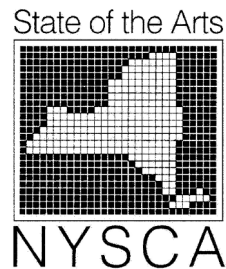


MUSIC ACTIVITIES IN MATH AND RHYTHM



Melodies and Math

Creating Music with Non-Traditional Instruments

http://artsedge.kennedy-center.org/educators/lessons/grade-3-4/Melodies_And_Math.aspx

(VISIT THE ABOVE LINK FOR ADDITIONAL LINKS/APPLICATIONS USED OR MENTIONED IN THIS ACTIVITY)

OVERVIEW

Summary

After reviewing basic music theory, students compose their own music for the touch-tone phone. The musical experience is enriched by further introduction and exploration of non-traditional musical instruments, resulting in a group orchestration and performance.

Learning Objectives

Students will:

- Experiment with creating electronic sounds
- Demonstrate an understanding of 4/4 and 2/4 time by creating melodies using 4/4 and 2/4 time
- Write numbers that correspond to those from the keypad in order to document an original melody
- Play a melody using 2/4 and 4/4 time signatures
- Create additional instruments using classroom-found materials
- Stage a class musical performance

Teaching Approach

Arts Integration

Teaching Methods

- Discovery Learning
- Experiential Learning
- Hands-On Learning
- Large or Small Group Instruction
- Studio Practice

Assessment Type

Self Assessment

PREPARATION

Lesson Setup

Teacher Background

- Review [SFS Kids' The Music Lab](#)
- Review DTMF Tone Generator [Applet](#)
- Review and select appropriate [song\(s\)](#) from Touch-Tone Tunes
- Review online video: [Touchtone Symphony](#)
- Review online video: [Vienna Vegetable Orchestra](#)
- Explore web site: [Experimental Musical Instruments](#)
- Select and download free music notation [paper](#)
- Obtain copy of instrument-making book, such as Making Musical Instruments with Kids: 67 Easy Projects for Adults Working with Children or explore a home-made instrument web site. (One is suggested at the end of this lesson.)

Prior Student Knowledge

Be familiar with the time signatures 2/4 and 4/4 and the values of musical notes in those signatures.

Physical Space

Classroom

Grouping

- Large Group Instruction
- Small Group Instruction

INSTRUCTION

Engage

1. Introduce students to a non-traditional instrument. Play the video: [Touchtone Symphony](#). Ask students:

- Is this music?
- How did the performer learn how to play this tune?
- What are some ways he could capture the musical notes for someone else to play the same song?
- What other electronic devices could be used to make similar sounds?
- What role does mathematics play in this performance?

Build Knowledge

- 1. Review basic music theory with students.** As a large group, in small groups, or at individual computer stations, explore the web site: [SFS Kids' The Music Lab](#). Explain 4/4 and 2/4 time. Review basic notes (*whole, half, quarter, eighth*). Clicking on “The Basics” sign walks students through a tutorial on this material.
- 2. Explore music notation using mathematics.** Dissect a measure of music, looking at total beats for the measure and the number of beats of individual notes within that measure. For example, in 4/4 music, each measure must contain four beats. Thus, one measure in 4/4 time can hold eight eighth notes (*each half a beat*), four quarter notes (*each 1 beat*), two half notes (*each 2 beats*), or one whole note (*4 beats*). In 2/4 time, one measure can hold four eighth notes, two quarter notes, or one half note.
- 3. Experiment with online touch-tone sound application.** Use the DTMF Tone Generator [Applet](#). Give students time to play random notes.
- 4. Provide students with touch-tone musical notation for one or more pre-selected songs.** (*You may wish to provide this as a printed page from the online resource.*) Ask them if they can determine the time (*4/4, 2/4, or something else*).

NOTE: Explain to students that this exercise should only be done on the touch-tone simulator. Do not do this with a real phone, as it may result in charges.

Apply

- 1. Create original touch-tone compositions.** Divide the class into small working groups. Assign some groups 4/4 time (*four beats per measure*) and other groups 2/4 time (*two beats per measure*). Provide students with musical notation paper. Ask them to create an original composition (*not a re-creation of a known song*). Ask them to record the notes as touch-tone numbers on the musical notation paper. Allow them to create their own notation for various lengths of notes, as necessary. Check the work of each group for understanding of the assignment before moving on.
- 2. Explore other non-traditional musical instruments.** Show the video: Vienna Vegetable [Orchestra](#). Ask students: What defines an instrument (*something that can be used to produce musical tones or sounds*)? Do instruments have to be intricate or complicated?
- 3. Explore the classroom for “found” instruments.** Allow students to be creative and innovative. (*Instruments can be paint brushes, fluttering pages of a book, the pencil sharpener, crayons inside a coffee can, etc.*) Instruments can also be found on them (*zippers, clapping hands, etc.*) Discourage them from using any traditional instruments you may have in the classroom.
- 4. Add more instruments to the original compositions.** Ask student groups to add more instruments to their touch-tone compositions. Ask them: How would you note these new additions on the musical notation paper?

