After the Asphalt

Trace environmental effects and weigh the evidence.

ES.12.b "Evaluate and communicate information describing the effects of urbanization on the environment."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two changes to the land, circle the environmental effects they could cause, and number two pieces of evidence that help you evaluate those links.

What Changed at Mill Creek?

1. At Mill Creek, a vacant field became a shopping center with a wide asphalt parking lot. Before construction, grasses and soil absorbed much of a rainstorm. Now rainwater runs across pavement, collecting oil and bits of tire rubber, then enters a storm drain that empties into the creek. After a heavy storm, residents notice cloudy water near the drain outlet. The cloudiness alone does not prove that the parking lot caused every change in the creek. But the new route for runoff gives a clear way that development could move pollutants from the lot into the water.

2. The new buildings and pavement may also affect temperature. On a sunny afternoon, a student measures air temperature above the parking lot and in a shaded park nearby. The lot reading is higher, but one afternoon cannot establish how much construction changed the neighborhood's temperature: shade and wind also differ between sites. Dark pavement absorbs solar energy and releases heat to the air. Fewer trees mean less cooling from shade and evaporation of water from leaves. Warmer runoff can also raise creek temperature for a short time, which may stress aquatic animals that need cooler water.

3. The center brought stores within walking distance for some residents, yet it replaced grasses and shrubs where insects and birds fed. Planting street trees and installing a rain garden beside the lot could reduce heat and slow runoff. A rain garden is a planted, shallow basin that lets some water soak into soil. Its effect depends on its size, soil, and maintenance, so a plan is not the same as a measured result. To judge whether these changes help, students could compare water clarity after similar storms and temperatures on similar sunny days before and after installation.

2 ANSWER WITH EVIDENCE

Use the passage

1. Explain how the shopping center could affect creek water. Why is cloudy water alone not proof of that effect?

2. A student found warmer air above the lot than in a nearby park. How strong is this evidence that construction raised the neighborhood's temperature? Explain.

3. What environmental cost came with the benefit of nearby stores? Explain how construction caused that cost.

4. How could a rain garden reduce runoff from the lot? What comparison could help test whether it works?

3 YOUR TURN

Your own words

A city will replace an old paved bus yard with apartments. Recommend two design choices that would affect different parts of the environment, explain how each would work, and name one observation that could test one of your predictions.

After the Asphalt

PART 1 · READ AND MARK

Underline two changes to the land, circle the environmental effects they could cause, and number two pieces of evidence that help you evaluate those links. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Explain how the shopping center could affect creek water. Why is cloudy water alone not proof of that effect?	**Runoff can carry oil and tire particles from the paved lot through a drain to the creek. Cloudy water alone does not show what caused the cloudiness.**
2	A student found warmer air above the lot than in a nearby park. How strong is this evidence that construction raised the neighborhood's temperature? Explain.	**It is limited evidence because the student measured on only one afternoon, and shade and wind differed between the sites.**
3	What environmental cost came with the benefit of nearby stores? Explain how construction caused that cost.	**Construction replaced grasses and shrubs that provided food for insects and birds, reducing that habitat.**
4	How could a rain garden reduce runoff from the lot? What comparison could help test whether it works?	**Its planted basin could let some rainwater soak into soil. Students could compare water clarity after storms of similar size before and after installation.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would add a rain garden beside the apartment courtyard so rainfall from roofs can soak into soil instead of rushing into storm drains. I would plant native shrubs along the courtyard edge to provide food and shelter for local insects and birds. To test the runoff prediction, residents could measure how much water reaches the storm drain during storms of similar size before and after the rain garden is built.

Accept other scientifically sound cause-and-effect explanations supported by the passage. For the open task, look for two distinct environmental effects and an observation that could test one prediction.