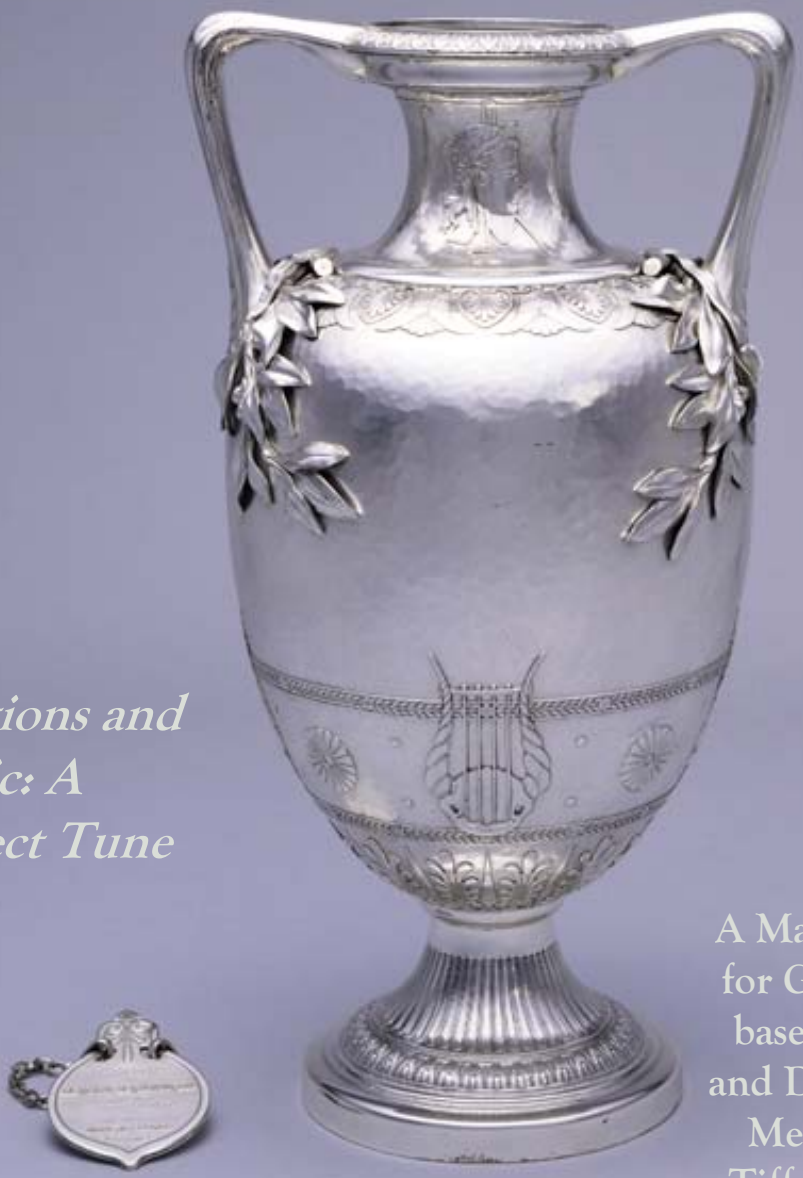
Discovering the Story: A City and Its Culture



Fractions and Music: A Perfect Tune

A Math Lesson for Grades K-3 based on Vase and Dedication Medallion by Tiffany & Co.

Tiffany & Co. (1853-) Vase and Dedication Medallion, 1878
Silver
Bequest of Reuben R. Springer 1884.483

Discovering the Story: A City and Its Culture
Fractions and Music: A Perfect Tune

A Math Lesson for Grades K-3
Based on Vase & Medallion, 1878 by Tiffany & Co.

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Concept

In this musical lesson on fractions, teachers will guide student understanding of fractions as the subdivision of a unit into equal parts. Students will explore and understand the concept of fractions through close examination of everyday objects that use fractions in their measurement– clocks, measuring cups/spoons and rulers, musical notes. Students will apply their knowledge of everyday fractions to a series of mathematical problems using musical notes.

The teacher will facilitate students in hands-on applications and study of lessons main objectives through pre videoconferencing classroom activities, a videoconference visit with Cincinnati Art Museum staff, and post-videoconferencing lesson activities.

Objectives

- Students will understand fractions as the subdivision of a unit into equal parts.
- Students will explore the concept of fractions through close examination of everyday objects that use fractions in their measurement– clocks, measuring cups/spoons and rulers, musical notes.
- Student will apply their knowledge of everyday fractions to mathematical problems on musical notes.

