Layers Tell Stories

Compare map evidence from a flood, then apply the method to a new place.

TOT.P.2.3.B "Compare and analyze complex maps and mapping technologies to analyze spatial patterns of human and physical environments, explaining relationships between the environment and events, past and present."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each type of map or image named in the passage. Circle a spatial pattern found by comparing layers, then number one link to a past event and one use for a present-day decision.

Mapping a Flooded City

1. In August 2005, Hurricane Katrina brought dangerous water to New Orleans. Storm surge damaged levees, and much of the city flooded. A satellite image taken after the storm showed broad dark patches of water across neighborhoods. A separate elevation map showed that many flooded streets lay below sea level, inside areas protected by levees. Neither map alone explains the disaster: the image records where water spread, while the elevation map shows where water could collect after barriers failed. Reading them together links a physical feature, low ground, with a past event, widespread flooding.

2. To study who could leave, a researcher could add a 2005 street map to the flood image in a geographic information system, or GIS. Where flooded streets cut routes toward higher ground, residents faced harder trips out, especially if they had no car. The street map shows possible connections, not who actually traveled them. Comparing the two layers reveals a spatial pattern: water covered parts of the road network as well as homes. Records of road closures and evacuation accounts would help test whether a route that looks open on a map was usable that day.

3. Today, planners use updated elevation data, satellite images, and digital street maps to examine flood exposure and access to shelters. A 2005 flood image shows where water reached during one disaster; it does not predict the exact outline of the next flood. Current street maps may show new routes, but they cannot by themselves show whether a route will stay dry. Planners can compare low areas, possible flood paths, and roads leading to higher ground before choosing shelter sites. The same map layers explain a past pattern and help evaluate present choices, as long as their dates and limits stay clear.

2 ANSWER WITH EVIDENCE

Use the passage

1. What does the 2005 flood image show that the elevation map does not, and how do the maps together help explain the flooding?

2. What pattern appears when the researcher compares the flood image with the 2005 street map? What can these layers not tell the researcher?

3. How can planners use the 2005 flood image and current map layers for different purposes? Name one limit of the 2005 image.

4. Why would a 2005 street map be insufficient for evaluating access to shelters today? Which map layer would improve the comparison?

3 YOUR TURN

Your own words

In another town, a 2010 satellite image shows trees around a school, while a current image shows a large paved lot there; a current temperature map shows that area is hotter than nearby tree-lined blocks. In four or five sentences, compare the map evidence, explain a possible relationship between land cover and heat, propose one more map layer for choosing a cooler walking route, and state one limit of your conclusion.

ANSWER KEY

Layers Tell Stories

HIGH SCHOOL · TOT.P.2.3.B

PART 1 · READ AND MARK

Underline each type of map or image named in the passage. Circle a spatial pattern found by comparing layers, then number one link to a past event and one use for a present-day decision. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What does the 2005 flood image show that the elevation map does not, and how do the maps together help explain the flooding?	**The image shows where water spread. The elevation map shows low ground where water could collect after levees failed.**
2	What pattern appears when the researcher compares the flood image with the 2005 street map? What can these layers not tell the researcher?	**Floodwater covered parts of the road network as well as homes. The layers cannot show who traveled a route or whether a route that appears open was usable.**
3	How can planners use the 2005 flood image and current map layers for different purposes? Name one limit of the 2005 image.	**The 2005 image documents where water reached during that disaster. Current layers help planners compare flood exposure and shelter access, but the old image cannot predict the exact extent of a future flood.**
4	Why would a 2005 street map be insufficient for evaluating access to shelters today? Which map layer would improve the comparison?	**Roads may have changed since 2005. An updated digital street map would show current routes to compare with low areas and possible flood paths.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The satellite images show that pavement replaced trees near the school between 2010 and today. The current temperature map shows that this area is hotter than nearby blocks with trees. The loss of shade and the added pavement may help explain that pattern. I would add a current sidewalk map to look for walking routes through tree-lined blocks. Because there is no 2010 temperature map, these layers do not show whether the area has become hotter since 2010.

Accept other relevant layers for the walking route, such as a current tree-cover map. Students should describe the land-cover and heat relationship as possible, not claim that the maps prove a temperature increase since 2010.