Lesson 4.13: Life Science – Ecosystems 1

Weekly Focus: Reading Comprehension
Weekly Skill: Finding Evidence from Passage

Lesson Summary: This week students will read two different passages with information on ecosystems. The first passage includes information specifically about Earth's ecosystems. The second passage has more information about ecosystems and the "eco-pyramid". The ideas are fundamental for some parts of the 2014 GED Science test.

Materials Needed:

- Comprehension Reading **Unit 4.13 Handout 1**
- Comprehension Reading **Unit 4.13 Handout 2**
- Extra Work/Homework **Unit 4.13 Handout 3** (6-way Paragraphs, Advanced, #73, pages 146 – 147)

Objectives: Students will be able to…

- Read comprehension passages with vocabulary related to the ecosystems.
- Practice citing evidence from reading passages to answer comprehension questions.

College and Career Readiness Standards: RI, RST, WHST

ACES Skills Addressed: EC, LS, ALS, CT, SM, N

Notes: Please review and be familiar with classroom routine notes for: reading for fluency strategies (**Routine 2**), summarizing techniques (**Routine 4**), self-management skills (**Routine 1**). The notes for the different activities will help with making a smooth transition to each activity.

GED 2014 Science Test Overview – For Teachers and Students

The GED Science Test will be 90 minutes long and include approximately 34 questions with a total score value of 40. The questions will have focus on three content areas: life science (~40%), physical science (~40%), and Earth and space science (~20%). Students may be asked to read, analyze, understand, and extract information from a scientific reading, a news brief, a diagram, graph, table, or other material with scientific data and concepts or ideas.

The online test may consist of multiple choice, drop down menu, and fill-in-the-blank questions. There will also be two short answer questions (suggested 10 minutes each) where students may have to design an experiment or identify errors in a conducted experiment, summarize, find evidence (supporting details), and reason or make a conclusion from the information (data) presented.

The work students are doing in class will help them with the GED Science Test. They are also learning skills that will help in many other areas of their lives.

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Activities:

Warm-Up: KWL Chart	Time: 10 - 15 minutes

- As students enter the class, have the following written on the board or overhead **"Ecosystems are communities of living things and the environmental features that support them."** Have students create a **"KWL"** chart on a piece of notebook paper (below). This helps to activate students' prior knowledge by asking them what they already **K**now (column 1); students (collaborating as a classroom unit or within small groups) set goals specifying what they **W**ant to learn (column 2); and after reading students discuss what they have **L**earned (column 3).
- Students apply higher-order thinking strategies which help them construct meaning from what they read and help them monitor their progress toward their goals.

KWL Chart:

K - What (else) do I KNOW?	W - What do I WANT to know?	L - What did I LEARN?

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Activity 1: Comprehension Reading (Unit 4.13 Handout 1)	Time: 40 - 45 minutes

1) Hand out **Unit 4.13 Handout 1** to students.
2) Explain to students they will read about the ecosystems. This information is important foundational knowledge for questions that may be on the 2014 GED Science module.
3) Discuss with students that when reading for comprehension, there are many strategies to use: read the title to predict what the reading is about; look at the subheadings to get a better idea of what each section is about; if there are images, look at them to gain understanding; while reading remember to ask "What is this all about?"
4) Have students read the passages independently while answering the questions at the end.
5) Circulate class while they are reading to make sure they understand the information presented and see if there are any questions.
6) Review answers as a whole class. Ask students to point to the evidence from the reading passage that helped them determine the answer(s).
7) If there is time, students can summarize the reading or write the main idea.
8) Students can fill in the **"L"** portion of the KWL chart.

Break: 10 minutes

Activity 2: Comprehension Reading (Unit 4.13 Handout 2)	Time: 40 - 45 minutes

1) Hand out **Unit 4.13 Handout 2** to students.
2) Explain to students they will continue with reading passages on ecosystems and their relationships. This information is important foundational knowledge for questions that may be on

the 2014 GED Science module.
3) Discuss with students that when reading for comprehension, there are many strategies to use: read the title to predict what the reading is about; if there are images, look at them to get a better understanding; while reading remember to ask "What is this all about?"
4) Have students read the passage independently while answering the questions at the end.
5) Circulate class while they are reading to make sure they understand the information presented and see if there are any questions.
6) Review answers as a whole class. Ask students to point to the evidence from the reading passage that helped them determine the answer.

Wrap-Up: Summarize	**Time: 5 minutes**
Have students turn to a partner (or write in their journals) about what they have learned today about ecosystems and the eco-pyramid. Ask them to tell a partner one thing they learned today in one or two sentences. *Note: Use Routine 4 Handout*	

Extra Work/Homework: Unit 4.12 Handout 3	**Time: 30 - 45 minutes outside of class**
Students can continue to read about Food Chains with a 6-way Paragraph passage – "A Chain of Life".	

