Sound and Vibration Assessment

Grade Eight
Physical Science Standard

<table>
<thead>
<tr>
<th>Benchmark D:</th>
<th>Describe that energy takes many forms, some forms represent kinetic energy and some forms represent potential energy; and during energy transformations the total amount of energy remains constant.</th>
</tr>
</thead>
</table>

| Grade Level Indicator | 1. Demonstrate that waves transfer energy.  
|                       | 2. Demonstrate that vibrations in materials may produce waves that spread away from the source in all directions (e.g., earthquake waves and sound waves). |

Teacher Information

Sound is a form of energy produced by vibrating objects. Without movement there could be no sound. When an object moves or vibrates, the air molecules around the object also vibrate. Vibrating objects (as long as they are not in a vacuum) produce sound. A sound wave contains energy, which in turn means it can make the air around it move. However, if the wave strikes something solid, the wave will bounce back -- an echo.

Materials needed for each group or student:

- Student Booklet
- Word sort cards
<table>
<thead>
<tr>
<th>Lion’s Roar</th>
<th>Singer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radio</td>
<td>Clapping</td>
</tr>
<tr>
<td>Thunder</td>
<td>Hammering</td>
</tr>
<tr>
<td>Trumpet</td>
<td>Tuning fork</td>
</tr>
<tr>
<td>Fireworks</td>
<td>Bird’s song</td>
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</tbody>
</table>
## Sound Waves Rubric

### TASK 1-Part 1
Sort the word cards into two columns: Objects that make sound by vibrations and objects that do **NOT** make sound by vibrations.

<table>
<thead>
<tr>
<th>OBJECTS THAT MAKE SOUND BY VIBRATIONS</th>
<th>OBJECTS THAT DO NOT MAKE SOUND BY VIBRATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**2 points:** Student lists the cards to indicate **ALL** objects make sound by vibrations.

**1 point:** Student indicates that some of the cards make sounds by vibrations and some do not; and the majority of the cards are in the left column.

**0 points:** Student does not demonstrate understanding of the concept.
Part 2: Explain how you chose to sort the cards into the group that make sound by vibration.

2 points: Student demonstrates a complete understanding that all of the objects would vibrate in order to cause the sound. They may provide specific examples of an object and how it vibrates to produce sound.

1 point: Student demonstrates some understanding that objects vibrate to produce sound, but does not offer detailed explanation.

0 points: Student does not demonstrate understanding.

TASK 2
Melissa tells her little brother that she has rice that can dance to music. Melissa takes an aluminum pie pan and places a shallow layer of rice in the pan. She holds the pan of rice over a speaker on the radio and turns the radio volume up. The rice begins to dance and her little brother is amazed! She shares this during science class the next day. Her teacher asks: “Melissa, can you explain using the concept of sound waves what really happened to make the rice dance”?

Write what Melissa should tell her teacher below.

Melissa could say:

When you turned on the radio, you created vibrations from the music. The energy of the vibrations made the pie pan vibrate and the vibration made the rice move.

While we can’t see the sound waves, we know that they are there because they travel and affect other objects. The vibrations make the particles of air around them vibrate. The vibrations bump against other particles and make them vibrate. These vibrations travel in all directions.
As sound waves travel, molecules are pressed together and spread apart. This is what creates a sound wave as they alternate with each other.

The louder the music, the more the rice will dance. Louder sounds are created by larger vibrations or a stronger movement of air molecules as the sound travels.

2 points: Student demonstrates a complete understanding that the vibrations coming from the radio cause the rice to move.

1 point: Student demonstrates some understanding that vibration from the radio produces sound. Explanation may be weak and not include many details.

0 points: Student does not demonstrate understanding.