

KIPP/2025/\_\_\_\_\_

## Review of Matter & Energy in Ecosystems

**Directions:** Study the key concepts and vocabulary below to prepare yourself for our fourth and final unit.

### Chapter 1

#### Vocabulary:

- Energy Storage Molecule (ESM) - A molecule organisms can use to release the energy they need to survive.
- Abiotic - matter that makes up the **nonliving** (never living) parts of an ecosystem, such as air, water, and rocks
- Biotic - matter that makes up the **living and dead** organisms in an ecosystem
- Producer - an organism that can make its own energy storage molecules (such as glucose)
- Consumer - an organism that needs to eat in order to get energy storage molecules (such as starch and fat)
- Decomposer - an organism that gets energy storage molecules (such as glucose) by breaking down dead matter
- Ecosystem - all the living and nonliving things interacting in a particular area
- Photosynthesis - the process by which plants and other producers use energy from sunlight to change carbon dioxide and water into oxygen and glucose (an energy storage molecule)
- System - a set of interacting parts forming a complex whole

#### Key Concepts:

- Carbon is a part of carbon dioxide, which is abiotic matter. Carbon is also a part of energy storage molecules, which are biotic matter.
- During the process of photosynthesis, producers make energy storage molecules, using carbon dioxide and energy from sunlight. This moves carbon from abiotic to biotic matter.
- If one part of a system changes, this affects the rest of the system.
- When there is *more* carbon (in the form of carbon dioxide) in abiotic matter, *more* carbon is available to producers for making energy storage molecules.
- When there is *less* carbon (in the form of carbon dioxide) in abiotic matter, *less* carbon is available for producers making energy storage molecules.
- When there is *more* sunlight, producers can make *more* energy storage molecules from the carbon in carbon dioxide.
- When there is *less* sunlight, producers cannot make as many energy storage molecules from the carbon in carbon dioxide.

### Chapter 2

Vocabulary:

- Cellular Respiration - the chemical reaction between oxygen and glucose that releases energy into cells

Key Concepts:

- As organisms release energy during cellular respiration, carbon dioxide is produced from the carbon in energy storage molecules. This process moves carbon from *biotic* to *abiotic* matter.

### Chapter 3

Key Concepts:

- Since carbon cannot be produced or used up, the total amount of carbon in a closed ecosystem does not change.
- If the amount of carbon increased in *abiotic* matter then it also decreased in *biotic* matter. If the amount of carbon decreased in *abiotic* matter, then it also increased in *biotic* matter.

### Practice Problems

1. The sun has been up for several hours, and it has been shining on these trees. What can the trees do because they are in sunlight? What does this mean for the number of energy storage molecules in the trees?

The trees can . . .

- (a) **give off** carbon to the air. Giving off carbon allows them to make energy storage molecules.
- (b) **give off** carbon to the air. Giving off carbon uses up energy storage molecules.
- (c) **take in** carbon from the air. The carbon is used to make energy storage molecules.
- (d) **take in** carbon from the air. The carbon is used to break down energy storage molecules.

2. These goats are eating grass on a sunny day. What is happening to the carbon in the air around the living things on the mountain? Is carbon moving into the air, moving out of the air, or both?

- (a) Carbon is only moving into the air; it is not moving out of the air.
- (b) Carbon is moving into the air **and** out of the air at the same time.
- (c) Carbon is not moving into the air; it is only moving out of the air.
- (d) With this information, there is no way to know for sure.

3. Will has an aquarium with water, plants, and fish that eat the plants. It is sealed so no material can get in or out, and has glass sides that allow sunlight to come in. The aquarium can also be covered to prevent light from entering.

The amount of carbon in the aquarium's water started out high. Now, the amount of carbon in the water is decreasing.

Is the aquarium now in sunlight or is it covered? What is happening to the number of energy storage molecules in the plants and fish as a result?

- (a) The aquarium is now in sunlight, and there are **more** energy storage molecules in the plants and fish.
- (b) The aquarium is now in sunlight, and there are **fewer** energy storage molecule in the plants and fish.
- (c) The aquarium is now covered so no light can get in, and there are **more** energy storage molecules in the plants and fish.
- (d) The aquarium is now covered so no light can get in, and there are **fewer** energy storage molecules in the plants and fish.

**4. Scientists are studying photosynthesis in a forest ecosystem that has plants, animals, and decomposers (which consume dead things). Which group or groups of organisms in the forest carry out photosynthesis?**

- (a) all organisms in the forest
- (b) animals and decomposers
- (c) plants and decomposers
- (d) plants

**5. A herd of deer lives in a forest where they eat the leaves of trees. The number of energy storage molecules in the trees and in the deer has increased. What has happened to the amount of carbon in the trees and in the deer?**

**The amount of carbon in the trees and in the deer . . .**

- (a) has increased.
- (b) has decreased.
- (c) has not changed.
- (d) is not related to the number of energy storage molecules.

**9. Scientists are studying cellular respiration in a jungle ecosystem that has plants, animals, and decomposers (which consume dead things). Which group or groups of organisms in the jungle carry out cellular respiration?**

- (a) plants
- (b) animals and decomposers
- (c) all organisms in the jungle
- (d) animals