Differentiated Instruction/ELL Accommodation Suggestions	**Activity**
If some students finish early, they can turn their paper over and summarize the reading passage.	**Activity 1 and Activity 2**
Teachers should be aware that ELLs could have some difficult time with some of the vocabulary encountered in the handouts for Activity 1 & 2. Encourage them to look for context clues in the reading that will help them with interpreting the main idea of each reading passage and cite evidence to support their written answers.	**Activity 1 & 2**

Online Resources:

If students have Internet connection, they can try online interactive activities with deciding on components of ecosystems. Here are a few websites that standout.

http://www.sheppardsoftware.com/content/animals/kidscorner/games/producersconsumersgame.swf

http://www.sheppardsoftware.com/content/animals/kidscorner/games/foodchaingame.swf

This is a great activity to analyze biomes:

http://www.pbslearningmedia.org/resource/lsps07.sci.life.oate.ecosystem/analyzing-an-ecosystem/

Suggested Teacher Readings:

- GED Testing Service – GED Science Item Sample (to get an idea of what the test *may* be like)

http://www.gedtestingservice.com/itemsamplerscience/

- Assessment Guide for Educators: A guide to the 2014 assessment content from GED Testing Service:

http://www.riaepdc.org/Documents/ALALBAASSESSMENT%20GUIDE%20CHAPTER%203.pdf

- Minnesota is getting ready for the 2014 GED test – website with updated information on the professional development in Minnesota regarding the 2014 GED.

http://abe.mpls.k12.mn.us/ged_2014_2

- Essential Education's 2014 GED Test Curriculum Blueprint (PDF)

http://www.passged.com/media/pdf/educators/curriculum-blueprint.pdf

Unit 4.13 handout 1 (4 pages total)

What Are Earth's Ecosystems?

Community Interactions

Living things need one another. They also need nonliving things, such as air, water, and soil. An ecosystem is made up of all the living and non-living things in an area. The living parts of an ecosystem, such as animals, plants, and microorganisms, are called its biotic factors. The nonliving parts of an ecosystem are called its abiotic factors. These include temperature, precipitation, wind, soil, and other nonliving things. The biotic factors depend on each other and on the abiotic factors to say alive.

Abiotic factors that support life are found nearly everywhere on Earth. These factors vary from place to place, which means that ecosystems and the life they support vary, too. One important abiotic factor is climate.

Living things survive in many different ecosystems. Living things depend on an ecosystem's climate to survive. Climate is the average weather in a place from year to year. Climate affects the kinds of things that live in an ecosystem.

Montana is cooler than Florida because it is farther north of the equator. Its climate is called temperate, which means it is warm in the summer and cold in the winter. Places with temperate climates do not have as much precipitation as tropical places.

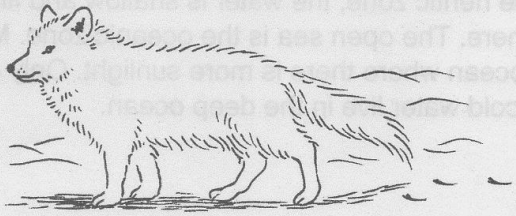
Fewer living things survive in the wild areas of Montana than in Florida. That is because Montana's colder, temperate climate makes it harder for all organisms to live there.

Land Biomes

Most species live best in their own biome. A biome is a large group of similar ecosystems. It has similar climates and living things. The six main land biomes are tundra, taiga, grassland, temperate forest, tropical rain forest, and desert.

The tundra is a cold biome with no trees. A thick layer of ice called permafrost stays below the soil all year. Mosses and shrubs can grow here. Arctic foxes, musk oxen, and snowy owls live here. They have thick coats of fur or feathers to help them survive the cold.

The taiga is an evergreen forest biome just south of the tundra. It is warmer and wetter than the tundra. Ferns and mosses, along with grasses and flowers, grow here.



Birds, squirrels, and bears live in the taiga. All summer, they store food and fat for the cold winter. They have thick coats to keep them warm.

In grasslands, there is enough rain for grasses to survive but not trees. Grasslands are found on every continent except Antarctica and can be very cold, very hot, or temperate. Most grasslands have wet and dry seasons.

Grassland animals and plants must be able to survive without water during dry seasons. Plants must be able to grow back from their roots after fires. The animals must be able to run fast or hide to survive.