"For the future of our children and our communities, we must find new ways to engage students in the learning process. The arts can be a powerful vehicle through which to challenge young people's minds, stir their creativity, instill discipline and build self-esteem."

Lawrence A. Hough
President and Chief Executive Officer
Sallie Mae

Teacher Preparation

Class Periods Required

1 (30-50 min.) class period for Pre-Lesson Activities
1 50-min. class period for Videoconference
1 (30-50 min.) class period for Post-Lesson Activities
1-2 (30-50min.) periods for Art Enrichment Activity (optional)

Background Information

Refer to Background Information on the *Discovering the Story* website at http://www.discoveringthestory.org/goldenage/springer/background.asp for more on Reuben Springer and the Museum's *Vase and Dedication Medallion* and the company that created them. Background Information has been written for teachers to review before the lesson and then share with students.

Video

Share the *Vase and Dedication Medallion* video with your students prior to the videoconference. The video is on the website at http://www.discoveringthestory.org/goldenage/springer/video.asp and is an interview with a Museum curator on Reuben Springer and the *Vase and Dedication Medallion*. This video is an excellent resource that will help to prepare students for the videoconference.

Video Duration – five minutes.

> *I believe arts education in music, theater, dance and the visual arts is one of the most creative ways we have to find the gold that is buried just beneath the surface. They [children] have an enthusiasm for life, a spark of creativity, and vivid imaginations that need training - training that prepares them to become confident young men and women.*
>
> Richard W. Riley
> U.S. Secretary of Education

Pre- Videoconference

Vocabulary

Definitions can be found in the Glossary on the *Discovering the Story* website at http://www.discoveringthestory.org/goldenage/springer/glossary.asp

Fraction
Measure
Musical Note
- Whole Note
- Half Note
- Quarter Note
- Eighth Note

Guiding Questions

- What is a fraction?
- How are fractions expressed?
- What is music?
- How is music expressed?

Materials

- Print reproduction of the Museum's *Vase and Dedication Medallion*, which is on the website at http://www.discoveringthestory.org/goldenage/springer/images/springer_full.jpg
- Objects that use fractions in their measurement (measuring cups and spoons, rulers, clocks, etc.)
- Music Note Flashcards downloaded from the Discovering the Story website at http://www.discoveringthestory.org/goldenage/springer/flashcards.asp

Procedure

Teacher will:
- Share with students the visual reproduction of the Museum's *Vase and Dedication Medallion.* Ask students to look at the pieces closely and describe what they see. Record all responses on the board.
- Share the *Background Information* on the Museum's *Vase and Dedication Medallion* with students. Upon reviewing the history of this vase, ask students why they think the artist

included a lyre (harp) on the front of the vase. (Because it was given to Springer at the opening of Music Hall and we play music on musical instruments like lyres.)

- Share with students that today they are going to learn about fractions in a brand new way. Before moving on, students should have a firm understanding that fractions are the subdivision of a unit into equal parts and have the ability to identify the following fractions 1/8, 1/4, and 1/2 and their relation to the whole.
- Once a full introduction/review of fractions has occurred, tell students that many everyday objects use fractions as measurement. At this time hold up the measuring cups or spoons and ask students if they have every seen a set of these at home? Pass around the cups/spoons. Share with students that measuring cups are broken into fractions of a cup/whole.
- Brainstorm with students other things that might be divided into fractions – possible objects could be: Record all responses on the board.
- Ruler Money Clock Pizza Pie
- Upon completion of this portion of the activity students should understand that fractions are very important to everyday life and knowing how to read and combine fractions to create a whole is important. Now share with students that they are going to look at something they hear everyday that also uses fractions as measurement – musical notes.
- Ask students, who among them play a musical instrument? Ask those students to share with the class how they now what kind of music to play when they play their instrument. They should all say that they read notes. Ask them to explain what notes are? Ask them the names of the different notes (whole note, half note, quarter note, etc.) Ask if they realized that when they play different notes, except for the whole note, they are actually playing fractions.
- Share with students **that musical notes are like fractions in that they represent parts of a whole and that today they are going to investigate fractions by looking at musical notes.** Before moving on, students should have a firm understanding that fractions are the subdivision of a unit into equal parts and have the ability to identify the following fractions 1/16, 1/8, 1/4, and 1/2 and their relation to the whole.
- Share the following basics on notes with students:
  - A Note determines the length of time that the note is played by the musician.
  - Notes are placed on a musical device known as a measure.
  - Each measure consists of a combination of notes that equal one whole note. Much like a series of fractions equals one whole. For this lesson, all measures will be four beats long, meaning a whole note will be worth four beats.
- At this time, introduce the different kinds of notes using the *Music Note* Flashcards (use only the whole, half, quarter and eighth note cards). Students should be able to identify eighth, quarter, half and whole notes as well as the fractions of the whole each represents.
- **Musical Note to Teachers:** It is important that students understand that while a whole note is held four beats, it still is considered for our purposes in looking at fractions as the whole.
  - Other note/fraction rules:
    - a whole note is held for four beats – or a whole number as it relates to fractions
    - a half note is held for 2 beats - or as a fraction, half –1/2 of a whole note
    - a quarter note is held for one beat - or as a fraction, quarter – 1/4 of a whole note
    - an eighth note is held for half of one beat - or as a fraction, an eighth - 1/8 of a whole note

