Sample Grade 2

Teacher's Guide and Student Literacy

Ecosystem Diversity

A New Generation

Building Blocks of Science®

Materials List

Needed from the kit
6 aquarium nets
1 bottle of tap water conditioner
6 clear plastic tanks
1 coupon for 5 plants and 2 insects
12 dried bees
1 Habitat Card Set
24 hand lenses
3 packs of sticky notes
7 plastic cups, 9 oz
2 spray bottles
Aquarium gravel
Potting soil
Radish seeds
Rye grass seed
Woodland soil

Provided by the teacher
1 document camera or other projection system
4 flowers with exposed pollen
1 large container, approx. 2.5 gal
6 large sheets of white paper
8 markers (at least 2 different colors)
1 pair of scissors
4 plastic bottles, 16 oz
1 roll of masking tape
24 sets of crayons (1 each brown, dark blue, light blue, green, and red)
9 sheets of chart paper
12 toothpicks
2.5 gal water
Chart paper
Colored pencils
Glue
Markers

Provided by the student
1 science notebook
1 highlighter
Additional items collected for habitat (optional)

Ecosystem Diversity

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Lesson Summaries

Unit Overview

Ecosystem Diversity takes students on an exploration of what living things need to survive in their particular environments. It begins with an informal pre-assessment of what students know about living and non-living things and the basic needs of living things. Then, the class is introduced to seven habitats that it will study throughout the unit. Students identify specific habitats and describe what makes each habitat unique. They begin to understand that the physical characteristics of living things are related to the climates in which they live.

Students explore plants and animals firsthand throughout the unit. Students plant their own seeds and care for them according to a class-developed experiment to determine that plants, as living things, have some of the same basic needs as animals for survival. By planting seeds and manipulating variables, students learn that although all plants have the same basic needs, the environment in which they live can have an effect on a plant's ability to survive. Through observations and discussions of plants that are found in different habitats, students gain a basic understanding of plants' ability to adapt to their environment.

Groups apply their growing understanding of habitats to plan and construct an aquatic or terrestrial habitat of their own. Students observe all the class habitats and evaluate whether the organisms would actually be able to survive in the habitats as designed or if modifications are necessary.

To conclude the unit, students learn about how human actions can affect habitats. Through an interactive reading activity, they discuss human actions that could happen in the habitat where they live. Students are asked to consider the habitat that they created and to think of examples of ways that each of the human actions discussed could affect that habitat. Groups choose one human action that could have the largest negative impact on their habitat and create a public education campaign to teach others about how their actions can affect local habitats.

Assessment

This unit offers several ways to assess students, including a pre- and a post-unit assessment opportunity. Teachers can also use class discussions and charts to assess each lesson. Student activity sheets and science notebook entries—including drawings, writings, and dictated statements—can be used to gauge individual understanding of objectives and key vocabulary throughout the unit. The Assessment Observation Sheets supplied with each lesson help teachers document and measure students' progress and knowledge using informal assessment. A general rubric is provided to help teachers evaluate individual students at any point in the unit. The rubric provides a progression of skills and understanding that covers exploration, vocabulary, concept building, and notebook entries. Finally, a summative assessment gives students the opportunity to demonstrate unit-specific content knowledge by responding to questions in a variety of formats.

Lesson 1: Organisms and Habitats

This lesson begins with an informal pre-assessment in which students brainstorm and list living things and what they need to survive. As a class, students view various habitat cards and discuss the basic characteristics of all habitats, aquatic or terrestrial. Student groups have the opportunity to identify specific habitats and describe what makes each habitat unique.

During an interactive reading activity, students learn more about the characteristics of different climates and what living things need in order to survive in those climates. The lesson concludes with students recognizing the differences between living and non-living things, and they begin to understand that the physical characteristics of living things are related to the climates in which they live.

Lesson 2: Plant Growth

Through the discussions and activities in Lesson 1, students have built an understanding that plants are living things and have specific needs that help them grow. By planting seeds and manipulating variables, they clearly see the effects that the physical environment has on plant growth.