Plants and animals live easily in temperate forests because there is much rainfall and sunlight. Their winters are not as cold as in the taiga, and their summers are warmer. This biome has trees, grasses, ferns, and bushes. Many insects, reptiles, birds, and mammals live in it. Animal adaptations include thick fur coats, hibernation, and migration.

Warm, wet tropical rain forests are found close to the equator. Because of the warm temperatures and high amount of rainfall, many species of animals and plants live here. This means that this biome has great biodiversity.

Rain forest organisms work hard to get sunlight, find food, and stay safe. Trees grow taller than other plants to reach sunlight. Many animals have adaptations to help them find food and stay safe. For example, some frogs have poison in their skin to keep enemies away. Monkeys use long tails and fingers to climb trees for food and safety.

Deserts are places that get little or no rainfall. Only strong living things survive in this biome using special adaptations. Animals find water in seeds they eat. They stay cool by hiding during the day. They hunt at night when it is cooler. Cactuses store water inside their tissues. Their thorns help keep them from being eaten by animals.

Ocean Biome

Water covers almost three-quarters of Earth's surface. Water biomes include freshwater biomes and saltwater biomes like the oceans.

Different areas of the ocean are called zones. Each zone has different characteristics. Organisms in each zone have adapted to become the right life forms for those conditions.

The intertidal zone is the area right along the shore that water reaches when the tide goes in and out. In the neritic zone, the water is shallow and filled with nutrients. Crabs, shrimp, and fish live here. The open sea is the oceanic zone. Most organisms in this zone live at the top of the ocean where there is more sunlight. Only organisms that have adapted to the dark, cold water live in the deep ocean.

Name _____ Date _____

What Are Earth's Ecosystems?

1. What are some of the biotic factors of an ecosystem?

_____

2. What are some abiotic factors in an ecosystem?

_____

3. What is a climate?

_____

4. What is a biome?

_____

5. What is the difference between tundra and taiga?

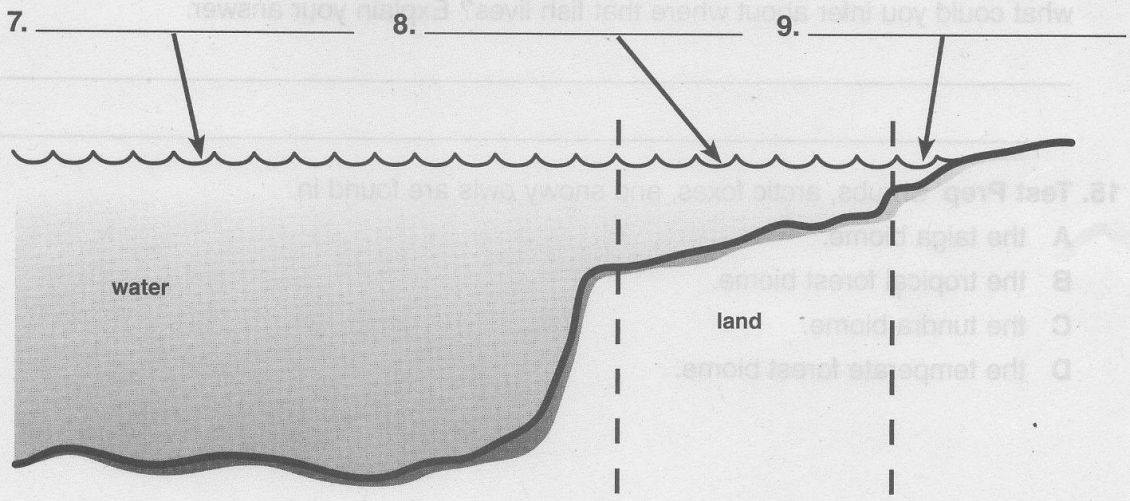
_____

6. What is the difference between grasslands and temperate forests?

_____

_____

Label the zones in the diagram below.



Name _____ Date _____

10. Main Idea Explain how the abiotic factors in an ecosystem determine the types of organisms living there. Use a desert biome as an example.

_____

_____

11. Vocabulary Define *biodiversity*. Explain which biome has the greatest biodiversity and why.

_____

_____

_____

12. Reading Skill: Cause and Effect Explain why different ocean zones are home to very different species.

_____

_____

13. Critical Thinking: Evaluation Based on the adaptations of animals, evaluate what might happen to the animals in a biome if Earth's temperature increased.

_____

_____

14. Inquiry Skill: Infer If you saw a photograph of a fish that can make its own light, what could you infer about where that fish lives? Explain your answer.

_____

_____

15. Test Prep Shrubs, arctic foxes, and snowy owls are found in

A the taiga biome.

