

Module Test: Matter and Energy in Ecosystems

1) What happens to the parts of food molecules as matter moves through an organism?

2) How are photosynthesis and cellular respiration related?

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3) Explain how cellular respiration is the opposite reaction to photosynthesis.

4) Which of the following flows through ecosystems in one direction?

- A) carbon
- B) energy
- C) nitrogen
- D) water

5) In what form is energy that is NOT used for life processes released from living things?

- A) light energy
- B) sound energy
- C) thermal energy
- D) chemical energy

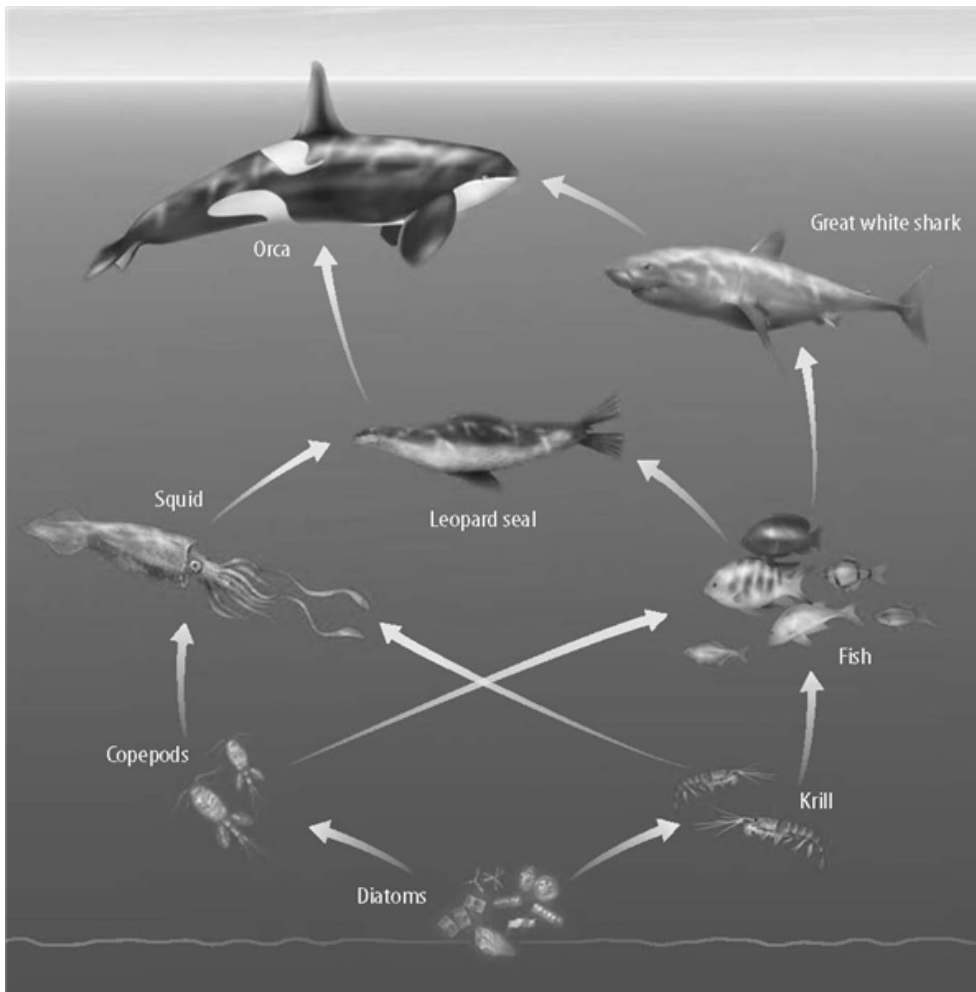
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6) Why are food webs better representations of how energy moves through an ecosystem than food chains?

- A) Food chains include decomposers, which do not play a role in energy movement through an ecosystem.
- B) Food chains show how matter moves through an ecosystem, not not energy.
- C) Food webs include how energy enters an ecosystem, and food chains don't.
- D) Food webs show that animals in an ecosystem can get energy by eating different things.

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7) Use the figure to answer the following questions.

