

**Topic:** Science, ecosystems, ecology

### **Overview**

The term *ecosystem* is an “essential knowledge” vocabulary word in the Virginia 4<sup>th</sup> grade science Standard of Learning (SOL) curriculum framework.

Because all of the other points of this SOL depend heavily on a solid understanding of what an ecosystem is, it is important to have a solid introduction to the unit. A very short video clip will be used to emphasize the parts of the definition and further student understanding.

### **Grade 4**

### **Time Allotment**

Two 40-minute sessions

### **Learning Objectives**

On completion of this lesson students will be able to:

- Identify from a list the 4 major living components of an ecosystem
- Identify from a list the 3 major non-living components of an ecosystem
- Define a microorganism
- Name 5 ecosystems
- Match 5 animals that are prevalent in each ecosystem
- Describe one reason that each animal must be in its ecosystem and could not survive in another

This lesson addresses Va. SOL Science 4.5.

### **Media Components**

- Video clip: [Biology: The Science of Life: Ecology: Organisms in Their Environment](http://www.unitedstreaming.com/). United Learning. 2003. Unitedstreaming. 9 Dec 2005  
<http://www.unitedstreaming.com/>  
Segment 2: Ecosystems: Abiotic and Biotic Factors (02:48).
- Computer with Windows Media Player and Microsoft Office
- Multimedia projector
- SmartBoard
- PowerPoint presentation (attached)

### **Materials and Student Handouts**

- Worksheet with clip art pictures and words-one per student (attached)
- Scissors-one pair per student
- Rubric-one per student (attached)

## Teacher Preparations

- Download and preview streaming clip
- Download PowerPoint
- Duplicate student handouts
- Set up SMART Notebook with the following in text boxes (in random order):  
**Ecosystem Living Things Non-living Things Plants Animals Fungus  
Microorganisms Water Light Soil**
- Set up a second SMART Notebook page with the following pictures randomly placed on the page: a deer, a camel, a polar bear, a snowy mountain, a dense forest, and a desert (get from clip art)
- Write the following on a chalkboard, whiteboard, or poster:  
**Ecosystem: All of the living and non-living things that interact with each other in a certain area or environment.**

## Introductory Activity

1. **Focus:** Can a frog survive in a desert? Can a whale survive in a pond? Can a polar bear survive in a forest? (Allow student responses and ask for reasons.) Thinking along those lines, who would like to read our new science vocabulary word and definition? (Choose a student to read. Re-read it aloud yourself.) Wow, that sounds like a lot of hard words! We need to break this apart so we can understand this.

**Activity:** Show first slide of PowerPoint presentation. Click until all words appear.

**Follow-up:** Ask students for definitions of some of the words. Write down student definitions, if desired, to correct later, if necessary.

2. **Focus:** Listen to this short video clip and we'll see if our definitions are correct and if we can make this definition easier to understand.

**Play:** the video segment from the beginning.

**Pause:** Time: 0:09

Visual: the words of the definition are displayed.

Audio: "...and with their physical environment."

**Follow-up:** Wait a minute! This shows a different definition than the one we read. Or does it? (Point to screen.) Here is the word "interactions." Here is "organisms." What are organisms? (living things) Here are the words "area" and "environment." And here is the word "physical." Could that be non-living things? Your job in these sessions is to make sense of all this.

## Learning Activities

1. **Focus:** Let's watch another segment to see how much more of our glossary definition we can figure out.

**Resume:** from where you paused.

**Pause:** Time: 00:39

Visual: the words "non-living things: abiotic factors"

Audio: "...known as abiotic factors."

**Follow-up:** There! Non-living things. Don't worry about the words "abiotic factors."

2. **Focus:** In this segment, listen for 2 non-living things that are important in an ecosystem.

**Resume:** from where you paused.

**Pause:** Time: 0:41

Visual: blue fish swims out of picture

Audio: "...light."

**Follow-up:** What 2 things are mentioned? (water and light) These are the 2 most important non-living things in an ecosystem. Why is water so important? (All living things need water to survive.) Why is light so important? (Lead them into thinking about the previous SOL on plants. Ask why sunlight is so important to plants. Answers: photosynthesis, making food, etc.)

3. **Focus:** Let's read our definition again. (Allow a student to read it aloud.) Now listen and watch to help us figure out more of our definition.

**Resume:** from where you paused.

**Pause:** Time: 00:48

Visual: words "biotic factors-the living community of organisms"

Audio: "...organisms."

**Follow-up:** What part of our definition is mentioned here? *Living things* (Point to the words living community of organisms and re-ask what organisms are.)

4. **Focus:** Now listen and think of this question: Are all ecosystems the same?

