Lesson 4.14: Life Science – Ecosystems 2

Weekly Focus: Reading Comprehension
Weekly Skill: Group Presentations

Lesson Summary: This week students will continue to learn more about ecosystems with two different reading passages. The first passage includes information specifically about food chains and food webs. The second passage will be presented in a jigsaw – group presentation fashion – and has more information about what limits population growth in the ecosystem.

Materials Needed:

- Comprehension Reading **Unit 4.14 Handout 1**
- Jigsaw Reading & Group Presentations **Unit 4.14 Handout 2**
- Extra Work/Homework **Unit 4.14 Handout 3** (Spectrum Science, Grade 7, pages 116 – 117)

Objectives: Students will be able to…

- Read comprehension passages with vocabulary related to ecosystems
- Practice effective communication skills to present information from a reading passage to classmates

College and Career Readiness Standards: RI, RST, WHST, LS

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

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 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 **"Scientists state that every organism has its own place and role in the ecosystem."** 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 4.14 Handout 1)	Time: 40 - 45 minutes

1) Hand out **Unit 4.14 Handout 1** to students.
2) Explain to students they will continue to read about ecosystems (which they had started in Unit 4.13). 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: Jigsaw Reading Presentations (Unit 4.14 Handout 2)	Time: 45 - 50 minutes

1) Put students into groups of 4 and label each group: A, B, C, D.
2) Hand out **Unit 4.14 Handout 2** to appropriate group and have students note which groups will present which sections:

Group A: Limited Resources & Competition
Group B: Ecosystem Balance & Predators
Group C: Diseases & Invasive Species
Group D: Extinction & Rescuing Species

3) Ask students to read only their section individually in order to become experts of the material for their group.

4) Have students turn their papers over and discuss within their group what their section is about. Tell students they should also discuss how they, as a group, will present the material to the other students in the class. Circulate to make sure students understand the objective and ask them to begin the discussion.

5) Explain to students will present only their portion of the reading to the class. While they are presenting, the other groups will take notes of the material and ask questions if they do not understand. (TIP: Have students keep their pencils down while the group is presenting so they focus on listening for key ideas. Then, give students a chance to write down some notes about what they remember. You may even choose to have the rest of the class verbally repeat back some of what they heard before having them write.)

6) When student groups are finished presenting, students should answer the questions independently on the last two pages of the handout.

7) Review the answers as a whole class. If time does not permit to get all the answers, have students take it as homework for the next lesson.

Wrap-Up: Summarize	**Time: 5 minutes**
Have students turn to a partner (or write in their journals) about what they have learned today about factors on limiting population growth of species. 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 4.14 Handout 3	**Time: 30 - 45 minutes outside of class**
Students can continue to read about ecosystems with a Spectrum Science – 7 reading passage – copy pages 116 – 117.	

Differentiated Instruction/ELL Accommodation Suggestions	**Activity**
If some students finish early, they can turn their paper over and summarize the reading passage.	**Activity 1**
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.	**Activity 1 & 2**

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Online Resources:

If students have Internet connection, they can try an online interactive activity with creating their own food webs. This is something that may be on the 2014 GED Science test and it is also an excellent opportunity to practice digital literacy skills for the test, too. Here are a few that stand out:

http://terry-eng35.blogspot.com/

http://www.gould.edu.au/foodwebs/kids_web.htm

http://teacher.scholastic.com/activities/explorer/ecosystems/be_an_explorer/map/foodweb_play.htm

This is another food web activity (click skip log-in to make it work).

http://coolclassroom.org/cool_windows/home.html

With this link, students can choose in which ecosystem (pond, Arctic, meadow) in which to create their own food web.

http://www.harcourtschool.com/activity/food/food_menu.html

This is an interactive "game" about the nitrogen cycle.

http://www.classzone.com/books/ml_science_share/vis_sim/em05_pg20_nitrogen/em05_pg20_nitrogen.swf

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 4.14 Handout 1 (4 pages total)

What Roles Do Species Play?

Niche

Every organism in an ecosystem has its own niche, or role, in that ecosystem. A species' niche is its relationship with the biotic and abiotic factors in the ecosystem. A niche includes where a species lives and how it cares for its offspring.

