Dear Educator,

Thank you for choosing the Cleveland Institute of Music. Inside this packet, you will find all of the materials your class will need for your upcoming Math and Music video conference. **There are lessons that need to be completed before the video conference. Please allow 2 class periods.**

**Please fax your students’ rhythms from p.7 to us AT LEAST THREE DAYS BEFORE the video conference.** Our fax number is 216-791-3063.

If at any time you have questions or concerns, please feel free to contact me. We look forward to “meeting” you!

Sincerely,

Heather Young Mandujano  
Distance Learning Education Coordinator  
Cleveland Institute of Music  
**Phone:** 216-368-0874  
**Fax:** 216-791-3063  
**Email:** hly2@cim.edu

**Table of Contents**

Pre-Conference Lesson Plan........................................................................................................2  
Note Values Worksheets..................................................................................................................4  
Metronome Worksheet..................................................................................................................8  
During the Video conference.........................................................................................................9  
Academic Content Standards.......................................................................................................10

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Objective:
- Students will use their knowledge of fractions to compose their own rhythm
- Students will practice using metronomes in preparation for their upcoming video conference.

Materials:
- Note Values Worksheet, pp.4-7
- Magnet board/magnets (*provided by CIM*)
- Metronomes (*provided by CIM*)
- Corresponding CD (*provided by CIM*)
- Pencils

Procedure:
- Pass out the “Note Values” worksheet. Discuss with students the fractional meanings of each note and rest based on the chart on p. 4
- Allow students time to finish the worksheet.
- Students can use the magnet boards/note magnets to complete the “Your Musical Rhythm” section on the last page.
- **Please send your students’ completed rhythms to Heather Mandujano AT LEAST 3 DAYS BEFORE THE VIDEO CONFERENCE.**
  - We will be arranging these rhythms to be performed by our students during the video conference and need to give our student composers some lead time.
    - Email: hly2@case.edu
    - Fax: 216-791-3063
    - **Snail Mail (please allow extra time):**
      Cleveland Institute of Music
      11021 East Blvd.
      Cleveland, OH
      44106
Objective:
- Students will practice using metronomes to determine tempo in preparation for their upcoming video conference.

Materials:
- Metronome Worksheet, p. 7
- Pencils
- CD Player
- Metronome CD (provided by CIM)
- Metronomes (provided by CIM)

Procedure Part 1:
- Divide students into 5 groups. Give each group a metronome.
- Explain that a metronome is a device used to help musicians keep a steady pulse. They can also be used to measure tempo. Ask:
  - What is pulse? [basic, underlying beat in a piece of music (or of someone's heart)]
  - What is tempo? [refers to the slowing or quickening of the pulse]
- Explain that tempo is expressed in a unit called beats per minute. Allow students a few minutes to experiment with their metronomes.
- Pass out the Metronome Worksheets on p. 7. Using the CD provided, play each track while the students use their metronomes to find the correct tempo. Check answers and discuss.
- Optional: Create various math problems around the answers on the worksheet. What is the mean? Median? Mode? How many seconds long is the duration of a beat at each tempo?
# Math and Music: Note Values Chart

## Directions
Use this chart to complete the note values worksheet and the rhythm/fractions assignment. Draw the notes (where they are not already printed) and write the fractions for each question.

<table>
<thead>
<tr>
<th>NAME</th>
<th>NOTE</th>
<th>REST</th>
<th>FRACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHOLE – 4/4</td>
<td>♬</td>
<td>♭</td>
<td>4/4 or 16/16</td>
</tr>
<tr>
<td>HALF – 1/2</td>
<td>♪</td>
<td>♭</td>
<td>1/2 or 8/16</td>
</tr>
<tr>
<td>QUARTER – 1/4</td>
<td>♬</td>
<td>♭</td>
<td>1/4 or 4/16</td>
</tr>
<tr>
<td>EIGHTH – 1/8</td>
<td>♬♩</td>
<td>♭♩</td>
<td>1/8 or 2/16</td>
</tr>
<tr>
<td>SIXTEENTH – 1/16</td>
<td>♬♩♩</td>
<td>♭♩♩</td>
<td>1/16 or 1/16</td>
</tr>
</tbody>
</table>

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NAME:______________________________

DIRECTIONS: Answer the following questions using the Note Values Chart.