Reflect

1. Perform the original compositions. Ask each group to perform its original piece.

2. Discuss and critique the performances. Ask the audience to critique the performance. You may need to guide them with questions:

- Was the group successful in using the touch-tone simulator as an instrument?
- What other instruments did they use?
- Was the group able to work together?
- What did they do well?

If possible, you may want to videotape the performance for each group to watch itself.

3. Ask each student to perform a self assessment. Use the provided handout entitled 'Self Assessment' found within the Resource Carousel.

Assess

Assess your student's work using the 'Assessment Rubric' handout located within the Resource Carousel.

STANDARDS

Standards for Arts Education:

Music

[Grade K-4 Music Standard 2](#): Performing on instruments, alone and with others, a varied repertoire of music

[Grade K-4 Music Standard 3](#): Improvising melodies, variations, and accompaniments

[Grade K-4 Music Standard 5](#): Reading and notating music

[Grade K-4 Music Standard 7](#): Evaluating music and music performances

[Grade K-4 Music Standard 8](#): Understanding relationships between music, the other arts, and disciplines outside the arts

Mathematics

[Math Standard 1](#):

Uses a variety of strategies in the problem-solving process

[Math Standard 2](#):

Understands and applies basic and advanced properties of the concepts of numbers

Language Arts

[Language Arts Standard 8:](#)

Uses listening and speaking strategies for different purposes

What You'll Need

Student Materials

- Book: Making Musical Instruments with Kids: 67 Easy Projects for Adults Working with Children (*optional*)
- Student computer workstations (*or a computer lab*)
- Pencils
- Music notation paper
- Access to “found” classroom materials (*such as books, art supplies, paper, educational toys*)
- Earplugs (*for the teacher!*)

Resources:

- **Printable**
- [Telephone Music](#)
- [Self Assessment](#)
- [Assessment Rubric](#)

Required Technology

- Projector
- Internet Access

Key Staff

This lesson can be taught by an elementary classroom teacher or an elementary music teacher.

Key Skills

Making Art: Producing, Executing and Performing, Performance Skills and Techniques

Creative Thinking: Communication and Collaboration

First Rhythmic Composition

Learning about the terms and symbols associated with music notation

http://artsedge.kennedy-center.org/educators/lessons/grade-6-8/First_Rhythmic_Composition.aspx

(VISIT THE ABOVE LINK FOR ADDITIONAL LINKS/APPLICATIONS USED OR MENTIONED IN THIS ACTIVITY)

OVERVIEW

Summary

This lesson introduces students to rhythm concepts, including the names and symbols associated with music notation. Students will fill in a chart that outlines names and meanings of rhythmic musical symbols. Then, using these symbols, they will clap rhythm sequences and compose their first compositions. They will also compare these rhythmic sequences to math concepts.

Learning Objectives

Students will:

- Apply math concepts in fractions to musical notation recognition and rhythm execution
- Clap rhythm patterns using the above concepts
- Compose an eight-measure rhythmic composition that requires them to use all of the above concepts
- Recognize and identify the following musical symbols and concepts: *Quarter rest, Quarter note, Half note, Half rest, Pair of eighth notes, Measures, Bar lines, Double bar lines, 4/4 time signature*

Teaching Approach

- Thematic
- Arts Integration

Teaching Methods

- Discovery Learning
- Discussion
- Experiential Learning
- Reflection

Assessment Type: Observation

PREPARATION

Lesson Setup

Teacher Background

Teachers should be familiar with musical notation and the relationship between notes/rests and fractions. Teachers should familiarize themselves with teaching rhythm and notation using the following sources:

Print:

- Lavender, Cheryl. *Rockin' Rhythm Raps: A Sequential Approach to Rhythm Reading* (book and CD package). Milwaukee, MN: Hal Leonard Publications.

Web:

- Teaching [Rhythm](#)

Prior Student Knowledge

Students should have basic familiarity of the concepts of:

- Rhythm
- Notes
- Time signature

They should also have a solid understanding of fractions.

Physical Space

Classroom

Staging

Make an overhead transparency of Rockin' Rhythm Raps, pages 23-24.

