When Rain Runs

How city choices change a stream

6-9.WG.2.6 "Analyze and give examples of the consequences of human impact on the physical environment, including the role of technology."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two changes people make to the ground, circle two technologies used to manage rainwater, and write 1 and 2 beside two different consequences for the stream.

Where Does the Rain Go?

1 After a hard rain, a city street can act like a fast river. Roofs and parking lots do not absorb much water, so runoff races into storm drains. Those drains are a useful technology: they move water away from buildings and roads. But many drains empty into nearby streams. Fast runoff can wear away streambanks and carry oil, litter, and soil into the water. In places where a city has replaced grassy ground with pavement, the stream may rise quickly after storms, increasing the risk of flooding downstream.

2 In one neighborhood, workers build a rain garden beside a parking lot. A shallow planted area catches runoff before it reaches a storm drain. Soil and plant roots slow the flow and trap some pollutants. More water can soak into the ground, which may reduce the sudden rush into the stream. The garden changes the physical environment too: workers remove pavement and add soil and plants. Its effect depends on care. If dirt and trash clog the garden, less water can soak in during a storm.

3 The neighborhood also tests pavement with tiny spaces that let rain pass through. This permeable pavement can reduce runoff from a walkway, but it costs more to install than ordinary pavement and needs cleaning so the spaces stay open. Neither tool stops every flood. During a very heavy storm, rain may fall faster than soil can absorb it. City planners must weigh where each tool will work, what it will cost, and how it might change the stream over time.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why can replacing grassy ground with pavement increase flooding downstream?

2. How do storm drains and rain gardens affect the flow of water toward a stream differently?

3. How could replacing pavement with a rain garden change both the ground and the water entering the stream?

4. What could keep a rain garden and permeable pavement from reducing runoff as planned? Name one problem for each.

3 YOUR TURN

Your own words

Imagine a farm beside a river uses a pump to water its fields during dry months. Propose a change in how the farm uses technology, then explain one possible benefit and one possible downside for the physical environment.

ANSWER KEY

When Rain Runs

GRADES 6-9 · 6-9.WG.2.6

PART 1 · READ AND MARK

Underline two changes people make to the ground, circle two technologies used to manage rainwater, and write 1 and 2 beside two different consequences for the stream. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why can replacing grassy ground with pavement increase flooding downstream?	**Pavement absorbs little rain, so more water runs quickly into the stream. The stream can rise rapidly and flood downstream.**
2	How do storm drains and rain gardens affect the flow of water toward a stream differently?	**Storm drains carry runoff into streams, while rain gardens slow runoff and let some water soak into the ground before it reaches a drain.**
3	How could replacing pavement with a rain garden change both the ground and the water entering the stream?	**Soil and plants replace pavement, allowing more water to soak in. The garden can also trap some pollutants before runoff reaches the stream.**
4	What could keep a rain garden and permeable pavement from reducing runoff as planned? Name one problem for each.	**Dirt and trash could clog the rain garden. The spaces in permeable pavement could clog if they are not cleaned.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The farm could use drip tubing to deliver water near crop roots instead of watering the whole field. Using less river water could leave more water in the river during dry months, helping protect fish habitat. If worn tubing is left in the fields, pieces of plastic could enter the soil or river.

Accept other passage-supported cause-and-effect explanations for Parts 1 and 2. For Part 3, accept a feasible technology change with a plausible environmental benefit and downside.