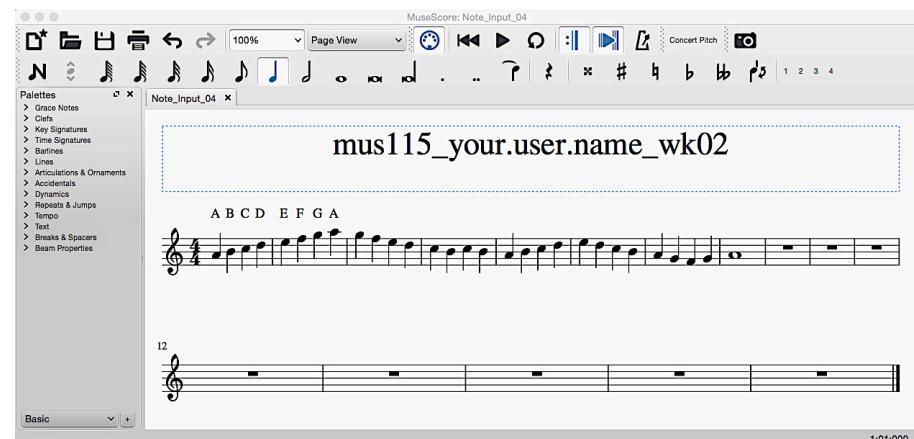
- Type the letters **A B C D E F G A** on the computer keyboard.



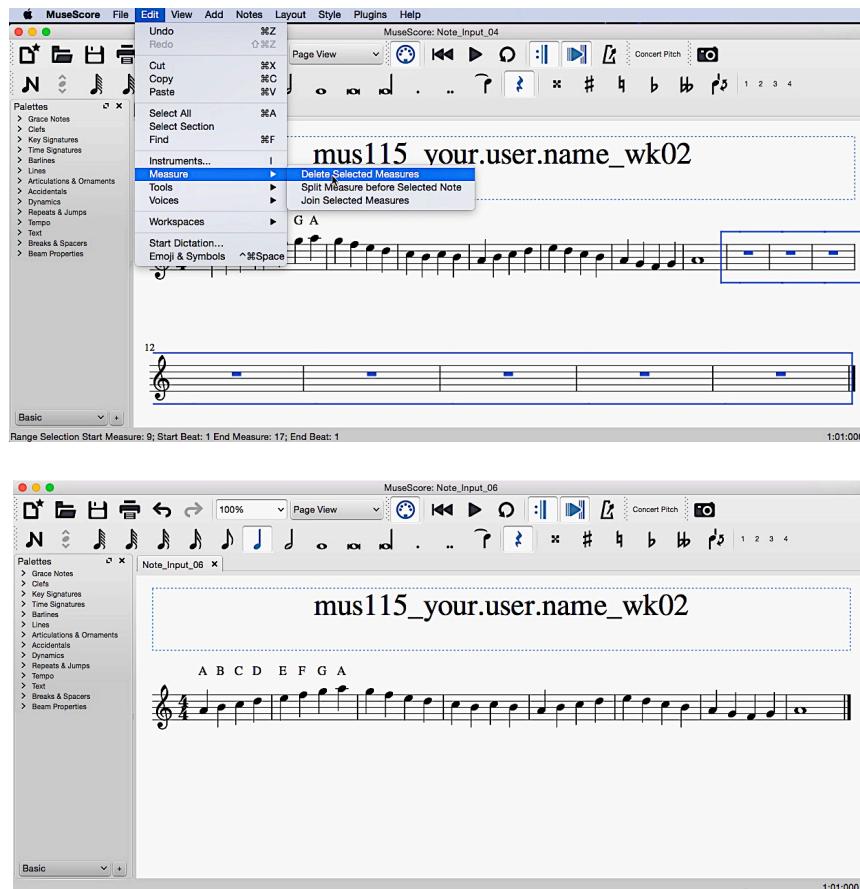
- To deselect note entry, click on the **N** in the *Tool Bar* or depress *esc*.
- To label note names with text, click on **Plugins** on the *Menu Bar* and then click on **Notes/Note Names**.



- **To playback**, click on the **Rewind** button on the *Tool Bar*.
- Click on the **Start** button on the *Tool Bar* or tap the **Spacebar** for playback.
- Explore note input in stepwise motion (i.e., movement by line-space-line-space on the staff) for eight measures by clicking on the **Note Input Mode** button (**N**).
- Begin and end on **A** (this will create the tonality of **A minor**).
- Click on lines and spaces up and down the staff for eight measures.

