City Heat Detectives

Read a technical text for ideas, evidence, and solutions.

CCSS.ELA-Literacy.RST.6-8.10 "By the end of grade 8, read and comprehend science/technical texts in the grades 6-8 text complexity band independently and proficiently."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one sentence in each paragraph that states a key idea. Circle words or phrases that explain how scientists measure, explain, or reduce urban heat islands.

Why Cities Stay Hot

1 On a hot summer day, a city can be several degrees warmer than nearby fields. This difference is called an urban heat island. Dark roofs, roads, and parking lots absorb sunlight and store energy as heat. At night, these surfaces release heat slowly, so city neighborhoods may stay warm after rural areas cool. Buildings and vehicles also add heat through air conditioners, engines, and other equipment. Trees and soil, by contrast, provide shade and release water vapor, which can help cool the air.

2 Researchers measure urban heat islands by comparing air temperatures at city and rural locations. They may also use thermal cameras on satellites or aircraft. These cameras detect infrared radiation, a form of energy related to an object's temperature. A thermal image can show that a black roof is hotter than a light-colored roof nearby. Measurements must be taken at similar times and weather conditions. Otherwise, clouds, wind, or changing sunlight could make the comparison less reliable. Scientists repeat measurements to find patterns rather than relying on one unusually hot afternoon.

3 Cities can reduce heat islands in several ways. Planting street trees can shade sidewalks and buildings, although young trees need water and care. Cool roofs are covered with materials that reflect more sunlight than dark roofs, reducing the amount of heat absorbed. Some places replace solid pavement with permeable surfaces. Water can soak through these materials instead of running off quickly, and evaporation may cool the surface. These choices work best when planners consider local space, cost, maintenance, and the needs of people who use each neighborhood.

2 ANSWER WITH EVIDENCE

Use the passage

1. What is the main idea of the first paragraph? Use two details from the paragraph to support your answer.

2. How do thermal cameras help researchers investigate urban heat islands?

3. Why must scientists measure temperatures at similar times and in similar weather conditions?

4. What is one benefit and one challenge of planting street trees to reduce heat islands?

3 YOUR TURN

Your own words

Write a 55 to 70 word technical summary of the passage. Include what causes urban heat islands, how scientists study them, and one way cities can reduce them.

ANSWER KEY

City Heat Detectives

GRADE 7 · RST.6-8.10

PART 1 · READ AND MARK

Underline one sentence in each paragraph that states a key idea. Circle words or phrases that explain how scientists measure, explain, or reduce urban heat islands. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What is the main idea of the first paragraph? Use two details from the paragraph to support your answer.	**Urban heat islands make cities warmer than nearby rural areas because dark surfaces absorb and release heat, and buildings and vehicles add heat. Trees and soil can help cool the air.**
2	How do thermal cameras help researchers investigate urban heat islands?	**Thermal cameras detect infrared radiation related to temperature, allowing researchers to see temperature differences, such as a black roof being hotter than a nearby light-colored roof.**
3	Why must scientists measure temperatures at similar times and in similar weather conditions?	**Clouds, wind, or changing sunlight could affect temperatures and make the comparison less reliable.**
4	What is one benefit and one challenge of planting street trees to reduce heat islands?	**Street trees can shade sidewalks and buildings, but young trees need water and care.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

An urban heat island occurs when city surfaces and activities make urban areas warmer than nearby rural places. Scientists compare temperatures and use thermal images, while controlling conditions so their evidence is reliable. Cities can lower stored heat by planting trees, installing reflective roofs, or using permeable pavement, but planners must consider costs and maintenance.

Accept summaries that accurately include a cause, a measurement method, and a reduction strategy from the passage. The response should be 55 to 70 words and should state ideas in the student's own words.