Where Light Goes

Use observations to explain how light interacts with materials

P.8.6.3 "Conduct simple investigations about the performance of waves to describe their behavior (e.g., refraction, reflection, transmission, and absorption) as they interact with various materials (e.g., lenses, mirrors, and prisms)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each material Maya tests, and circle the observation that shows what happened to the light. Use your marks to connect each observation to a wave behavior.

Maya's Light Tests

1. At a science table, Maya makes a narrow beam by shining a flashlight through a slit in a card. She aims the beam at a white wall and marks its bright spot with tape. Keeping the flashlight in place, she puts a flat mirror in the beam's path. The spot moves to another part of the wall because the beam bounces off the mirror. This change in direction is reflection. Maya turns the mirror slightly and sees the spot move again, evidence that the outgoing direction depends on the mirror's angle.

2. Next, Maya removes the mirror and aims the beam at an angle through a clear container of water. On a sheet of paper beyond the container, the bright spot appears in a different place than it did without the water. Light changes direction as it enters and leaves the water because its speed changes between air and water. This bending is refraction. Maya then replaces the container with a curved plastic lens. The lens also bends light, and its shape brings much of the beam together in a smaller bright spot.

3. Finally, Maya places wax paper in front of the flashlight. A dim, spread-out glow appears on the other side, showing that some light passes through but scatters. This is transmission, even though the beam no longer makes a sharp spot. She tries black cloth instead. Almost no light reaches the other side, and the cloth grows slightly warmer after several minutes. The cloth absorbs much of the light and changes some of its energy into heat. Maya keeps the flashlight at the same distance for both tests so the comparison is fair.

2 ANSWER WITH EVIDENCE

Use the passage

1. What observation shows that the mirror reflected light? What happened when Maya changed the mirror's angle?

2. What evidence shows that light refracted in the water test? How did the lens change the beam?

3. How does Maya's observation with wax paper show transmission, even though she no longer sees a sharp spot?

4. Which observations suggest that the black cloth absorbed light? Why did Maya keep the flashlight at the same distance for this test and the wax paper test?

3 YOUR TURN

Your own words

Design a light test using a flashlight and two materials Maya did not test. In four sentences, name the materials, explain how you would test them fairly, and predict an observation and wave behavior for each material.

Where Light Goes

PART 1 · READ AND MARK

Underline each material Maya tests, and circle the observation that shows what happened to the light. Use your marks to connect each observation to a wave behavior. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What observation shows that the mirror reflected light? What happened when Maya changed the mirror's angle?	**The bright spot moved to another part of the wall when the beam struck the mirror. Turning the mirror moved the spot again.**
2	What evidence shows that light refracted in the water test? How did the lens change the beam?	**The spot appeared in a different place with the water than without it, showing that the light changed direction. The lens bent light into a smaller bright spot.**
3	How does Maya's observation with wax paper show transmission, even though she no longer sees a sharp spot?	**A dim glow appeared on the other side, so some light passed through the wax paper. The light also scattered.**
4	Which observations suggest that the black cloth absorbed light? Why did Maya keep the flashlight at the same distance for this test and the wax paper test?	**Almost no light reached the other side, and the cloth grew slightly warmer. Keeping the distance the same made the comparison fair.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would test a shiny metal spoon and clear plastic wrap with a flashlight and a white wall. I would hold each material at the same distance from the flashlight and keep the room lighting the same. I predict that light bouncing off the spoon will make a bright patch on the wall, showing reflection. I predict that a bright spot will appear beyond the plastic wrap, showing transmission.

Accept predictions that connect a plausible observation to reflection, refraction, transmission, or absorption. Students should identify a condition they would keep the same for both tests.