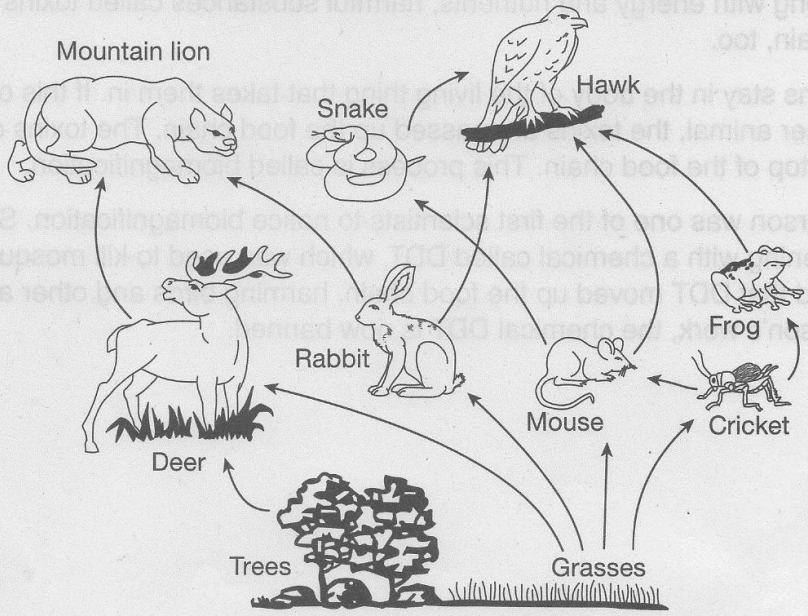
Part of an animal's niche depends on what it eats and what eats it. A predator is an animal that eats other animals. The prey is the animal that is eaten.

Some species are generalists. They fit into a large niche. For example, raccoons are predators that eat almost anything. They dine on nuts, birds, and even garbage!

Other species are specialists and occupy a very specific niche. For example, five different insect-eating birds called wood warblers live in evergreen forests and hunt in the same trees. But each warbler works in a different part of the tree. They also make nests and raise their young at different times.

Food Webs

Energy and nutrients transfer, or move, from plants to animals. A food chain shows how energy moves from producers to consumers. A group of overlapping food chains forms a food web. A food web shows how energy is transferred in an ecosystem.



All food webs have the same parts: producers, herbivores, carnivores, omnivores, and decomposers. These parts are organized in the same way.

Producers, like plants and algae, are at the bottom of the food web. They use the Sun's energy to make food. This energy passes to herbivores, or plant-eating animals. Herbivores, like deer and rabbits, are primary consumers, the first animals in any food chain.

Animals that get their energy from eating herbivores are called carnivores. Carnivores, including hawks, rattlesnakes, and lions, are consumers. Omnivores get energy from eating plants and animals. Carnivores and omnivores are at the top of a food web.

Decomposers are animals that eat dead plants and animals. They break down the dead things into nutrients for the soil. In every ecosystem, nutrients move from plants to animals to decomposers and back to plants.

The top carnivore plays an important role in most ecosystems. If this animal, such as a lion, is healthy, it shows the ecosystem is healthy. Top carnivores cannot survive without healthy plants and animal populations below them.

In healthy ecosystems, the population of each species should stay large enough to reproduce. It should also stay small enough for the species to have enough food.

Biomagnification

Energy and nutrients pass up the food web from producers to herbivores to carnivores. Along with energy and nutrients, harmful substances called toxins can pass up the food chain, too.

Some toxins stay in the body of the living thing that takes them in. If this organism is eaten by another animal, the toxins are passed up the food chain. The toxins collect in animals at the top of the food chain. This process is called biomagnification.

Rachel Carson was one of the first scientists to notice biomagnification. She saw this problem happening with a chemical called DDT, which was used to kill mosquitoes. Carson showed that DDT moved up the food chain, harming birds and other animals. Thanks to Carson's work, the chemical DDT is now banned.

Name _____ Date _____

What Roles Do Species Play?

Write answers to the questions on the lines below.