**Resume:** from where you paused

**Pause:** Time: 01:08

Visual: a snowy mountain top

Audio: "...found on this snowy mountaintop."

**Follow-up:** Are all ecosystems the same? (Elicit "no.") What are some of the ecosystems that were mentioned? (drop of pond water, swamp, ocean shore, tropical jungle, tundra, mountaintop)

5. **Focus:** Watch the rest of the video and be ready to name as many living and non-living things that you can remember.

**Resume:** from where you paused

**Stop:** at the end of the segment

**Follow-up:** Tell me the living and non-living things you remember hearing. (non-living-water, living-bacteria, protests, Cyclops, fish, plants, insects, frogs, turtles, birds)

6. **Focus:** Now let's re-read our definition to see if we are better understand what it all means.

**Activity:** Have a student re-read the definition. Look at the original student definitions and correct any misinformation.

**Follow-up:** Make sure all words are understood. Ask for volunteers to explain the words.

7. **Focus:** This PowerPoint should help us review and make our definition even more clear.

**Activity:** Resume the PowerPoint.

Slide 2: Living Things-read each word as it appears. Fungus may be unknown.

Slide 3: Plants-click until all plants appear (7). Have students tell pertinent info about plants and identify those they can.

Slide 4: Animals-click until first 2 appear and ask if all animals have 4 legs. Then click on remaining 12 and have students identify. Say: As you can see, there are all kinds of animals and each has its own ecosystem that it has to live in in order to survive.

Slide 5: Fungus-click on title and see if anyone knows what this is before clicking on 8 pictures. Say: These living things are very important in each ecosystem because they help break down dead organisms and return them to the soil.

Slide 6: Microorganisms-read and discuss definition.

Slide 7: Clip art of microscopes

Slide 8: Single microscope-Say: These organisms are so tiny that thousands can fit on the head of a pin! They are so small that you can't see them unless you look through a microscope.

8. **Focus:** I am going to play the video segment one more time. Count how many different scenes show a view of microorganisms shown through a microscope.

**Play:** the entire clip

**Stop:** at the end

**Follow-up:** How many did you see? (6) Good! So there are lots of living things that we can't even see. Why does your mom want you to wash your hands before you eat? (germs) A germ is a microorganism.

9. **Focus:** What are the 2 things that are part of every ecosystem? (living and non-living things) We've looked at living things. Now let's look at non-living things.

**Activity:** Resume the PowerPoint with slide 10.

Slide 10: Non-living things-before clicking, see if students can name any or all of the non-living things in an ecosystem. Then click to reveal water, light, and soil.

Slide 11: Water-before clicking on pictures, ask students to name different types of water. Then reveal 5 pictures, one at a time, discussing each one.

Slide 12: Light-ask where all light comes from (sun) before revealing 4 pictures.

Slide 13: Soil-as you click for 4 pictures, discuss each one.

Slide 14: Picture of very rich soil. Ask students to relate the importance of soil.

**Follow-up:** What 2 things does every ecosystem have to have? (living and non-living things) Name the living things. (plants, animals, fungus, microorganisms) Name the non-living things. (water, light, soil)

## **Culminating Activities**

1. **Focus:** We've learned a lot. As we go through this final activity, I want you to know what I will be looking for from you. (Hand out and explain the rubric. Let students ask questions and make sure they know whether you will be assessing informally or with a pencil/paper test.)

I need some volunteers to help tie all that we've learned together.

**Activity:** (Bring up the first SMART notebook page you created.) What is our main title? Ecosystem, right! (Have a student drag it to the top.)

What are the 2 main parts of every ecosystem? (After students respond, have them drag living and non-living side-by-side under the title.)

Now I want volunteers to drag the other words on this screen and put them under the right category. (living-plants, animals, fungus, microorganisms non-living-water, light, soil)

**Follow-up:** Everyone needs to look at the screen and make sure all words are in the right category. (Allow students to make any corrections as needed.) Very good! Now, that takes care of the first part of our definition-“All of the living and non-living things...”

2. **Focus:** Now we will look at the next part of the definition-“...in an area or environment...”

**Activity:** (Bring up the second SMART notebook page you created.) One at a time, I want you to come up and pair each animal with its ecosystem and be ready to tell why it must live there or why it can't live in any of the other ecosystems. (Have one student at a time pair an animal with its ecosystem.)

**Follow-up:** Ask students who make each pair to explain why the animal must live where they placed it and/or why it cannot live elsewhere.

Repeat until all 3 pairs are matched. Possible answers: polar bears need fish and cold water, they would not get food in a desert, deer would not be able to hide in the tundra, would stand out too much, there would be no leaves for them to eat, camel would freeze in the tundra or not be able to maneuver in a forest) Optional: Have students who remained at their seats give other examples of animals and the ecosystems they require.