    Teacher Note*: For those of you experienced in reading music, this lesson we will be using only 4/4 time.*

- To emphasize the way different notes sound as how they represent the parts of a whole, teacher may ask a student who plays a musical instrument to perform each type of note for the class. Another option would be to play a clapping game in which students clap each type of note. For Example:
  - A whole note can be represented by one clap with three bounces (the clap is on the first count, the three bounces represent 3 remaining counts of the note.
  - A half note can be represented by one clap and one bounce (the clap is on the first count, the bounce is the second count)
  - A quarter note can be represented by 4 equal claps (one clap for each count)
  - A eighth note can be represented by 2 short/quick claps (one clap each for half of one count)
- To show how notes can be combined to equal a whole note, the teacher may choose to split the team into groups with each group clapping a different kind note simultaneously while counting out loud. Students should begin and end at the at the same time.

Once students fully comprehend the relationship between fractions and musical notes, share with them that they are now going to meet someone from the Cincinnati Art Museum and they are going to learn more about the *Vase and Dedication Medallion.*

"It's a given that today's employee has to have basic skills. But superior skills are needed to survive competitively in the global context. Acquiring them has to begin as early as possible in a child's education, and we see that it comes through arts education. We are not doing justice to our economy or our children if they don't get that in the K through 12 context."

Dan Lacy
Corporate Vice President for Communications
Ashland, Inc.

Videoconference

Objectives

- Students will interact with the Cincinnati Art Museum staff through a sixty-minute videoconference. Information on the videoconference can be found at http://www.discoveringthestory.org/videoconference/
- Students will learn about Cincinnati history from 1850 to 1900.
- Students will use Museum objects to reinforce activities completed in preparation for this videoconference.

Concept

A videoconference conducted by the Cincinnati Art Museum staff extends student learning through emphasis on the viewing and discussion of art objects. During this videoconference with the Museum, students will explore Cincinnati art history and the methods and practices of many of the artists working in the city.

Schedule

- **5 minutes** Introduction to CAM staff *(This is also buffer time in case of connection complications)*
- **10 minutes** Brief discussion of student pre-videoconferencing activities.
- **10 minutes** Museum staff will lead an interactive discussion with students on the history of Cincinnati from 1850-1900
- **20 minutes** Museum staff will lead students in an in-depth investigation of selected Museum objects.

Objects Include

- *Bedstead* by Benn Pitman, Adelaide Nourse Pitman, and Elizabeth Nourse. http://www.discoveringthestory.org/goldenage/images/bedstead_full.jpg
- *Reception Dress* by Selina Cadwallader. This image can be found at http://www.discoveringthestory.org/goldenage/images/dress_full.jpg
- *Aladdin Vase* by Maria Longworth Nichols Storer, which is available at http://www.discoveringthestory.org/goldenage/images/aladdin_full.jpg
- *Ali Baba Vase* by M. Louise McLaughlin, which is available at http://www.discoveringthestory.org/goldenage/images/alibaba_full.jpg
- *Vase and Dedication Medallion* by Tiffany & Co. This image is on the Website at http://www.discoveringthestory.org/goldenage/images/springer_full.jpg

- **10 minutes** Questions and student sharing of art projects.
- **5 minutes** Closing *(This is also buffer time in case of connection complications)*