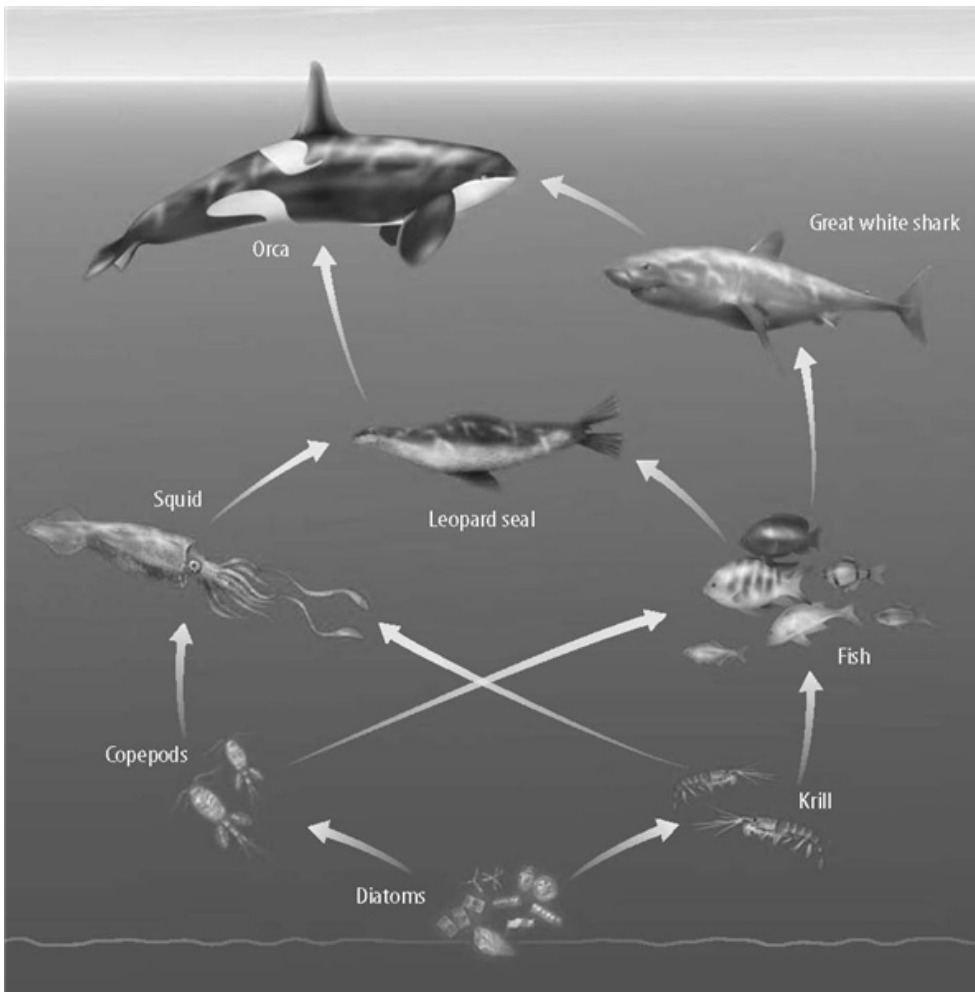


Which organism has the most energy available in the food web shown?

- A) diatoms
- B) squid
- C) leopard seal
- D) orca

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8) Use the figure to answer the following questions.



In the food web, what eats the squid?

- A) diatoms
- B) squid
- C) leopard seal
- D) orca

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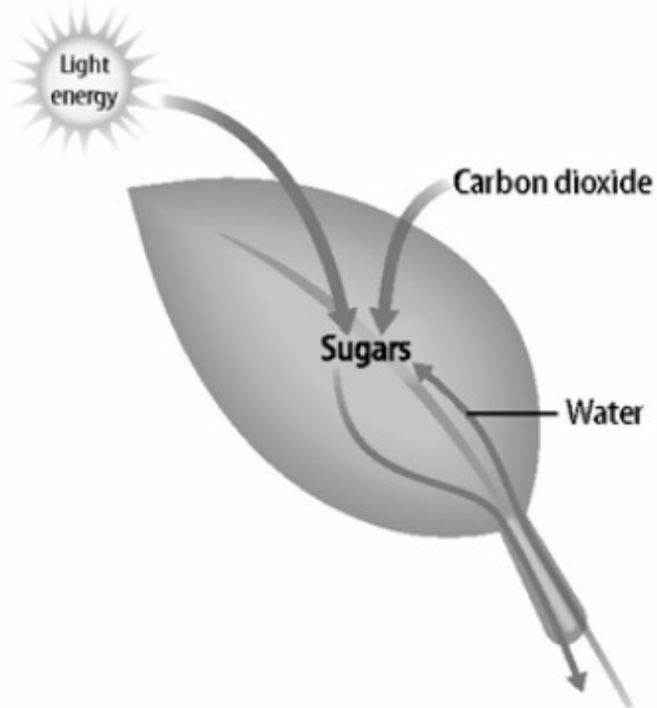
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9) How does the movement of water in ecosystems differ from the movement of energy?

