Creek Choice Challenge

Compare designs that protect living things and useful ecosystem services.

MS-LS2-5 "Evaluate competing design solutions for maintaining biodiversity and ecosystem services. Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each effect on biodiversity or an ecosystem service. Circle each cost, limit, or community concern so you can compare the designs.

A Town Plans for Maple Creek

1. Maple Creek runs beside a middle school and several farms. After heavy rain, muddy water carries soil, fertilizer, and litter into the creek. The sediment can cover fish eggs, and extra fertilizer can cause algae to grow quickly. When algae die, decomposers use oxygen, leaving less for fish and insects. The town wants a design that protects creek organisms while providing ecosystem services. Those services include cleaner water, nutrient recycling by plants and microbes, and soil held in place along the banks.

2. One proposal would replace part of the streambank with a concrete channel and storm drains. Water would move quickly, reducing flooding on a nearby road. The design would cost less at first than planting a buffer. However, concrete would provide few places for insects, frogs, or native plants. Fast water could still carry pollution downstream. Some residents support this plan because road access matters, but anglers worry that it would reduce habitat and fishing opportunities.

3. A second proposal would create a 20-meter-wide strip of native grasses, shrubs, and trees beside the creek. Their roots would slow runoff and reduce bank erosion. Plants and soil microbes could trap some pollutants and recycle nutrients. The buffer would give birds, pollinators, and small animals habitat. It costs more to install and takes time to grow. Farmers would lose a small amount of planting space, yet the town could offer payments or shared maintenance to address that concern.

2 ANSWER WITH EVIDENCE

Use the passage

1. Which ecosystem services should the town use as criteria when comparing the two proposals?

2. Compare the likely effects of the concrete channel and the native buffer on biodiversity.

3. What trade-off does each proposal have that town leaders must consider?

4. Based on the passage, which proposal is more likely to maintain both biodiversity and ecosystem services? Use two details as evidence.

3 YOUR TURN

Your own words

For a school parking-lot puddle that drains toward a pond, compare two designs in four to six sentences. Explain how each would affect biodiversity and at least two ecosystem services, include one scientific, economic, or social constraint, and choose the stronger design with evidence.

ANSWER KEY

Creek Choice Challenge

GRADES 6-8 · MS-LS2-5

PART 1 · READ AND MARK

Underline each effect on biodiversity or an ecosystem service. Circle each cost, limit, or community concern so you can compare the designs. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Which ecosystem services should the town use as criteria when comparing the two proposals?	**Cleaner water, nutrient recycling, and prevention of soil erosion.**
2	Compare the likely effects of the concrete channel and the native buffer on biodiversity.	**The concrete channel would provide little habitat for insects, frogs, and native plants. The native buffer would provide habitat for birds, pollinators, and small animals.**
3	What trade-off does each proposal have that town leaders must consider?	**The concrete channel costs less at first and reduces road flooding, but it reduces habitat and may not stop pollution. The native buffer costs more, takes time to grow, and uses some farm planting space, but it improves habitat and ecosystem services.**
4	Based on the passage, which proposal is more likely to maintain both biodiversity and ecosystem services? Use two details as evidence.	**The native buffer is more likely to maintain both. It provides habitat for several kinds of animals, slows runoff, reduces erosion, traps some pollutants, and recycles nutrients.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A larger drain pipe would move water away quickly, but it would provide little habitat and would not filter runoff pollutants or slow soil loss. A native rain garden would give insects and birds habitat, filter runoff, and hold soil with roots. The garden needs space and money for plants, and families may want the parking spaces kept. I would choose the rain garden because it supports more species while cleaning water and reducing erosion.

Accept reasoned choices when students compare two designs using accurate effects on biodiversity and ecosystem services. Strong responses name a realistic constraint and use evidence to support a decision.