

END OF TERM EXAM
COVERAGE GRADE 7
2025-2026

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Al Refaah School

Outcomes covered as per EOT coverage document UNIT 4 MCQ

1- Identify the parts of an ecosystem.	
2-Explain the process of chemical reactions such as photosynthesis and/or cellular respiration.	Investigation - P10
3-Explain the process of chemical reactions such as photosynthesis and/or cellular respiration	Collect Evidence - P19
4-Explain the process of chemical reactions such as photosynthesis and/or cellular respiration.	Three-Dimensional Thinking - P20
5-Describe the flow of energy among living and nonliving parts of an ecosystem.	Collect Evidence - P32
6-Describe the flow of energy among living and nonliving parts of an ecosystem.	
7-Describe the flow of energy among living and nonliving parts of an ecosystem.	Three-Dimensional Thinking - P41
8-Describe the processes involved in the cycling of matter.	Collect Evidence - P50
9-Describe the processes involved in the cycling of matter.	Collect Evidence- P53
10-Identify changes to physical or biological components of an ecosystem that affect populations.	
11-Identify changes to physical or biological components of an ecosystem that affect populations.	Collect Evidence - P80
12-Explain patterns of interactions among organisms.	Summarize it! - P100
13-Explain patterns of interactions among organisms.	Summarize it! - P100
14-Explain patterns of interactions among organisms.	
15-Explain the changes to physical or biological components of an ecosystem.	Investigation - P108
16-Explain the changes to physical or biological components of an ecosystem.	Three-Dimensional Thinking - P112
17-Explain the changes to physical or biological components of an ecosystem.	Collect Evidence - P115
18-Identify methods for measuring biodiversity.	Investigation - P142
19-Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations	Three-Dimensional Thinking - P165
20-Identify methods to maintain biodiversity.	Investigation P177-178

Outcomes covered as per EOT coverage document UNIT 4 FRQ

- 21-Identify levels of organizations across ecosystems. **Encounter the Phenomenon P71-73, Collect Evidence P75**
- 22-Evaluate differing biodiversity and ecosystems. **Collect Evidence P159**
- 23-Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. **Three-Dimensional Thinking P83**
- 24-Model chemical reactions such as photosynthesis and/or cellular respiration. **Summarize it! P22**
- Three-Dimensional Thinking P23**
- 25-Model and describe the cycling of matter in an ecosystem. **Collect Evidence P52**

Outcomes covered as per EOT coverage document UNIT 4 MCQ

1- Identify the parts of an ecosystem.

Define ecosystem.

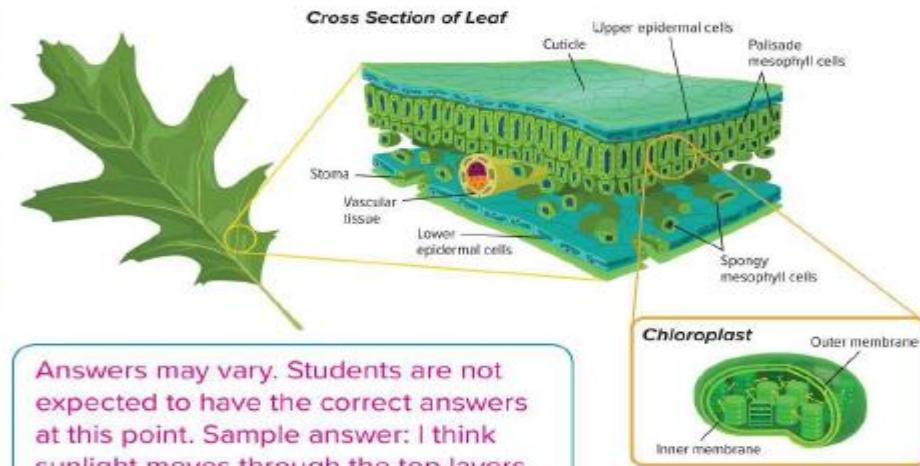
2- Explain the process of chemical reactions such as photosynthesis and/or cellular respiration.

What is photosynthesis? What is cellular respiration?

INVESTIGATION

Plant Structure

Examine the leaf cross section below. How do you think sunlight is absorbed by a leaf? How are other materials necessary for survival, such as carbon dioxide, oxygen, water, and other nutrients, moved through a leaf? Record your ideas below the cross section.



Answers may vary. Students are not expected to have the correct answers at this point. Sample answer: I think sunlight moves through the top layers to the layers below. I think the vascular tissue moves materials through the leaf.

Want more information?

Go online to read more about photosynthesis and cellular respiration.

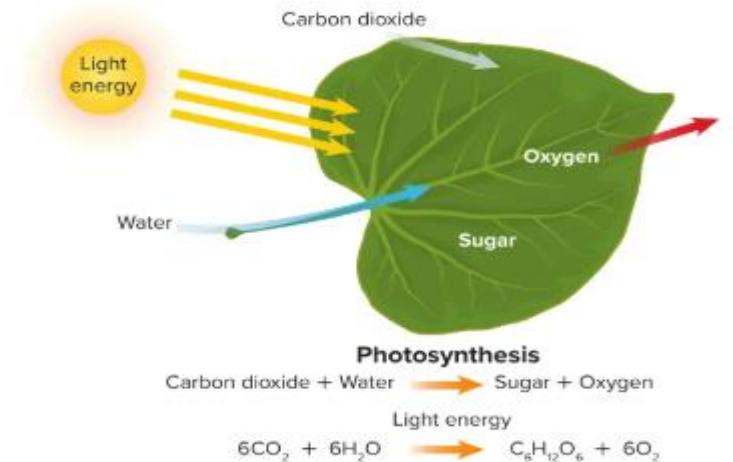
FOLDABLES®

Go to the Foldables® library to make a Foldable® that will help you take notes while reading this lesson.



Three-Dimensional Thinking

Use the model to answer question 2.



2. Which is the best explanation of the change in energy shown in the model?

- A New energy is produced by plants during photosynthesis.
- B Large amounts of energy are released into the environment during photosynthesis.
- C Energy from sunlight is destroyed as it powers photosynthesis
- D Energy input from the environment is stored in food molecules during photosynthesis.