Students learn that although all plants have the same basic needs, the environment in which they live can have an effect on a plant's ability to survive. Through observations and discussions of plants that are found in different habitats, students gain a basic understanding of plants' ability to adapt to their environment.

Lesson 3: Plant and Animal Interactions

Students learn how animals help in seed dispersal by acting out the process using model seeds. Through dialogue and interactions between group members, students discover many ways that seeds can be moved from the flower to a location where they can grow into a new plant.

Students next observe the characteristics of insects more thoroughly. They examine the body of a dried bee, and simulate the bee behavior of flying from one plant to another to develop an understanding of how bees use their bodies to pollinate plants.

During an interactive reading activity, students learn more about the various methods of seed dispersal. The lesson concludes with students realizing the important role that plants and animals play in each other's lives and they begin to understand that neither could exist without the other.

Lesson Summaries

Lesson 4: Diversity of Life

In this lesson, groups use the understanding of habitats gained in the previous lessons to plan and construct their own habitat. Half the class will create terrestrial habitats and the other half will create aquatic habitats. Then, students will observe all of the habitats and evaluate whether the organisms would actually be able to survive in the habitats as designed or if modifications are necessary.

Lesson 5: Human Impact

In this final lesson, students learn about various human actions that can affect a habitat. As they participate in an interactive reading activity, they discuss which of those human actions could happen in the habitat where they live.

Students then look back at the habitat that they created in the classroom and come up with examples of ways that each of the human actions discussed could affect the habitat. Groups choose the human action that could have the largest negative impact on their habitat. Finally, they create a public education campaign to teach others about how their actions can affect local habitats.

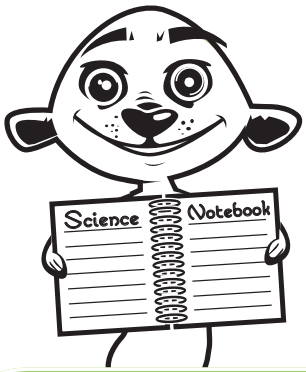
Lesson 5: Human Impact

Lesson Essentials	Next Generation Science Standards	Language Arts and Math Standards
Objectives: • Evaluate the effect of human actions on habitats. • Identify which human action has the greatest effect on specific habitats. • Determine ways that changes in behavior can have a positive effect on habitats. **Time Requirements:** **Teacher Preparation** **Part A:** 10 minutes **Part B:** 10 minutes **Part C:** 10 minutes **Lesson** **Part A:** 1 class session **Part B:** 1 class session **Part C:** 2 class sessions **Essential Questions:** • How can human action affect a habitat? **Vocabulary** • Air pollution • Land development • Land pollution • Runoff • Water pollution	**Performance Expectations** • **2-LS4-1:** Make observations of plants and animals to compare the diversity of life in different habitats. **Disciplinary Core Ideas** • **LS4.D:** Biodiversity and Humans • **ETS1.B:** Developing Possible Solutions **Science and Engineering Practices** • Developing and Using Models • Planning and Carrying Out Investigations **Crosscutting Concepts** • Cause and Effect	**Language Arts** • **L.2.4:** Vocabulary Acquisition and Use • **L.2.5:** Vocabulary Acquisition and Use • **L.2.6:** Vocabulary Acquisition and Use • **RI.2.1:** Key Ideas and Details • **RI.2.2:** Key Ideas and Details • **RI.2.3:** Key Ideas and Details • **RI.2.4:** Craft and Structure • **RI.2.8:** Integration of Knowledge and Ideas • **RL.2.1:** Key Idea and Details • **RL.2.5:** Craft and Structure • **SL2.1:** Comprehension and Collaboration • **SL2.2:** Comprehension and Collaboration • **W.2.2:** Text Type and Purpose • **W.2.8:** Research to Build and Present Knowledge **Math** • **2.MD.D.10:** Represent and interpret data.

