After the Fire

Trace how a burned hillside affects water and living things

EN.ESS2.2 "Analyze geoscience data to make the claim that one change to Earth's surface can create feedback and interactions that cause changes to other Earth systems."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline changes to the hillside, circle runoff and sediment measurements, and number the steps of a feedback loop between soil loss and plant cover.

A Hillside Above a Creek

1. A wildfire burned a steep hillside above a creek. Before the fire, shrubs and grasses covered most of the ground. Their roots held soil, and leaves softened raindrops. After the fire, exposed soil was easier to wash downhill. Researchers tested one hillside plot before the fire and at two later dates. Each time, they simulated a 25-millimeter rainstorm.

2. Runoff is rainwater that flows over land instead of soaking in. Researchers collected this water and weighed the sediment it carried. The table shows measurements per square meter of hillside. The readings are from one site, so they show a pattern, not proof that fire alone caused every change. Compare the dates before drawing a conclusion.

HILLSIDE PLOT AFTER EQUAL SIMULATED RAINSTORMS

Test date	Plant cover (%)	Runoff (L/m²)	Sediment (g/m²)
Before fire	85	4	20
1 month after fire	15	14	180
6 months after fire	8	17	250

3. When runoff carries soil into the creek, the water becomes cloudier. Sediment can settle over gravel where fish lay eggs. On the slope, lost topsoil also means fewer nutrients and seeds for new plants. If plants return slowly, more ground stays exposed during later storms. This process can continue to affect both the living community and the flow of water.

2 ANSWER WITH EVIDENCE

Use the passage

1. What data support a claim that the change in plant cover affected how water moved across the hillside?

2. Use the sediment data and the passage to explain one possible effect on the creek's living things.

3. How could the changes from one month to six months after the fire be part of a feedback loop? Use data and a process from the passage.

4. A student claims the fire alone caused every change in the table. What does the evidence support, and what can it not prove?

3 YOUR TURN

Your own words

Suppose workers spread mulch over the burned plot before another equal rainstorm test. Write four or five sentences predicting how runoff and sediment might compare with the six-month readings. Use both six-month numbers, explain a possible effect on plant recovery, and state one limit of your prediction.

After the Fire

PART 1 · READ AND MARK

Underline changes to the hillside, circle runoff and sediment measurements, and number the steps of a feedback loop between soil loss and plant cover. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What data support a claim that the change in plant cover affected how water moved across the hillside?	**Plant cover fell from 85% before the fire to 15% one month after it, while runoff from equal rainstorms rose from 4 to 14 L/m².**
2	Use the sediment data and the passage to explain one possible effect on the creek's living things.	**Sediment rose from 20 to 180 g/m² one month after the fire. If that soil reaches the creek, it could settle over gravel where fish lay eggs.**
3	How could the changes from one month to six months after the fire be part of a feedback loop? Use data and a process from the passage.	**Sediment rose from 180 to 250 g/m² as plant cover fell from 15% to 8%. Soil loss can remove seeds and nutrients, slowing plant recovery and leaving more ground exposed to erosion.**
4	A student claims the fire alone caused every change in the table. What does the evidence support, and what can it not prove?	**The measurements support a link between reduced plant cover and increased runoff and sediment after the fire. One site's data cannot prove that fire alone caused every change.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Mulch covers some exposed soil, so I predict runoff would be lower than the six-month reading of 17 L/m². I also predict less sediment would wash away than the six-month reading of 250 g/m². Keeping more soil on the slope could protect seeds and nutrients. More plants could then grow, leaving less ground exposed during later storms. This prediction is uncertain because the table does not show a test with mulch.

Accept reasonable causal claims that connect a change in surface cover to water, sediment, and living things using the supplied data. Students should distinguish a supported pattern or prediction from proof of a single cause.