Outcomes covered as per EOT coverage document UNIT 4 MCQ

3-Explain the process of chemical reactions such as photosynthesis and/or cellular respiration

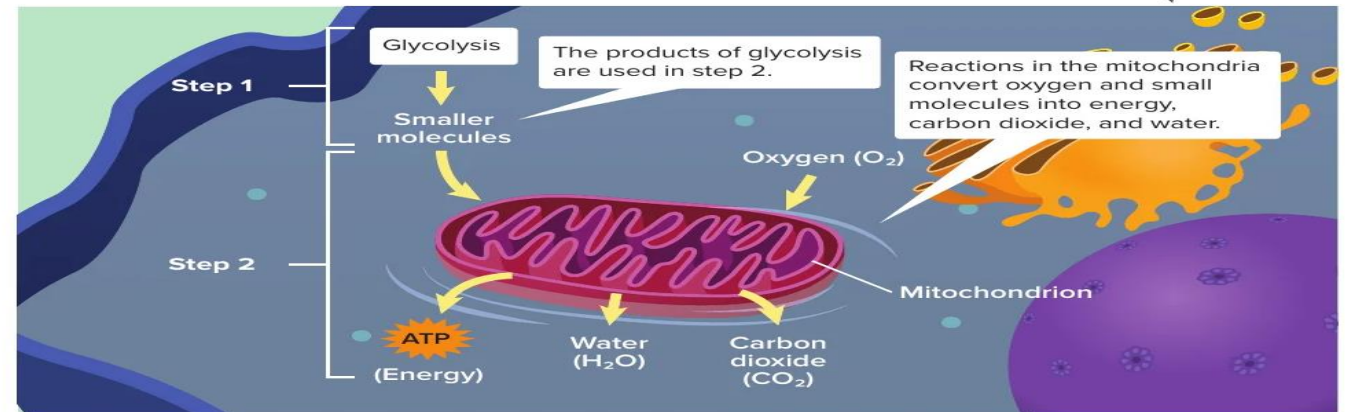
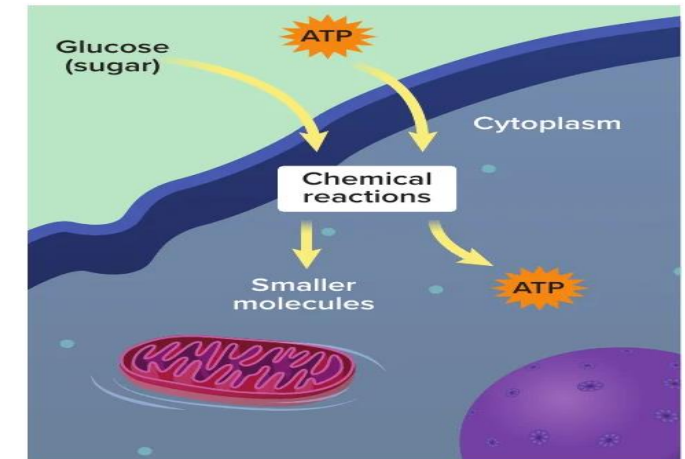
Where does photosynthesis occur?

Where does cellular respiration occur?

Cellular Respiration The bromthymol blue changed color due to the presence of carbon dioxide in your exhalations. Where did the carbon come from? It is a waste product from a process that releases energy from molecules. **Cellular respiration** is a series of chemical reactions that convert the energy in food molecules into a usable form of energy called ATP. Cellular respiration occurs in two parts of a cell—the cytoplasm and the mitochondria.

The first step of cellular respiration, called glycolysis, occurs in the cytoplasm of all cells. **Glycolysis** is a process by which glucose, a sugar, is broken down into smaller molecules. Glycolysis produces some ATP, an energy storage molecule. This process also uses energy from other ATP molecules.

The second step of cellular respiration occurs in the mitochondria of eukaryotic cells. This step requires oxygen. The smaller molecules made from glucose during glycolysis are broken down. Large amounts of ATP—usable energy—are produced. Cells use ATP to power all cellular processes. Two waste products—water and carbon dioxide (CO_2)—are given off during this step. The CO_2 released by cells as a waste product is used by plants and some unicellular organisms during photosynthesis.



COLLECT EVIDENCE

How do plants and animals process energy from food? Record your evidence (B) in the chart at the beginning of the lesson.

Outcomes covered as per EOT coverage document UNIT 4 MCQ

4-Explain the process of chemical reactions such as photosynthesis and/or cellular respiration

List the organisms that are photosynthetic.

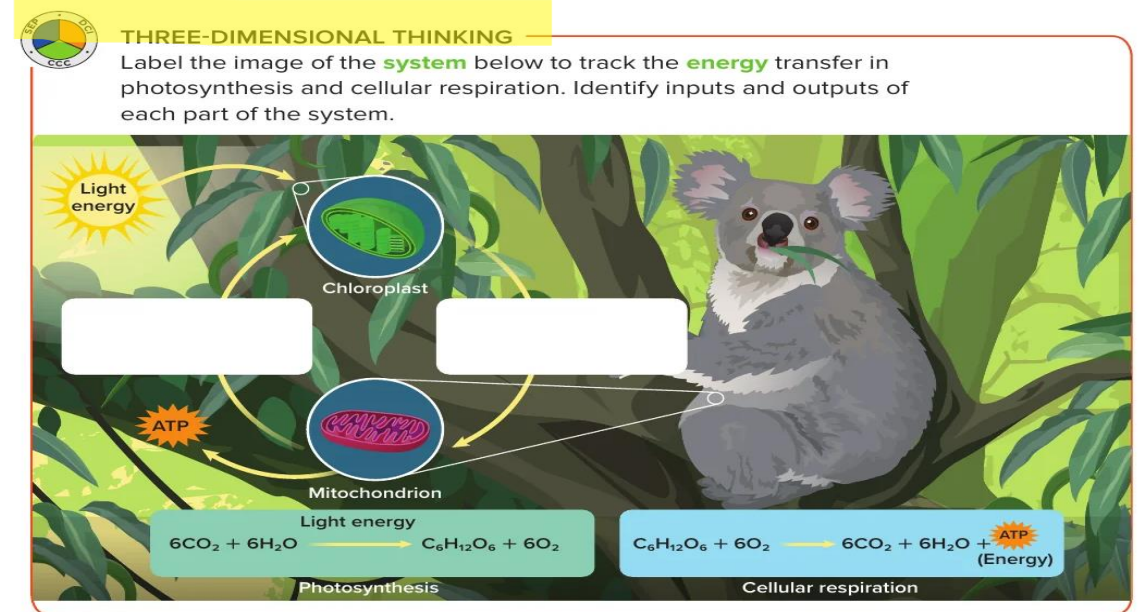
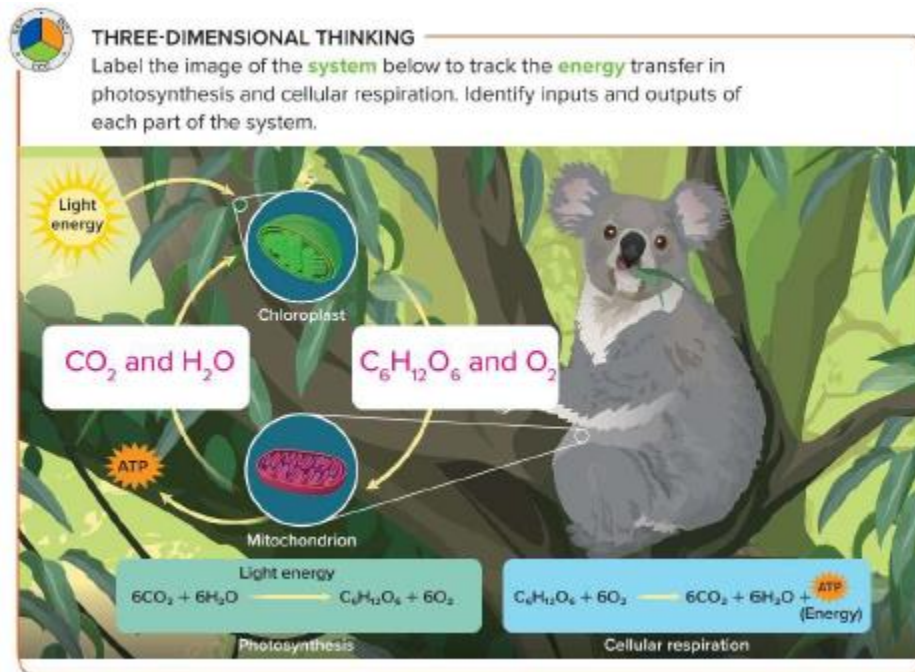
List the organisms that perform cellular respiration.

