Sound Waves

Summary

Water waves, as observed in a bowl of water on the overhead projector, act as a model for sound waves.

Time Frame

1 class periods of 45 minutes each

Group Size

Large Groups

Materials

overhead projector large glass bowl eye dropper food coloring liquid bleach tuning fork dominoes

Background for Teachers

This activity is designed to show how sound waves would look and behave if we could see them. Rehearse this demonstration before doing it for your students. It requires practice! The water model of sound waves is not the same as sound waves themselves. Help your students understand ways in which this model is accurate, and ways in which it is inaccurate.

Intended Learning Outcomes

Observe simple objects, patterns, and events, and report their observations. Compare things, processes, and events. Demonstrate a sense of curiosity about nature.

Instructional Procedures

Remember to rehearse this demonstration before doing it for your students--it requires practice! Fill the bowl half full of water and place on the overhead projector. Wait for the water to become still. Turn on the overhead and focus the image of the surface of the water onto the screen. Have the students predict what will happen when you tap the water with your finger at slow, even intervals. Watch what happens. Discuss. Note how the waves spread in the bowl. Predict what will happen if you tap the water harder. Watch and discuss what happen to the waves.

With an eyedropper, slowly drop clear water into the middle of the bowl. Watch what happens as the water drop hits the surface of the water.

Have the students document the pattern with drawings in their science journals.

Experiment with different speeds of drops. Also experiment with dropping the water from different heights.

Discuss or draw what happens in the different experiments.

Add a drop of food coloring to the water and observe what happens. If you want to repeat this experiment after the water becomes colored, just add a few drops of chlorine bleach to the water

and it will clear to a light color. Did the food coloring act differently than the water? Strike the tuning fork on a rubber surface (never a hard surface) and place its base on the screen of the overhead projector. Observe the waves in the water.

Strike the tuning fork and place its base in the water and observe the waves produced. Discuss with students ways in which this model is and accurate and inaccurate depiction of actual sound waves.

Accurate:

Sound waves move out from their source.

Sound waves are vibrations of molecules which is similar to how the water vibrates. Inaccurate:

Instead of moving up and down like these water waves, sound waves travel in a horizontal motion. Demonstrate the horizontal motion of sound waves by setting up a line of dominoes and pushing over the first in the line.

The second shortcoming of the water model for sound waves involves the plane of motion. Unlike the water waves in which waves travel only on plane of motion, sound waves move out in all directions from the source.

Have the students summarize how sound moves in their science journals.

Assessment Plan

Assess student summaries, drawings, and conclusions using the Science Journal Rubric.

Rubrics

Science Journal Rubric

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