

Young Audiences of Massachusetts

Educational Materials

Please forward to teachers

ABOUT THE PERFORMANCE:

Science of Sound

Grade levels: 5-12

This program is not meant for general use. It is designed to augment the science curriculum and should be presented in conjunction with the school science teachers.

In this program, science, technology, and history are all wrapped into one! Students will hear a chorus of garden hoses, view a vibrating rope, listen to early brass instruments, and discover how they and their sounds have evolved over the last 3,000 years.

LEARNING GOALS:

1. To promote an understanding of acoustics.
2. To explore the technological evolution of modern brass instruments.
3. To demonstrate how the limitations of these instruments influenced the way composers wrote for them.

PRE-ACTIVITY SUMMARY: *Instrument Families*

Discuss the differences between string, wind, brass, and percussion instruments. Listen to examples of classical works to hear the different characteristics that group certain instruments together.

POST-ACTIVITY SUMMARY: *Making Musical Instruments*

Discuss instruments played during Cantabrigia Brass Quintet's performance. How did these instruments produce sound? Collect materials that students can use to make musical instruments. Have students make their own instruments and create rhythms and layers of sound with them. Students create their own instruments from one of the four instrument families. What characteristics group the instruments into those families? Create a piece of music using these instruments.

CURRICULUM LINKS: History and Social Sciences, Music, Science and Technology, Science, Social Studies

PRE-ACTIVITY

INSTRUMENT FAMILIES

LEARNING GOAL:

To explore different instrument families

MATERIALS/PREPARATION:

Tape or CD player,
tape/CD of an orchestra,
pictures of instruments

TIME:

Two 45 minute sessions

TIPS FOR THE TEACHER:

Woodwind Instruments:

piccolo, flute, clarinet,
oboe, bassoon, saxophone.

String Instruments: viola,
violin, cello, stringed bass.

Brass Instruments: trumpet,
trombone, tuba,
french horn, saxophone

Percussion Instruments:
drums, piano, xylophone,
timpani

INSTRUMENT FAMILIES

STEP 1: Discuss instrument families. What are some of the reasons instruments might be grouped together? (i.e., the way sound is produced, the materials they are made of, etc.)

STEP 2: Write the headings of the four instrument families on the board: Brass, Woodwind, String, and Percussion. Have students name any instrument they can think of and put it on the board under its heading. What characteristics do the instruments of each family share?

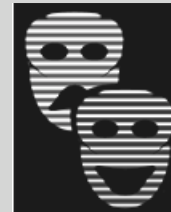
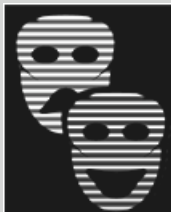
STEP 3: Ask students where they have seen and heard each of the instruments played (parades, concerts, music videos, etc.). Ask students to use descriptive words to characterize the sounds each family of instruments makes. (Students may be best able to describe the instruments' sounds in terms of the feelings they evoke -- happy, sad, angry, etc.) As students respond to these questions, write their answers and descriptive words on the chalkboard with the corresponding instrument family.

STEP 4: Divide the class into four groups and assign each group a section of the orchestra. Ask the groups to make a list of instruments in their assigned section.

STEP 5: Play an orchestral recording for the class. Ask students to listen for the instruments in their sections of the orchestra. Have the students indicate when they hear their assigned instrument.

EXTENSIONS:

Invite students to bring instruments to play for the class. After a student demonstrates an instrument, ask the class to decide which family it belongs to. Again, ask students to share their impressions about the look and sound of each instrument.



POST-ACTIVITY

MAKING MUSICAL INSTRUMENTS

LEARNING GOAL:

To create musical instruments; to create layers of sound using handmade instruments

MATERIALS/PREPARATION:

Coffee cans, beans, rubber bands, fabric, soda bottles and caps, paper towel rolls, paper clips, wooden sticks (for tapping), water

TIME:

One 45 minute session

TIPS FOR THE TEACHER:

*Collect coffee cans, soup cans, paper towel rolls, etc. in the weeks preceding this lesson.

MAKING MUSICAL INSTRUMENTS**STEP 1:**

Discuss how instruments produce sound. Discuss the brass instruments that the members of Cantabrigia Brass Quintet played. How do these instruments make sound?

STEP 2:

Ask students to think of everyday materials that they could use to create instruments. Collect the materials. Discuss how students might vary the sounds of the instruments (amount of beans, different size cans, etc.).

STEP 3:

Have each student make an instrument from everyday materials. Encourage students to experiment with different sounds before making their final instruments.

STEP 4:

Give students time to practice playing their instruments by themselves and with partners.

