

Light on the Move

Read closely to track what light does with different materials.

SC.3.P.10.4 "Demonstrate that light can be reflected, refracted, and absorbed."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline one sentence about light bouncing, circle one sentence about light changing direction, and number one sentence about light being taken in. Use 1, 2, and 3 to show the three different ways light acts.

Maya's Light Tests

- ① At recess, Maya aimed a flashlight at a smooth metal lunch box. A bright patch appeared on the wall behind her. Light traveled from the flashlight to the metal and bounced in a new direction. This bouncing is called reflection. A shiny, smooth surface, such as a mirror or calm water, can reflect light. The reflected light lets people see objects and images.
- ② Later, Maya put a pencil in a clear cup of water. The part under the water looked bent, although the pencil was straight. Light from the pencil moved through water and then into air before reaching Maya's eyes. Light changed direction as it moved between water and air. This change in direction is called refraction. Clear glass can also refract light.
- ③ Maya also set a black lunch bag and a white lunch bag in sunlight. After a few minutes, the black bag felt warmer. Both bags received light, but the black surface absorbed more of it. Absorbed light does not bounce away or pass through. Instead, the surface takes in the light's energy and can warm up. Dark surfaces often absorb more light than light-colored surfaces.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What did the light do when it reached the metal lunch box?

2 What two materials did light move between when the pencil looked bent?

3 Why did the pencil look bent even though it was straight?

4 Which lunch bag absorbed more light, and what happened to it?

3 YOUR TURN

Your own words

First demonstrate all three behaviors with your teacher. (1) Aim a flashlight at a flat classroom mirror and catch its reflected spot on a white screen; turn the mirror slightly and observe the spot move. (2) Look from the side at a straight pencil slanting in a clear cup, first empty and then half filled with water; record how it appears at the water surface. (3) Teacher places two identical smooth-rimmed cans, one wrapped in black paper and one in white, with matching safe thermometers inside, side by side in sunlight. Record both temperatures at Start and after 10 minutes. Compare the changes as evidence of absorbed light warming a surface. On extra paper record the actual observations and temperatures with units. Then draw three panels of these demonstrations with light arrows, labels and captions explaining reflection, refraction and absorption. Never direct light at eyes or touch hot cans.

PART 1 • READ AND MARK

Underline one sentence about light bouncing, circle one sentence about light changing direction, and number one sentence about light being taken in. Use 1, 2, and 3 to show the three different ways light acts. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What did the light do when it reached the metal lunch box?	It bounced in a new direction, or reflected.
2	What two materials did light move between when the pencil looked bent?	Light moved between water and air.
3	Why did the pencil look bent even though it was straight?	The pencil looked bent because light changed direction as it moved between water and air. This is refraction.
4	Which lunch bag absorbed more light, and what happened to it?	The black lunch bag absorbed more light, and it felt warmer.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1: Light travels from the flashlight to the mirror and then to the screen; the spot moves when the mirror turns. Panel 2: Light from the submerged pencil changes direction on its way through water and air to my eyes; the pencil appears displaced at the surface but is not physically bent. Panel 3: Sunlight reaches the black/white cans; labels record our actual temperatures. The warming is evidence that absorbed light energy becomes heat.

Accept descriptions of reflection as bouncing, refraction as light changing direction between materials, and absorption as light being taken in. For the open task, accept any accurate three-panel situation with arrows, labels, and captions for all three light behaviors. Teacher supplies a safe classroom mirror, low-power flashlight, white screen, straight pencil, clear cup/room-temperature water, two identical smooth-rimmed cans, equal paper wraps, two non-glass thermometers and timer. Pretests all stations and reads/scribes. Keep paper size, cans, probe placement, starting temperature, exposure time and location alike. A larger rise for black supports greater absorption under these conditions; actual ties or unexpected readings require honest reporting/setup checks, not invented values. Temperature is indirect absorption evidence, not a percent-absorption measurement. Both colors can absorb some light. Pencil displacement is evidence of refraction; it is not a visible light ray or a physically bent pencil. Require each observed behavior and actual temperature records; drawings alone are incomplete. Primary activity background: NASA/JPL Absorbing Light: Dark Versus Bright, <https://sealevel.jpl.nasa.gov/files/archive/activities/ts1enac1.pdf> ; OpenStax Physics 16.2 Bent Pencil, <https://openstax.org/books/physics/pages/16-2-refraction> .