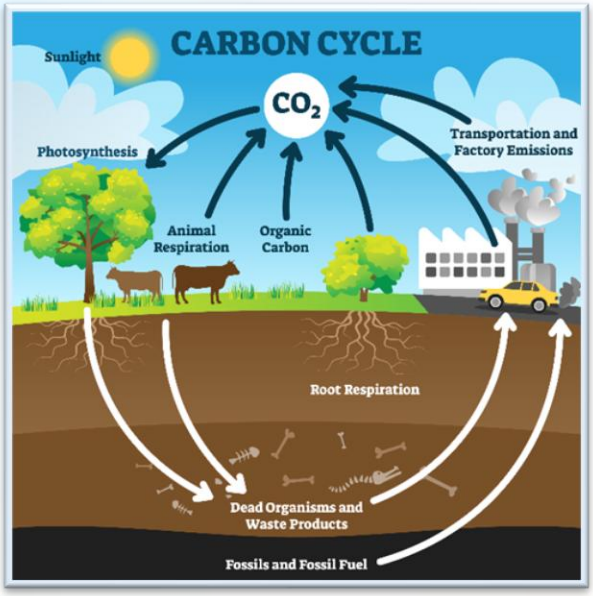
The Cycling of Matter

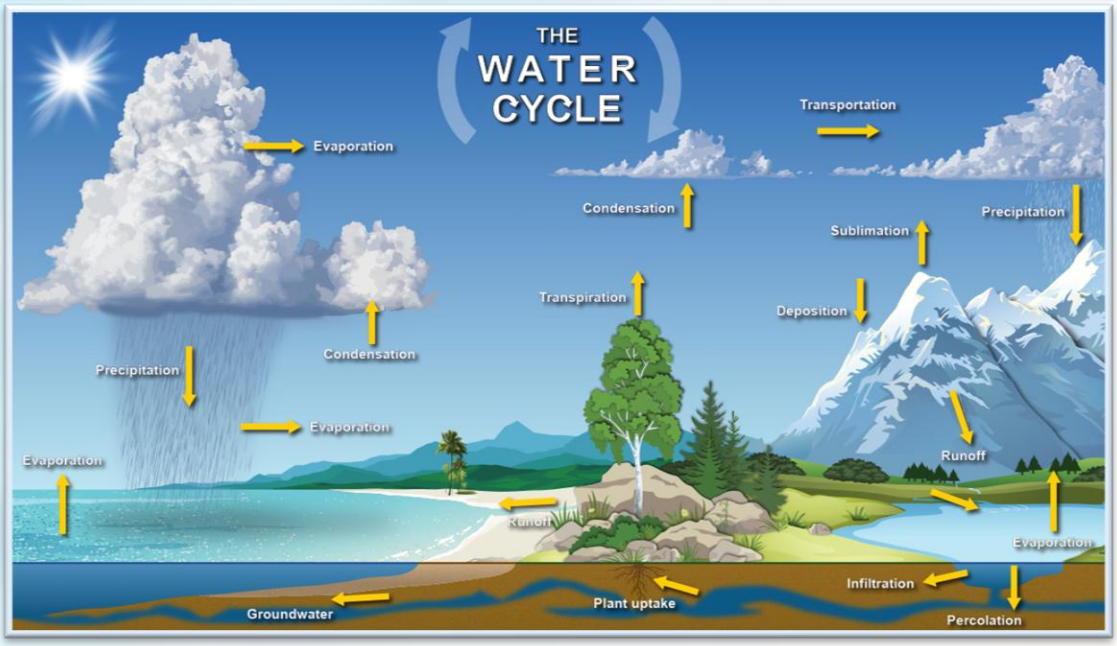
Name: ..... **Date:** .....

The cycling of matter is the continuous process by which essential elements like carbon, water, and nitrogen are reused in an ecosystem. This is a core concept in biology and is governed by the law of conservation of mass, which means that matter cannot be created or destroyed, only changed in form.

