Name: _____ **Date:** _____

Answer Key: Light Wave Wonders Quiz for 4th Graders

Challenge students beyond simple reflection by investigating how periscopes work and why light shifts speed in different materials.

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1. A scientist is designing a periscope to see over a wall using two mirrors. In what position must the mirrors be placed to reflect light correctly to her eye?

Answer: A) Parallel at a 45-degree angle

To bounce light through a Z-shaped path, two mirrors must be parallel and angled at 45 degrees so the angle of reflection guides the light to the viewer.

2. If you look through a hand lens and the object appears larger and upside down, you are likely using a ____ lens at a specific distance.

Answer: B) Convex

Convex lenses converge light rays; depending on the distance between the object and the lens, the image can be magnified and inverted (upside down).

3. Light travels at the exact same speed whether it is moving through the air, deep ocean water, or a solid diamond.

Answer: B) False

Light slows down when it enters denser mediums like water or glass; this change in speed is what causes refraction (bending).

4. Why does a white lab coat appear white when viewed under sunlight?

Answer: C) It reflects all colors of visible light

Objects appear white when they reflect all the wavelengths of the visible spectrum back to our eyes.

5. When light hits a rough, uneven surface like a crumpled piece of foil, the light bounces off in many directions. This is called ____ reflection.

Answer: B) Diffuse

Diffuse reflection occurs when light hits an uneven surface, causing the rays to scatter in many different angles.

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6. A desert mirage, which looks like blue water on a hot road, is actually caused by the refraction of light through layers of air at different temperatures.

Answer: A) True

Hot air near the ground is less dense than cooler air above it; as light passes through these layers, it bends (refracts) and creates the illusion of water.

7. An astronomer uses a telescope with a large curved mirror that caves inward to gather light from distant stars. What type of mirror is this?

Answer: C) Concave

Concave mirrors curve inward like a cave and are used in reflecting telescopes to focus light to a single point.

8. When using a prism to create a spectrum, the light bends because different ____ of light travel at different speeds through the glass.

Answer: D) Colors

Each color (wavelength) of light refracts at a slightly different angle when entering glass, causing white light to separate into a spectrum.

9. If you are standing 3 feet in front of a flat (plane) mirror, how far away from you does your reflection appear to be?

Answer: B) 6 feet

The image in a plane mirror appears to be as far 'behind' the mirror as the object is in front of it. 3 feet to the mirror + 3 feet to the image = 6 feet.

10. Fiber optic cables can send information over long distances because light remains trapped inside the cable by constantly reflecting off the inner walls.

Answer: A) True

This is known as Total Internal Reflection, where light pulses bounce along the inside of glass fibers to transmit data.