

Learning Target: I can demonstrate the behavior of waves including reflection, rarefaction, diffraction, transmission, and absorption.

Properties & Behavior of Waves Lab

Introduction: Have you ever seen a boat in the water? The bigger the boat the more energy it takes to move it, the smaller the boat the less energy it takes to move it. In today's lab we will review and demonstrate the behavior of waves including reflection, diffraction, rarefaction, constructive interference, and destructive interference.

Materials: - pan or bowl of water - several hard objects - pipettes - pencil - beaker

- Marbles - measuring tape - slinky - mirror - 2 flashlights - tissue paper
- Ear plugs or ear buds - sun shades - magnifying glass - boat or floating object

Eight activity stations will be set up for you to explore the wave behaviors of refraction, transmission, reflection, and absorption for both mechanical and electromagnetic waves. You will be in groups of no more than 4. You will have **5 minutes** at each station to make observations and record the type of wave that you are observing. Group Members: _____

Station 1: Reflection of mechanical wave.

Methods: Fill the pan or bowl about half full with water. Place the blocks (or other hard objects) in the pan close to one end. Create a wave at the other end by dropping water into the pan using the pipette. Observe what happens to the waves as they travel to the other end of the pan. Clean up your materials when you are finished. What wave behavior? _____

Station 2: Refraction of electromagnetic waves.

Methods: Fill the glass or beaker about half full with water. Place the pencil in the glass or beaker. Look at the pencil in the glass from the side. What do you observe about the pencil? Clean up your materials when you are finished. What wave behavior? _____

Station 3: Transmission of mechanical waves.

Methods: Place all marbles except for one in between the measuring tape so that they are all touching each other. Make sure the marbles are near the center of sticks. Roll the other marble toward the rest so that it collides with the first marble in the line. Observe what happens to the marbles. Clean up your materials when you are finished. What wave behavior? _____

Station 4: Transmission or absorption of electromagnetic waves.

Methods: Turn the flashlight on and hold a piece of construction paper in front of the light. Look at the paper from the other side. What do you observe on the side of the paper away from the light? Clean up your materials when you are finished. What wave behavior? _____

Station 5: Reflection of mechanical waves. One end of the slinky needs to be taped to the wall or other hard object so that the slinky can be stretched out along a table or the floor.

Methods: Have one person stretch the slinky across the table. Create a wave by pulling sections of the slinky toward you and then releasing them (but keep the slinky stretched across the table). Watch the wave until you can no longer see it. What did you observe? Clean up your materials when you are finished. What wave behavior? _____

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Station 6: Reflection of electromagnetic waves.

Methods: Hold the mirror close to the table or the wall and shine the flashlight on the mirror. Can you tilt the mirror so that you light up the table or the wall? Clean up your materials when you are finished. What wave behavior? _____

Station 7: Absorption of mechanical waves.

Methods: Make observations about the noise you hear in the room. Put on the earmuffs. What changes did you observe? Clean up your materials when you are finished. What wave behavior? _____

Station 8: Absorption of electromagnetic waves.

Methods: Make observations about the brightness and the light you see in the room. Put on the sunglasses. What changes did you observe? Clean up your materials when you are finished. What wave behavior? _____