

# National End-of-Course Practice

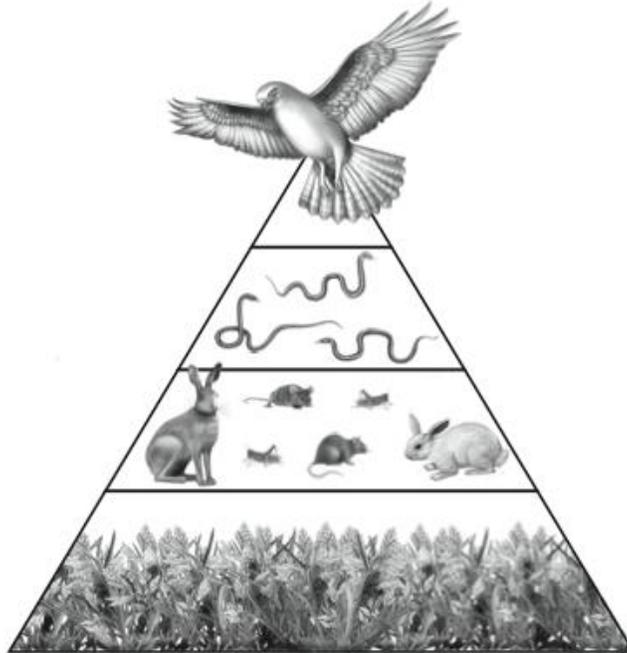
## Chapter 4

### Directions

Choose the letter that best answers the question or completes the statement.

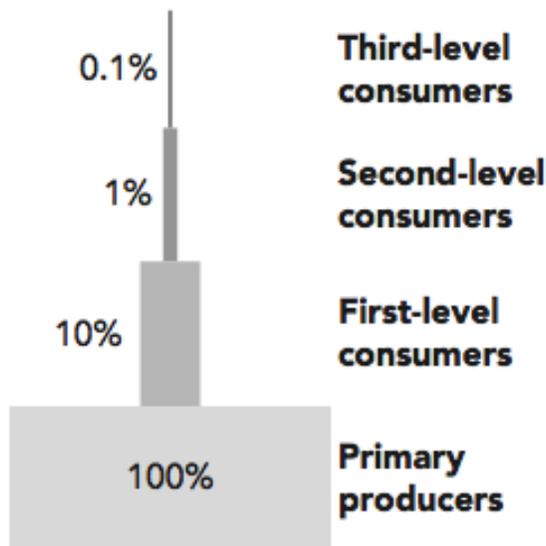
1. A carnivore obtains energy by eating other animals. Which of the following shows the process by which energy flows to a carnivorous animal?
  - (A) light energy → plant → carnivore
  - (B) plant → light energy → carnivore
  - (C) light energy → herbivore → carnivore
  - (D) light energy → plant → herbivore → carnivore
  - (E) light energy → plant → decomposer → herbivore → carnivore

2. The diagram is a pyramid of biomass for a meadow ecosystem. The triangular shape of the diagram is useful for explaining which relationship among the trophic levels?



- (A) The amount of living organic matter is equal at all trophic levels in this ecosystem.
- (B) Third-level consumers in this ecosystem have the greatest amount of living organic matter.
- (C) With each step to a higher trophic level in this ecosystem, the amount of living organic matter increases.
- (D) Third-level consumers in this ecosystem provide living organic matter to producers and other consumers.
- (E) The amount of living organic matter decreases at each trophic level in this ecosystem.

3. The ecological pyramid models energy flow in a particular ecosystem.

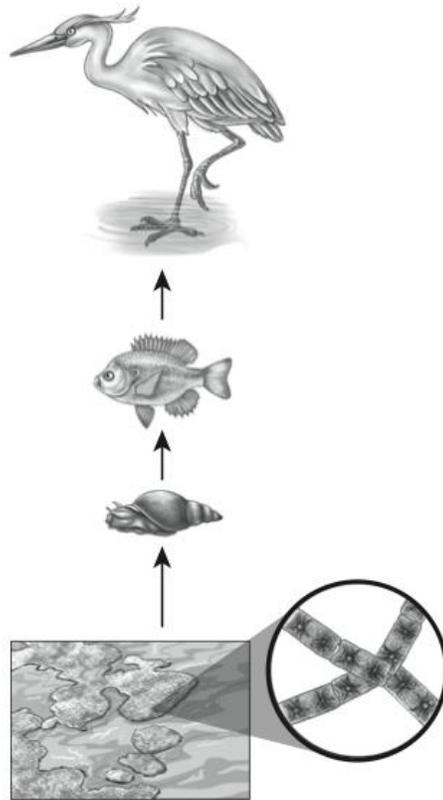


If the primary producers produce 50,000 energy units, about how much of this energy is available to the secondary consumers?

- (A) 50 energy units
  - (B) 500 energy units
  - (C) 1000 energy units
  - (D) 5000 energy units
  - (E) 10,000 energy units
4. Which of the following explains the role of plants in the carbon cycle?
- (A) Plants transfer carbon dioxide in the atmosphere to carbohydrates in the biosphere.
  - (B) Plants transport carbon dioxide in the atmosphere to groundwater.
  - (C) Plants transfer oxygen and carbohydrates in the biosphere to carbon dioxide in the atmosphere.
  - (D) Plants transfer oxygen in the atmosphere to fossil fuels.
  - (E) Plants transfer carbon dioxide in the groundwater to carbon and oxygen in the atmosphere.

