***Science**

Sweet Music to My Ears

Peter Rabbit loved musical sounds so much that he always wanted to surround himself in sound. That's exactly what we experience everyday, sounds all around us; various sounds, the result of vibrations and waves moving back and forth only to land in our ears.

Kentucky Science Standards
Patterns, Systems, Scale and Models, Constancy, and Change over Time (2.2-2.6) Grades K-3
Sound: Position and Motion of Objects
Academic Expectations:
2.3 Students identify and analyze systems and the ways their components work together or affect each other.
2.4 Students use the concept of scale and scientific models to explain the organization and functioning of living and nonliving things and predict other characteristics that might be observed.
Note: Sound and the transfer of energy are addressed in-depth in grades4, 5, and 6.

Ohio Science Standards: Physical Sciences
Sound: Force and Motion
Benchmarks Grades K-2
B. Recognize that light, **sound** and objects move in different ways.
C. Recognize sources of energy and their uses.
Grade 3
C. Describe the forces that directly affect objects and their motion. *(speed and velocity)*

Objective:

Students will:

- Recognize that sound is produced from a vibration--a disturbance (pressure wave) that transfers energy within a medium (air).
- Explore and describe how various things make sound through vibration.

Assessment:

Students will be able to:

- Identify factors that create sound.
- Demonstrate the creation of sound with various vibrating objects.
- Demonstrate the movement and measurement of sound. (Appropriate for grade 3).

Sample selected response items to gauge student understanding:

1. When you hear sound you are the _____.
   a. Vibration
   b. Producer
   c. Sound chamber
   d. Receiver

   Answer: d. Receiver

2. You have a picture of an orchestra giving a performance and its audience. Identify the producers and the receivers.
   Answer: *Instruments are the producers (of sound) and the audience is the receiver (of sound).*
3. Choose an instrument and tell how it produces sound. Use both words and pictures to help explain your thinking.
   Answer: Individual student response based on choice of instrument. Emphasis on the identification of vibrating factors; where and how vibration is produced and how sound is then carried to a receiver. (Younger students: emphasis most likely will address how one plays an instrument, e.g., hitting, blowing through, etc.)

Vocabulary:

- Vibration
- Sound waves
- Producer
- Sender
- Receiver
- Sound chamber

Materials:

- Sound cup, one per pair of students (directions follow)
- String
- Musical instruments with sound chambers
- Pictures of the above musical instruments
- Board for displaying pictures
- Cards for recording descriptions for each picture

Activity

Sounds All Around Us

Teacher will:

Option: Develop a word bank of vocabulary used throughout the exploration and discussion of sound and sound chambers.

1. Engage students by having them close their eyes and listen without talking for one minute to surrounding sounds. After one minute, have students describe what they heard. Record their observations for whole class sharing.
2. Have each student predict what he/she believes created the various sounds.
3. Introduce the concepts of “producer,” “sender” and “receiver.” Have students reflect on one previously heard sound and identify its producer, sender and receiver.
4. Emphasize the use of the sense of hearing to perceive and receive sounds.
5. Prepare a “sound cup” for each student, (e.g., a paper or foam cup, with a hole punched in the center of its bottom and a string tied through the hole, with a large knot is on the underside of the cup; the string will hang down through the open area of the cup).

6. Distribute “sound cups” to pairs of students. Tell one student to hold the cup in one hand and pull tightly on the string. The second student rubs his/her thumbnail along the string. Together they listen for the sound produced by this action. Have students trade tasks and repeat the rubbing of the string.
7. Facilitate discussion to address what happened during the exploration. Students will describe the action they took to make the sound (providing tension on the string and rubbing to cause friction/vibration), and identify the type of sound produced. Students will also identify the producer and the receiver of the sound.
8. Have students repeat the activity to observe the string and what happens to it when rubbed. *(Observation should consist of the string vibrating to create the sound and the sound “increased” by being inside the cup.)*
9. Have two students hold a string, not attached to a cup, rub it and observe what happens. Emphasis on the degree of vibration and the degree/loudness of the produced sound. Students will compare this sound and vibration to that created with the string and cup. *(Sound produced with the string without the cup should not be as loud, as the cup creates a chamber for the sound waves to travel, bounce around, and intensify what is heard. Sound waves not confined in a chamber disburse/move in all directions.)*
10. Collaborate with a Music Specialist to allow students opportunity to explore musical instruments that produce sound with aid of a sound chamber.
11. Have student examine the shape of the instruments and the kinds of produced sounds. Allow students to demonstrate the sounds with each instrument. *Option: Have students create a visual display (with descriptive text) of instruments with and without sound chambers.*
12. Challenge students to reflect upon The Children’s Theatre of Cincinnati’s production of *The Rockin’ Adventures of Peter Rabbit*, and instruments heard in the musical presentations. Have students identify the type of sound heard, the producer, where the vibration occurred, and use of any sound chambers.