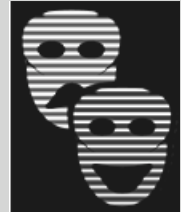
STEP 5:

Have students play different rhythms with their instruments and create layers of sound by playing them with each other.

EXTENSIONS:

Invite students to draw imaginary, science fiction instruments. What would music for these instruments sound like?

Have students write a story or poem while listening to a piece of music. What aspects of the music do they capture in the writing?



Cantabrigia Brass Quintet: *Science of Sound*

VOCABULARY:

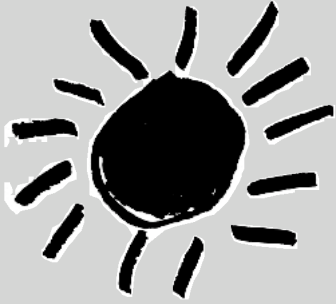
bell	fanfare	fugue
fundamental pitch	sound wave	overtone series
sound wave	vibration	resonate

ABOUT THE PERFORMERS:

Cantabrigia Brass Quintet features some of Boston's finest freelance brass players. The quintet was formed in 1977 by trumpet player **Robert Pettipaw**. Bob is the Brass Department Chair at the New England Conservatory Preparatory School and was for many years the Brass Department Coordinator at the Boston Conservatory. He has performed with the Boston Pops, Boston Symphony, Boston Ballet, Opera Company of Boston, and the Boston Brass Ensemble. He has also taught at M.I.T. and Brown University. **Richard Given**, trumpet, is a graduate of the New England Conservatory. He has toured nationally with many Broadway shows and has performed with the Boston Symphony Orchestra, the Boston Ballet, and the Boston Pops. He is Principal trumpet with the Boston Classical Orchestra. **George Sullivan**, French horn, studied at the University of Illinois and the New England Conservatory, receiving the Jackson Award for Outstanding Brass Player at the Berkshire Music Festival. He is a member of the Boston Ballet and has performed with the Vermont Symphony, Boston Lyric Opera, and Portland Maine Symphony. **Robert Couture**, trombone, is a graduate of the New England Conservatory. He is Principle trombone with the Boston Ballet Orchestra and also performs with Handel and Haydn Society, the New Hampshire Symphony Orchestra, New England Ragtime Ensemble, Boston Pops, and Boston Symphony. **Chip Halt**, tuba, has been an active performer in northern California, appearing with the Napa Valley, Santa Rosa, and Sacramento Symphonies as well as subbing with the San Francisco Symphony. Since moving to Boston, he has worked with the Boston Lyric Opera, Boston Philharmonic, Boston Modern Orchestra Project, and the Disney theatre production of *The Lion King*.

ABOUT YOUNG AUDIENCES:

Young Audiences of Massachusetts (YAMA) is the oldest, largest and most utilized arts-in-education organization in the state and one of the largest in a national network of 33 chapters. For over 45 years, YA has been serving as a link between teaching artists and the region's school children, providing dance, storytelling, music and theater programs to children in schools, libraries and hospitals in the form of assembly performances, workshops and residencies. The organization's mission is to encourage lifelong engagement with the arts by making them an integral part of every child's education.



Young Audiences of Massachusetts

255 Elm Street, Suite 302, Somerville, MA 02144

(617) 629-YAMA (9262)

www.yamass.org

MASSACHUSETTS CURRICULUM FRAMEWORKS CONNECTIONS

Cantabrigia Brass Quintet:

Back to Brassics, Sounding Brass, and The Science of Sound

<i>Language Arts 9</i>	...identify the basic facts and essential ideas in what they have read, heard, or viewed.
<i>Arts-Music 3</i>	Playing Instruments...play instruments, alone and with others, to perform a varied repertoire of music.
<i>Arts-Music 4</i>	Improvisation and Composition...improvise, compose, and arrange music.
<i>Arts-Music 5</i>	Critical Response...describe and analyze their own music and the music of others using appropriate music vocabulary.
<i>Arts-Music 6</i>	Purpose and Meaning in the Arts...describe the purpose for which works of dance, music, theatre, visual arts, and architecture were and are created.
<i>Arts-Music 8</i>	Concepts of Style, Stylistic Influence, and Stylistic Change...demonstrate understanding of styles, influence, change.
<i>Arts-Music 9</i>	Inventions, Technologies, and the Arts...describe and analyze how performing and visual artists use and have used materials, inventions, and technologies in their work.
<i>Arts-Music 10</i>	Interdisciplinary Connections...apply knowledge of the arts to the study of English language arts, foreign languages, health, history, and social science, mathematics, and science and technology/engineering.