Accessibility Notes

Students with visual impairments or disabilities may need modified handouts or texts.

INSTRUCTION

Engage

1. Ask students what they already know about rhythm. Have them brainstorm words associated with rhythm and write these on the board. Talk about the fact that rhythm is important in music because it provides structure to the melody or background accompaniment

2. Pass out the 'Notation' worksheet located within the Resource Carousel and ask students to fill in any information they already know. The column on the left should contain a drawing of the symbol. The column on the right should signify the duration of the note or notes in a whole number or a fraction. (*This chart should be kept in the students' notes, and students should add to it as new rhythm concepts are introduced.*)

3. Complete the chart and review it as a class. The teacher should demonstrate how to represent the length of each rhythmic element visually in a clapping sequence, such as in the following examples:

- *Quarter note*: clap
- *Quarter rest*: hands out
- *Half note*: clap and hold with forward movement to represent the second beat

4. Have students read and clap out rhythm patterns from *Rockin' Rhythm Raps*. Display the overhead produced from *Rockin' Rhythm Raps*, pages 23-24. The first time, the teacher should clap the rhythms with the students. The students then clap out the rhythms again with the aid of the solo and rap accompaniment from the CD.

Finally, turn off the right-hand speakers so that the class claps alone with the accompaniment. Repeat this exercise as needed until the class can clap the exercise with the accompaniment without the solo or the teacher.

Build Knowledge

1. Using fractions in math, discuss the math concepts in notation. Distribute fraction manipulatives and explain the relationship between notes/rests and fractions. For example, 1 whole fraction circle is equal to 2 half circles, just as 1 whole note is equal to 2 half notes. Show and have students explore the following relationships:

- 1 whole note = 2 half notes = 4 quarter notes
- 1 half note = 2 quarter notes = 4 eighth notes
- 1 quarter note = 2 eighth notes = 4 sixteenth notes
- 1 whole rest = 2 half rests = 4 quarter rests

2. Have students practice mathematical equations using music notes. Write the following equations on the board and have students work in pairs with their manipulatives to solve the equations. (*Students can answer in notes or numbers.*)

half note + quarter note + quarter note = _____ (*whole note*)

$\frac{1}{2} + \frac{1}{4} + \frac{1}{4} =$ _____ (*1*)

whole note – half note = _____ (*half note*)

$1 - \frac{1}{2} =$ _____ ($\frac{1}{2}$)

3. Have students create an equation for peers to solve. Working independently or in pairs, students should create an equation using notes. Students should double check their equations, then switch with another student and try to solve each other's equations.

Apply

1. Explain the 4/4 time signature. Explain that a time signature is a sign that shows how many beats should be in each measure. For a 4/4 time signature, each measure has 4 beats, and each beat is a quarter note. Thus, each measure should have the equivalent of 4 quarter notes. Ask students what else they could use to create a complete measure in 4/4 time (*1 whole note, 2 half notes, 1 half note and 2 quarter notes, etc.*).

2. Have students compose an eight-measure rhythmic composition using the assignment 'Checklist' handout located within the Resource Carousel. Have the students draw two parallel lines across a plain piece of paper in a landscape position. Show them how to divide these two lines into four measures each. (*Note: Since this exercise deals only with rhythmic elements, it is not necessary for students to draw the full, five-lined musical staff.*)

Reflect

1. Have students check each other's work. Have students pair up or get into small groups. Ask them to clap out other students' compositions to make sure each measure has four beats.

2. Have the students copy their compositions onto an overhead projector sheet. The class should clap out each student's composition.

3. Finish the lesson with a discussion of what students have learned. Remind them that rhythm is the foundation of all music, from Mozart to modern-day rappers. Ask them questions such as:

- What is 4/4 time?
- Explain what a whole note, whole rest, half note, half rest, quarter note and quarter rest mean/do.
- Why is rhythm important?

Assess

Assess your student's work using the 'Assessment Rubric' located within the Resource Carousel.

STANDARDS

The National Standards for Arts Education:

Music

[Grade 5-8 Music Standard 3](#): Improvising melodies, variations, and accompaniments

[Grade 5-8 Music Standard 4](#): Composing and arranging music within specified guidelines

[Grade 5-8 Music Standard 5](#): Reading and notating music

Mathematics

[Math Standard 2](#):

Understands and applies basic and advanced properties of the concepts of numbers

[Math Standard 9](#):

Understands the general nature and uses of mathematics

What You'll Need

Student Materials

Supplies:

- Fraction manipulatives (*fraction bars or fraction circles*) for each student
- Pencils/pen and paper (*one per student*)
- 'Rockin' Rhythm Raps' book and CD package (*see the Sources section for complete bibliographic information*)
- Transparencies and markers for overhead projector (*one per student*)

Resources:

- **Printable**
- [Notation](#)
- [Checklist](#)
- [Assessment Rubric](#)

Required Technology

- Projector
- Speakers

Technology Notes

You will need to know how to disconnect the right speaker during the lesson. If you are not sure how to do this, please consult your school's media specialist.