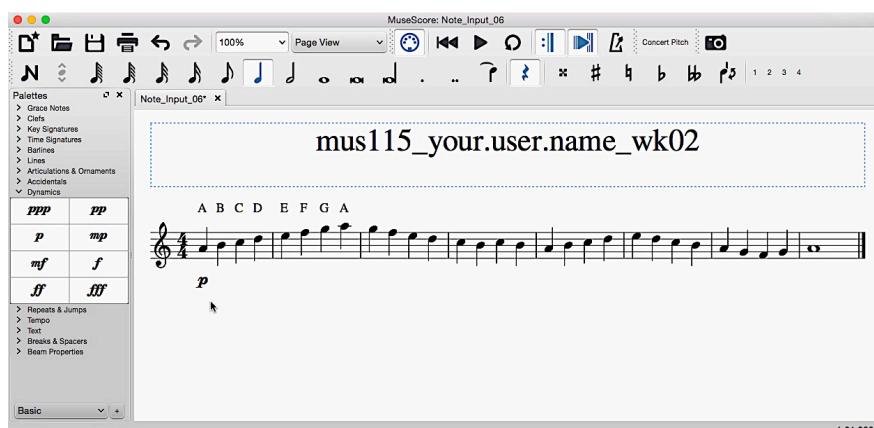


- To delete unwanted measures, select the first measure you wish to delete, **select+shift** the last measure you wish to delete, and click on **Edit/Delete Selected Measures**.



Changing the Intensity (Dynamics) of the Music

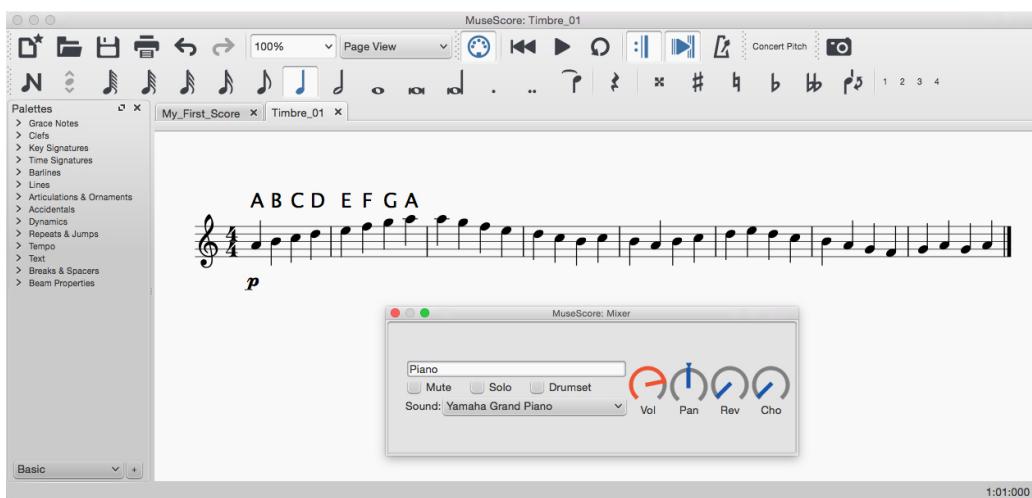
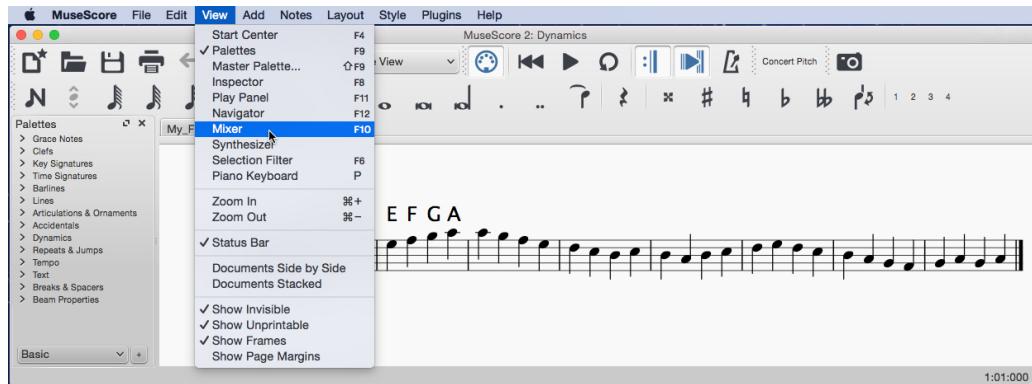
- On the **Palettes** window, click on the **Dynamics** drop down list tab, select **p** (for piano or soft), drag and drop **p** below the first note of your score and center.