How are photosynthesis and cellular respiration related?

While animals only perform cellular respiration, plants conduct both cellular respiration and photosynthesis. How do the processes compare?

Comparing Photosynthesis and Cellular Respiration Photosynthesis requires the reactants carbon dioxide and water. Oxygen and glucose are the products. Most plants, some protists, and some bacteria are photosynthetic. Photosynthesis is important because plants help maintain the atmosphere you breathe. Photosynthesis produces most of the oxygen in the atmosphere.

Cellular respiration requires the reactants glucose and oxygen, produces carbon dioxide and water, and releases energy. Most organisms perform cellular respiration. Cellular respiration is important because if your body did not break down and rearrange the food you eat, you would not have energy to do anything. Plants produce their own food, but without cellular respiration, plants could not grow, reproduce, or repair tissues.



5-Describe the flow of energy among living and nonliving parts of an ecosystem.

Classify producers, consumers, and detritivores by their source of energy. Explain the relationship between consumers, producers and detritivores in an ecosystem.

Detritivores Another group of consumers are detritivores (dih TRI tuh vorz). **Detritivores** get their energy by eating the remains of other organisms. Some detritivores, such as bacteria and mushrooms, feed on dead organisms and help break down or decompose them. For this reason, these organisms often are called decomposers. The yeast in the activity above is a decomposer. During decomposition, decomposers produce carbon dioxide that enters the atmosphere. Some of the decayed matter enters the soil or water. In this way, decomposers help recycle nutrients through ecosystems. They also help keep ecosystems clean. Without decomposers, dead organisms would pile up in an ecosystem.



These mushrooms are decomposers!

COLLECT EVIDENCE

How do producers and consumers obtain energy? Record your evidence (A) in the chart at the beginning of the lesson.

6-Describe the flow of energy among living and nonliving parts of an ecosystem.

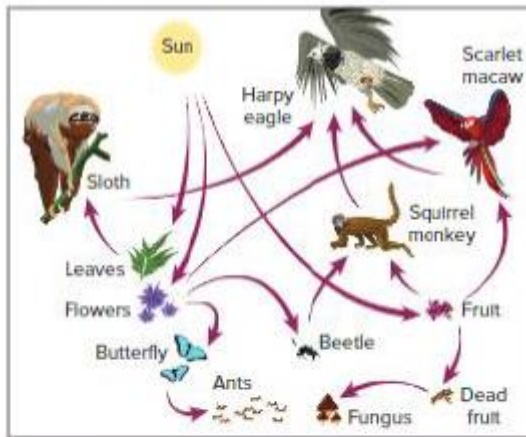
Define herbivore, carnivore, omnivore.

Outcomes covered as per EOT coverage document UNIT 4 MCQ

7-Describe the flow of energy among living and non-living parts of an ecosystem.

What are the differences between a food chain, a food web and a food pyramid?

2. Analyze the food web. Which statement is correct?



- A** The model tracks the transfer of energy as energy flows in this ecosystem.
- B** The transfer of matter back into the environment occurs only at the detritivore level.
- C** The model shows the transfer of matter only.
- D** The decomposers in the model use matter but not energy for their life processes.

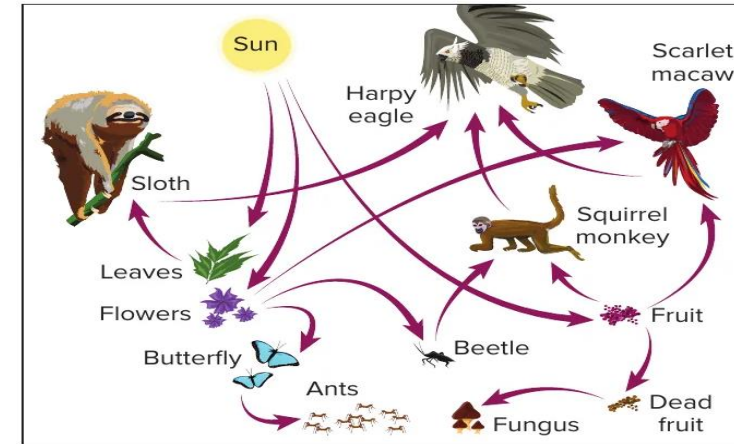
3. In an energy pyramid, approximately 10 percent of the energy available in one trophic level is transferred to the next level. Which statement helps explain why this occurs?

- A** Consumers eat both producers and other consumers.
- B** Organisms use most of the available energy to fuel their own life processes.
- C** Predators eat more organisms in their own level than organisms in other levels.
- D** Producers exist in only the lowest level of the pyramid.



Three-Dimensional Thinking

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Outcomes covered as per EOT coverage document UNIT 4 MCQ

8-Describe the processes involved in the cycling of matter.

