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### Georgia Performance Standards Framework for Science – Grade 4

#### **Unit One Organizer:** **8 Weeks** **Ecosystems**

**OVERVIEW:** This unit teaches the roles of organisms and the flow of energy within an ecosystem. It also teaches the factors that affect the survival or extinction of organisms

#### **STANDARDS ADDRESSED IN THIS UNIT**

**Focus Standards: S4L1 Students will describe the roles of organisms and the flow of energy within an ecosystem.**

- a. Identify the roles of producers, consumers, and decomposers in a community.
- b. Demonstrate the flow of energy through a food web/food chain beginning with sunlight and including producers, consumers, and decomposers.
- c. Predict how changes in the environment would affect a community (ecosystem) of organisms.
- d. Predict effects on a population if some of the plants or animals in the community are scarce or if there are too many.

**S4L2 Students will identify factors that affect the survival or extinction of organisms such as adaptation, variation of behaviors (hibernation) and external features (camouflage and protection).**

- a. Identify external features of organisms that allow them to survive or reproduce better than other organisms that do not have these features. (e.g. camouflage, use of hibernation, protection, etc.)
- b. Identify factors that may have lead to the extinction of some organisms.

#### **STANDARDS ADDRESSED IN THIS UNIT**

**Supporting Standards:**

**S4CS1. Students will be aware of the importance of curiosity, honesty, openness, and skepticism in science and will exhibit these traits in their own efforts to understand how the world works.**

- a. Keep records of investigations and observations and do not alter the records later.
- b. Carefully distinguish observations from ideas and speculation about those observations.
- c. Offer reasons for findings and consider reasons suggested by others.
- d. Take responsibility for understanding the importance of being safety conscious.

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**S4CS3.1 Students will use tools and instruments for observing, measuring, and manipulating objects in scientific activities utilizing safe laboratory procedures.**

- a. Choose appropriate common materials for making simple mechanical constructions and repairing things.
- b. Measure and mix dry and liquid materials in prescribed amounts, exercising reasonable safety.
- c. Use computers, cameras and recording devices for capturing information.
- d. Identify and practice accepted safety procedures in manipulating science materials and equipment.

**S4CS4 Students will use ideas of system, model, change, and scale in exploring scientific and technological matters.**

- a. Observe and describe how parts influence one another in things with many parts.

**S4CS5 Students will communicate scientific ideas and activities clearly.**

- a. Write instructions that others can follow in carrying out a scientific procedure.
- b. Make sketches to aid in explaining scientific procedures or ideas.
- c. Locate scientific information in reference books, back issues of newspapers and magazines, CD-ROMS, and computer bases.

**S4CS6 Students will question scientific claims and arguments effectively.**

- a. Support statements with facts found in books, articles, and databases, and identify the sources used.
- b. Identify when comparisons might not be fair because some conditions are different.

**ELA4R1 a, b, c, d, e, f, g, h; ELA4R2; ELA4R3 a, b, c, d, e, f, g, h, i; ELA4R4 a,b,c; ELA4W2 a,b,c,d,e,f,g,h; ELA4W3 a,b,c,d; ELA4W4 a,b,c; M4D1a,b.**

**ENDURING UNDERSTANDINGS**

- For any particular environment, some kinds of plants and animals survive well, some survive less well, and some cannot survive at all.
- Insects and various other organisms depend on dead plant and animal material for food.
- Organisms interact with one another in various ways besides providing food. Many plants depend on animals for carrying to other plants or for dispersing their seeds.
- Changes in an organism's habitat are sometimes beneficial to it and sometime harmful.
- Most microorganisms do not cause disease, and many are beneficial.
- Almost all kinds of animals' food can be traced back to plants.
- Some source of "energy" is needed for all organisms to stay alive and grow.
- Over the whole earth, organisms are growing, dying, and decaying, and new organisms are being produced by the old ones.
- Individuals of the same kind differ in their characteristics, and sometimes the differences give individuals an advantage in surviving and

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reproducing.

- Fossils can be compared to one another and to living organisms according to their similarities and differences. Some organisms that lived long ago are similar to existing organisms, but some are quite different.

**ESSENTIAL QUESTIONS**

- What is necessary for life?
- Are all organisms important?
- Why is a food web called a food web?
- Why do organisms become extinct?
- What are the roles of the producers, consumers, and decomposers in the community?
- How does the flow of energy go through a food chain? From where does this energy come?
- How will changes in the environment affect a community of organisms?
- How does the population affect the number of plants and animals in the community?
- How do external features tell you about the ability of the animal to survive in the ecosystem?
- Why do some animal become extinct?
- What role in a community so producers, consumers and decomposers play?
- What makes an animal a consumer?
- What makes a plant are producer?
- What do decomposers feed on?
- How does a scarcity or abundance of plants and animals?
- What causes plant and animal species to become endangered and extinct?
- Why do all food chains and food webs start with the sun?

**MISCONCEPTIONS**

- Plants and animals don't need each other for survival.
- Adaptations and camouflage prevent some animals and plants from becoming food.
- Extinction only occurred in the days of dinosaurs.
- Plants and animals can change features to adapt.

**PROPER CONCEPTIONS**

- Plants and animals do need each other to survive.
- All plants and animals will become food for something one day.
- Extinction still occurs today.
- Adaptations take a long time to occur.