Key Staff

Primary instructor with opportunity to collaborate with the music teacher

Key Skills

Developing Arts Literacies: Understanding Genres, Analyzing and Evaluating - Critique
Making Art: Composing and Planning

Creating AB Patterns

Recognizing and predicting a simple pattern in nature and the manmade world

http://artsedge.kennedy-center.org/educators/lessons/grade-k-2/Creating_AB_Patterns.aspx

(VISIT THE ABOVE LINK FOR ADDITIONAL LINKS/APPLICATIONS USED OR MENTIONED IN THIS ACTIVITY)

OVERVIEW

Summary

Patterns exist both in the natural and man-made world. Patterns are an element in art, as well as math and science. Knowledge of patterns allows the learner to systematize and predict outcomes. In this lesson, students will have the opportunity to construct this concept using visual arts designs and math manipulatives.

Learning Objectives

Students will:

- Understand the meaning of the words pattern and repetition.
- Recognize AB patterns in nature and manmade objects or material.
- Construct an AB pattern using small manipulatives.
- Practice an AB pattern using simple items found in the classroom.
- Participate in a group activity that reinforces the AB pattern.

Teaching Approach

Arts Integration

Teaching Methods

- Cooperative Learning
- Experiential Learning
- Hands-On Learning
- Group or Individual Instruction

Assessment Type

Performance Assessment

PREPARATION

Lesson Setup

Teacher Background

Teacher should be familiar with basic concepts of rhythm and AB pattern structure.

Prior Student Knowledge

Basic vocabulary and concepts of mathematics, such as pattern and repetition.

Physical Space

- Classroom
- Outdoor Recreation Space

Staging

Gather blocks, paper, ribbon samples. Take a quick pattern walk around the school looking for AB patterns.

INSTRUCTION

Engage

1. Warm up! Start with a pile of blocks that contains two colors. Have the students sort the blocks by color into two separate piles. Next, have the students lay out the blocks in a long line alternating color. Explain that they have just created an AB pattern.

2. Introduce students to AB patterns. Gather the students around you in the front of the class. Have them take a seat on the floor. Ask two students (one boy and one girl) to come to the front and have the girl hold a large sheet of paper with the letter "A", and the boy as "B" and arrange them in an AB pattern. Explain that it is called AB pattern because the letters A and B represent when the first pattern changes to a second new pattern. (A is one thing, B is something else.)

3. Have students create AB patterns. Bring up several more students (even number of boys as girls) and instruct the students to arrange themselves in AB patterns. Write the pattern that is created on the board and explain that pattern is something that repeats. Label this as an AB pattern.

4. Create AB patterns through clapping. Make one clap for "A" and two claps for "B". Ask the students to say "A", "B" aloud and in time with the claps as you point to the students that are arranged up in front of the room. [NOTE: You can try more complicated patterns if you think that they understand the concept. Older students should easily be able to try ABA and ABBA, etc.]

Large sheets of paper with letters A and B.

Build Knowledge

- 1. Show students pictures exhibiting the AB pattern.** These pictures can come from all different areas of life: inside or outside; at home or in school, playing in the pool or at a playground.
- 2. Ask students to think about where they have seen patterns.** Write or draw them on the board. Keep the conversation positive and give students an explanation of why each is or is not a pattern. If the example is not a pattern, ask students what they could do to make it a pattern or challenge them to find another type of pattern in the same category.
- 3. Reinforce the AB pattern by showing them examples of AB patterns in textile samples.** Find patterns in students clothes, like alternating stripes, or polka dots. Pictures illustrating the AB pattern. (Magazines are a good source for these pictures.)