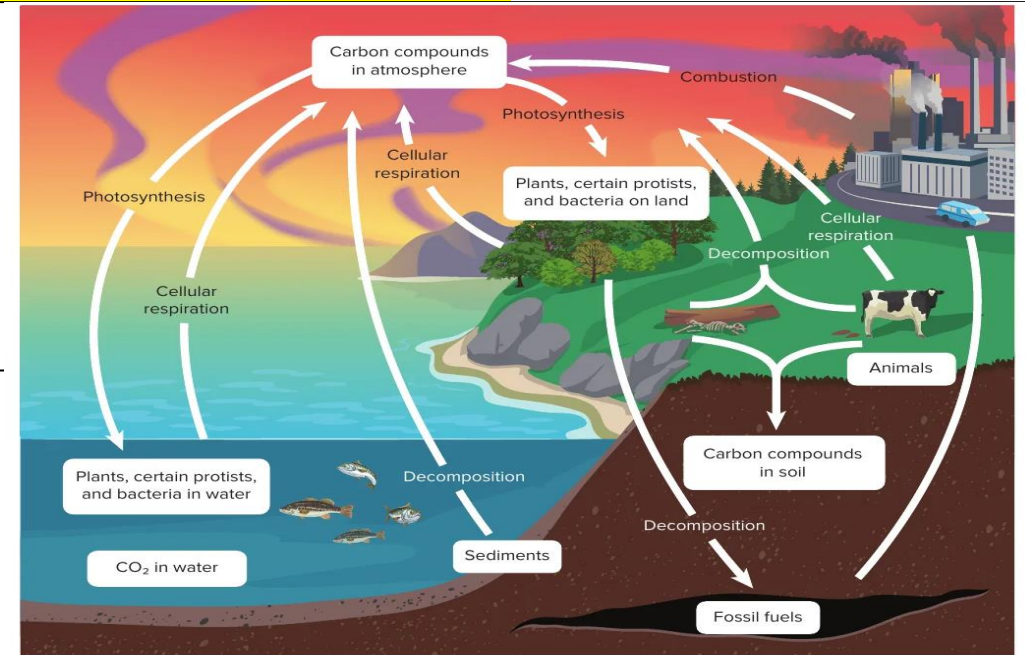
Describe the following cycles of matter:

Nitrogen cycle:

Carbon cycle:

Water cycle:

Oxygen cycle:



The Carbon Cycle All organisms contain carbon. Some organisms, including humans, get carbon from food. Other organisms, such as plants, get carbon from the atmosphere or bodies of water.

Carbon can enter the environment when organisms die and decompose. This returns carbon compounds to the soil and releases carbon dioxide (CO_2) into the atmosphere for use by other organisms. Carbon is also found in fossil fuels, which formed when decomposing organisms were exposed to pressure, high temperatures, and bacteria over hundreds of millions of years.

Recall that carbon is found in the atmosphere as carbon dioxide. Plants and other photosynthetic organisms take in carbon dioxide and water to produce energy-rich sugars. These sugars are a source of carbon and energy for organisms that eat photosynthetic organisms.

COLLECT EVIDENCE

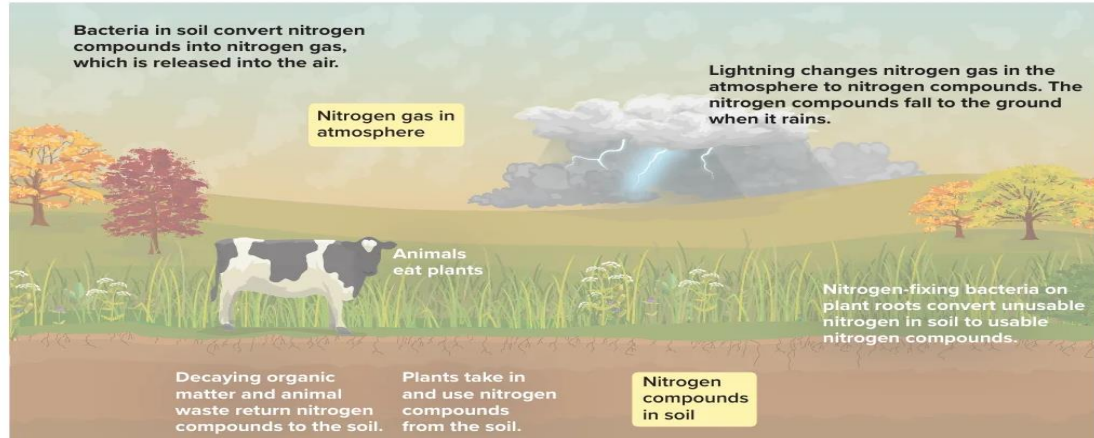
How does carbon move through the environment? Record your evidence (A) in the chart at the beginning of the lesson.

Outcomes covered as per EOT coverage document UNIT 4 MCQ

9-Describe the processes involved in the cycling of matter.

What is nitrogen fixation?

The Nitrogen Cycle Just as water is necessary for life on Earth, so is the element nitrogen. It is an essential part of proteins, which all organisms need to stay alive. Nitrogen, like water, cycles between Earth and its atmosphere and back again. Examine the figure and draw arrows to show the path nitrogen takes according to the descriptions.



Recall that the atmosphere is mostly nitrogen. However, this nitrogen is in a form that plants and animals cannot use. The process that changes atmospheric nitrogen into nitrogen compounds that are usable by living things is called **nitrogen fixation** (NI truh jun • fihk SAY shun). Plants and some other organisms take in this changed nitrogen from the soil and water. Then, animals take in nitrogen when they eat the plants or other organisms.

As you learned in the previous lesson, decomposers can break down the tissues of dead organisms. When organisms die, nitrogen-fixing bacteria help return the nitrogen in the tissues of dead organisms to the environment. Nitrogen also returns to the environment in the waste products of organisms. Farmers often spread animal wastes, called manure, on their fields during the growing season. The manure provides nitrogen to plants for better growth.

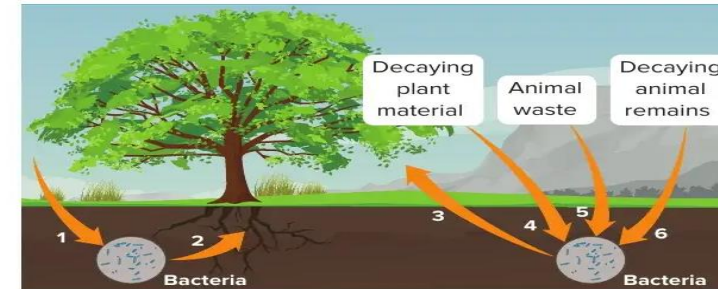
COLLECT EVIDENCE

How does nitrogen move through the environment? Record your evidence (C) in the chart at the beginning of the lesson.



Three-Dimensional Thinking

Keisha and her classmates created a model of the nitrogen cycle. Their diagram is shown below.



