Marsh Energy Loop

Track energy flow and nutrient recycling in a salt marsh.

7.12.B "describe how ecosystems are sustained by the continuous flow of energy and the recycling of matter and nutrients within the biosphere."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline every sentence that explains how energy enters, moves, or leaves the marsh ecosystem. Circle every sentence that explains how matter or nutrients are returned and used again, and use both marks on a sentence that explains both processes.

Life in a Salt Marsh

1. On a sunny salt marsh, cordgrass catches sunlight and uses it to make sugars. The grass uses some chemical energy to grow, and a grasshopper gets chemical energy when it eats a leaf. A heron may later eat the grasshopper. At each feeding step, organisms use energy for movement, repair, and life processes. Much of that energy leaves the ecosystem as heat, so it cannot return to the grass or be used again by the food chain.

2. Meanwhile, matter stays within the biosphere, the parts of Earth where life exists. When the grasshopper produces waste or dies, decomposers such as bacteria and fungi break the material down. They return nutrients to marsh soil and water. Cordgrass roots take in some of these nutrients again. Unlike energy, atoms in water and nutrients can move through living and nonliving parts of the ecosystem many times. Tides can carry dissolved nutrients through the marsh, where plants and microbes use them.

3. The marsh remains productive only when both pathways continue. Sunlight supplies a steady new input of energy, while producers capture it and consumers pass some of it along by eating. Decomposers connect the pathways because they get energy from dead material while releasing nutrients that plants can reuse. If pollution killed many decomposers, dead material would build up and fewer nutrients would return to the soil and water. Cordgrass growth could decline, leaving less food energy for grasshoppers and herons.

2 ANSWER WITH EVIDENCE

Use the passage

1. Trace the energy path from the original source to the heron. Use arrows or words from the passage.

2. Why does the marsh need a steady new input of energy from sunlight?

3. Describe one path that nutrients can take from a grasshopper back to cordgrass.

4. How could killing many decomposers affect grasshoppers and herons? Explain the chain of effects.

3 YOUR TURN

Your own words

Choose a pond, forest, garden, or another ecosystem. Write exactly four sentences. Sentence 1 identifies the energy source and a producer, sentence 2 traces energy to a consumer, sentence 3 explains energy loss, and sentence 4 traces matter from dead material through a decomposer back to a producer.

ANSWER KEY

Marsh Energy Loop

GRADE 7 · TEKS 7.12.B

PART 1 · READ AND MARK

Underline every sentence that explains how energy enters, moves, or leaves the marsh ecosystem. Circle every sentence that explains how matter or nutrients are returned and used again, and use both marks on a sentence that explains both processes. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Trace the energy path from the original source to the heron. Use arrows or words from the passage.	**sunlight → cordgrass → grasshopper → heron**
2	Why does the marsh need a steady new input of energy from sunlight?	**Organisms use energy for life processes, and much of it leaves the ecosystem as heat. It cannot return to producers or be used again by the food chain.**
3	Describe one path that nutrients can take from a grasshopper back to cordgrass.	**A grasshopper produces waste or dies. Decomposers break down the material and return nutrients to the soil or water. Cordgrass roots take in the nutrients.**
4	How could killing many decomposers affect grasshoppers and herons? Explain the chain of effects.	**Fewer decomposers would return nutrients to soil and water, so cordgrass growth could decline. With less cordgrass, grasshoppers would have less food energy, and herons would have less food energy from grasshoppers.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

In a pond, algae capture sunlight and make sugars. A tadpole gets chemical energy by eating algae. The tadpole uses energy and releases much of it as heat, so that energy does not cycle back. When a dead tadpole is broken down by bacteria, nutrients return to the water and algae can use them again.

Accept equivalent energy paths and nutrient cycles that match the passage. For the open response, check for a one-way energy flow with heat loss and a matter route that returns nutrients to a producer.