POST – VIDEOCONFERENCE

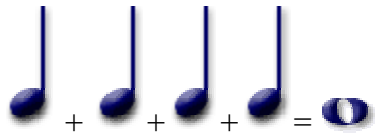
MATERIALS

- Print reproduction of the Museum's *Vase and Dedication Medallion* which is on the website at http://www.discoveringthestory.org/goldenage/springer/images/springer_full.jpg
- Music Note Flashcards can be downloaded from the website at http://www.discoveringthestory.org/goldenage/springer/flashcards.pdf
- *Where's the Note? What's the Fraction* Worksheet (which is at the end of the lesson)

PROCEDURE

Teacher will:

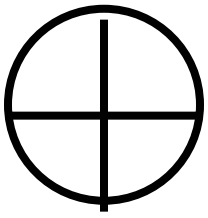
- Review with students what they learned during the videoconference with the Museum; students should be more aware of the history of not only the Vase and Dedication Medallion, but also the city of Cincinnati.
- Review with students the *Music Note Flashcards.*
- Once students are able to identify each note and its value as a fraction, share with students that notes/fractions are combined in music to form measures and each measure must create a whole, just like a combination of fractions create a whole. For example: *Teacher should write examples on the board* . Teacher also may choose to express these as pieces of a pie.



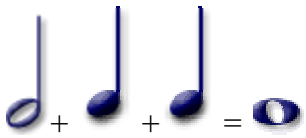
4 Quarter Notes = 1 whole note

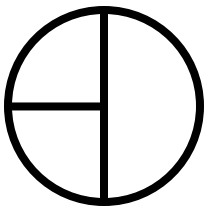
or

¼ + ¼ + ¼ + ¼ = 1



Another example:



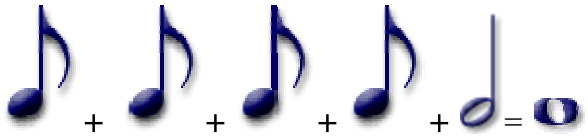


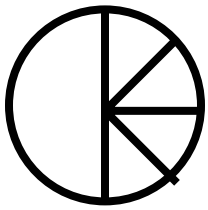
1 Half Note + 2 Quarter Notes = 1 whole note

or

½ + ¼ + ¼ =1

Another example:



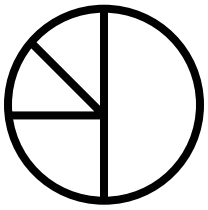


4 Eighth Notes + 1 Half Note = 1 Whole Note

or

1/8 + 1/8 + 1/8 + 1/8 + ½ = 1

Another example:



2 Eighth Notes + 1 Quarter Note + 1 Half Note = 1 Whole Note

or

1/8 + 1/8 + 1/4 + 1/2 = 1

- Continue creating note combinations with students for practice. Stress to students that all note combinations must equal one whole note.
- Tell students that they are now each going to work on a worksheet that will ask them to fill in the missing note or fraction.
- Pass out the *Where's The Note? What's the Fraction Worksheet* to students. Students should be given time in class to complete the worksheet.

Assessment Objectives

- Student understands that fractions are the subdivision of a unit into equal parts.
- Student understands that fractions are used as measurement tools in everyday objects like music notes.
- Student applied their knowledge of fractions to a series mathematical problems using on music notes.

Academic Content Standards

National Standards: Mathematics

Standard 2 : Understands and applies basic and advanced properties of the concepts of numbers

Grades K-2

Benchmark 5: Understands the concept of a unit and its subdivision into equal parts (e.g., one object, such as a candy bar, and its division into equal parts to be shared among four people)

Grades 3-5

Benchmark 2: Understands equivalent forms of basic percents, fractions, and decimals (e.g., 1/2 is equivalent to 50% is equivalent to .5) and when one form of a number might be more useful than another

Standard 3 : Uses basic and advanced procedures while performing the processes of computation

Grades K-2

Benchmark 2. Solves real-world problems involving addition and subtraction of whole numbers

Grades 3-5

Benchmark 3. Adds and subtracts simple fractions

National Standards: Visual Art

Standard 4 : Understands the visual arts in relation to history and cultures

Grades K-4

Benchmark 1: Knows that the visual arts have both a history and a specific relationship to various cultures

National Standards: Music

Standard 5: Reads and notates music

Grades K-2

Benchmark 1: Knows standard symbols used to notate meter (e.g., 2/4, 3/4, 4/4 time signatures), rhythm (e.g., whole, half, dotted half, quarter, eighth notes), pitch (e.g., notes in treble clef), and dynamics (e.g., p, f, <, >) in simple patterns

Grades 3-5

Benchmark 1: Reads whole, half, dotted half, quarter, and eighth notes and rests in 2/4, 3/4, and 4/4 meter signatures

OHIO STANDARDS: MATHEMATICS

Number, Number Sense and Operations Standard: Students demonstrate number sense, including an understanding of number systems and operations and how they relate to one another. Students compute fluently and make reasonable estimates using paper and pencil, technology-supported and mental methods.