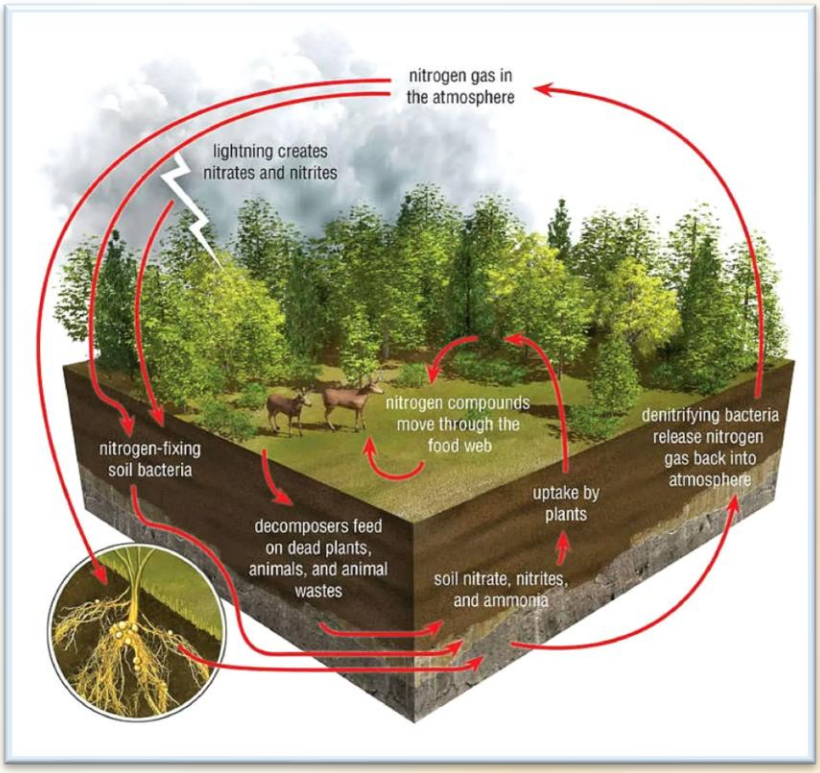
Matter cycles between living and non-living things. For example, in the carbon cycle, plants use photosynthesis to absorb carbon dioxide from the atmosphere and convert it into food. Animals then get this carbon by eating plants. Both plants and animals release carbon dioxide back into the atmosphere through respiration. Decomposers also return carbon to the environment by breaking down dead organisms. The burning of fossil fuels is a major way humans impact this cycle.



The water cycle involves water moving between Earth's surface and the atmosphere. Water on the ground or in plants turns into vapor through evaporation and transpiration. This vapor cools and turns back into liquid through condensation, forming clouds. Water then falls back to Earth as precipitation (rain, snow, etc.).



The nitrogen cycle is important for making proteins. Most nitrogen in the atmosphere is not usable by living things. Nitrogen-fixing bacteria convert it into a form plants can absorb. Animals get nitrogen by eating plants or other animals, and decomposers return it to the soil when organisms die.



I. Multiple Choice Questions

Choose the best answer for each question.

1. **Which process takes carbon dioxide out of the air and turns it into organic compounds?**
   a. respiration
   b. photosynthesis
   c. combustion
   d. transpiration

2. **How does matter cycle in an ecosystem?**
   a. matter moves only from producers to consumers
   b. matter is reused in different forms among organisms and environment
   c. matter is continuously created and destroyed
   d. matter is found in one area and doesn't transfer to other areas

3. **What is common between a carbon cycle and a water cycle?**
   a. they remove matter from the ecosystems
   b. they produce new matter in the ecosystems
   c. they recycle matter between ecosystems
   d. they conserve energy in the ecosystems

4. **Which law states that matter can't be created or destroyed?**
   a. law of formation of matter
   b. law of gravity
   c. law of conservation of mass
   d. law of conservation of energy

5. **What role do transpiration and evaporation play in the water cycle?**
   a. return water to living things and Earth's surface
   b. decreases the amount of water in an ecosystem
   c. increases the amount of water in an ecosystem
   d. return water vapor to the atmosphere

6. **Which process of the water cycle returns water to the Earth?**
   a. condensation
   b. precipitation
   c. transpiration
   d. evaporation

7. **Which of the following processes is NOT a part of the carbon cycle?**
   a. evaporation of water
   b. combustion of fossil fuels
   c. respiration by animals
   d. photosynthesis by plants