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10) Explain the process in the figure.



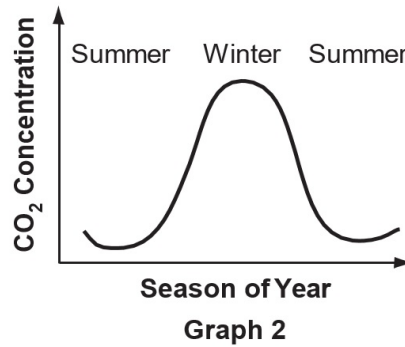
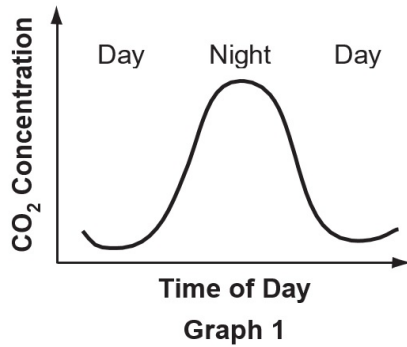
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- 11)** If the first trophic level in an energy pyramid receives 1,000 units of energy from the Sun, how much energy is available for the third trophic level?

- 12)** Describe the water cycle.

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- 13)** The graphs show the atmospheric carbon dioxide (CO_2) concentration at different times of the day and in different seasons of the year.

Atmospheric Carbon Dioxide Concentrations

- a. Explain the role of photosynthesis in relation to the amount of carbon dioxide in the atmosphere.

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b. Explain how **each** graph provides evidence that carbon dioxide is removed from the atmosphere by the process of photosynthesis.

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14) Biosphere 2 was a man-made ecosystem in which plants, animals, people, various types of habitat, and soil for raising food were enclosed in an airtight, glass building. The building covered land the size of two football fields and was exposed to plenty of sunlight. The goal of the Biosphere 2 project was to create a self-sufficient ecosystem that could sustain life for long periods of time. At one point in the project, one of the gases in Biosphere 2 decreased to a level that became unhealthy for the animals, including the people, inside.

a. Describe how photosynthesis enables plants, animals, and other organisms to survive in a closed ecosystem such as Biosphere 2. In your answer, be sure to trace how matter flows through the ecosystem as a result of photosynthesis.

b. During the course of the Biosphere 2 project, oxygen levels fell, dramatically endangering the health of all organisms in the ecosystem. Describe what might have caused this and suggest a solution.

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15) a. Describe what happens to grass molecules as they move through a rabbit.

b. Explain why rabbits must eat plants.

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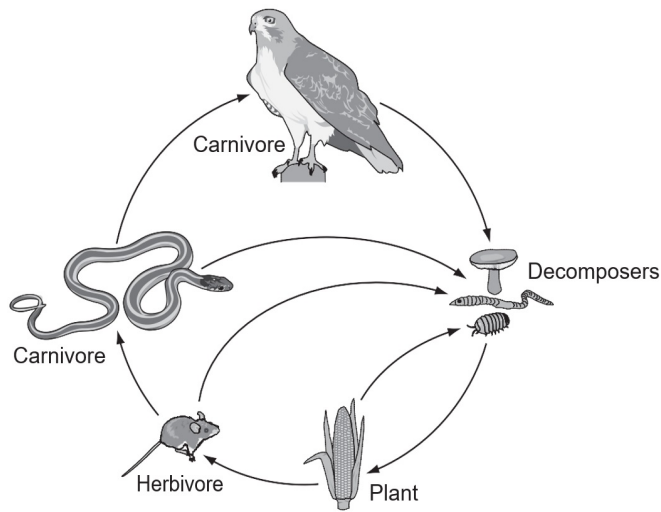
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16) Several forest organisms make up the food web shown.



a. Describe what needs to be added to this model to show how energy flows **into** and **out** of this food web.

