Beyond the Thermometer

Read closely to evaluate ways to cool a public space.

11-12.RI.10.a "Demonstrate proficiency in reading and comprehending grade-appropriate texts."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one benefit of shade and one benefit of reflective pavement, circle a limit of each, and number two details that show why measuring heat requires care.

What Makes a Sidewalk Cooler?

1 At noon in a dense neighborhood, a dark sidewalk can feel much hotter than the air above it. Sunlight warms the pavement, which then radiates heat toward people and nearby surfaces. Shade interrupts that exchange: a tree canopy or shelter blocks direct sunlight before it reaches the ground. Trees can also cool the surrounding air as water evaporates from their leaves, but that effect depends on available soil moisture. A shaded sidewalk may therefore feel better even when an air thermometer a few feet away shows only a small change. Surface temperature, air temperature, and human comfort describe related but different outcomes.

2 Another approach is to make pavement lighter so it reflects more sunlight instead of absorbing it. In tests, reflective surfaces can register lower surface temperatures than darker ones under similar conditions. Yet a cooler surface does not always mean a more comfortable walk. Light bouncing off an unshaded walkway may reach a pedestrian's body or nearby walls; glare can also be a problem. Reflective pavement's effects vary with the angle of the sun, surrounding buildings, and the material used. Comparing only pavement temperatures would miss these possible costs, just as measuring air temperature alone might miss the value of shade.

3 Suppose a city must improve a bus stop beside a broad, sunlit plaza. A shelter could provide shade quickly, while newly planted trees would take years to develop a substantial canopy. A reflective coating might lower pavement temperatures across more of the plaza, but its impact on people waiting at the stop is less certain. To judge the options, planners should record surface and air temperatures as well as conditions people experience at pedestrian height, including radiant heat and glare. They should compare measurements at similar times and in similar weather. The best choice depends on both immediate comfort and the space's longer-term needs.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why might a shaded sidewalk feel better even if a nearby air thermometer shows little change?

2. How could reflective pavement have a lower surface temperature but still make a walk uncomfortable?

3. If the city needs relief at the bus stop soon but also plans for the future, how do the shelter and trees differ?

4. A planner says, "The option with the coolest pavement must be best for people." Use two details from the passage to explain why this conclusion is too simple.

3 YOUR TURN

Your own words

A school lunch area has crowded seating, afternoon sun, and soil too shallow for trees. In three or four sentences, recommend either a shade shelter or reflective pavement, predict how it would affect students, and describe a fair test using at least two kinds of evidence.

ANSWER KEY

Beyond the Thermometer

HIGH SCHOOL · 11-12.RI.10.a

PART 1 · READ AND MARK

Underline one benefit of shade and one benefit of reflective pavement, circle a limit of each, and number two details that show why measuring heat requires care. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why might a shaded sidewalk feel better even if a nearby air thermometer shows little change?	**Shade blocks sunlight from heating the pavement and reduces heat reaching pedestrians. Air temperature alone does not capture that change in comfort.**
2	How could reflective pavement have a lower surface temperature but still make a walk uncomfortable?	**It could reflect sunlight toward pedestrians or nearby walls and create glare.**
3	If the city needs relief at the bus stop soon but also plans for the future, how do the shelter and trees differ?	**A shelter provides shade quickly. Newly planted trees take years to grow a substantial canopy, though they could provide shade later.**
4	A planner says, "The option with the coolest pavement must be best for people." Use two details from the passage to explain why this conclusion is too simple.	**Pavement temperature differs from human comfort, and reflective pavement can send sunlight toward people or cause glare. Planners need measurements at pedestrian height, not just pavement temperatures.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I recommend a shade shelter because the shallow soil rules out trees, and a shelter would block sunlight above the crowded seats. Students may feel cooler even if the air temperature changes little. I would compare the shaded seats with unshaded seats at the same time of day in similar weather. I would measure pavement temperature and ask students at each location about their comfort.

Accept either recommended option if the prediction and test follow from the passage. A fair test should compare conditions at similar times and in similar weather and use at least two relevant kinds of evidence.