- Click on **Play** and listen to the softer (**p**) dynamic level.
- To remove the dynamic marking, select the note and depress the **delete** key.
- Explore other dynamic markings by repeating the previous steps as you listen to softer and louder dynamic levels (**ppp**, **pp**, **mp**, **f**, **ff**, and **fff**).

Changing the Timbre of the Music Through an Instrument (Patch) Change

- Click on **View** on the **Menu Bar** and then click on **Mixer**.

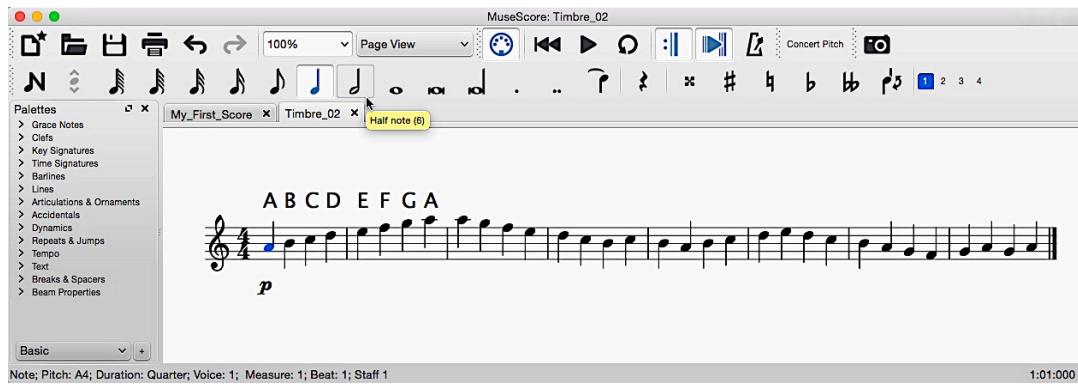


- Click on the **Sound** drop down list tab and select **Flute**.

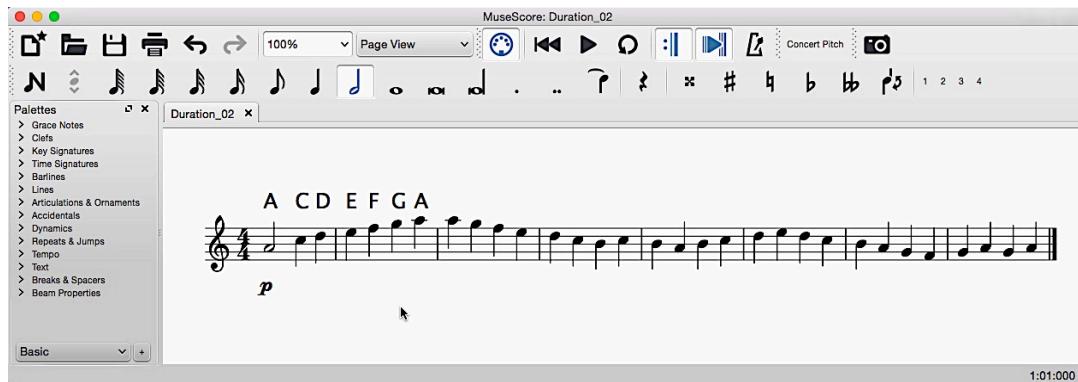
- Click on **Play** as you listen to the change in timbre quality.
- Explore other instrument timbre qualities.