Cross-Curricular Connections	Literacy	Assessment Strategies
Science Notebooks Language Arts Science Math Technology Art	***Ecosystem Diversity* Literacy Reader*:** • "Plants and Animals Everywhere!" pg. 2 • "Kinds of Animals," pgs. 2-3 • "Water Habitats," pg. 4 • "Freshwater Habitats," pg. 5 • "Land Habitats," pg. 6-13 • "Science and Engineering Practices," pg. 14 • "Careers," pg. 15 ** See Appendix E for Literacy Connections for before, during, and after reading.* **Additional Reading Suggestions:** TG pg. 63 • *The Lorax* by Dr. Suess (Random House Books for Young Readers, 1971)	**Student Activity Sheets:** • Literacy and Science 5: *Humans and Habitats* • Student Activity Sheet 5: *Human Impact* **Science Notebook Opportunity:** • Students describe ways that they can help maintain habitats where they live. (TG pg. 61) **Formative Assessment:** **1.** Use the public awareness posters groups create in Part C to assess understanding of the impact that humans can have on a habitat and what can be done about it. **2.** Use the included Assessment Observation Sheet for this lesson to formatively assess your class, and adjust instruction as needed. **3.** Use Science Notebook Opportunities to formatively assess the class and adjust instruction as needed. **4.** Evaluate student understanding through class discussions. **General Rubric:** • Refer to the General Rubric included in Appendix D to assess individual progress. **Science Notebooks** **Summative Assessment:** • Use the summative assessment included in Appendix F to help evaluate student understanding of key unit concepts.

Lesson 5

HUMAN IMPACT



MATERIALS

Student

1 science notebook*
1 Student Activity Sheet 5: *Human Impact*
1 copy of Literacy and Science 5: *Humans and Habitats*
1 highlighter*

Team of four students

Habitat from Lesson 4*
2 spray bottles of water
1 large sheet of white paper*

Class

Markers or colored pencils*

Teacher

Assessment Observation Sheet: Lesson 5
General Rubric (Appendix D)

*These materials are needed but not supplied.

LESSON OVERVIEW

In this final lesson, students will learn about various human actions that can affect a habitat. As they participate in an interactive reading activity, they will discuss which of those human actions could happen in the habitat where they live.

Students will then look back at the habitat that they created in the classroom and come up with examples of ways that each of the human actions discussed could affect the habitat. Groups will then choose the human action that could have the largest negative impact on their habitat. Finally, they will create a public education campaign to teach others about how their actions can affect local habitats.

OBJECTIVES

- Evaluate the effect of human actions on habitats.
- Identify which human action has the greatest effect on a specific habitat.
- Determine ways that changes in behavior can have a positive effect on habitats.

VOCABULARY

Describing Science

- Clean
- Dirty

Science Words

- Air pollution
- Land development
- Land pollution
- Runoff
- Water pollution

TIME CONSIDERATIONS

Teacher Preparation

Part A ..... 10 minutes
Part B ..... 10 minutes
Part C ..... 10 minutes

Lesson

Part A ..... 1 class session
Part B ..... 1 class session
Part C ..... 2 class sessions

TEACHER PREPARATION

Part A

1. Make one two-sided copy (brochure format) for each student from the master Literacy and Science 5: *Humans and Habitats* by following the steps below:

A. Set the copier to make two-sided opies from single copies.

B. Place the front side of Literacy and Science 5 on the copier glass, aligning the bottom right corner of the cover (panel 1) of the master to the top left corner of your copier. Copy the front of the brochure.

C. Place the second side of Literacy and Science 5 on the copier glass, aligning the top left corner of panel 2 of the master to the top left corner of your copier. (This page will face the opposite direction on the copier glass than the first page.) Copy the back of the brochure.

D. Make enough two-sided copies for each student to have one.

E. Fold each copy into a brochure. Alternatively, you may have students fold the copies when you distribute them. When folded, the title Literacy and Science 5: *Humans and Habitats* will be on the first page of the tri-fold brochure.

2. Have a highlighter available for each student.

Part B

1. Make a copy of Student Activity Sheet 5: *Human Impact* for each student.

2. Have available the habitats that students created in Lesson 4.

Part C

1. Have available a large sheet of white paper for each group of four students.

2. Have a selection of markers or colored pencils available for the class to share.

BACKGROUND INFORMATION

Pollution is a major problem affecting habitats of all types. Pollution is simply when an area is dirty and filled with things that aren't naturally there. When there is enough of it, the things that live in the habitat can be harmed or even killed.

