Mapping the Heat

Use maps and satellite data to compare connected regions.

7.P.2.3.B "Use multiple mapping techniques, data visuals, satellite images, and geographic technology to analyze spatial patterns of physical and human characteristics, making connections between regions."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline one physical feature and circle one human-made feature in the passage. Number the three regions in the order the river reaches them, from upstream to downstream.

A Hot Day Along the River

1 On a hot afternoon, a planning team studies three regions. Hill Ridge lies upstream and above River Flats; the river then reaches Dock Quarter. An elevation map shows the change in height, while a road map shows a highway linking River Flats and Dock Quarter. Together, these maps show how places connect, not just where they sit.

2 A satellite image taken that afternoon shows dense trees on Hill Ridge, scattered trees in River Flats, and broad roofs and pavement in Dock Quarter. A computer mapping tool, called GIS, places tree cover estimates over a map of satellite-measured land surface temperatures. The table summarizes each region. Surface temperature measures the ground and rooftops, not the air people breathe.

LAND COVER AND SURFACE TEMPERATURE THAT AFTERNOON

Region	Tree cover	Paved land	Surface temperature
Hill Ridge	68%	12%	27°C
River Flats	22%	61%	34°C
Dock Quarter	8%	83%	39°C

3 The table shows a pattern: places with more tree cover have lower surface temperatures, while places with more pavement have higher readings. The highway links two of the warmer regions, so travelers may pass through both. This pattern does not prove that pavement alone caused the temperatures; shade, building materials, and time of day may also matter.

2 ANSWER WITH EVIDENCE

Use the passage

1. Compare Hill Ridge and Dock Quarter using two numbers from the table. What spatial pattern do they show?

2. How does the satellite image description help explain the difference between River Flats and Dock Quarter in the table?

3. Which two maps would you use to trace both the river's direction and the highway connection? Name the regions each route connects.

4. What can the GIS overlay show about trees and surface temperature across the regions? What can it not prove?

3 YOUR TURN

Your own words

Design a GIS check for where to add shade along the highway between River Flats and Dock Quarter. Name two map layers you would use, choose a region to survey first using one table value, and state one new measurement needed before choosing exact sites.

ANSWER KEY

Mapping the Heat

GRADE 7 · 7.P.2.3.B

PART 1 · READ AND MARK

Underline one physical feature and circle one human-made feature in the passage. Number the three regions in the order the river reaches them, from upstream to downstream. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Compare Hill Ridge and Dock Quarter using two numbers from the table. What spatial pattern do they show?	**Hill Ridge has 68% tree cover and a 27°C surface temperature, while Dock Quarter has 8% tree cover and a 39°C surface temperature. The region with more trees has the lower surface temperature.**
2	How does the satellite image description help explain the difference between River Flats and Dock Quarter in the table?	**The image shows scattered trees in River Flats but broad roofs and pavement in Dock Quarter. Dock Quarter has more paved land and a higher surface temperature, 39°C compared with 34°C.**
3	Which two maps would you use to trace both the river's direction and the highway connection? Name the regions each route connects.	**Use the elevation map to trace the river from Hill Ridge through River Flats to Dock Quarter. Use the road map to trace the highway between River Flats and Dock Quarter.**
4	What can the GIS overlay show about trees and surface temperature across the regions? What can it not prove?	**It can show that regions with more tree cover have lower surface temperatures in these data. It cannot prove that tree cover alone caused the temperature differences.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would overlay a road map with a tree-cover layer to find stretches of the highway with little shade. I would survey Dock Quarter first because its surface temperature is 39°C. Before choosing exact sites, I would count how many people wait at stops along each stretch.

Accept other relevant physical features and human-made features for the marking job. For Your Turn, accept either highway region if the student supports the choice with a correct table value and names a useful new measurement.