

Sunshine and Shade

How sunlight warms objects and shade can cool them.

SC.3.E.6.1 "Demonstrate that radiant energy from the Sun can heat objects and when the Sun is not present, heat may be lost."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each sentence that tells how sunlight warms an object. Circle each sentence that tells what can happen when direct sunlight is gone.

Maya's Warm Objects

- ① On a clear morning, Maya put two metal spoons on a dry tray outside. One spoon sat in sunlight. The other spoon stayed under a covered porch. After a while, Maya carefully held the ends that had not been in the sun. The sunny spoon felt warmer. Sunlight carries radiant energy, which can warm an object without touching it.
- ② At noon, the tray became hot where sunlight shone. A dark rock beside it also warmed up. The Sun's radiant energy reached the tray and rock. The energy made particles in the objects move faster, so the objects got warmer. This is why a sunny sidewalk can feel hot, even when nobody has touched it.
- ③ Later, clouds covered the Sun, and the porch spoon was brought indoors. The tray, rock, and sunny spoon no longer received direct sunlight. Over time, they lost some heat to the cooler air around them. They became less warm. An object does not stay hot forever when the Sun is not present. Its heat can move to cooler things nearby.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What showed Maya that sunlight had warmed one of the spoons?

2 What kind of energy from the Sun warmed the tray and rock?

3 What happened to the tray, rock, and sunny spoon after they no longer received direct sunlight?

4 Where did some of the objects' heat go as they became less warm?

3 YOUR TURN

Your own words

First demonstrate heating and later cooling with your teacher. Teacher puts matching non-glass thermometers inside two identical black-paper envelopes on matching insulating trays. Record both starting temperatures with units. Put A in direct sunlight and B in nearby full shade for 15 minutes; record both temperatures. Move A into full shade beside B. After 10 more minutes record both again. On extra paper make a table with A/B rows and Start, After 15 minutes, After 10 minutes in shade columns. Compare the changes. Then draw two panels showing envelope A in sunlight and later in shade. Label its actual measured temperatures and write one sentence explaining how the Sun can warm it and how it may lose heat afterward. Do not touch hot objects or look at the Sun.

	
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PART 1 • READ AND MARK

Underline each sentence that tells how sunlight warms an object. Circle each sentence that tells what can happen when direct sunlight is gone. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What showed Maya that sunlight had warmed one of the spoons?	The spoon in sunlight felt warmer than the spoon under the covered porch.
2	What kind of energy from the Sun warmed the tray and rock?	Radiant energy from the Sun.
3	What happened to the tray, rock, and sunny spoon after they no longer received direct sunlight?	They lost some heat and became less warm.
4	Where did some of the objects' heat go as they became less warm?	Some heat moved to the cooler air around them.

PART 3 • YOUR TURN (SAMPLE ANSWER)

Panel 1 shows envelope A in sunlight with its actual starting and later temperatures. Panel 2 shows the same envelope after 10 minutes in shade with its actual later temperature. Sentence frame: In our test A changed from __ to __ in sunlight, then to __ in shade; this supports __ about radiant heating and later heat loss.

Accept answers that state that radiant energy from sunlight warms objects and that objects can lose heat when sunlight is absent. For the drawing, accept any safe object with accurate labels showing warming in sunlight and cooling or heat loss without sunlight. Teacher supplies two matched safe thermometers, identical envelopes/trays and a timer; checks readings side by side initially, pretests sunny conditions and reads/scribes with children. Keep envelope size/color, thermometer placement and exposure time alike; avoid warm pavement and a different indoor location. Read promptly with probes still positioned, minimizing shade from hands. A rise in the sunny envelope followed by a fall in cooler shade supports radiant heating then heat loss; B helps compare nearby conditions. No fixed temperatures or guaranteed cooling: if readings do not change, record that result and extend/repeat under suitable conditions, never invent data. Require actual readings and their comparison before panels are accepted. Envelope temperature measurement is informed by NASA Cool Suits Activity, <https://www.nasa.gov/stem-content/cool-suits-activity/>; this task adapts the setup to sunlight/shade and adds a cooling phase.