1. What is a species' niche?

_____

_____

2. How does the presence of top carnivores indicate that an ecosystem is healthy?

_____

_____

_____

3. Why are raccoons called a generalist species?

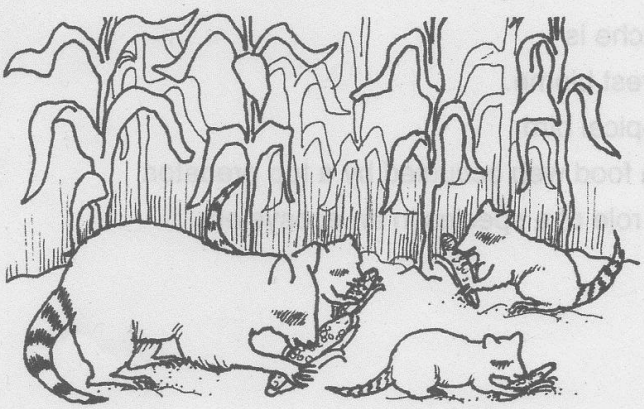
_____

Fill in the blanks.

4. _____ are at the bottom of the food web.

5. _____ and omnivores are found at the top of the food web.

6. Animals that break down dead things into nutrients that go into soil are _____.



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Name _____ Date _____

7. **Main Idea** Explain how each species in an ecosystem depends on other species.

_____

_____

8. **Vocabulary** How is a carnivore different from an omnivore?

_____

_____

9. **Reading Skill: Classify** Classify each of the following species as producers, herbivores, carnivores, or omnivores: deer, raccoon, oak tree, rabbit, cactus, grass, rattlesnake.

_____

_____

10. **Critical Thinking: Apply** Which of the following species would you expect to be most vulnerable to biomagnification: hawk, bumblebee, oak tree, deer, or raccoon? Explain your answer.

_____

11. **Inquiry Skill: Measure** Suppose you wanted to measure the amount of DDT in a food chain. Which animals in the food chain would you measure? Explain your strategy.

_____

_____

_____

12. **Test Prep** A niche is

A a type of forest biome.

B a type of tropical bird.

C the part of a food web occupied by a top predator.

D the specific role of a species in an ecosystem.

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Unit 4.14 Handout 1

TEACHER ANSWER KEY

1. ***Answer will vary - Answers should be similar to*:** A species' niche is its relationship with the biotic and abiotic factors of the ecosystem.

2. ***Answer will vary - Answers should be similar to*:** Their presences indicates an ecosystem is healthy because they cannot survive without healthy numbers of other plant and animal populations.

3. ***Answer will vary - Answers should be similar to*:** Raccoons will eat almost anything.

4. producers **5.** carnivores **6.** decomposers

7. ***Answer will vary - Answers should be similar to*:** They depend on other organisms for nutrients. Each species must remain healthy to keep the entire system healthy.

8. ***Answer will vary. Suggested answer:*** Both will eat animals; an omnivore will also eat plants.

9. **Producers:** oak tree, cactus, grass **herbivores:** deer, rabbit;

Carnivores: rattlesnake **omnivores:** raccoon

10. ***Answer will vary - Answers should be similar to:*** The hawk is because it is at the top of the food chain.

11. ***Answer will vary. Suggested answer:*** I would measure the concentration of DDT in animals at or near the top of the food chain.

12. **D**

4.14 Handout 2 (5 pages total for all students – 2 pages reading & 3 pages of notes & questions)
Group A = Limited Resources & Competition **Group B** = Ecosystem Balance & Predators

What Limits Population Growth?

Limited Resources

The population of a species depends on resources such as food and water. A limiting factor is something that stops a population from growing or spreading out. Limiting factors can be things animals need, such as water, food, and space. Limiting factors can also be competition, predation, illness, and humans. Without limiting factors, populations would keep getting larger.

Competition

Competition is the struggle among living things to use the same resources in an ecosystem. Sometimes the competition is between members of the same species. Plants, for example, might compete for space to grow. There is also competition between different species. Owls and hawks might compete for the same prey.

Ecosystem Balance

Limiting factors control the numbers of organisms an ecosystem can support. This number is called the carrying capacity. An ecosystem is in balance when the carrying capacity is reached for all its species.

Predators

When a predator catches and eats a prey, predation is taking place. For example, many wolves eat deer. When the prey population of deer grows, wolves have plenty to eat. The wolf population grows, and the deer population goes down. Now that the wolves' main food resource is diminished, the wolf population gets smaller, too. With fewer predator wolves, the deer population begins to grow again. Then the predator-prey cycle repeats.