Change the Duration of the Music through Changes in Note Values

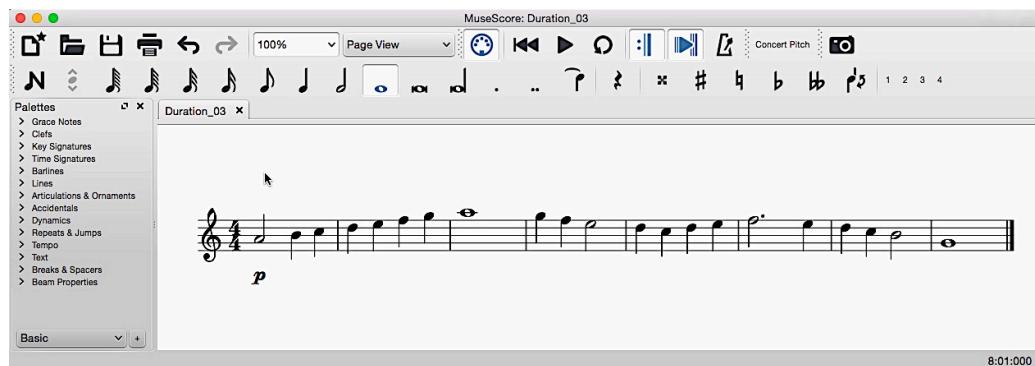
- Click on the first note of the score.



- Click on the half note in the *Tool Bar*.

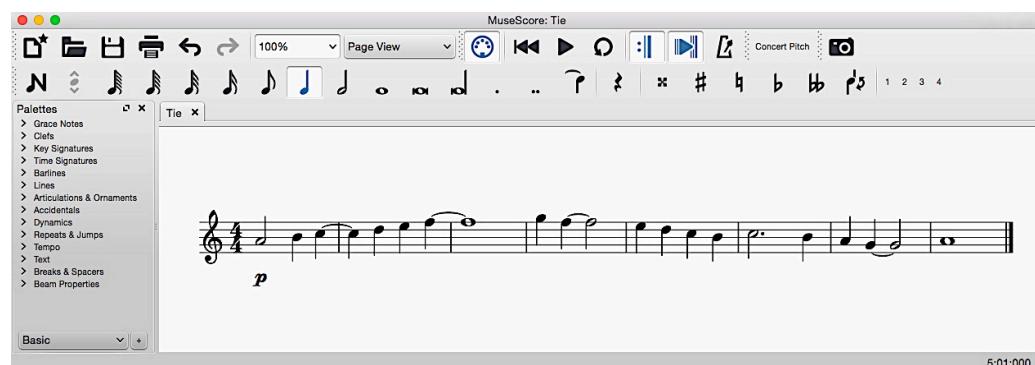


- **To remove the left over note names**, select and delete the note name.
- To adjust the pitch of adjacent notes in order to maintain step-wise motion, select and drag the note up and down with the mouse or move the notes with the arrow keys.
- Explore other possible durations using combinations of quarter notes, half notes, and whole notes.

