

Name: _____ Date: _____

Making Waves: Advanced 3rd Grade Sound and Light Challenge

Students engineer solutions for communication barriers by synthesizing how vibrations move through solids and how light behaves when hitting mirrored surfaces.

1. If you are designing a secret 'string telephone' to talk to a friend, which material would help the sound waves travel most clearly based on how particles are packed together?

- A. A thick, fuzzy wool yarn
- B. A tight, metal wire
- C. A loose, stretchy rubber band
- D. A hollow plastic tube filled with air

2. Imagine you are in a dark room. You shine a flashlight at a shiny silver trophy. The light bounces off and hits the wall. This 'bouncing' behavior is called _____.

- A. Refraction
- B. Absorption
- C. Reflection
- D. Transmission

3. True or False: If an astronaut claps their hands in the empty vacuum of deep space, another astronaut standing nearby would hear the sound.

- A. True
- B. False

4. You place a straw into a glass of water and notice it looks 'broken' or bent at the water line. Why does the light do this?

- A. The water acts as a mirror and reflects the straw.
- B. The light waves speed up when they hit the water.
- C. The light waves slow down and bend as they move from air to water.
- D. The straw is actually changing shape because of the pressure.

5. When a whale sings deep underwater, the sound waves move by bumping water particles into each other. These types of waves are known as _____ waves.

- A. Transverse
- B. Longitudinal
- C. Electromagnetic
- D. Vacuum

6. True or False: A dark black t-shirt feels warmer in the sun than a white t-shirt because the black fabric absorbs more light energy.

- A. True

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B. False

7. If you want to create a higher pitch on a homemade guitar using rubber bands, what should you do to the band?

- A. Use a thicker, heavier rubber band.
- B. Loosen the rubber band so it is floppy.
- C. Stretch the rubber band tighter so it vibrates faster.
- D. Pluck the rubber band much harder.

8. A stained-glass window lets some light through but scatters it so you cannot see clearly through it. Scientists call this material _____.

- A. Transparent
- B. Opaque
- C. Translucent
- D. Reflective

9. How does the amplitude of a sound wave change the way we experience it when listening to music?

- A. It changes the pitch from low to high.
- B. It changes the volume from quiet to loud.
- C. It changes the sound from a wave to a particle.
- D. It changes the color of the light in the room.

10. True or False: Light waves can travel through a glass window, but they cannot travel through a vacuum like sound can.

- A. True
- B. False