B the tropical forest biome.

C the tundra biome.

D the temperate forest biome.

Unit 4.13 handout 1

TEACHER ANSWER KEY

1. Some of the biotic factors of an ecosystem are animals, plants, and microorganisms

2. Some abiotic factors in an ecosystem are temperature, precipitation, wind, and soil

3. A climate is the average weather conditions in a place from year to year

4. A biome is a large group of similar ecosystems.

5. The taiga is warmer and wetter than the tundra.

6. Temperate forests gets enough rainfall to support trees, but grasslands are too dry to support trees.

7. Oceanic zone **8.** Neritic zone **9.** intertidal zone

10. *Answer will vary. Suggested answer:* Organisms that live in a desert must survive abiotic factors of high temperatures and lack of water.

11. *Answer will vary. Suggested answer*: Biodiversity is the variety of organisms in an area. Tropical rain forests have the greatest biodiversity because of the year-round warm temperatures and lots of rain.

12. *Answer will vary. Suggested answer:* Each zone has different characteristics. The species in each zone are adapted to those characteristics.

13. *Answer will vary. Suggested answer:* Animals adapted to cold climates might have trouble surviving because they would be too warm.

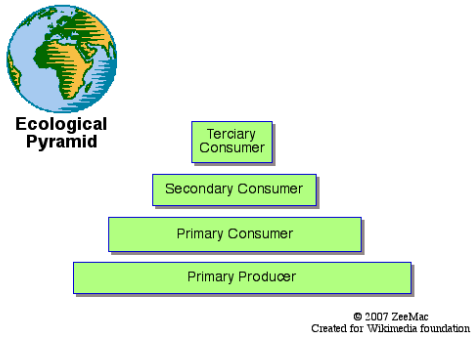
14. *Answer will vary. Suggested answer:* You could infer that it lives in the oceanic zone. That zone is very deep and dark, so the fish has adapted to this environment by make its own light.

15. C

4.13 Handout 2 (4 pages total)

The Eco Pyramid

By Michael Stahl



An ecosystem is a group of living organisms going through their life cycles in a particular environment alongside nonliving things. Ecosystems exist because of the interactions between these living and nonliving things. In other words, plants and animals all need each other so that they can continue living; they even need nonliving parts of ecosystems to survive. One very important aspect of an ecosystem is the energy that flows through it. Energy is exchanged between members of ecosystems, creating a cycle and assisting in the continuation of life. However, not all of the organisms living in an ecosystem absorb equal amounts of energy as it travels throughout the cycle. An eco pyramid effectively illustrates which types of organisms absorb various levels of energy in an ecosystem's energy cycle.

The power of the Earth's sun gets the energy cycle of most ecosystems going. Solar rays enter the Earth's atmosphere and fall to the surface where plants utilize the energy from them. Through a process called photosynthesis, plants, like trees, grass, and bushes, create food for themselves. Plants are able to take in carbon dioxide from the atmosphere and their roots absorb water from the surrounding soil. Plants then use the solar energy and the hydrogen from water to transform the carbon dioxide into a nourishing carbohydrate. With photosynthesis complete and food and energy absorbed, the plants release the oxygen part of the water that they had taken from the soil back out into the atmosphere. Other living things, like human beings, enjoy oxygen in the breathing process. The plants of an ecosystem are called "autotrophs," which means "self-feeders."

Lesson 4.13: Life Science – Ecosystems 1

The carbohydrates that were produced by the photosynthesis process give the plant energy to continue on living. Herbivores are animals that eat mostly, if not strictly, plant life. Termites, koalas, field mice, and deer are a few examples of herbivores. Deer feed on leaves and grass, consuming the green plant life's energy. To consume means to eat something and absorb its nutrients for survival. After eating the plants of their choice, deer will then digest the plants and use whatever nutrients that plant had stored inside to create energy so that they can continue to live. The herbivores of an ecosystem are called "primary consumers." This is because they are the first organisms to eat something else in the ecosystem's energy cycle. Some of the energy that the herbivores use is lost in the ecosystem when they create body heat. For example, when deer run and their bodies warm up, the excess heat within their bodies escapes into the atmosphere. If that did not happen, the deer's bodies would get too hot and their organs would fail to work any longer.

Energy is transferred again in an ecosystem's energy cycle when "secondary consumers" begin to carry out their function. Carnivores, or meat eaters, act as secondary consumers. Lions, tigers, and polar bear are carnivorous. They eat the meat of the herbivores after a hunt. When tigers eat their prey's meat, they go on to digest it and use the energy from it for their own survival. Like the herbivores in the previous section of the energy cycle, carnivores also give off heat energy when their bodies warm up from exercise. Unfortunately for the carnivorous secondary consumers, they too will eventually find themselves targets for their energy by other members of their ecosystem: the tertiary consumers.