**Refer to the passage and diagram to answer questions 5 and 6.**

The diagram shows an example of a food chain in a pond ecosystem. The first organisms in the food chain are algae, shown at the bottom of the diagram. Each arrow in the diagram represents a transfer of energy

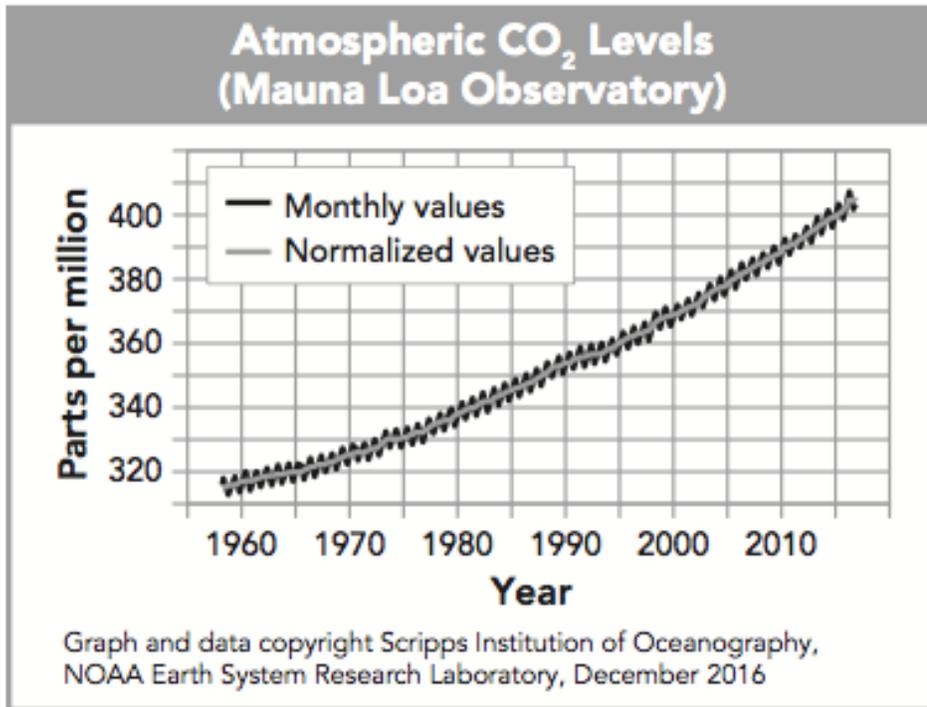


5. To represent all of the energy in the food chain, which modification to the arrows, if any, would be MOST useful to include?
- (A) Add arrows from the environment to each organism, to show how the organisms gain energy from nonliving sources.
  - (B) Add arrows to connect all other pairs of organisms, to show all possible feeding relationships.
  - (C) Add arrows pointing in the opposite direction, such as from the fish to the snail, to show two-way energy flow.
  - (D) Add arrows from each organism to its environment, to show the energy lost as heat.
  - (E) No modification is necessary because the arrows represent all of the energy in the ecosystem.

6. What can be inferred about the source of energy for the algae?
- (A) The energy source is water, which the algae absorb from the pond.
  - (B) The energy source is sunlight, which the algae take in by photosynthesis.
  - (C) The energy source is the snail population that eats the algae.
  - (D) The energy source is nutrients in the water that diffuse into algal cells.
  - (E) The energy source is bacteria and other decomposers that break apart the algae.
7. A group of students is developing models of the carbon cycle and the nitrogen cycle. How should cellular respiration be included in these models?
- (A) Cellular respiration should be included in both cycles because all organisms, including nitrogen-fixing bacteria, perform cellular respiration.
  - (B) Cellular respiration should be included in both cycles because it involves compounds of carbon and nitrogen combining with oxygen to release energy.
  - (C) Cellular respiration should be included in the carbon cycle only because the process transfers carbon from the biosphere to the atmosphere.
  - (D) Cellular respiration should be included in the nitrogen cycle only because cellular respiration converts nitrogen in the atmosphere to a form that living things can use.
  - (E) Cellular respiration should not be included in either cycle because cellular respiration requires oxygen, not carbon or nitrogen.

8. A pond ecosystem is home to a community of algae, insects, snails, and a variety of fishes and birds. The pond is part of a wildlife preserve and is adjacent to a new housing development. Which of these events would MOST LIKELY cause the greatest change to the pond ecosystem?
- (A) Fertilizer is washed regularly into the pond from nearby lawns.
  - (B) A person catches and eats the largest fish in the pond.
  - (C) A raccoon discovers the pond and returns to hunt for small fish and other food.
  - (D) During a severe storm, the pond water washes onto the dry land around it.
  - (E) After an especially cold winter, pond ice remains for two weeks longer than normal.
9. Scientists use various models, such as energy pyramids, to study the transfer of energy in ecosystems. They use other models, such as biogeochemical cycles, to study the transfer of matter in ecosystems. Which describes biogeochemical cycles, but not energy pyramids?
- (A) show an endless cycle
  - (B) show a one-way flow
  - (C) involve an energy source, such as sunlight
  - (D) useful for explaining the importance of photosynthesis
  - (E) useful for showing differences between plants and animals

10. Mandy is studying the graph below, which plots carbon dioxide levels in the atmosphere over time.



Mandy claims that human activity is not responsible for the trend in the data shown in the graph. She argues that carbon dioxide is a natural part of Earth's atmosphere, and it is constantly being released as a byproduct of cellular respiration.

Evaluate Mandy's claim and argument.

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