There are many types of pollution. **Air pollution** causes poor air quality and organisms can struggle to breathe. This can be caused naturally by things like volcanic eruptions, fires, erosion, and even radioactivity. These things can't be helped. Sometimes, however, the air pollution is caused by humans. Factories, cars, cigarette smoke, and pesticides all contribute to poor air quality. Many times, humans are not even aware that the actions are affecting the air at all.

Land pollution is another type. Natural disasters can cause pollution on the land. Things like volcanic eruptions, storms, and flooding can affect the quality of the soil. A more common cause of land pollution is littering. Simply putting waste in a trash can or picking up garbage from the ground can make a big difference!

Water pollution affects habitats because it impacts the water supply. Often, the water gets polluted because the land nearby was polluted. When it rains, **runoff** carries the pollutants into lakes, streams, rivers, oceans, and other bodies of water. Strict regulations are in effect that prevent factories and businesses from dumping wastes into the water, but it does still happen. When the animals in the habitat drink the water, they can become sick or even die.

Another way that humans impact habitats is through **land development**. Cutting down trees and removing plants to prepare the land for construction takes away habitats. Animals have nowhere to live or to hide from predators.

ACTIVITY INSTRUCTIONS

Part A

Post-Unit Assessment: What Have Humans Done?

1. **Have students discuss with a partner or their group ways that humans can impact habitats.**

2. **Distribute a copy of Literacy and Science 5: *Humans and Habitats* to each student and read aloud as a class to learn more about how human actions can affect habitats. Make the connection that many of these actions are things that happen in all habitats, regardless of location and climate.**

3. **Have students highlight words in the brochure that describe things that they think happen in the habitat where they live.**

Science Notebook Opportunity

Notebook Prompt:
What actions can you take in your life to help maintain habitats near you?

Part B

Post-Unit Assessment: How Are the Classroom Habitats Affected?

1. **Have groups get the habitats they designed in Lesson 4, and allow them to discuss how each type of human action discussed in Part A can impact their specific habitat.**

2. **After time for groups to talk about the human actions, distribute a copy of Student Activity Sheet 5: *Human Impact* to each student. Allow groups time to discuss specific examples of each type of human action as it would pertain to their habitat and to complete the activity sheet together.**

3 **Once all groups have completed Student Activity Sheet 5, bring the class together and allow students to share the example of pollution in their habitat with the class.**

Part C

What Can Be Done?

Teacher Tip

If computers are available, you may have students do additional research about the human action that they choose.

1 **Challenge groups to choose the one human action that will have the greatest impact on their habitat.**

2 **Allow ample time for groups to develop a campaign to educate the public on the effect their actions have on the habitat. Each group should create a poster to spread the word.**

LESSON NOTES

EXTENSIONS

The Lorax

Read *The Lorax* by Dr. Seuss aloud to the class, or have several copies available for students to read in small groups. As a class, discuss how this story relates to the unit they have just completed. Have small groups create concept maps detailing the problems in the book.

Campus Beautification Day

Schedule a campus beautification day. Invite other students, teachers, parents, and community members to campus to pull weeds, plant a tree or trees, plant flowers, create a garden, or start an on-campus composting project. Ask for donations from local businesses.

Recycled Art

Challenge students to create an art project using only "used" materials. You may even decide to collect materials for the project in your recycling bin in the classroom. Explain to the class that these items were thrown away, but you will be giving them new life.

A Virtual Everglades Adventure

Take your class on a virtual tour of Everglades National Park in Florida by visiting the website below. Learn about the American crocodile through a series of photos, explore the Anhinga Trail Webcam, view a variety of diverse ecosystem videos including "Glade Glimpse" and "Everglades Mountains and Valleys," and use the videos to plan a trip to the park.

- www.nps.gov/ever/photosmultimedia/index.htm

Literacy Series Reader: *Ecosystem Diversity*

As a class, in small groups, or in pairs, have students explore the informational text in the literacy reader for this unit. Refer to Appendix E for strategies for before, during, and after reading the lesson-specific chapters or for exploring the literacy reader as a whole after the unit.