8. **How is carbon stored in the ecosystem for a long time?**
   a. as carbon nutrients in the soil
   b. as carbon dioxide absorbed by plants
   c. as fossil fuels buried in the Earth
   d. as carbon dioxide in the atmosphere

9. **Which process converts atmospheric nitrogen into a form usable by plants?**
   a. decomposition
   b. photosynthesis
   c. respiration
   d. nitrogen fixation

10. **How do consumers obtain nitrogen to make their own proteins?**
    a. by cellular respiration
    b. by eating plants and other animals
    c. by decomposing plants and animals
    d. by photosynthesis

11. **What is the primary role of plants in the oxygen cycle?**
    a. Plants use oxygen to produce glucose during photosynthesis.
    b. Plants convert carbon dioxide and water into oxygen and glucose.
    c. Plants absorb oxygen from the air during cellular respiration.
    d. Plants decompose dead organisms and release carbon dioxide.

12. **What is the main source of oxygen in the atmosphere?**
    a. respiration
    b. decomposition
    c. nitrogen fixation
    d. photosynthesis

13. How does oxygen move within an ecosystem?

a. Plants release oxygen during photosynthesis, and animals take in oxygen during respiration.
b. Animals release oxygen during respiration, and plants absorb oxygen during photosynthesis.
c. Nonliving parts of the ecosystem convert oxygen into nitrogen, which plants can use.
d. Animals take in oxygen during respiration and permanently store it in their tissues.

14. What does the photosynthesis process need to occur?

a. water, oxygen, and sunlight
b. water, oxygen, and glucose
c. water, carbon dioxide, and sunlight
d. water, carbon dioxide, and glucose

15. What does the direction of the arrow represent in a food chain?

a. the movement of organisms
b. the flow of nitrogen element
c. the decrease in energy flow
d. the flow of energy and nutrients

II. Fill-in-the-Blank Questions

Fill in the blank with the correct term.

16. In ecosystems, matter moves between living and _____ parts.

17. The carbon cycle is the continuous movement of _____ between living things and the environment.

18. The _____ is made of all the living and nonliving things in an area.

19. Without _____, plants cannot perform photosynthesis.

20. Living things need _____ to survive.

III. Short Answer Questions

Answer the following questions in complete sentences.

21. Explain the role of decomposers in the carbon cycle.

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22. How do humans impact the carbon cycle? Provide an example.

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23. How are animals involved in the carbon cycle?

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24. Describe what happens in a closed ecosystem in terms of matter.

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25. What is the purpose of the nitrogen cycle in ecosystems?

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Answer Key

1	b. photosynthesis
2	b. matter is reused in different forms among organisms and environment
3	c. they recycle matter between ecosystems
4	c. law of conservation of mass
5	d. return water vapor to the atmosphere
6	b. precipitation
7	a. evaporation of water
8	c. as fossil fuels buried in the Earth
9	d. nitrogen fixation
10	b. by eating plants and other animals
11	b. Plants convert carbon dioxide and water into oxygen and glucose.
12	d. photosynthesis
13	a. Plants release oxygen during photosynthesis, and animals take in oxygen during respiration.
14	c. water, carbon dioxide, and sunlight
15	d. the flow of energy and nutrients
16	nonliving
17	carbon
18	ecosystem
19	sunlight
20	oxygen
21	Decomposers break down dead organisms and waste products, which releases carbon dioxide back into the atmosphere and returns carbon to the soil. This makes the carbon available for plants to use again.
22	Humans impact the carbon cycle by burning fossil fuels, which releases large amounts of stored carbon dioxide into the atmosphere. This increases the amount of carbon dioxide in the air and contributes to climate change.
23	Animals are involved in the carbon cycle by taking in oxygen and releasing carbon dioxide during the process of respiration. They get carbon by eating plants and other animals.
24	In a closed ecosystem, matter is recycled. While energy can enter from an outside source (like sunlight), all the physical materials—such as water, air, and nutrients—are contained within the system and continuously reused by the organisms living there.
25	The purpose of the nitrogen cycle is to make nitrogen available to organisms. It converts atmospheric nitrogen, which most organisms cannot use, into a form that plants can absorb from the soil.