Creekside Choices

Design and test a solution for polluted runoff

FB.6.7 "Enrichment: Design solutions to reduce the impact of human activity on the ecosystem."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the human activities that could harm the creek, circle each proposed solution, and number two ways the team could check whether a solution works.

After the Rain at Cedar Creek

1. After a storm, rainwater races across the parking lot at Cedar Creek High School. The water carries bits of litter, loose soil, and fertilizer from a nearby lawn into a storm drain that empties into the creek. Soil can cloud the water and make it harder for aquatic plants to get light. Fertilizer adds nutrients that can fuel algae growth. When algae die, decomposers break them down and use oxygen that fish and other creek animals need. Students want to reduce these effects, but the parking lot and its safe walking routes must remain in use.

2. One student team proposes a rain garden beside the parking lot. A shallow dip would collect some runoff before it reaches the drain. Plants and soil would slow the water, trap some sediment, and allow some water to soak into the ground. The garden would have an overflow route for storms that bring more water than it can hold. Another team suggests using less fertilizer on the lawn and keeping it off paved areas. That change targets nutrients at their source, but it would not catch litter or soil already washing across the lot.

3. The teams also consider upkeep and testing. A screen at the rain garden inlet could catch litter, but leaves might clog it and keep runoff from entering the garden. Staff could clear the screen after storms. To test the garden, students could record how much water bypasses it during rain and how cloudy the creek water looks after a storm. They would compare storms with similar rainfall, since a larger storm could move more water and soil even if the garden works. They must also check that the garden does not flood the sidewalk.

2 ANSWER WITH EVIDENCE

Use the passage

1. The school can build the rain garden, but it cannot remove the parking lot. Explain how the garden could reduce one impact of runoff on creek organisms.

2. Why might the school use less fertilizer as well as build the rain garden? Name one problem that using less fertilizer would not solve.

3. After leaves clog the rain garden's inlet screen, water pools instead of entering the garden. What should staff change in their upkeep plan, and how would it help?

4. The team wants to know whether the rain garden is working. What two observations could they compare across storms with similar rainfall, and what would each reveal?

3 YOUR TURN

Your own words

Students have worn a shortcut across bare ground beside a pond, and rain washes soil from the path into the water. In one paragraph, design a way to keep the shortcut usable while reducing this impact. Explain how your design works, one trade-off, and what you would measure to test it.

Creekside Choices

PART 1 · READ AND MARK

Underline the human activities that could harm the creek, circle each proposed solution, and number two ways the team could check whether a solution works. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	The school can build the rain garden, but it cannot remove the parking lot. Explain how the garden could reduce one impact of runoff on creek organisms.	**The garden could trap some sediment before it reaches the creek. Less cloudy water would let more light reach aquatic plants.**
2	Why might the school use less fertilizer as well as build the rain garden? Name one problem that using less fertilizer would not solve.	**Using less fertilizer would reduce nutrients entering runoff at their source. It would not catch litter or soil washing across the lot.**
3	After leaves clog the rain garden's inlet screen, water pools instead of entering the garden. What should staff change in their upkeep plan, and how would it help?	**Staff should clear leaves from the screen after storms. An open inlet would let runoff enter the garden again.**
4	The team wants to know whether the rain garden is working. What two observations could they compare across storms with similar rainfall, and what would each reveal?	**They could compare how much water bypasses the garden to see whether it captures runoff. They could compare creek cloudiness to look for a change in sediment reaching the creek.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would put a raised walkway along the shortcut and plant ground cover on both sides. Students could still reach the pond, but their shoes would no longer wear away the soil, and the plants' roots would help hold it in place. The walkway would cost money and need repairs. I would compare how cloudy the pond water looks after similar rainstorms before and after the changes.

Accept other feasible designs that preserve access and explain how they reduce soil reaching the pond. A valid test names an observable measure and accounts for differences in rainfall.