2. What is the function of the bacteria shown in the model?

- A They prevent the nitrogen from harming the plants.
- B They remove the nitrogen from the soil.
- C They remove the oxygen from the soil.
- D They return the nitrogen to the system.

3. Which of the following is NOT true about systems that cycle matter?

- A Living things play a role in the cycling of matter.
- B Matter changes form as it cycles.
- C Some matter is destroyed as it cycles through the environment.
- D Matter is constantly cycling through the environment.

Outcomes covered as per EOT coverage document UNIT 4 MCQ

10-Identify changes to physical or biological components of an ecosystem that affect populations.

List reasons why populations would decrease.

List reasons why populations increase.

11-Identify changes to physical or biological components of an ecosystem that affect populations.

Define extinct. What characterizes extinction?

Population Size Decrease Population size can increase, but it also can decrease. For example, a population of field mice might decrease in size in the winter because there is less food. Natural disasters such as floods, fires, or volcanic eruptions also affect population size. Sometimes, a population's size can decrease to such an extent that it may threaten the entire species. Examine the table to learn about what happens to species that see large decreases in population size.

Extinction If populations continue to decrease in numbers, they disappear. An extinct species is a species that has died out and no individuals are left. Extinctions can be caused by predation, natural disasters, or damage to the environment. For example, New Zealand was once home to a large, flightless bird called the giant moa. Humans first settled these islands about 700 years ago. They hunted the moa for food. As the size of the human population increased, the size of the moa population decreased. Within 200 years, all the giant moas had been killed and the species became extinct.



Endangered Species Mountain gorillas are an example of a species that is endangered. An endangered species is a species whose population is at risk of extinction. There are currently over 16,000 species that are categorized as endangered. Species that are considered critically endangered face an even higher risk of extinction.

Threatened Species California sea otters almost became extinct in the early 1900s due to overhunting. In 1977, California sea otters were classified as a threatened species—a species at risk, but not yet endangered. Laws were passed to protect the otters and by 2016 there were about 3,200 sea otters. Worldwide, approximately 7,000 species are classified as threatened.



COLLECT EVIDENCE

How do limiting factors, like the water in the watering hole, affect populations of animals in Etosha National Park? Record your evidence (B) in the chart at the beginning of the lesson.

Outcomes covered as per EOT coverage document UNIT 4 MCQ

12-Explain patterns of interactions among organisms

What is a symbiotic relationship? What are different types of symbiotic relationships? Give specific examples.

13-Explain patterns of interactions among organisms

14-Explain patterns of interactions among organisms

Provide examples for predator-prey, cooperative, and competitive relationships.

Provide examples of relationships of mutualism, parasitism, and commensalism.

Summarize It!

1. Identify how populations interact in a community.

Relationship	Description
Predator-prey	A predator eats prey for energy. The predator benefits from receiving food.
Cooperative	In a cooperative relationship, members of the same species work together in order to benefit the entire group.
Competitive	In a competitive relationship, organisms that share the same habitat often compete for resources.
Symbiotic	
a. Mutualism	A mutualistic relationship is a symbiotic relationship in which both partners benefit.
b. Parasitism	Parasitism is a symbiotic relationship that benefits one species and harms the other.
c. Commensalism	Commensalism is a symbiotic relationship that benefits one species but does not harm or benefit the other.

Summarize It!

1. Identify how populations interact in a community.

Relationship	Description
Predator-prey	
Cooperative	
Competitive	
Symbiotic a. Mutualism b. Parasitism c. Commensalism	

Outcomes covered as per EOT coverage document UNIT 4 MCQ

15-Explain the changes to physical or biological components of an ecosystem.

Compare and contrast ecological succession, primary succession and secondary succession. What is a climax community?

INVESTIGATION

Change in Communities

Examine the two images below. One is labeled *A* and the other is labeled *B*.
Imagine community *A* changes and becomes like community *B*.



1. How long do you think it would take community *A* to become like community *B*?

Students should infer that the process takes time.

2. Summarize the changes you think would happen as the community changed from *A* to *B*.

Sample answer: Trees and plants grew along the edges of the pond. Animals like ducks and frogs then came to live in the pond.

How do land ecosystems change?

An ecosystem can change over time. Change usually happens so gradually that you might not notice the differences from day to day. Examine the pond community below to observe what changes occur.

 **Want more information?**

Go online to read more about changing ecosystems.

INVESTIGATION

Change in Communities

Examine the two images below. One is labeled *A* and the other is labeled *B*.
Imagine community *A* changes and becomes like community *B*.



1. How long do you think it would take community *A* to become like community *B*?

2. Summarize the changes you think would happen as the community changed from *A* to *B*.

Outcomes covered as per EOT coverage document UNIT 4 MCQ

16-Explain the changes to physical or biological components of an ecosystem.

How do aquatic ecosystems change?

How do aquatic ecosystems change?

Like land ecosystems, freshwater ecosystems change over time in a natural and predictable process. This process is called aquatic succession. Observe how freshwater ecosystems change over time.



THREE-DIMENSIONAL THINKING
Construct an explanation of how **changes**, such as the buildup of soil, could affect populations of organisms in a lake ecosystem.

Sample answer: If soil were to build up at the bottom of a lake, it may crowd out species that live within the lake. Some populations will leave while others may die out.

THREE-DIMENSIONAL THINKING
Construct an explanation of how **changes**, such as the buildup of soil, could affect populations of organisms in a lake ecosystem.

GO ONLINE for an additional opportunity to explore!

Do you want to know more about how ecosystems can change over time? Investigate succession by watching the following animation.

☐ **Watch** the animation *Aquatic Succession* to see a pond ecosystem transform.

Outcomes covered as per EOT coverage document UNIT 4 MCQ

17-Explain the changes to physical or biological components of an ecosystem.

How do aquatic ecosystems change?

Read a Scientific Text

Eutrophication Like sediment, decaying organisms fall to the bottom of a pond, a lake, or a wetland, adding nutrients to the water. Runoff from fertilizers used in farming adds even more nutrients to water systems. **Eutrophication** is the process of a body of water becoming nutrient rich. Read about how nutrient pollution and eutrophication can affect an ecosystem.



PRIMARY SOURCE

CLOSE READING

Inspect

Read the passage *Too Much of a Good Thing: Human Activities Overload Ecosystems with Nitrogen*.

Find Evidence

Reread the passage. Underline words and phrases in which the author discusses nitrogen.

Make Connections

Collaborate With your partner, evaluate the claim that agricultural activities are responsible for eutrophication.

Too Much of a Good Thing: Human Activities Overload Ecosystems with Nitrogen

Humans are overloading ecosystems with nitrogen through the burning of fossil fuels and an increase in nitrogen-producing industrial and agricultural activities, according to a new study. While nitrogen is an element that is essential to life, it is an environmental scourge at high levels.

