

Flashlight Light Paths

Trace how light changes when it meets different materials.

SC.7.P.10.2 "Observe and explain that light can be reflected, refracted, and/or absorbed."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline one sentence in each paragraph that reports the main flashlight interaction. Write R beside the reflection sentence, RF beside the refraction sentence, and A beside the absorption sentence.

Maya's Flashlight Investigation

- ① At the school science night, Maya aimed a flashlight at a smooth metal mirror. A bright beam bounced from the mirror and landed on a white screen across the table. This was reflection, because light changed direction when it struck the mirror's surface. The screen looked bright because it scattered some of the arriving light into Maya's eyes. Maya moved the flashlight, and the reflected spot moved too. The mirror did not make new light. It redirected light that had reached it.
- ② Next, Maya placed a clear glass cup of water in the flashlight's path. As the beam entered the water from the air, it bent. This was refraction, a change in light's direction as it moves between materials. The bend happened because light travels at different speeds in air and water. Maya could also see a straw through the cup. The straw appeared shifted at the water's surface, even though it had not broken. Clear water transmitted much of the light, so the beam could continue through the cup.
- ③ Finally, Maya shone the flashlight onto a black piece of fabric. The fabric absorbed much of the light that reached it, so very little light bounced toward her eyes. This was absorption. The absorbed light energy increased the fabric's thermal energy by a tiny amount. Dark surfaces often absorb more visible light than light-colored surfaces, although material and surface finish matter. On the same table, a shiny foil sheet reflected much more light than the fabric. Light can interact with an object in more than one way, but one effect may be easier to observe.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What observation showed that the mirror reflected light?

2 Why did the flashlight beam bend when it entered the water?

3 How did the black fabric's appearance show that it absorbed much of the light?

4 Compare the black fabric and the shiny foil sheet. Which one reflected more light, and what does the passage say about the fabric?

3 YOUR TURN

Your own words

First observe real refraction with your teacher: view a straight pencil from the side, place it at a slant in a clear plastic cup half full of water, and view it from the side again. On extra paper sketch what you actually see before and after and explain the apparent shift using refraction; the pencil itself stays straight. Then create the original three-panel flashlight model: in each panel sketch a different object and arrows showing light's path, with one sentence. Use reflection exactly once, refraction exactly once and absorption exactly once. Keep the observed sketch and the three conceptual models labeled separately.

		
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PART 1 • READ AND MARK

Underline one sentence in each paragraph that reports the main flashlight interaction. Write R beside the reflection sentence, RF beside the refraction sentence, and A beside the absorption sentence. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What observation showed that the mirror reflected light?	The flashlight beam bounced from the mirror and landed on the white screen.
2	Why did the flashlight beam bend when it entered the water?	It bent because light travels at different speeds in air and water.
3	How did the black fabric's appearance show that it absorbed much of the light?	Very little light bounced from the fabric toward Maya's eyes, so it looked dark.
4	Compare the black fabric and the shiny foil sheet. Which one reflected more light, and what does the passage say about the fabric?	The shiny foil reflected more light. The black fabric absorbed much of the light and reflected very little toward Maya's eyes.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1: An arrow reaches a mirror and an arrow leaves it because reflection changes the light's direction.

Panel 2: An arrow bends as it enters water from air because refraction changes its direction.

Panel 3: An arrow reaches black cloth and stops because absorption transfers light energy to the cloth.

Accept equivalent evidence and explanations that match the passage. For the three-panel task, accept varied objects if the sketches and sentences accurately show each interaction exactly once. Teacher supplies a straight pencil, clear plastic cup, water and spill tray, pretests side-view visibility and helps every learner observe or describes the actual display accessibly. Record what was seen, not a fabricated beam path in clear water. An apparent bend/shift supports refraction of light reaching the eye; the physical pencil is not bent. Require the actual before/after observation and explanation as well as the three retained model panels. OpenStax Physics 16.2 Bent Pencil supplies the observation principle: <https://openstax.org/books/physics/pages/16-2-refraction> .