Name:_____ Date:_____

Light Wave Behavior: Refraction, Diffraction, and Scattering

Light waves can change direction, spread out, or move in different directions when they interact with materials and particles. These behaviors help explain many everyday observations, such as a bent straw in water, light spreading through an opening, and the colors of the sky.

Refraction is the bending of light when it passes from one medium into another, such as from air into water or glass. Light bends because its speed changes as it enters the new medium.

Diffraction is the bending and spreading of light waves as they pass through a narrow opening or around the edge of an obstacle. The spreading is easier to observe when the opening is close in size to the wavelength.

Scattering happens when light strikes particles and travels in many directions. Dust, fog, and gases in Earth's atmosphere can scatter light, making a beam visible or causing the sky to appear blue.

Part 1: Match the Behavior

Word Bank: Refraction Diffraction Scattering

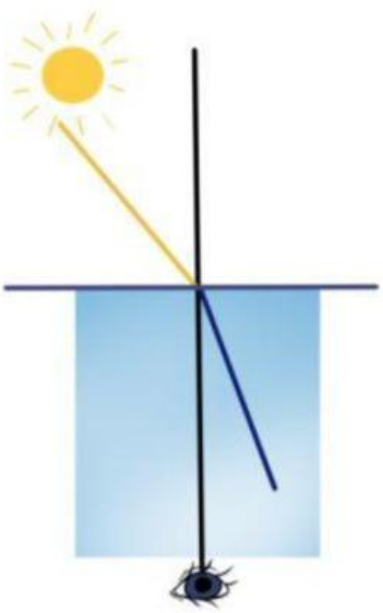
1. Light rays bounce off particles in the air and travel in many different directions. _____

2. Light bends as it passes from one medium (like air) into another medium (like water) because its speed changes. _____

3. Light waves bend and spread out when they pass through a small opening or go around the edge of an obstacle. _____

Part 2: Refraction in Action

LIVEWORKSHEETS



4. Look at the picture of the pencil in the glass of water. Why does the pencil look broken at the surface of the water? Explain using the concept of **refraction** and light speed.

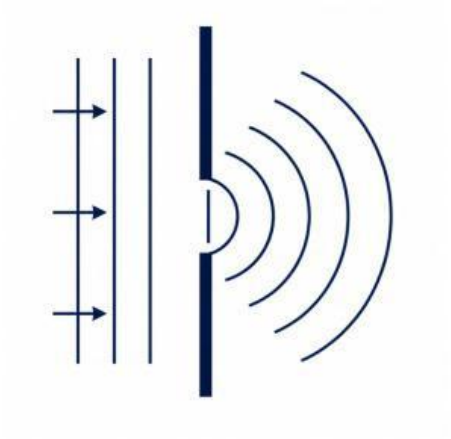
5. Which of the following is another example of refraction?

[ ] A) Seeing your reflection in a smooth mirror

[ ] B) A prism separating white light into a rainbow

[ ] C) Light creating a shadow behind a solid wall

Part 3: Diffraction in Action



6. The diagram shows light waves passing through a narrow slit. What happens to the shape of the light waves after they pass through the opening?

7. True or False: Diffraction only happens with light waves, not sound or water waves.

Part 4: Scattering in Action

LIVEWORKSHEETS

8. You can often see the exact path of sunlight in a dusty room or a foggy forest (as shown in the image). Why does the dust or fog make the light beam visible?

9. What very common, everyday phenomenon is caused by the **scattering** of sunlight by gases in Earth's atmosphere?

Part 5: Multiple-Choice Review

10. What happens when light passes from air into water?

A) It always stops moving

B) It changes speed and may bend

C) It disappears

D) It becomes sound

11. Which situation best demonstrates diffraction?

A) Light bending as it enters glass

B) Light spreading after passing through a narrow opening

C) Light bouncing off a mirror

D) Light being absorbed by a dark surface

12. Why can you see a beam of light in a dusty room?

A) Dust scatters light toward your eyes

B) Dust creates its own light

C) Dust refracts all light into one direction

D) Dust blocks every light wave

13. Which behavior causes the sky to appear blue?

A) Reflection

B) Refraction

C) Diffraction

D) Scattering

LIVEWORKSHEETS