

Spheres of the Earth Lesson Review, Test, and Project

Energy Flow in Ecosystems Summary

Photosynthesis and Cellular Respiration

- Photosynthesis is the process where sunlight is converted into chemical energy (glucose/sugar) by plants and occurs in chloroplasts.
- Producers like plants create sugar using the Sun's energy through photosynthesis.
- Cellular respiration is the opposite of photosynthesis - sugar is converted into carbon dioxide, water, and energy that organisms use to function. Both producers and consumers undergo cellular respiration.

Consumers

- Many organisms cannot photosynthesize - they are consumers that get energy by eating other organisms.
- Types of consumers:
 - Herbivores eat plants/producers.
 - Carnivores eat other animals.
 - Omnivores eat plants and animals.
 - Scavengers eat remains of other organisms.
- To get energy from food, consumers undergo cellular respiration.

Importance of Sun and Photosynthesis

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Food Chains and Webs

- Food chains show transfer of energy through feeding relationships, but do not accurately represent ecosystems.
- Food webs are intricate networks showing organisms feeding on multiple species.
- Introducing or removing species from food webs can alter ecosystem balance.

Ecological Pyramids

- Display energy transfer between trophic levels.
- Types include:
 - Energy pyramid (amount of energy available)
 - Biomass pyramid (mass of organisms)
 - Numbers pyramid (organism quantities)
- Energy pyramids show only ~10% of energy is passed to higher trophic levels, the rest is lost as heat.
- Therefore, less energy is available at higher trophic levels in an ecosystem.

Energy Flow in Ecosystems Test

Multiple Choice

1. What process converts the Sun's energy into chemical energy in plants?
 - a. Respiration
 - b. Combustion
 - c. Photosynthesis
 - d. Digestion

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7. What type of ecological pyramid shows the mass of organisms at each trophic level?
 - a. Energy
 - b. Numbers
 - c. Biomass
 - d. Species
8. Where does most of the energy at each trophic level go?
 - a. Growth
 - b. Reproduction
 - c. Heat
 - d. Storage

9. What displays the feeding relationships within a community?
- Food chain
 - Food web
 - Ecological niche
 - Trophic level

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Matching

Match the terms with their definitions.

- | | |
|--------------------|-------|
| 11. Producer | _____ |
| 12. Consumer | _____ |
| 13. Herbivore | _____ |
| 14. Carnivore | _____ |
| 15. Photosynthesis | _____ |

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Fill in the Blank

16. The arrow in a food chain points from the _____ to the _____.
17. The _____ of an organism depends on its feeding position.
18. _____ show energy transfer between trophic levels.
19. A food _____ shows complex feeding relationships in a community.
20. Removing a species from a food web can alter the _____.

Short Answer

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Long Answer

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28. Describe how energy flows through an ecosystem using ecological pyramids as an example. Explain why available energy decreases at higher trophic levels.

Energy Flow in Ecosystems Test - Answer Key

Multiple Choice:

1. C
2. C
3. C
4. C
5. B
6. C
7. C
8. C
9. B
10. D

Matching:

11. D
12. A
13. E
14. C
15. B

Fill in the Blank:

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Short Answer:

21. Energy pyramid, biomass pyramid, numbers pyramid
22. Sugar is converted into carbon dioxide, water, and energy that the organism uses to function
23. Herbivore - eats plants; carnivore - eats animals; omnivore - eats plants and animals; scavenger - eats remains of other organisms
24. Produce energy-rich compounds like sugar from sunlight through photosynthesis to provide food for the ecosystem
25. The animals that feed on phytoplankton would decrease in number due to loss of food source. This would affect other animals up the food chain.

Long Answer:

26. Photosynthesis is the process plants use to convert sunlight into chemical energy in the form of sugar. This process occurs in chloroplasts using chlorophyll and water and carbon dioxide. The sugar produced is used by plants for energy and growth. Photosynthesis is critical because it harnesses the Sun's energy to produce food that supports almost all life on Earth.

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Energy Flow in Ecosystems - Food Web Project

Objective: To create

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Materials:

- Large poster board or paper
- Markers, colored pencils, etc. to create drawings/diagrams.
- Photos printed from internet or cut out from magazines (optional)

Directions:

1. Choose an ecosystem to depict (forest, desert, grassland, marine, etc.)

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This hands-on project allows

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