According to the study, excess nitrogen that is contributed by human activities pollutes fresh waters and coastal zones, and may contribute to climate change. Nevertheless, such ecological damage could be reduced by the adoption of time-honored sustainable practices.

[...]Much of nitrogen fertilizer that is used worldwide is applied inefficiently. As a result, about 60 percent of the nitrogen contained in applied fertilizer is never incorporated into plants and so is free to wash out of root zones, and then pollute rivers, lakes, aquifers and coastal areas through eutrophication.

"While the processes of eutrophication have been recognized for many years, only recently have scientists been able to begin placing the anthropogenic processes in the context of an understanding of the broader biogeochemical cycles of the planet," says Robert Burnap, an NSF program director. This is an important article because it concisely develops this understanding and also provides reasonable predictions regarding the economic and policy dimensions of the problem."

Source: National Science Foundation

Eutrophication is a natural part of aquatic succession. However, human activity also contributes to eutrophication. The fertilizers that farmers use on crops and the waste from farm animals can be very high in nutrients. High nutrient levels support large populations of algae and other microscopic organisms. These organisms use most of the dissolved oxygen in water and less oxygen is available for fish and other aquatic organisms.

COLLECT EVIDENCE

How do physical changes to ecosystems, like the forest fire in the beginning of the lesson, occur? Record your evidence (A) in the chart at the beginning of the lesson.



Three-Dimensional Thinking

After a devastating forest fire, small green sprouts begin to appear on the forest floor.



2. What is happening in the image?

A The forest is undergoing primary succession.

B The forest is undergoing secondary succession.

C The green sprouts will not grow into full plants and the forest will not recover.

D The forest is suffering from eutrophication.

3. How might a lake suffering from eutrophication affect a population of fish?

A The population will grow because of the extra nutrients.

B The population will suffer due to decreases in oxygen and habitat loss.

C The fish population will not be affected.

D The size of the population will waver.

Outcomes covered as per EOT coverage document UNIT 4 MCQ

18-Identify methods for measuring biodiversity.

How do scientists measure biodiversity?

INVESTIGATION

Collect That Data

Explore some of the different ways that people collect data on the biodiversity of an area.



GO ONLINE Watch the videos *Grey-Faced Sengi* and *Counting Species in California*.

Record your observations about the different ways people collect data on biodiversity. What different methods and technologies did they use?

Sample answer: In one video the scientists used a camera trap to discover a new species. In the other video, they used cameras on poles to collect data on bats, large nets to collect data on fish, and climbing equipment to collect data on organisms at the tops of trees.

How do scientists measure biodiversity?

How do scientists measure biodiversity?

How do scientists determine the biodiversity in a given area? The first step is to collect data on the numbers and types of organisms that live there. The method and technology used depends on the types of organisms being counted and the habitat. For example, a scientist may not be able to use the same method or technology to collect data about insects in the rain forest as she would to collect data about the number of fish living around a coral reef.

INVESTIGATION

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Canopy Fogging Scientists use canopy fogging to collect data about the biodiversity of insects. It is often used in forests. A low dose of insecticide is sprayed up into the top of a tree or trees. The insecticide kills the insects, causing them to fall from the trees. When the insects fall, they are collected in a large screen, a large sheet, or several large funnels. To learn more about biodiversity, scientists study the insects, identify them, and count them.



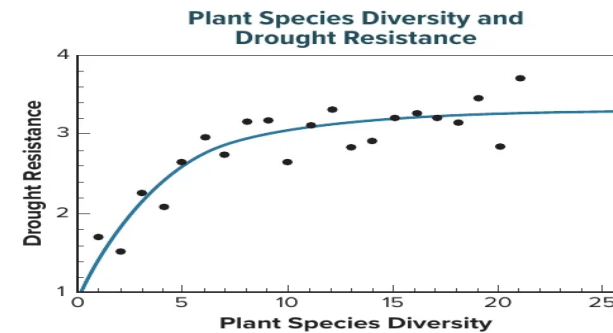
19-Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations

What is biodiversity?



Three-Dimensional Thinking

The graph below shows more data from the second experiment described in the Investigation *Plant Productivity*. During the course of the experiment, the region experienced an extended drought. The researchers tracked the relationship between plant species diversity and the ecosystem's resilience to the drought. Values closer to one on the vertical axis imply less resilience to the drought.



2. What conclusion can be made by analyzing the data from the graph?

- A As plant biodiversity increases, resistance to drought decreases.
- B As plant biodiversity increases, resistance to drought increases.**
- C Ecosystems with lower biodiversity are better able to respond to changes.
- D Ecosystems with higher biodiversity are less able to respond to changes.

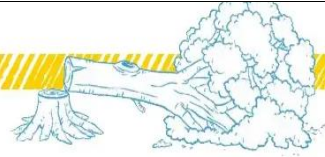
3. What would happen to the biodiversity index of an ecosystem if a change in the ecosystem caused the number of species to stay the same and the total number of individuals to increase?

- A The biodiversity index would increase.
- B The biodiversity index would decrease.**
- C The biodiversity index would stay the same.
- D The biodiversity index would increase, and then decrease.

20-Identify methods to maintain biodiversity.

List threats to biodiversity and list strategies that can help maintain biodiversity. How are these related? What are measures that can be taken that protect biodiversity?

INVESTIGATION



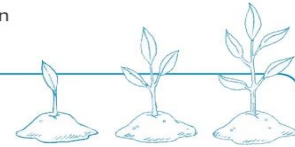
Save the Earth

Your teacher will give each group a different card with a scenario of an ecosystem experiencing a threat to its biodiversity. Your job is to research and evaluate possible solutions for your scenario.

1. With your group, define the problem and brainstorm different solutions to your assigned scenario in the space below. After you have some ideas written down, research solutions to your scenario using print and digital sources and record them below. Try to come up with as many solutions as possible.

Answers may vary. Sample answer: getting species on endangered species list, setting up designated "protected areas," monitoring/ setting up rules and regulations for tourists, SCUBA divers, snorkelers, boaters, etc., guidelines for fishing, guidelines for pollution

2. What are some different considerations to keep in mind when evaluating these solutions? Record your ideas below.



3. Decide on your four best solutions and fill in the table below to evaluate them.

Solution	Benefits	Constraints	Ranking and Reasoning (lowest number = most important/do first)
Example: designating endangered/ threatened species	animals offered protection by the federal government	long process	2
education for divers	gets people involved in helping	difficult to regulate	4
zone management	able to control pollution, development	cost of regulating is high	1
reintroducing species	makes ecosystems genetically diverse	doesn't always work	3

Outcomes covered as per EOT coverage document UNIT 4 FRQ

21-Identify levels of organizations across ecosystems.