EVALUATION/ASSESSMENT

1. Use the public awareness posters groups create in Part C to assess understanding of the impact that humans can have on a habitat and what can be done about it.

2. Use the included Assessment Observation Sheet for this lesson to formatively assess your class and adjust instruction as needed.

3. Use the General Rubric in Appendix D to assess individual progress as needed.

4. Use the summative assessment included in Appendix F to help evaluate student understanding of key unit concepts.

Assessment Observation Sheet

Lesson 5—Human Impact

Consider the following observations/talking points during student exploration activities, quiet conversations, learning centers, and class discussions.

A. What descriptive explanations do students use to describe human actions as they impact habitats?

B. Do students demonstrate an understanding of the various types of human actions?

C. Do students' public awareness campaigns demonstrate their developing knowledge of the large effect that humans can have on the surrounding environment?

D. Can students talk informally about the human actions?

E. Are there students who seem to be having difficulty understanding the differences that small changes in human behavior can have on habitats and the earth as a whole?

F. Additional considerations:

Teacher Notes

Land Development

Land development is the cutting down of trees and forests so that things can be built in their place. When humans do this, they take habitats away from plants and animals. When trees are taken away, there are fewer places for animals to live and hid, and also less air for animals to breathe!

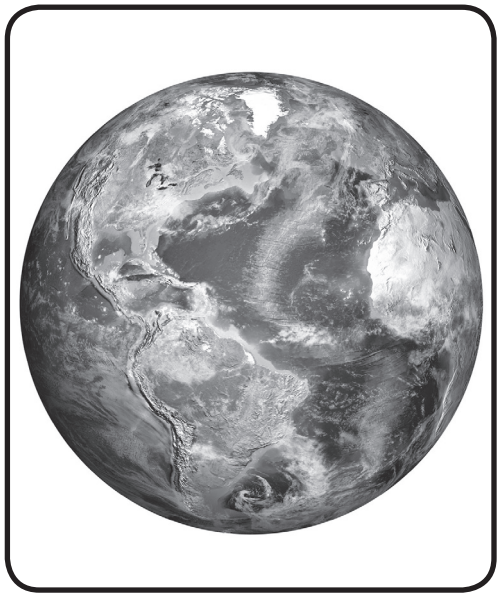
What Can Be Done?

Have you ever done any of the things you have just read about here? Do you know anyone who has?

What can you do to improve the habitats in your neighborhood or community?

Start small by sharing this information with others. You can help make a big difference!

Humans and Habitats



Take care of the earth and she will take care of you.
–Author Unknown

Air Pollution

Air pollution is when the air is dirty. Why does this affect habitats? Animals need to breathe clean air to stay alive.

Some things that make air dirty are factories, cars, cigarette smoke, and chemicals used to kill bugs.

Land Pollution

Land pollution is when the ground is not like it should be. Littering is the easiest land pollution problem to fix. Always throw your garbage in a trash can. If you see litter on the ground, pick it up!

Sometimes, farmers use chemicals to help their crops grow, but these can hurt the animals that live nearby. Some factories dump their waste onto nearby land. This can kill both plants and animals living there.

Water Pollution

Water pollution happens when things enter rivers, lakes, streams, and oceans. Water pollution can be caused by dumping garbage into the water or from draining factory wastes into the water.

Another way that water becomes polluted is through runoff. When it rains, pollution from land is washed into the nearby water.

Water pollution can kill plants and animals that live in the water. It can also hut the water supply that humans depend on.

Name: _____ Date: _____

Human Impact

Human actions impact the world. Sometimes, the impact is not good. Human actions cause the air, water, and land to become more polluted each day. Humans cut down forests at an alarming rate in order to develop the land.

With your group, discuss each human action listed below. Give a specific example of the human action in the habitat you made in class. List how each action would affect your habitat. What can be done to fix the problem?

