Marsh Energy Paths

Model food-web connections and biomass in a coastal marsh.

BIO.5.4 "Develop and use models to describe the flow of energy and amount of biomass through food chains, food webs, and food pyramids."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the words in paragraph 1 that tell you who eats whom. Then number the table rows from the energy source to the top predator to trace energy flow and biomass.

Who Eats in the Marsh?

1 At a coastal marsh, grasses and algae capture sunlight and store some of that energy in new tissue. Grasshoppers eat grasses, while aquatic snails graze on algae. Frogs eat grasshoppers, and sunfish eat snails. Herons eat both frogs and sunfish. Arrows from food to eater show where stored energy moves.

2 These feeding links form a food web rather than separate chains because both paths end at herons. A food chain follows one route for energy, while a food web joins several routes. The table groups organisms by feeding level and estimates their total dry biomass across 100 hectares of marsh. Each row combines the biomass of all listed organisms.

ESTIMATED MARSH BIOMASS

Feeding level	Organisms	Dry biomass (kg)
Producers	Grasses and algae	120,000
Primary consumers	Grasshoppers and snails	12,000
Secondary consumers	Frogs and sunfish	1,200
Tertiary consumers	Herons	120

3 A biomass pyramid stacks the feeding levels with producers at the base and herons at the top. In this model, each higher level holds one tenth as much biomass as the level below. Organisms use much of the energy they obtain for life processes, and energy also leaves as heat. Less energy remains to build tissue for the next level.

2 ANSWER WITH EVIDENCE

Use the passage

1. Write a food chain from grasses to herons. Use arrows that point in the direction energy moves.

2. Write a second food chain from algae to herons. Which organism connects this chain to the one in question 1?

3. How does the primary consumers' biomass compare with the secondary consumers' biomass? Use the table values to support your answer.

4. If producer biomass doubled and the same one-tenth pattern held, what would the new biomass be at each higher level?

3 YOUR TURN

Your own words

Create a woodland food web using oak trees, caterpillars, leaf-eating beetles, robins, lizards, and hawks; draw two food-to-eater paths that meet at hawks. Label four biomass-pyramid levels with plausible totals that decrease upward, then write one sentence explaining the decrease.

ANSWER KEY

Marsh Energy Paths

HIGH SCHOOL · BIO.5.4

PART 1 · READ AND MARK

Underline the words in paragraph 1 that tell you who eats whom. Then number the table rows from the energy source to the top predator to trace energy flow and biomass. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Write a food chain from grasses to herons. Use arrows that point in the direction energy moves.	**Grasses → grasshoppers → frogs → herons.**
2	Write a second food chain from algae to herons. Which organism connects this chain to the one in question 1?	**Algae → snails → sunfish → herons. Herons connect the two chains.**
3	How does the primary consumers' biomass compare with the secondary consumers' biomass? Use the table values to support your answer.	**Primary consumers have 12,000 kg of dry biomass, ten times the secondary consumers' 1,200 kg.**
4	If producer biomass doubled and the same one-tenth pattern held, what would the new biomass be at each higher level?	**Primary consumers: 24,000 kg; secondary consumers: 2,400 kg; tertiary consumers: 240 kg.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Oak trees → caterpillars → robins → hawks. Oak trees → leaf-eating beetles → lizards → hawks. Pyramid from bottom to top: producers, 8,000 kg; primary consumers, 800 kg; secondary consumers, 80 kg; tertiary consumers, 8 kg. Biomass decreases because organisms use energy for life processes, leaving less energy to build tissue at higher levels.

Accept other plausible woodland feeding links if arrows point from food to eater and both paths meet at hawks. Pyramid totals should decrease from producers to tertiary consumers; they need not follow an exact one-tenth pattern.