Predator and prey species can live together this way for a long time. Their population numbers cycle from high to low to high, naturally controlling the population.

wolf: predator

deer: prey

Life Science

Group C = Diseases & Invasive Species **Group D** = Extinction & Rescuing Species

Diseases

A disease is something that stops an organism's body from working. It is an important limiting factor because it can stop population growth. Diseases can affect animal populations weakened by overcrowding or lack of food and water. Plant populations can also suffer from disease. Dutch elm disease killed most elm trees in the United States between 1930 and the 1970s.

Invasive Species

Invasive species are plants or animals that are not native to an ecosystem. When these organisms enter a balanced ecosystem, they can cause many problems. Because they have no natural enemies, their populations can grow quickly. They also use up resources such as food, water, and space. They can destroy habitats and disrupt the food chain.

Extinction

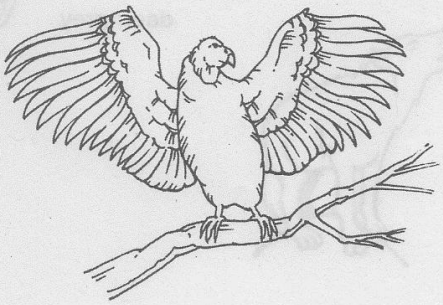
Most of the species that ever lived on Earth are now extinct. Extinction is the complete disappearance of a species. Extinction can happen when an ecosystem changes. A food source might be lost, predators might increase, or disease might appear.

Many species become extinct naturally, but humans have brought invasive species to places and caused native species to become extinct. The most significant way humans cause extinction is by destroying habitats and using up natural resources.

Rescuing Species

Many people now work to stop species from becoming extinct. In the United States, laws protect plants and animals that are close to extinction.

Captive breeding is one way to help animals close to extinction. During captive breeding, animals live and reproduce in controlled habitats with plenty of resources. Captive breeding helps the population of a species get larger. Then the species is placed back into the wild. Captive breeding saved the California condor, pictured below, from extinction.



Lesson 4.14: Life Science – Ecosystems 2

Take notes as student groups present their portion of the material on limits of population growth.