Secondary consumers are carnivorous predators, meaning that they hunt down other animals and kill them for food. However, these animals are not at the very top of the food chain and they too can be hunted and utilized as a meal. Tertiary consumers are predators who lie at the top of the food chain. Human beings are the most obvious example of a tertiary consumer. Unlike the secondary consumers, tertiary consumers are not normally preyed upon by other members of the ecosystem. Therefore, the tertiary consumer has a much different role in the energy cycle.

Like the primary and secondary consumers, the tertiary consumers give off body heat. That energy is lost to the energy cycle. For the energy cycle to gain energy from tertiary consumers, they must die. Even if they are not hunted, all living things die, and when they do so, they decompose. Bacteria and fungi attach themselves to a dead tertiary consumer and begin to break down the matter of the body, releasing nutrients into the soil. These nutrients are then used to give life to new plant life. This means that the energy cycle has been completed can begin again!

Lesson 4.13: Life Science – Ecosystems 1

Use the information presented in the reading passage to answer the following questions.

1. What is an ecosystem?

A. a process in which plants take carbon dioxide from the atmosphere and hydrogen from water, and release oxygen into the atmosphere

B. a group of living organisms going through their life cycles in a particular environment alongside nonliving things

C. a predator that lies at the top of the food chain and may feed on plants, primary consumers, or secondary consumers

D. an organism that attaches itself to dead tertiary consumers and breaks down the matter of their bodies

2. What is a list of the types of organisms in an eco-pyramid?

A. nonliving things, bacteria, fungi, sunlight, water secondary consumers, tertiary consumers

B. primary consumers, deer, bacteria, fungi, nonliving things, tertiary consumers

C. primary producers, primary consumers, secondary consumers, tertiary consumers

D. primary producers, primary consumers, secondary consumers, carbohydrates, water

3. In an ecosystem, primary consumers eat plants. Secondary consumers eat primary consumers. Tertiary consumers eat secondary consumers. What can be concluded from this information?

A. Plants need both carbon dioxide and water for photosynthesis to occur.

B. Different types of organisms within an ecosystem need each other to live.

C. Bacteria and fungi are needed to break down the dead bodies of tertiary consumers.

D. Light from the sun is necessary for most ecosystems on Earth to get going.

4. Which members of an ecosystem are part of the energy cycle?

A. ONLY the living things in the ecosystem

B. ONLY the nonliving things in the ecosystem

C. living and nonliving things in the ecosystem

D. the energy cycle is not dependent on any members of the ecosystem

5. What is this passage mostly about?

A the energy cycle of an ecosystem and the different types of organisms within an ecosystem

B the function of secondary consumers and their importance to an ecosystem

C the problems for ecosystems that result from humans hunting animals such as deer and tigers

D the creation of body heat in primary consumers and the release of that heat into the atmosphere

6. Choose the answer that best completes the sentence below.

Living and nonliving things in an ecosystem interact with each other; _____, plants use energy from the sun.

A on the other hand

B in the end

C in particular

D previously

7. What are herbivores?

_____

_____

_____

8. What do secondary consumers eat?

_____

_____

_____

9. If one type of organism described in the passage were removed from an ecosystem, what would happen to the ecosystem? Explain your answer using evidence from the passage.

_____

_____

_____

_____

4.13 Handout 2

TEACHER ANSWER KEY

1. B

2. C

3. B

4. C

5. A

6. D

7. *Answer may vary. Suggested answer;* Herbivores are animals that eat mostly, if not strictly, plant life.

8. *Answer may vary. Suggested answer;* Students may answer that secondary consumers eat primary consumers, herbivores, or specific herbivores (e.g., deer).

9. *Answer may vary. Suggested answer;* Answer may vary, as long as they are supported by evidence from the passage. Students may make the case that if one type of organism were removed, other types of organisms would die. For instance, if plants were removed form an ecosystem, herbivores would die, and then animal that prey on herbivores would die, and so on. Students may also argue that in some cases, an ecosystem would be unaffected by the removal of one type of organism. The disappearance of tertiary consumers, for example, might not interfere with an ecosystem's energy cycles, as bacteria and fungi could continue providing nutrients to the soil by breaking down the bodies of primary and secondary consumers.

4.13 Handout 3

TEACHER ANSWER KEY

1. a. **M** (main idea)
   b. **N** (narrow idea)
   c. **B** (broad idea)

2. **c**

3. **a**

4. **d**

5. **b**

6. **a**