I. Air Pollution

Give an example of this in your habitat. _____

How would this affect your habitat? _____

What can be done to fix the problem? _____

2. Land Pollution

Give an example of this in your habitat. _____

How would this affect your habitat? _____

What can be done to fix the problem? _____

3. Water Pollution

Give an example of this in your habitat. _____

How would this affect your habitat? _____

What can be done to fix the problem? _____

4. Land Development

Give an example of this in your habitat. _____

How would this affect your habitat? _____

What can be done to fix the problem? _____

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Ecosystem Diversity

Forests

A forest habitat has many large trees. One kind of forest is a **woodland**. Some trees in a woodland have wide, flat leaves. They lose their leaves in the fall. Other trees have needles. A needle is a kind of narrow leaf. Trees with needles have leaves on them all year round. Woodlands are much wetter than deserts. About 60 inches of rain falls in woodlands each year.

Many animals live in woodlands. Squirrels build nests in trees. Woodpeckers find insects to eat in the trees. Rabbits find what they need on the forest floor.

Woodlands have four seasons—spring, summer, fall, and winter. Woodland plants and animals must be able to live in both cold and warm weather.

Tropical rain forests are found near the equator. These forests do not have cold seasons like the woodlands. The temperature on most days is very warm. Rain falls almost every day. More than 80 inches of rain falls throughout the year.

The trees of a rain forest are very tall with many leaves. This covering makes the forest floor dim. Plants on the forest floor have big leaves to take in the little light that reaches there.

There are more kinds of animals in the rain forest than anywhere else on Earth. Monkeys, birds, large cats, and snakes live in and around the trees.

The red-eyed tree frog lives among the large leaves of the rain forest.

The trees in the rain forest grow thick and tall.

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Integrate opportunities to explore mathematics, technology, engineering, reading, and writing.

	Physical	Life	Earth & Space
Kindergarten	**Push, Pull, Go** *K-PS2-1; K-PS2-2*	**Living Things and Their Needs** *K-LS1-1; K-ESS2-2; K-ESS3-1; K-ESS3-3*	**Weather and Sky** *K-PS3-1; K-PS3-2; K-ESS2-1; K-ESS3-2*
1st Grade	**Light and Sound Waves** *1-PS4-1; 1-PS4-2; 1-PS4-3; 1-PS4-4*	**Exploring Organisms** *1-LS1-1; 1-LS1-2; 1-LS3-1*	**Sky Watchers** *1-ESS1-1; 1-ESS1-2*
2nd Grade	**Matter** *2-PS1-1; 2-PS1-2; 2-PS1-3; 2-PS1-4*	**Ecosystem Diversity** *2-LS2-1; 2-LS2-2; 2-LS4-1*	**Earth Materials** *2-ESS1-1; 2-ESS2-1; 2-ESS2-2; 2-ESS2-3*
3rd Grade	**Forces and Interactions** *3-PS2-1; 3-PS2-2; 3-PS2-3; 3-PS2-4*	**Life in Ecosystems** *3-LS1-1; 3-LS2-1; 3-LS3-1; 3-LS3-2; 3-LS4-1; 3-LS4-2; 3-LS4-3; 3-LS4-4*	**Weather and Climate Patterns** *3-ESS2-1; 3-ESS2-2; 3-ESS3-1*
4th Grade	**Energy Works!** *4-PS3-1; 4-PS3-2; 4-PS3-3; 4-PS3-4; 4-PS4-1; 4-PS4-3; 4-ESS3-1*	**Plant and Animal Structures** *4-LS1-1; 4-LS1-2; 4-PS4-2*	**Changing Earth** *4-ESS1-1; 4-ESS2-1; 4-ESS2-2; 4-ESS3-2*
5th Grade	**Structure and Properties of Matter** *5-PS1-1; 5-PS1-2; 5-PS1-3; 5-PS1-4*	**Matter and Energy in Ecosystems** *5-PS3-1; 5-LS1-1; 5-LS2-1; 5-ESS2-1; 5-ESS2-2; 5-ESS3-1*	**Earth and Space Systems** *5-PS2-1; 5-ESS1-1; 5-ESS1-2*
	Science	**Science**	**Science**