Ex. If ♬♩ = ♩ and ♬♩ = ♩
    \[ \frac{2}{16} = \frac{1}{8} \quad \frac{2}{8} = \frac{1}{4} \]

How many sixteenth notes are in a quarter note? __4__
\[ \frac{X}{16} \quad \frac{1}{4} \]

1. If there are four quarter notes in a whole note
   How many ♩ are in ○? ____________

2. ♩ = ♩ ♩ ♩ ♩ ♩
   How many quarter notes are in ♩? ____________

3. ♩ ♩
   \[ \frac{2}{8} = \frac{X}{4} \] (draw the note value)

4. You have a ♩ and six sixteenth notes;
   how many ♩ should you add to equal ○? ____________

5. A ▲ ▲ = ♩ and ▲ ▲ = ♩.
   How many quarter rests equal ♩? ____________

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6. \( \frac{2}{16} = \frac{X}{8} \) \( \text{___________} \) (draw the note value)

7. You have four eighth notes; how many \( \frac{\text{}}{} \) should you add to equal a whole note? \( \text{___________} \)

8. You have a \( \text{\text{c}} \) and two quarter notes; how many \( \text{\text{c}} \) do you need to equal \( \text{0} \)? \( \text{___________} \)

9. How many \( \text{\text{c}} \) are there in a half note? \( \text{___________} \)

10. You have eight \( \text{\text{c}} \); how many should you take away to equal a quarter note? \( \text{___________} \)

11. \( \frac{2}{4} = \frac{X}{16} \) \( \text{___________} \) (draw the note value)

12. If you have \( \text{\text{c}} \) and a quarter rest, how many eighth notes need to be added to equal a whole note? \( \text{______} \)

13. You have \( \text{\text{c}} \) and \( \text{\text{c}} \); how many quarter rests should you add to equal \( \text{\text{c}} \)? \( \text{___________} \)
Your job now is to create one measure of a musical rhythm using the magnet packet sent to your teacher. One measure is equal to one whole note. You may use any combination of the notes provided to you, only you must follow these requirements:

1. You must use at least one eighth-note and two sixteenth notes.
2. You must use at least one rest of any value you choose.
3. You may not use whole notes or whole rests.
4. You may use only one half note.

Use what you learned above about fractions and rhythm and check your rhythm accuracy using fractions. Bring your rhythm to the first video conference.

Ex: \[ \begin{array}{c}
1/2 + 1/8 + 1/8 + 1/16 + 3/16 \\
\end{array} = 4/4 \]

Your Musical Rhythm: After you have decided on your final rhythm, see if you can draw the note values onto this page. The bars represent bar lines. Follow the above example.
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The Cleveland Institute of Music
Activity Plan and Resource Guide

Metronome Worksheet Pt. 1

NAME: ______________________________

DIRECTIONS: During class, use the enclosed metronomes and CIM CD to complete questions A through I before video conference #2.

Listen to the CD and find the tempo* (beats per minute) of the following pieces using a metronome*.

Example
(beat/minute)  Tempo

A. Drum  __________
B. Claves  __________
C. Keyboard  __________
D. Clapping  __________
E. Sticks  __________
F. Clicks  __________
G. Uno bow serenade  __________
H. Maple Leaf Rag  __________
I. Mozart Symphony in E-flat major, No. 39, K. 543  __________

(Extra credit)

*Definitions:

Pulse - is the basic, underlying beat in a piece of music (or of someone’s heart).
Tempo - refers to the slowing or quickening of the pulse.
Metronome - A mechanical or electronic device that pulses audibly at various rates.

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During the Video Conference

Classroom Set Up

- Students should have the following:
  - Metronomes
  - Calculators
  - Blue Boards
  - Rubber Bands
  - Rope
  - Pencils
  - Scrap paper for solving problems

- Please assist us during the video conference by calling on students to ask or answer questions.

Video conference activities will be selected from the following:

- Discussion: How do we use metronomes?
- Activity: Using metronomes to find percent increase
- Activity: Ratios (using mock violin string)
- Review: Notes and Fractions
- Live Performance: Rhythms composed by students
National Core Arts Standards (Music)

Creating
Imagine

Grade 6  MU:Cr1.1.6a Generate simple rhythmic, melodic, and harmonic phrases within AB and ABA forms that convey expressive intent.

Grade 7  MU:Cr1.1.7a Generate rhythmic, melodic, and harmonic phrases and variations over harmonic accompaniments within AB, ABA, or theme and variation forms that convey expressive intent.

Plan and Make

Grade 6  MU:Cr2.1.6a Select, organize, construct, and document personal musical ideas for arrangements and compositions within AB or ABA form that demonstrate an effective beginning, middle, and ending, and convey expressive intent.

Grade 7  MU:Cr2.1.7a Select, organize, develop and document personal musical ideas for arrangements, songs, and compositions within AB, ABA, or theme and variation forms that demonstrate unity and variety and convey expressive intent.

Evaluate and Refine

Grade 6  MU:Cr2.1.6b Use standard and/or iconic notation and/or audio/video recording to document personal simple rhythmic phrases, melodic phrases, and two-chord harmonic musical ideas.

Grade 7  MU:Cr2.1.7b Use standard and/or iconic notation and/or audio/video recording to document personal simple rhythmic phrases, melodic phrases, and harmonic sequences.

Performing

Analyze

Grade 6  MU:Pr4.2.6a Explain how understanding the structure and the elements of music are used in music selected for performance. MU:Pr4.2.6b When analyzing selected music, read and identify by name or function standard symbols for rhythm, pitch, articulation, and dynamics.