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CONCEPTS	KNOW AND DO	LANGUAGE	EVIDENCE
<ul style="list-style-type: none"> <li>• Roles of consumers, producers and decomposers.</li>   <li>• Flow of energy in food webs/food chains beginning with sunlight.</li>   <li>• Identify external feature of organisms that allow them to survive or reproduce better than organisms that do not have these features (camouflage, hibernation, protection etc.)</li>   <li>• Changes in environments affect communities (ecosystems) of organisms.</li> </ul>	<ul style="list-style-type: none"> <li>• Students will identify the roles of consumers, producers &amp; decomposers in a community.</li>   <li>• Students will be able to illustrate a food chain and a food web starting with sunlight including the producers, consumers and decomposers.</li>   <li>• Students will identify the ways that hibernation, camouflage, and adaptation can help an animal or plant survive better than animals that do not have these features.</li>   <li>• Students will predict how changes in an environment will affect a community of organisms.</li> </ul>	<ul style="list-style-type: none"> <li>• producer, decomposer, consumer, ecosystem, population, community, habitat,</li>   <li>• food web, food chain, predator, prey, herbivore, omnivore, carnivore,</li>   <li>• camouflage, adaptation, hibernation, mimicry</li>   <li>• ecosystem, population, community, habitat,</li> <li>• adaptation,</li> <li>• hibernation, extinction</li> </ul>	<ul style="list-style-type: none"> <li>• Science journal with 3 column graphic organizer in science journal listing 5 organisms under each heading.</li>   <li>• In science journal students will draw a food chain with 4 links including the sun and then they will redraw the food chain adding other organisms to make a food web.</li>   <li>• In science journal students will list ways that different animals, such as a poisonous snake/spider, a fawn, or a black bear use external features, protection or hibernation to allow them to survive and reproduce better than organisms that do not have these features.</li>   <li>• Students will draw a picture in their science journals showing what happens to a community of animals that’s habitat has been cut down</li> </ul>

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<ul style="list-style-type: none"> <li>• Effects of a population if there are an overabundance or scarcity of plants or animals.</li> <li>• Factors that may have lead to the extinction of some organisms.</li> </ul>	<ul style="list-style-type: none"> <li>• Students will predict the effects on a population if some of the plants and animals in the community are scarce or if there are too many.</li> <li>• Students will be able to identify factors that may have led to the extinction of some organisms.</li> </ul>	<ul style="list-style-type: none"> <li>• scarcity, over-populated, endangered, under-populated characteristic/feature, balance</li> <li>• extinction, extinct</li> </ul>	<p>for a mall.</p> <ul style="list-style-type: none"> <li>• Students will list the effects on a population in a 2 column graphic organizer when there is an overabundance of plants /animals and when there is a scarcity of plants/animals.</li> <li>• Students will be able to make a word web listing 4 factors that may lead to the extinction of some organisms</li> </ul>
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**EVIDENCE OF LEARNING**

**By the conclusion of this unit, students should be able to demonstrate the following competencies:**

**Culminating Activity:** Writing a letter to local community residents explaining what is going on with the depletion of vegetation, why it is happening and what can be done to stop it from continuing.

**GRASPS**

**Goal:** (a) Students will identify why the vegetation at a local state park is being overeaten.  
 (b) Students will come up with a solution to this problem.

**Role:** You will be a State Park Ranger/Cadet assigned to help Ranger Tom find out the reason that the local resident’s gardens, small trees and underbrush are being eaten down to the point that they are dying. Your task is figure out to figure out why this is happening and what can be done to stop it.

**Audience:** Residents of Smyrna Mountain and the surrounding community.

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**Scenario:** Ranger Tom Brown has been a park ranger at Smyrna Mountain for over twenty years. Ten years ago, local residents insisted on having all of the wolves removed from the park. The residents were concerned about a rabies epidemic and thought that the Red wolf population was one of the main carriers. The wolves were removed. Since that time, the residents have noticed a major increase in the White tailed deer population and the Cottontail rabbit population. Now the residents are upset because something is eating all of their gardens, small trees and underbrush. Your task is to figure out how what is eating the gardens and other vegetation. Why has this started happening and what can be done about it?

**Product:** You will need to research and draw the food chains of the White Tailed deer, the Red wolf, and the Cottontail rabbit. You will also need to draw a food web including the White tailed deer, the Red wolf, and the Cottontail rabbit. After reviewing the food web, you will need to make a hypothesis about why the vegetation is being eaten, and what has made things get unbalanced? What needs to happen to bring everything back into balance? After you have shown your hypothesis to Ranger Tom and have gotten his approval, you will need to write a letter to the residents of the area discussing the situation. You will be advising them of what is eating their gardens, and other vegetation. Your letter will also need to let them know why this is happening and what needs to happen in order for the ecosystem to be balanced again. You will need to include the following scientific terms in the letter: ecosystem, population, predator, prey, herbivore, carnivore, adaptation, extinction, environment, energy, sun, ecosystem, balance, habitat, scarcity, over populated, under populated.

### TEACHER INFORMATION AND RESOURCES

The following websites are organizations that have good information and some resources.

- Georgia Wildlife Federation
- <http://www.gwf.org>
- Georgia Museum of Natural History Science Box Program
- <http://museum.nhm.uga.edu/htmldocs/scienceboxes/scibox.asp>
- Georgia Wildlife Web
- <http://museum.nhm.uga.edu/gawildlife/gawwregions.html>
- Georgia Science Links
- <http://www.georgiascienceteacher.org/links.htm>
- Georgia Learning Connection
- <http://www.glc.k12.ga.us>
- National Wildlife Federation
- <http://www.nwf.org>