What are the levels of organization in an environment? Describe the relationship between individuals, populations, community, ecosystems and the biosphere.

ENCOUNTER THE PHENOMENON

How does the availability of resources affect the animals living in Etosha National Park in Namibia?

Down at the
Watering
Hole

GO ONLINE

Watch the video *Down at the Watering Hole* to see this phenomenon in action.

After watching the video, what did you notice? What are the relationships between the oryx, birds, springboks, and lions?

Sample answer: All of the animals live close together. They all live near, and share the area of water.

What resources do the animals in the video share?

Sample answer: The animals share space, water, grass, sunlight, and fresh air.



EXPLAIN THE PHENOMENON

You just observed many different animals surrounding a watering hole in Etosha National Park. Now make a claim about why these animals were gathered around the water.

CLAIM

The animals in the park were gathering near water because...

COLLECT EVIDENCE as you work through the lesson.
Then return to these pages to record your evidence.

EVIDENCE

A. What evidence have you discovered to explain how the animals of the park in Namibia are organized in their ecosystem?

MORE EVIDENCE

B. What evidence have you discovered to explain how limiting factors, like water, affect the populations of animals living in the park?

When you are finished with the lesson, review your evidence. If necessary, based on the evidence, revise your claim.

REVISED CLAIM

The animals in the park were gathering near water because...

Finally, explain your reasoning for how and why your evidence supports your claim.

REASONING

The evidence I collected supports my claim because...

Outcomes covered as per EOT coverage document UNIT 4 FRQ

21-Identify levels of organizations across ecosystems.

What are the levels of organization in an environment? Describe the relationship between individuals, populations, community, ecosystems and the biosphere.

Ecosystems As you can see, an individual elephant is part of an ecosystem. An elephant relies on interactions with other elephants to survive. They move in herds and keep each other safe. All of the elephants in the area make up a population. A **population** is all the organisms of the same species that live in the same area at the same time. A **species** is a group of organisms that have similar traits and are able to produce fertile offspring.

Many species besides elephants live in Etosha National Park. Zebras, tortoises, and lions all call the area their home. Plants that grow in the savanna include shrubs, grasses, and small trees. Together, all these plants, animals, and other organisms make up a community. A **community** is all the populations of different species that live together in the same area at the same time.

COLLECT EVIDENCE

How are the animals in Etosha National Park organized in their ecosystem? Record your evidence (A) in the chart at the beginning of the lesson.

Exploring the living and nonliving things that make up the Etosha National Park ecosystem may have made you think about your own ecosystem. What are the parts that make up the ecosystem where you live?

INVESTIGATION

There's No Place Like Home

Use the space below to list the living and nonliving things in your local ecosystem.

Living Things

Answers may vary. Sample answer: Trees, grass, squirrels, rabbits, raccoons, mosquitos, mushrooms

Nonliving Things

Answers may vary. Sample answer: Rocks, water, sand, sunlight

How do you think the living and nonliving parts of your ecosystem interact?

Answers may vary. Sample answer: Living things like trees and other plants require nonliving things like water and sunlight. Animals in turn need those plants for survival.



INVESTIGATION

There's No Place Like Home

Use the space below to list the living and nonliving things in your local ecosystem.

Living Things

Nonliving Things

How do you think the living and nonliving parts of your ecosystem interact?



22-Evaluate differing biodiversity and ecosystems.

Define biome.

List the characteristics of the following biomes:

Desert

Grassland

Tropical Rain Forests

Temperate Rain Forests

Temperate Deciduous Forests

Taiga

Tundra

COLLECT EVIDENCE

How does biodiversity in tropical rain forest ecosystems, such as those in the rain forests of Madagascar, differ from biodiversity in other ecosystems? Record your evidence (C) in the chart at the beginning of the lesson.

How do humans benefit from biodiversity?

The benefits that humans receive from biodiversity and healthy ecosystems are extremely valuable. Changes to biodiversity can influence the benefits we receive from an ecosystem. Some studies have helped show the importance of these benefits by translating them into dollar values, which total thousands of trillions of dollars. What kinds of benefits do we receive from ecosystems that are healthy due to biodiversity?

INVESTIGATION

Benefits of Healthy Ecosystems

ENVIRONMENTAL Connection Observe the ecosystem in the image to the right. With a partner, brainstorm the benefits that humans receive from that ecosystem in the space below.



Answers may vary. Students should be encouraged to speculate.

Sample answer: Humans receive food, such as corn, from the ecosystem. People also make money from the sale of food.

Humans also use the water in this ecosystem, and breathe the air. Humans also receive benefits by enjoying activities in the ecosystems, such as biking and boating. They also benefit from the trees in this ecosystem because they provide oxygen.

Outcomes covered as per EOT coverage document UNIT 4 FRQ

23-Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

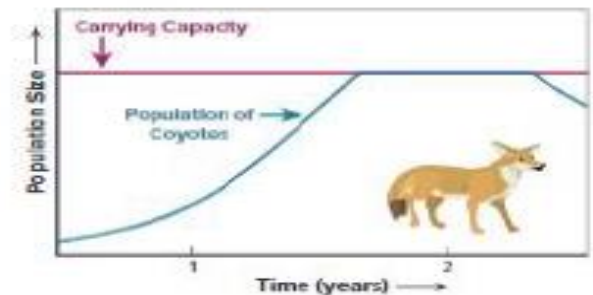
What are limiting factors? And how do they affect the population? What is the difference between biotic potential and carrying capacity? Define overpopulation.

Predict A drought decreases the growth of prairie grass. How might this affect the deer population that eats the grass as its main food source? In your Science Notebook, write your response or illustrate your answer using a graphic organizer.



Three-Dimensional Thinking

Examine the graphs, then answer the questions below.



2. A population of coyotes lives in a habitat with plentiful food and no predators. Analyze the graph and interpret what is happening to their population size at the one year mark.

A The population size is increasing.

B The population size is decreasing.

C The population size is remaining the same.

D The population size cannot be inferred from the graph.
3. Which of the following explains what happened to the coyote population size when it reached its carrying capacity, and why?

A The population size continued to increase because the ecosystem had not changed.

B The population size stopped increasing because it had reached the largest number of coyotes that the ecosystem could support.

C The population size became zero because the ecosystem could no longer support the coyote population.

D The population size can no longer be inferred from the graph once carrying capacity is reached.

Outcomes covered as per EOT coverage document UNIT 4 FRQ

24-Model chemical reactions such as photosynthesis and/or cellular respiration.

