Unit 4.11 Handout 2 (5 pages total)

How Do Oxygen and Carbon Dioxide Cycle?

Photosynthesis and Respiration

Organisms use oxygen and carbon dioxide over and over. Some of this cycling happens during photosynthesis and respiration. A runner breathes faster and more deeply as she runs because her body needs more oxygen. Green plants and algae make most of the oxygen in the atmosphere.

Plants and algae make oxygen and food through photosynthesis. During photosynthesis, energy from the Sun is used to change carbon dioxide and water into a simple sugar called glucose and oxygen.

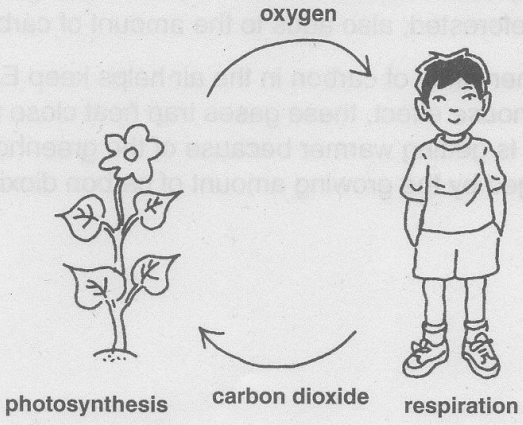
Glucose gives plants energy, which is stored inside food. Animals get the energy when they eat the plants. Animals that eat other animals also get energy from glucose. The oxygen is released into the atmosphere.

Most organisms are able to use the chemical energy in food through respiration. During respiration, oxygen joins with glucose to produce carbon dioxide and water. The stored energy is let go.

Plants, animals, and many other organisms carry out respiration. Respiration is why oxygen is so important to life on Earth, including human life. You take in oxygen with every breath. Your blood carries oxygen to the cells in your body, where respiration is always taking place.

Photosynthesis and respiration work in opposite ways. The things that are used during photosynthesis (carbon dioxide and water) are produced during respiration. The things that are used during respiration (oxygen and glucose) are produced during photosynthesis. This is how oxygen and carbon dioxide cycle through the biosphere.

Just as animals need plants for food and oxygen, plants need animals for carbon dioxide.



Carbon Cycle and Oxygen Cycle

Carbon is one of Earth's most common elements—materials that cannot be broken down into other materials. It is a basic part of all living things. Carbon is part of every body cell, every sugar, and carbon dioxide gas. Carbon is also part of Earth's outer layer called the crust. Much carbon is underground in fossil fuels such as coal, oil, and natural gas.

Carbon moves through the carbon cycle mostly as carbon dioxide gas. Plants take in carbon dioxide during photosynthesis, and it goes into molecules like glucose. When organisms use the glucose, carbon goes back into the environment as carbon dioxide.

Carbon also moves through the environment in other ways. When organisms die, some carbon stays in their bodies. As bacteria and fungi break down dead organisms, carbon leaves their bodies and returns to the environment. Burning fossil fuels also moves carbon back into the environment.

Living things need oxygen to live. Like carbon, oxygen cycles through the environment. Oxygen is produced during photosynthesis. Some oxygen comes from water vapor in the atmosphere. Oxygen is used during respiration. It is also consumed when metals rust or when something burns.

Because oxygen is one of the substances that make up carbon dioxide, the oxygen cycle is tied to the carbon cycle. Both carbon and oxygen cycle between living and nonliving things in the environment.

Things that happen on Earth can change or harm the carbon and oxygen cycles. When people cut down trees in the rain forests, there is less photosynthesis. This means that less oxygen enters the atmosphere and less carbon dioxide leaves.

Disrupting the Cycle

Each year there is more carbon dioxide in the atmosphere. Burning fossil fuels, such as natural gas, coal, and oil, adds carbon dioxide to the air. Cutting down trees, such as when the rain forests are deforested, also adds to the amount of carbon dioxide.

Carbon dioxide and other kinds of carbon in the air helps keep Earth warm. Through a process called the greenhouse effect, these gases trap heat close to Earth's surface. Many scientists think Earth is getting warmer because of the greenhouse effect. The environment can be damaged by the growing amount of carbon dioxide.

Name _____ Date _____

How Do Oxygen and Carbon Dioxide Cycle?

Write answers to the questions on the lines below.

carbon dioxide + water + energy → glucose + oxygen

1. What process is shown in the diagram above?

_____

2. What happens during this process?

_____

_____

glucose + oxygen → carbon dioxide + water + energy

3. What process is shown in the diagram above?

_____

4. What happens during this process?

_____

_____

5. What are two causes of the increase in carbon dioxide in the atmosphere?

_____

Lesson 4.11: Life Science – Photosynthesis & Respiration

Name _____ Date _____

6. **Main Idea** How do living things depend on the carbon dioxide cycle and the oxygen cycle?

_____

_____

7. **Vocabulary** Write a sentence that relates the terms *photosynthesis* and *respiration*.

_____

_____

8. **Reading Skill: Compare and Contrast** Contrast the processes of photosynthesis and respiration.

_____

_____

9. **Critical Thinking: Evaluate** Will the amount of carbon dioxide in the atmosphere soon be greater than the amount of oxygen? Explain.

_____

_____

10. **Inquiry Skill: Predict** You blow through a straw into a beaker of water that has algae growing in it. If you then cover the container, will the level of carbon dioxide increase or decrease over time? Explain your answer.

_____

_____

_____

11. **Test Prep** Which process provides the oxygen you breathe?

A greenhouse effect

B deforestation

C respiration

D photosynthesis

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Lesson 4.11: Life Science – Photosynthesis & Respiration

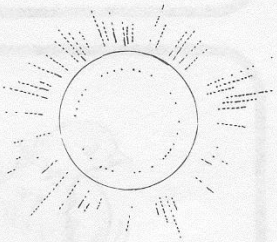
Name _____ Date _____

The Carbon Dioxide-Oxygen Cycle

Matter is continuously cycled between the living and nonliving parts of an ecosystem and between ecosystems. Matter is recycled, no new matter is added to the earth and none is lost. One example of this is in the carbon dioxide-oxygen cycle. Match each term in the word box with its description.

carbon dioxide	oxygen	photosynthesis	marine algae	decomposers
producers	consumers	aerobic	geologic activity	fossil fuels

1. _____ Carbon is present in Earth's atmosphere in the form of this gas.



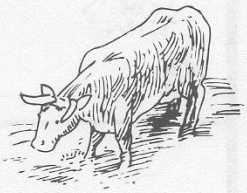
2. _____ The world's oceans hold most of the carbon in a dissolved form. These organisms use the carbon and release oxygen back into the atmosphere.

3. _____ Plants, also called this, use carbon dioxide to make their own food.

4. _____ This process, used by producers, releases oxygen into the atmosphere as a byproduct.

5. _____ These organisms cycle carbon through their bodies through the foods they eat. After they die and decompose, carbon is released back into the soil and atmosphere.

6. _____ The burning of these has put more carbon back into the atmosphere than can be cycled naturally.



7. _____ These organisms feed off of dead material and release the carbon back into the cycle.

8. _____ This type of respiration uses oxygen and produces carbon dioxide as a byproduct.

9. _____ Examples of this include volcanic eruptions and weathering of limestone rock, both of which release carbon into the atmosphere.

10. _____ The respiration of consumers uses this gas and releases carbon dioxide as a byproduct.