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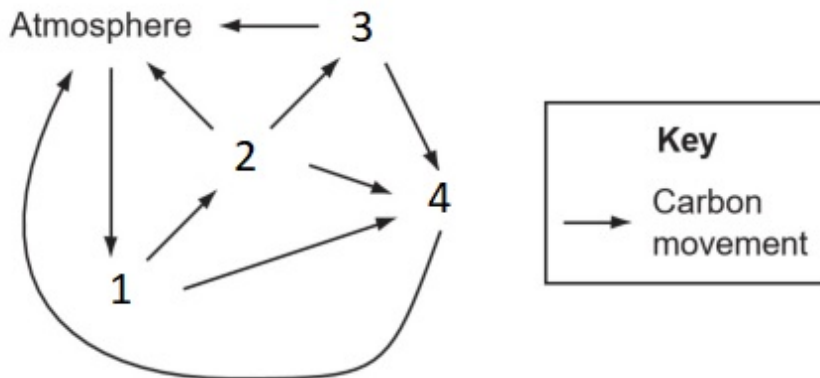
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b. Explain how the model demonstrates the cycling of matter within the ecosystem.

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17) Carbon moves between living and nonliving things in every ecosystem.



Match the terms below to the numbers in the diagram to show how carbon moves among the following living and nonliving parts in an ecosystem:

- Wolf
- Rabbit
- Grass
- Fungi

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18) Students are studying an ocean ecosystem. They have grouped the inputs and organisms of the ocean ecosystem into the following four major parts:

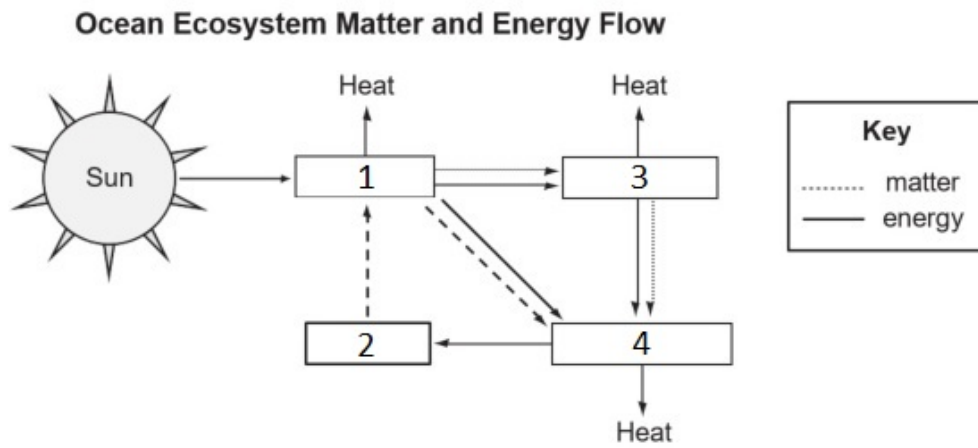
- consumers, such as zooplankton, herring, seagulls, and cod;
- producers, such as algae and phytoplankton;
- decomposers, such as fungi and bacteria;
- nonliving inputs, such as the sun, water, nutrients, and oxygen.

a. Match the terms below to the numbers in the model to show how matter and energy move among the four major parts of the ocean ecosystem.



- producers, decomposers, consumers, nutrients

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b. Explain how energy flows into and out of the ecosystem.

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19) Which describes how the atoms in living things cycle?

- A)** through living parts of ecosystems only
- B)** in one direction from living to nonliving parts of the ecosystem
- C)** in one direction from nonliving to living parts of the ecosystem
- D)** repeatedly back and forth through living and nonliving parts of the ecosystem

20) What is the source of the carbon atoms in a plant's cells?

- A)** they were created as the plant grew
- B)** the Sun
- C)** water molecules
- D)** the environment