Human Ear and Ear Disorders Part 1

Lesson Overview
In this lesson, students will learn about the parts of the human ear and their functions using Cyber Science 3D and other sources. Students will build a simple model of the ear and conduct a few sound experiments to learn more about the sense of hearing (optional).

Objectives
- Learn how humans receive important information about their surroundings from the sense of hearing
- Conduct in-depth research from multiple sources to learn about the parts of the ear and their functions
- Build a model and conduct experiments that demonstrate how the brain processes the sensory information from the ear (optional)

Standards (NGSS and Common Core)

For state specific standards visit edu.zspace.com/activities

Next Generation Science Standards
- Life Science – Structures and Processes
  - MS-LS1-8 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Common Core Connections
- Language Arts
  - RI.6.7 Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
  - W.6-8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.

Differentiation
- Provide paper copies of diagrams to students to use as a reference
- Provide a handout with a list of vocabulary terms and definitions that will appear in their activity
- Allow students to provide answers that are handwritten, typed, or verbal
- Give students a variety of presentation styles to choose from (using charts/graphs, PowerPoint, making 3D presentations, creating videos/movies, making posters)

Grade Level: 6th – 8th
Lesson Time: 120 Minutes

Key Terms:
- Anvil
- Cochlear
- Cochlear nerve
- Ear canal
- Eardrum
- Eustachian tube
- Facial nerve
- Hammer
- Pinna
- Semicircular canals
- Stirrup
- Vestibular nerve

Resources:
- Human Ear worksheet

Materials needed:
- Research center about human ears
- Center with materials for ear models and sound experiments (optional): (toilet paper rolls; plastic wrap; tape; construction paper; dry rice grains; cookie sheet; string; pictures of a hammer, anvil, stirrup, and snail)
Introduction

The teacher will review the five senses and their connection with the nervous system. The teacher will explain that the students will learn more about the parts of a human ear and their functions. Students should discuss why the ear is so important and what life would be like without hearing.

Activity – Human Ear and Ear Disorder Part 1

CENTER 1:
1. Open the “Human Ear” session in Cyber Science 3D.
2. Click on the “Presenter” mode at the top left corner of the screen. This will display a list of slides along the left side.
3. Follow the presentation: Click on the “Play Slides” button to pause the session at the first slide. When you are ready for the next slide, click the next slide on the list. Follow the directions on each slide and explore at your own pace.
4. Using the "Human Ear" worksheet, draw a cross section of the ear and label its parts.

CENTER 2:
1. Conduct in-depth research about the parts of the human ear and their functions.
2. Record your findings on the chart of the provided worksheet.

CENTER 3 (optional):
1. Build a simple model of the human ear. Directions for ear model:
   a. Roll and tape a small piece of construction paper in a funnel shape at one end of a toilet paper roll to represent the outer ear. The toilet paper tube represents the ear canal.
   b. Tape a piece of plastic wrap tightly around the other side of the toilet paper tube to represent the ear drum.
   c. Place your ear model on a piece of construction paper on your desk.
   d. Cut out pictures of a hammer, anvil, and stirrup to represent the names of the three small bones in the middle ear and place them on the construction paper behind the ear drum.
   e. Cut out a snail to represent the cochlea and place that behind the three small bones.
   f. Cut a piece of string and attach it to the cochlea to represent the nerves to the brain.
2. Using your ear model, conduct a few sound experiments. Pick up the toilet paper tube section of your ear and place some grains of rice on the plastic wrap. Make some loud sounds close to it, like banging on a cookie sheet. Observe what happens to the rice with different sounds, noise levels, and distances.
3. When you are finished experimenting, glue all ear pieces in order onto the construction paper.

Closing

After the students complete their worksheets, ear models, and sound experiments, the students will discuss the parts of the ear and their functions. They will share their observations about how the ear model replicates the
actions within the ear. They will make conclusions about how the brain processes and responds to stimuli from the ear as they answer the following discussion questions.

Questions for Discussion

1. Based on your experiments, how does the ear model replicate the actions within the ear?
   
   *Answers will vary. Sample Answer: The plastic wrap represents the eardrum. When you make loud noises, the grains of rice bounce on the plastic wrap. Sound causes vibrations on the eardrum, which then sends messages to the brain about the sounds that you are hearing.*

2. What types of sounds caused the greatest vibrations?
   
   *Answers will vary. Sample Answer: The louder the sounds and the closer the source, the bigger the vibrations on the plastic wrap.*

Investigate Further

Follow-up Activity: Human Ear and Ear Disorders Part 2

Extension Activity: Students could research the ears of other animals and compare their parts/functions with the human ear.
Human Ear

Directions: Draw a cross section of the human ear and label its parts.
Directions: Research the parts of an ear and their functions.

<table>
<thead>
<tr>
<th>Parts of an Ear</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outer Ear</strong></td>
<td></td>
</tr>
<tr>
<td>Pinna</td>
<td></td>
</tr>
<tr>
<td>Ear Canal</td>
<td></td>
</tr>
<tr>
<td><strong>Middle Ear</strong></td>
<td></td>
</tr>
<tr>
<td>Ear Drum</td>
<td></td>
</tr>
<tr>
<td>Hammer (malleolus)</td>
<td></td>
</tr>
<tr>
<td>Anvil (Incus)</td>
<td></td>
</tr>
<tr>
<td>Stirrup (stapes)</td>
<td></td>
</tr>
<tr>
<td><strong>Inner Ear</strong></td>
<td></td>
</tr>
<tr>
<td>Cochlea</td>
<td></td>
</tr>
<tr>
<td>Semicircular Canals</td>
<td></td>
</tr>
<tr>
<td>Eustachian Tube</td>
<td></td>
</tr>
<tr>
<td>Vestibular Nerve</td>
<td></td>
</tr>
<tr>
<td>Cochlear Nerve</td>
<td></td>
</tr>
<tr>
<td>Facial Nerve</td>
<td></td>
</tr>
</tbody>
</table>