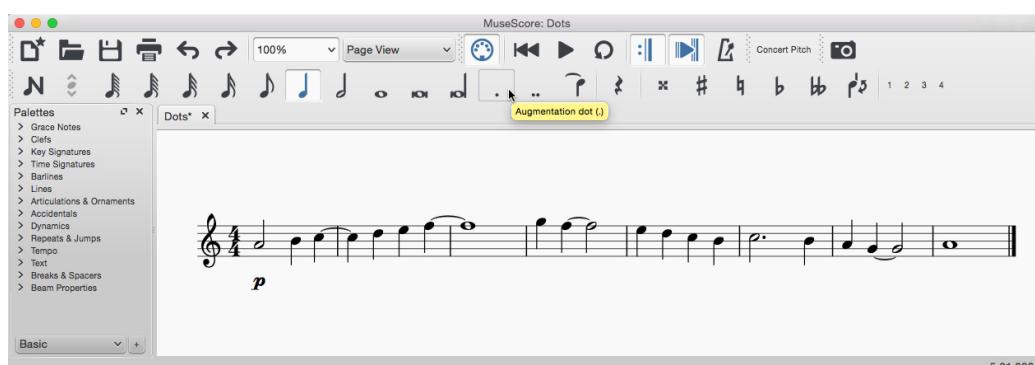


Further Changes to the Duration of the Music's Note Values

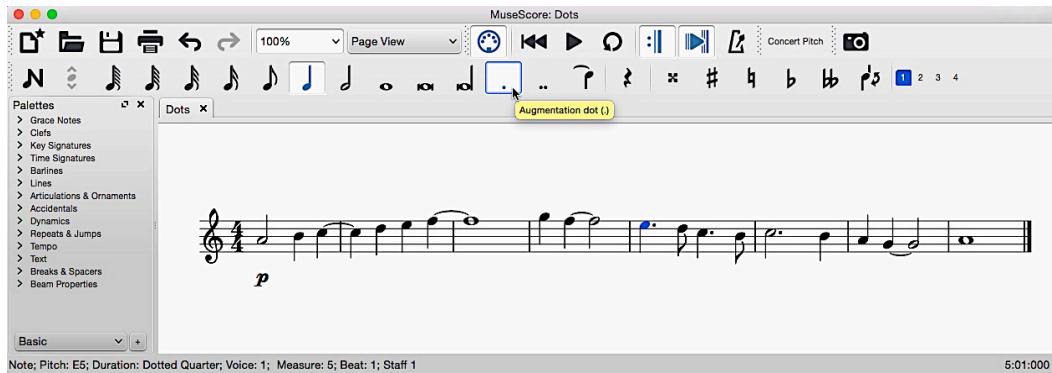
- To tie two note values together, locate any note found on beat 1, 2, 3, or 4.
- Adjust following the note to the same pitch as your selected note.
- Click on the **Tie Button** () found in the **Tool Bar**.



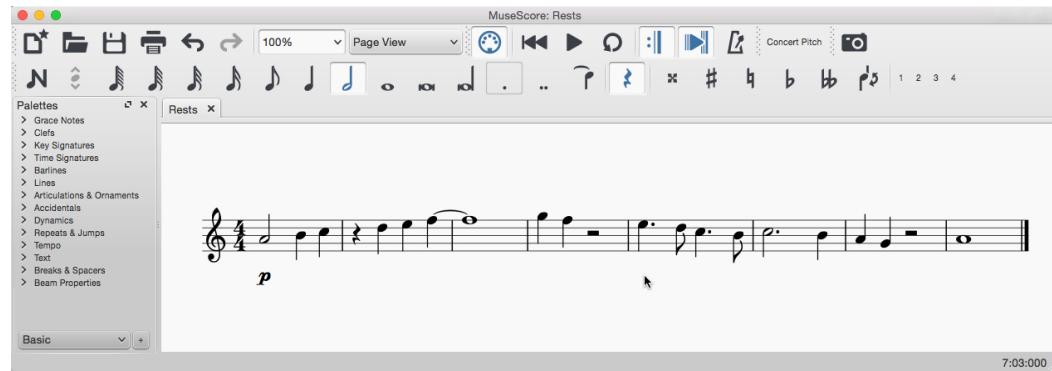
- Adjust the pitch of adjacent notes to maintain step-wise motion.
- To create a dotted note, click on any note on beat 1 or 3 in the score.
- Click on the quarter note and then, click on the **Augmentation Dot Button** found in the **Tool Bar**.



- Adjust the pitch of adjacent notes to maintain step-wise motion.

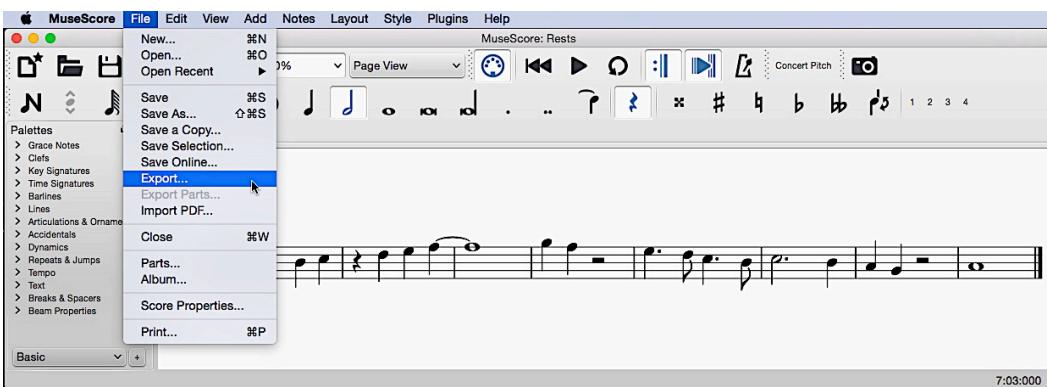


- To create a rest, click on any note found on beat 1, 2, 3, or 4 in the score.
- Depress **delete**.
- Adjust the pitch of adjacent notes to maintain step-wise motion.



Exporting Music as a WAV or MIDI File

- Click on **File** in the Menu Bar.
- Click on **Export**.



- In the **Save as Type** box enter the name of your assignment and, in the drop down menu, select **Wave Audio (*.wav)**, and **Save** to the folder of your choice.

