Name: _____ **Date:** _____

Shatter the Illusion: A 5th Grade Optics Challenge Quiz

Why does a pencil look broken in a glass of water? Analyze how light bends and bounces through complex scenarios involving prisms and periscopes.

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1. An deep-sea explorer uses a periscope to see above the waves. If the top mirror is angled at 45 degrees to catch the sunlight, what must be true about the bottom mirror for the image to reach the explorer's eye correctly?

A. It must be curved like a bowl to magnify the light.
B. It must be parallel to the first mirror to reflect light at the same angle.
C. It must be made of frosted glass to spread the light out.
D. It must be perpendicular to the first mirror to stop the light.

2. Light travels at the exact same speed through a diamond as it does through a vacuum like outer space.

A. True
B. False

3. A desert mirage happens because light _____ as it moves from cool air into the very hot air right above the sand.

A. stops
B. refracts
C. magnifies
D. disappears

4. If you are designing a solar oven to melt chocolate, which type of surface would be most effective at concentrating the light into a single hot spot?

A. A flat, plane mirror
B. A convex mirror (curved outward)
C. A concave mirror (curved inward)
D. A sheet of clear plastic

5. White light is actually a mixture of many colors. When white light passes through a glass prism, it separates into a spectrum because each color _____ at a slightly different angle.

A. reflects
B. bends
C. shrinks
D. heats

6. A magnifying glass uses a diverging lens to make an object look much larger than it actually is.

A. True

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B. False

7. Imagine you are trying to spear a fish from a boat. Because of light refraction, where should you aim compared to where you 'see' the fish in the water?

A. Directly at the fish
B. Slightly above the fish
C. Slightly below the fish
D. To the left of the fish

8. Smooth, shiny surfaces like polished metal produce _____ reflection, while rough surfaces like a brick wall produce diffuse reflection.

A. broken
B. opaque
C. specular
D. refractive

9. If a red laser beam hits a flat mirror at a 20-degree angle, it will bounce off the mirror at exactly a 20-degree angle.

A. True
B. False

10. Which of these objects works by both refracting light and then focusing it to a specific point on a digital sensor or film?

A. A flashlight's metal casing
B. A high-speed camera lens
C. A standard bathroom mirror
D. A tinted car window