3. **Focus:** Now let's look at the rest of the definition-“...that interact with each other in an area or environment.” The INTERACT part is another lesson. We'll get to that. BUT, what about this matter of “area or environment?”

**Activity:** (Hand out cut-out sheet.) Quickly cut out these 10 rectangles. There are 5 animals and 5 ecosystems that are found in the United States. Try to match up each animal with the ecosystem where it would most likely live. (Allow students sufficient time to cut and sort.)

**Follow-up:** Tell the class where you placed the penguin? Why is it that the penguin could not survive in a forest? (Possible answers: would overheat in warmer weather, needs the fish that a cold ocean provides, has to stay wet at all times)

Why would a camel not be able to survive in the tundra? (Possible answer: would freeze to death)

Why would a shark not be able to survive in a pond? (Possible answers: not enough space, not enough food [large sea creatures not in a pond] needs salt water

Why would a deer not survive in a desert? (Possible answers: not enough water, would be attacked by predators, not able to stand hot weather, limited leaves and grasses for food Name 4 reasons why a frog MUST have a pond. (lay eggs in water, tadpoles have to live like fish, tadpoles eat algae, frogs eat mosquitoes, mosquitoes lay eggs in water )

## **Assessment**

- See rubric. Assessment can be informal, during the lesson, or teacher can make a more formal pencil/paper evaluation.

## **Community Connections**

- Encourage students to go to a nearby pond or forest. Have them list all of the living and non-living things that they see. Encourage taking images on a digital camera or video. Have them report their findings and their experience to the class.
- Encourage students with parent help to email the United States Department of the Interior for information on an ecosystem of their choice. (Add prairie, wetlands, and grasslands to the list of U.S. ecosystems.) Have them bring the information to share with the class.

## **Cross-Curricular Extensions**

### **Language Arts**

- Write a story from the perspective of an animal entering a foreign ecosystem. (Ex. camel in forest, penguin in desert, etc.)

### **Science**

- Choose one of the animals mentioned in the lesson to research.
- Choose one of the ecosystems to fully research.

### **Social Studies**

- Locate different ecosystems within the United States and around the world. Display them on a world map.

### **Art**

- Draw animals with the living and non-living aspects of their ecosystems. Display them in the class or hallway.

## **About the Author**

William Luders is a fourth grade teacher at Stanley Elementary School in Page County, Virginia.

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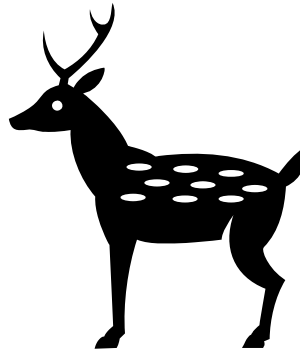
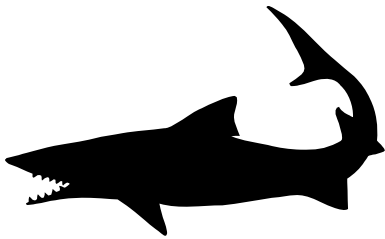
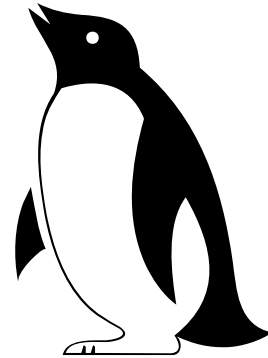
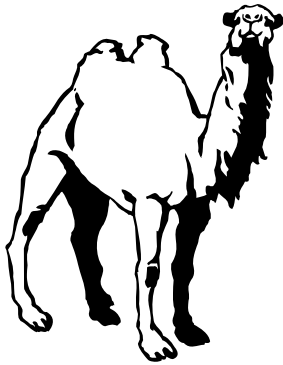


**A Frog Without a Pond**  
William D. Luders  
Page County Public Schools



	<b>3</b>	<b>2</b>	<b>1</b>
When presented with an animal native to a certain ecosystem, the student can name 3 reasons why it needs that ecosystem	Able to name 3 or more reasons	Able to name 2 reasons	Able to name 1 reason
From a list of 7 items, be able to sort and identify the living and non-living things - 4 living and 3 non-living	Able to get all 7 categorized correctly	Able to get at least 5 of the 7 categorized correctly	Able to get at least 3 of the 7 categorized correctly
Orally name 5 ecosystems found in the United States	Able to name 4 or more	Able to name 3	Able to name 2 or less

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OCEAN

DESERT

TUNDRA

POND

FOREST