Apply

- 1. Students practice arranging manipulatives in an AB pattern.** Students are given a set of manipulatives, such as Unifix cubes, in two different colors. Students practice arranging them in AB pattern. (If time allows, they may try other patterns as teacher instructs.)
- 2. Students analyze AB patterns.** Gather the students together. On the board, create simple AB patterns using shapes. Ask students to write the pattern down on large newsprint paper. Ask the students to duplicate this pattern with their blocks.
- 3. Students analyze more complex patterns.** On the board, create an ABA or ABBA pattern using shapes. Ask students to write the pattern down. Ask the students to duplicate this pattern with their blocks.
- 4. Students explore classroom for AB patterns.** Students may go around the room and search for patterns in anything they see. (You may have previously set out some of the patterns.) Students may share what they found in the room regarding pattern.
- 5. Create AB music patterns by clapping.** Clap once for A and twice for B for both simple AB and more complex patterns still on the board or found in the classroom.
- 6. Check for understanding by asking students to make instrumental music using patterns.** Using two different instruments (rhythm sticks, bells, cymbals, triangles, etc.), assign one instrument to the letter A and another to the letter B. Put AB patterns on the board. Ask the classroom musicians to play the patterns. Depending on the number of students and/or instruments, each student may have only one instrument to play.
- 7. Assign homework to take patterns outside the classroom.** Ask students to look in their closets and drawers for clothing that shows an AB pattern. Ask them to wear or bring that clothing with them to school tomorrow. Examples can be a shirt or scarf with two-color stripes, a repeated set of images on a belt or socks, etc. (The teacher may want to bring a few extra clothing patterns to the class for those students who do not bring or wear a pattern.)

8. Have a pattern parade in the classroom (or into the hallways and school). Put the class into an AB pattern by alternating girl-boy-girl-boy. Give each girl one type of instrument and each boy another type of instrument. As they march, establish a left-right (AB) pattern and play the instruments on the same pattern. For example, girls strike rhythm sticks on the left foot and boys shake the tambourine on the right. As each student enters the “grandstand area,” have him or her stop and explain the pattern he or she is wearing.

Reflect

1. Make a wall mural of the pattern parade. Using a large roll of paper, have each student drawn himself or herself in the order he or she marched in the parade. Have the student label if he or she was an A or B, what instrument he or she played, and the pattern he or she wore.

2. Take a pattern walk around the school, playground, nature trail, etc. looking for AB patterns. Have each student draw one picture reflecting what he or she saw. Put the pictures together to create a classroom book. It could be called “Patterns on our Playground” or something similar.

Assess

Assess the students' work using the assessment rubric located within the Resource Carousel.

STANDARDS

The National Standards For Arts Education:

Visual Arts

[Grade K-4 Visual Arts Standard 1](#): Understanding and applying media, techniques, and processes

[Grade K-4 Visual Arts Standard 2](#): Using knowledge of structures and functions

[Grade K-4 Visual Arts Standard 3](#): Choosing and evaluating a range of subject matter, symbols, and ideas

Visual Arts

[Grade K-4 Visual Arts Standard 6](#): Making connections between visual arts and other disciplines

Music

[Grade K-4 Music Standard 2](#): Performing on instruments, alone and with others, a varied repertoire of music

[Grade K-4 Music Standard 8](#): Understanding relationships between music, the other arts, and disciplines outside the arts

Mathematics

[Math Standard 5:](#)

Understands and applies basic and advanced properties of the concepts of geometry

[Math Standard 8:](#)

Understands and applies basic and advanced properties of functions and algebra

What You'll Need

Student Materials

- Small math manipulatives such as Unifix cubes
- Several large cardboard signs labeled "A" and "B" (These could be color coded as well.)
- Ribbon samples showing pattern
- Images of pattern in art and architecture
- Musical instruments
- Large roll of paper
- Construction paper or drawing paper

Resources:

- **Printable**
- [Assessment Rubric](#)

Required Technology

- 1 Computer per Classroom

Technology Notes

This lesson makes use of multimedia. Be sure to test all resources prior to teaching the lesson.

Key Skills

Developing Arts Literacies: Analyzing and Evaluating - Critique, Applying Vocabulary

Creative Thinking: Critical Thinking and Problem Solving

THE CONDUCTOR'S SCORE

A score is the written music which shows all the instrumental parts on one very large page. This is what a conductor looks at while he is conducting an orchestra. Below is an excerpt from a conductor's score.

Allegro ♩ = 145

Piccolo
Flutes I & II
Oboes I & II
Cor Anglais
Clarinets in B♭ I & II
Bass Clarinet
Bassoons I & II
Contra Bassoon
Horns in F I II III IV
Trumpets in C I & II
Trombones I & II
Bass Trombone & Tuba
Timpani
Percussion S.D. Cym. B.D.
Violin I
Violin II
Viola
Cello
Bass

Name the instrument and state which line is it on in the score:



name: _____
line _____



line _____



line _____



line _____



line _____



Answer Sheet

The Conductor's Score

1) Violin Line 16

2) Trumpet Line 10

3) Cello Line 19

4) Oboe Line 3

5) Timpani Line 14

