Pond Energy Paths

Trace energy through a pond food web and pyramid.

FB.6.5 "Use models to analyze the flow of energy through food chains, webs, and pyramids."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the feeding links in the passage, then number the table rows 1 to 4 from greatest to least available energy to build an energy pyramid.

Who Eats Whom at the Pond?

1 At a pond, sunlight helps algae make food. Water fleas graze on algae, while tadpoles also scrape algae from rocks. Minnows eat water fleas, and bass hunt both minnows and tadpoles. A food-web arrow points from food to eater, tracing energy rather than the direction an animal swims. Several routes can lead to one predator.

2 A food chain follows just one route through that web. The table records available energy in a measured route at this pond, in kilojoules (kJ) per square meter over a season. It lists the organisms out of order. In an energy pyramid, the widest base has the most available energy; each higher tier has less.

AVAILABLE ENERGY IN ONE POND FOOD CHAIN

Organism	Energy (kJ per square meter per season)
Bass	8
Algae	8,000
Minnows	80
Water fleas	800

3 Not all the energy in a meal becomes new body tissue for the next eater. Organisms use energy for movement and other life processes, and much energy leaves as heat. A web also reveals indirect effects: if one animal becomes scarce, its food may face fewer hunters, while animals that eat it may need other prey.

2 ANSWER WITH EVIDENCE

Use the passage

1. Use the table to write the measured food chain from the base of the energy pyramid to its top. Include each energy value.

2. What percentage of the algae's available energy is available to water fleas in the measured chain? Show your calculation.

3. Write a second route from algae to bass that skips water fleas and minnows. How does bass's pyramid tier change compared with the measured chain?

4. If minnows become scarce, predict one possible effect on water fleas and one on bass. Use the feeding links to explain both effects.

3 YOUR TURN

Your own words

A diving beetle eats water fleas and is eaten by bass; in the box, draw a new four-organism food chain with labeled arrows, then write two sentences explaining the beetle's tier and how available energy changes toward bass.

ANSWER KEY

Pond Energy Paths

HIGH SCHOOL · FB.6.5

PART 1 · READ AND MARK

Underline the feeding links in the passage, then number the table rows 1 to 4 from greatest to least available energy to build an energy pyramid. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Use the table to write the measured food chain from the base of the energy pyramid to its top. Include each energy value.	**Algae (8,000 kJ) → water fleas (800 kJ) → minnows (80 kJ) → bass (8 kJ).**
2	What percentage of the algae's available energy is available to water fleas in the measured chain? Show your calculation.	**800 ÷ 8,000 × 100 = 10%.**
3	Write a second route from algae to bass that skips water fleas and minnows. How does bass's pyramid tier change compared with the measured chain?	**Algae → tadpoles → bass. Bass is in the third tier on this route, rather than the fourth tier in the measured chain.**
4	If minnows become scarce, predict one possible effect on water fleas and one on bass. Use the feeding links to explain both effects.	**Water fleas may increase because fewer minnows eat them. Bass would have fewer minnows to eat and might rely more on tadpoles.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Algae → water fleas → diving beetle → bass. The diving beetle belongs in the third tier because it eats water fleas, which eat algae. Less energy is available at each higher tier, so less reaches bass than was available to water fleas.

Accept equivalent arrow chains if arrows point from food to eater. For the prediction, accept other plausible effects supported by the passage's feeding links.