Compare photosynthesis and cellular respiration. What is required for photosynthesis? What are the products of photosynthesis? What is required for cellular respiration? What are the products of cellular respiration?

Summarize It!

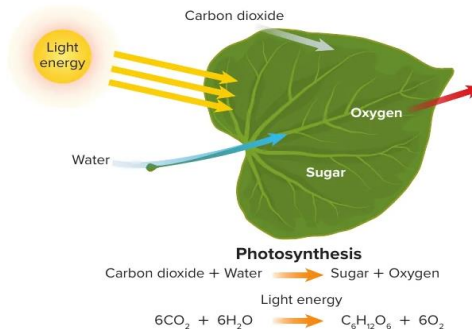
- Explain** the transfer of energy and cycling of matter by modeling the chemical reactions of photosynthesis and cellular respiration below. Use arrows to show movement in your model. Include yourself and the *Elodea* plant from the *Photosynthesis and Light* lab in the model.

Answers may vary. Students should model photosynthesis and cellular respiration using chemical reactions, arrows, themselves, and the *Elodea* plant.



Three-Dimensional Thinking

Use the model to answer question 2.

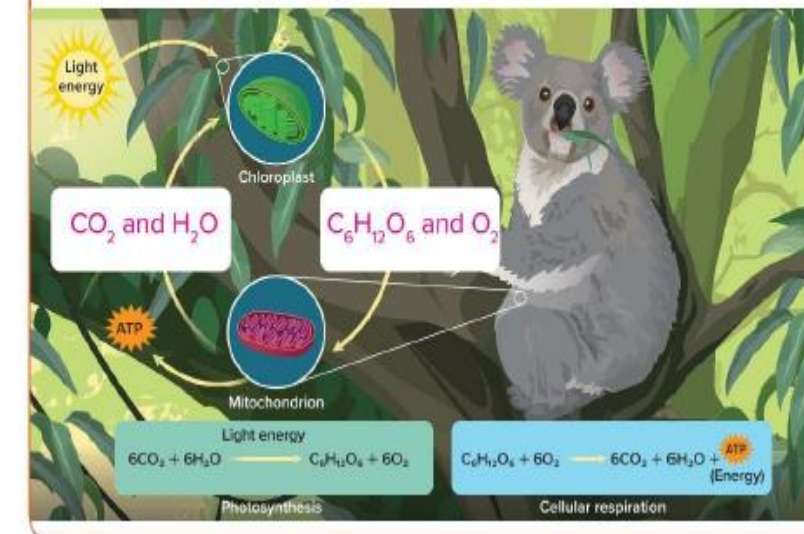


- Which is the best explanation of the change in energy shown in the model?
 - New energy is produced by plants during photosynthesis.
 - Large amounts of energy are released into the environment during photosynthesis.
 - Energy from sunlight is destroyed as it powers photosynthesis
 - Energy input from the environment is stored in food molecules during photosynthesis.
- EARTH SCIENCE Connection** In recent decades, average global temperatures have increased significantly. Scientists agree that the widespread destruction of the Amazon rain forest contributes to climate change. Which mechanism might be cited to support that hypothesis?
 - Deforestation causes water on the ground to reflect sunlight.
 - Deforestation reduces the number of plants able to absorb carbon dioxide.
 - Photosynthesis produces energy, which gives off heat.
 - Plants use up energy during cellular respiration.



THREE-DIMENSIONAL THINKING

Label the image of the **system** below to track the **energy** transfer in photosynthesis and cellular respiration. Identify inputs and outputs of each part of the system.

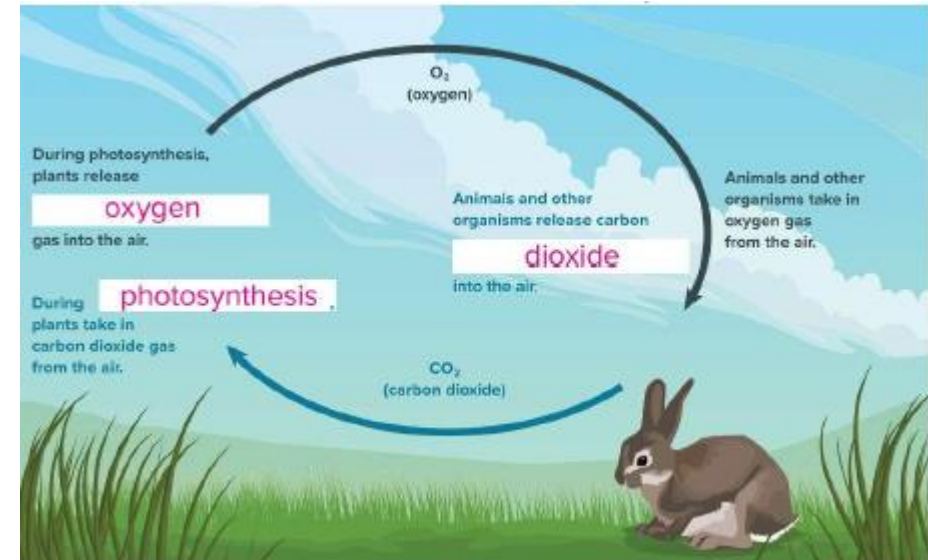


Outcomes covered as per EOT coverage document UNIT 4 FRQ

25-Model and describe the cycling of matter in an ecosystem.

Compare photosynthesis and cellular respiration. What is required for photosynthesis? What are the products of photosynthesis? What is required for cellular respiration? What are the products of cellular respiration?

Label evaporation, condensation, and precipitation in the diagram below.



3. Which of the following is NOT true about systems that cycle matter?

- A Living things play a role in the cycling of matter.
- B Matter changes form as it cycles.
- C Some matter is destroyed as it cycles through the environment.
- D Matter is constantly cycling through the environment.

Outcomes covered as per EOT coverage document UNIT 4 FRQ

P41 Q26 3. In an energy pyramid, approximately 10 percent of the energy available in one trophic level is transferred to the next level. Which statement helps explain why this occurs?

- A Consumers eat both producers and other consumers.
- B Organisms use most of the available energy to fuel their own life processes.**
- C Predators eat more organisms in their own level than organisms in other levels.
- D Producers exist in only the lowest level of the pyramid.

P 117 Q27 How does human activity cause disruptions in ecosystems? How are pollution and invasive species threats to biodiversity?

P183 Q 28



Evaluate the following possible solutions to combat the threats to biodiversity shown in the image above. Which of the following would be the least effective solution?

- A regulating fishing**
- B bioremediation
- C proper disposal of wastes
- D reducing the use of harmful chemicals

P 141 Q29 .Define species.