Grade 7  MU:Pr4.2.7a Explain and demonstrate the structure of contrasting pieces of music selected for performance and how elements of music are used.
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The Cleveland Institute of Music
Activity Plan and Resource Guide

**MU:Pr4.2.7b** When analyzing selected music, read and identify by name or function standard symbols for **rhythm**, **pitch articulation**, **dynamics**, **tempo**, and **form**.

Present

**Grade 6** **MU:Pr6.1.6b** Demonstrate performance decorum (such as stage presence, attire, and behavior) and **audience etiquette** appropriate for venue and purpose.

**Grade 7** **MU:Pr6.1.7b** Demonstrate performance decorum (such as stage presence, attire, and behavior) and **audience etiquette** appropriate for venue, purpose, and context.

Connecting

**Connect #10**

**Grade 6** **MU:Cr2.1.6a** Select, organize, construct, and document personal musical ideas for **arrangements** and **compositions** within **AB** or **ABA** form that demonstrate an effective beginning, middle, and ending, and convey **expressive intent**.

**Grade 7** **MU:Cr2.1.7a** Select, organize, develop and document personal musical ideas for **arrangements**, **songs**, and **compositions** within **AB**, **ABA**, or **theme and variation forms** that demonstrate **unity** and **variety** and convey **expressive intent**.

**Connect #11**

**Grade 6** **MU:Crl.1.6a** Generate simple rhythmic, melodic, and harmonic **phrases** within **AB** and **ABA forms** that convey **expressive intent**. **MU:Pr6.1.6b** Demonstrate performance decorum (such as stage presence, attire, and behavior) and **audience etiquette** appropriate for venue and purpose.

**Grade 7** **MU:Crl.1.7a** Generate rhythmic, melodic, and harmonic **phrases** and variations over harmonic accompaniments within **AB**, **ABA**, or **theme and variation forms** that convey **expressive intent**. **MU:Pr6.1.7b** Demonstrate performance decorum (such as stage presence, attire, and behavior) and **audience etiquette** appropriate for venue, purpose, and context.

**Common Core Standards- Math**

**Ratios and Proportional Relationships**

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Grade 6:
Understand ratio concepts and use ratio reasoning to solve problems.
6.RP.1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, “The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak.” “For every vote candidate A received, candidate C received nearly three votes.”

6.RP.2. Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. For example, “This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is 3/4 cup of flour for each cup of sugar.” “We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger.”

6.RP.3. Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.

Grade 7:
Analyze proportional relationships and use them to solve real-world and mathematical problems.
7.RP.1. Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction \( \frac{1/2}{1/4} \) miles per hour, equivalently 2 miles per hour.

7.RP.3. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

The Number System

Grade 6:
Compute fluently with multi-digit numbers and find common factors and multiples.
6.NS.2. Fluently divide multi-digit numbers using the standard algorithm.

6.NS.3. Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.

Grade 7:
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
7.NS.1. Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
  • Apply properties of operations as strategies to add and subtract rational numbers.
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7.NS.2. Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
  - Apply properties of operations as strategies to multiply and divide rational numbers.
  - Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

7.NS.3. Solve real-world and mathematical problems involving the four operations with rational numbers.

Expressions and Equations
Grade 7:
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.

7.EE.3. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

7.EE.4. Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
  - Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where $p$, $q$, and $r$ are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?

Ohio Academic Content Standards: Music
Perceiving/Knowing/Creating
Grade 6
2CE Identify instruments used in Western and world music ensembles.
5CE Distinguish between and among the use of dynamics, meter, tempo and tonality in various pieces through active listening.
6CE Describe roles and skills musicians assume in various cultures and settings.

Grade 7
5CE Describe a varied repertoire of music with appropriate music vocabulary.

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6CE  Identify various careers for musicians (e.g., in education, entertainment and technical support).

Producing/Performing
Grade 6
3PR  Improvise, compose and arrange music.
5PR  Read, write, perform and compose rhythm patterns and simple melodies in 2/4, 3/4, 4/4 and 6/8 meter.
6PR  Attend live performances and demonstrate appropriate audience etiquette.

Grade 7
3PR  Improvise, compose and arrange music.
4PR  Read, write and perform rhythmic (including dotted rhythms) and melodic patterns in a variety of meters.

Responding/Reflecting
Grade 6
1RE  Develop criteria to evaluate the quality and effectiveness of music performances and compositions including their own.
2RE  Reflect on a variety of live or recorded music performances.
5RE  Compare and contrast subject matter common to music and other subject areas.
6RE  Explain and apply skills developed in music (e.g., critical thinking, collaboration) to other disciplines.

Grade 7
1RE  Apply multiple criteria to evaluate the quality and effectiveness of music performance and composition including their own.
2RE  Compare and contrast a variety of live or recorded music performances using appropriate audience etiquette.