Grades K-2

Benchmark C: Represent commonly used fractions using words and physical models.

Benchmark G: Model, represent and explain addition as combining sets and counting on.

Grades 3-4

Benchmark C: Represent commonly used fractions and mixed numbers using words and physical models.

Benchmark D: Use models, points of reference and equivalent forms of commonly used fractions to judge the size of fractions and to compare, describe and order them.

Benchmark M: Add and subtract commonly used fractions with like denominators and decimals, using models and paper and pencil.

OHIO STANDARDS: VISUAL ART

Historical, Cultural and Social Contexts: Students understand the impact of visual art on the history, culture and society from which it emanates. They understand the cultural, social and political forces that, in turn, shape visual art communication and expression. Students identify the significant contributions of visual artists to cultural heritage. They analyze the historical, cultural, social and political contexts that influence the function and role of visual art in the lives of people.

Grades K-4

Benchmark A: Recognizes and describes visual art forms and artworks from various times and places.

Connections, Relationships and Applications: Students connect and apply their learing of visual art to the study of other arts areas and disciplines outside the arts. They understand relationships between and among concepts and ideas that are common across subjects in the curriculum. Students recognize the importance of lifelong learning and experience in visual art.

Grades K-4

Benchmark B: Use the visual arts as a means to understand concepts and topics studied in disciplines outside the arts.

MUSIC

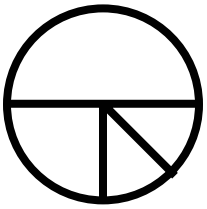
Creative Expression and Communication: Students sing, play instruments, improvise, compose, read and notate music.

Grades K-4

Benchmark B: Read, write, improvise and compose melodies and accompaniments.

Where's The Note? What's The Fraction?

Sample:

Notes:  

Fractions: 1/8 + 1/8 + 1/4 + 1/2 = 1

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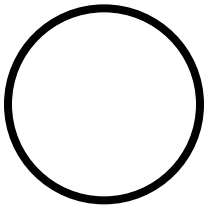
1.  

   1/2 + ___ + ___ = ___

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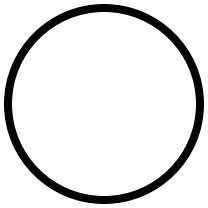
2. ___ +  

   1/4 + ___ + ___ = 1

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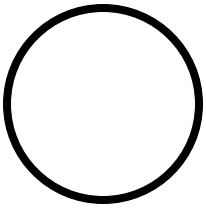
3. ___ + ___ + ___ + ___ + ___ =  

   1/8 + 1/8 + 1/8 + 1/8 + 1/2 = ___

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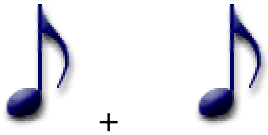
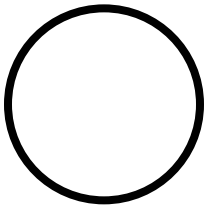
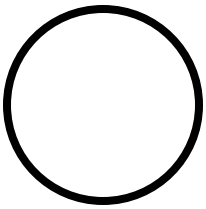
4. ___ + ___  = ___ 

   1/2 + ___ + ___ + ___ = 1

5. ___ + ___ + ___ + ___ = 

___ + ___ + 1/4 + ___ =



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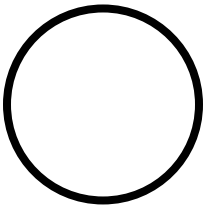
6.  +  + ___ = ___

___ + ___ + ___ = 1



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7. ___ + ___ + ___ + ___ +  + ___ = ___

1/8 + ___ + ___ + ___ + ___ + ___ = 1

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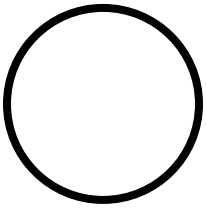
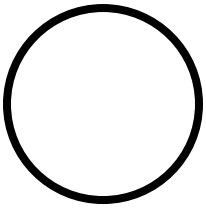
8.  +  +  + ___ = ___

___ + ___ + ___ + ___ = 1



Create Your Own Measures – Remember They Must Equal One or 

9.



10.