Group A = Limited Resources & Competition

Group B = Ecosystem Balance & Predators

Group C = Diseases & Invasive Species

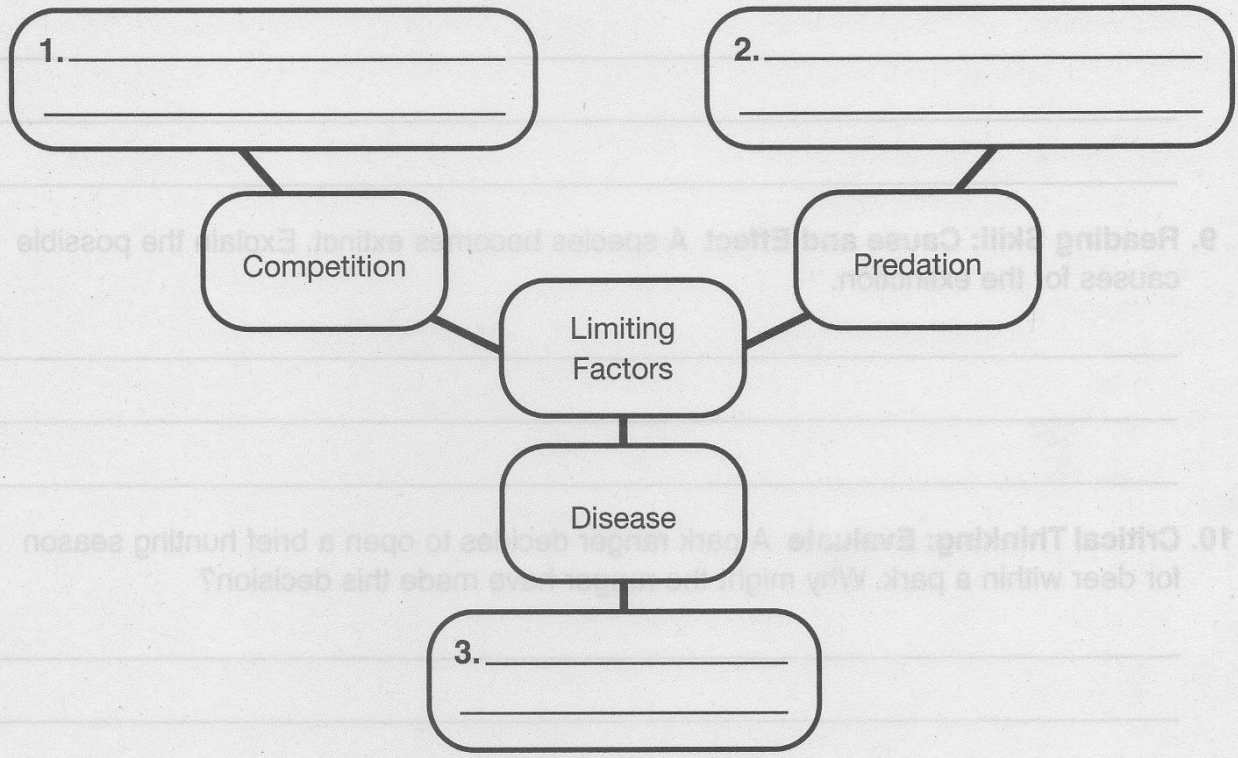
Group D = Extinction & Rescuing Species

Questions for all student groups to answer

Name _____ Date _____

What Limits Population Growth?

Fill in the blanks in the diagram below to give examples of limiting factors.



Write *true* if the statement is true and *false* if the statement is false.

_____ **4.** The natural balance of ecosystems cannot be destroyed by invasive species.

_____ **5.** The most significant way that humans increase the rate of extinction is through habitat destruction.

_____ **6.** Most of the species that ever lived on Earth are now extinct.

Name _____ Date _____

7. **Main Idea** What type of population will be most vulnerable to disease?

_____

8. **Vocabulary** Write a short paragraph using the terms *predation* and *limiting factor*.

_____

_____

_____

9. **Reading Skill: Cause and Effect** A species becomes extinct. Explain the possible causes for the extinction.

_____

_____

_____

10. **Critical Thinking: Evaluate** A park ranger decides to open a brief hunting season for deer within a park. Why might the ranger have made this decision?

_____

_____

11. **Inquiry Skill: Predict** A population of coyotes is found living in a suburban neighborhood. Over time, what will happen to the number of coyotes in the neighborhood? Explain your answer.

_____

_____

_____

12. **Test Prep** Which of the following is NOT a limiting factor?

A disease

B competition

C predation

D extinction

4.14 Handout 2

TEACHER ANSWER KEY

1. Hawk and owl hunting the same prey

2. wolves eating deer

3. Dutch elm disease

4. false **5.** true **6.** true

7. ***Answer will vary - Answers should be similar to*:** A population vulnerable to disease is one stressed by overcrowding or lack of food and water

8. ***Answer will vary - Answers should be similar to*:** A limiting factor restricts the growth of a population. Predation is one important limiting factor.

9. ***Answer will vary - Answers should be similar to*:** Some examples are habitat loss, disease, loss of food source, increased predators, and invasive species.

10. ***Answer will vary - Answers should be similar to*:** There are too many deer and the ecosystem cannot support them. Decreasing the deer population to the carrying capacity will help balance the ecosystem.

11. ***Answer will vary - Answers should be similar to*:** The number of coyotes will increase because there are not natural predators in the neighborhood to control the population.

12. D

4.14 Handout 3

TEACHER ANSWER KEY

1. ***Answer will vary - Answers should be similar to*:** It can be dangerous because this can make the animal think that the person is its prey.

2. ***Answer will vary - Answers should be similar to*:** They shouldn't leave food or trash out, and they shouldn't let small pets or children be outside alone.

3. ***Answer will vary - Possible answer:*** As a development spreads, more roads are built, which fragments, or divides, animal habitats.

4. ***Answer will vary - Answers should be similar to*:** They are building tunnels and overpasses so that animals won't have to cross busy roads.

5. ***Answer will vary – possible answer*:** Possible examples are droughts, floods, or wildfires.

6. ***Answer will vary -*** Students should be able to write a short response to answer the question. If possible, they should cite evidence from the reading to support their answer.