

Nature Walks, Recycles and Responds  
5-E Lesson Plan for Language Arts and Science

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Grade Level: Middle School 6-8	Subject Area: Language Arts, Science
Lesson Title: Nature Walks, Recycles and Responds	Lesson Length: 6-12 weeks This can also be divided into three different learning sessions.

**The Teaching Process**

**Lesson Overview:**

**Students in this unit will develop their observation skills by documenting a nature walk using descriptive and narrative writing. They will complete an observational experiment using a decomposition column in order to better understand how decomposition involves the whole community of organisms. Using expository writing, students will explain decomposition and nutrient cycling. Finally, students will predict what happens when humans or other forces change components in an ecosystem. Using persuasive writing, students will create an argument concerning people and nature.**

**Unit Objectives:**

**Students will create narrative, expository and persuasive writing.  
Students will identify and apply the scientific process.  
Students will analyze how ecosystems and populations are affected by environmental change.**

**Standards addressed:**

**MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics**

Students who demonstrate understanding can:

**MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.** [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]

<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Crosscutting Concepts</b>
<p><b>Analyzing and Interpreting Data</b> Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.</p> <ul style="list-style-type: none"> <li>Analyze and interpret data to provide evidence for phenomena.</li> </ul>	<p><b>LS2.A: Interdependent Relationships in Ecosystems</b></p> <ul style="list-style-type: none"> <li>Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.</li> <li>In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.</li> <li>Growth of organisms and population increases are limited by access to resources.</li> </ul>	<p><b>Cause and Effect</b></p> <ul style="list-style-type: none"> <li>Cause and effect relationships may be used to predict phenomena in natural or designed systems.</li> </ul>

<b>MS-LS2-2.</b>	<b>Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.</b> [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]
<b>MS-LS2-5.</b>	<b>Evaluate competing design solutions for maintaining biodiversity and ecosystem services.*</b> [Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]

**MS-LS2-3 Ecosystems: Interactions, Energy, and Dynamics**

Students who demonstrate understanding can:

**MS-LS2-3.** **Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.** [Clarification Statement: Emphasis is on describing the conservation of matter and flow of energy into and out of various ecosystems, and on defining the boundaries of the system.] [Assessment Boundary: Assessment does not include the use of chemical reactions to describe the processes.]

<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Crosscutting Concepts</b>
<p><b>Developing and Using Models</b> Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.</p> <ul style="list-style-type: none"> <li>Develop a model to describe phenomena.</li> </ul>	<p><b>LS2.B: Cycle of Matter and Energy Transfer in Ecosystems</b></p> <ul style="list-style-type: none"> <li>Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. Transfers of matter into and out of the physical environment occur at every level. Decomposers recycle nutrients from dead plant or animal matter back to the soil in terrestrial environments or to the water in aquatic environments. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem.</li> </ul>	<p><b>Energy and Matter</b></p> <ul style="list-style-type: none"> <li>The transfer of energy can be tracked as energy flows through a natural system.</li> </ul> <p>-----</p> <p style="text-align: center;"><i>Connections to Nature of Science</i></p> <p><b>Scientific Knowledge Assumes an Order and Consistency in Natural Systems</b></p> <ul style="list-style-type: none"> <li>Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.</li> </ul>

**S-LS2-4 Ecosystems: Interactions, Energy, and Dynamics**

Students who demonstrate understanding can:

**MS-LS2-4.** **Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.** [Clarification Statement: Emphasis is on recognizing patterns in data and making warranted inferences about changes in populations, and on evaluating empirical evidence supporting arguments about changes to ecosystems.]

<b>Science and Engineering Practices</b>	<b>Disciplinary Core Ideas</b>	<b>Crosscutting Concepts</b>
<p><b>Engaging in Argument from Evidence</b> Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).</p> <ul style="list-style-type: none"> <li>Construct an oral and written argument supported by empirical evidence and</li> </ul>	<p><b>LS2.C: Ecosystem Dynamics, Functioning, and Resilience</b></p> <ul style="list-style-type: none"> <li>Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions</li> </ul>	<p><b>Stability and Change</b></p> <ul style="list-style-type: none"> <li>Small changes in one part of a system might cause large changes in</li> </ul>

<p>scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.</p> <p><b>Connections to Nature of Science</b></p> <p><b>Scientific Knowledge is Based on Empirical Evidence</b></p> <ul style="list-style-type: none"> <li>Science disciplines share common rules of obtaining and evaluating empirical evidence.</li> </ul>	<p>to any physical or biological component of an ecosystem can lead to shifts in all its populations.</p>	<p>another part.</p>
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**Language Standards:**

CCSS.ELA-Literacy.W.7.1 Write arguments to support claims with clear reasons and relevant evidence.

CCSS.ELA-Literacy.W.7.2 Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

CCSS.ELA-Literacy.W.7.3 Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.

CCSS.ELA-Literacy.W.7.10 Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

**Materials:**

- Science journals
- Computers
- Projectors
- 2 liter bottles
- Organic matter
- Scissors
- Tape
- Camera or phone with camera

## Instructional Sequence

<p><b>Phase One: Engage the Learner</b></p> <p>These activities mentally engage students with an event or question. Engagement activities capture students' interest and help them to make connections with what they know and can do. The teacher provides an orientation to the unit and assesses students' prior understanding of the concepts addressed in the unit.</p> <p><b>In this lesson, students will be identifying observation skills and refining their descriptive writing. They will also discover tropical animals and habitat and categorize them according to different criteria. They will look at native animals and habitat and make observations about what they find.</b></p>	
<p>What's the teacher doing?</p> <p><b><u>Descriptive/ Narrative Writing</u></b></p> <ol style="list-style-type: none"> <li>1. Hide <u>Panama species cards</u> around the room so students can only find them by looking.</li> <li>2. Ask students what they notice about the room. Discuss with class what students noticed.</li> <li>3. Ask students what else they could do to help them observe the classroom environment? Students should say move around look closer...etc. Discuss the importance of not touching anything so that the next person can observe the "natural" habitat. Guide students to come up with types of observations: sensory, details...etc.</li> <li>4. Discuss species cards/ animals that were found in large group.</li> <li>5. Give each group a <u>complete set of cards</u>, present richness of diversity on BCI and ask students to explore the different species on BCI.</li> <li>6. Show students PowerPoint of BCI experience and discuss Tropical Biome.</li> <li>7. Pass out KWL and Amazon Rainforest books.</li> <li>8. Introduce the nature walk and discuss observation skills. Play sound bites from BCI, discuss smells, and other sensory details.</li> </ol>	<p>What are the students doing?</p> <p><b><u>Descriptive/ Narrative Writing</u></b></p> <ol style="list-style-type: none"> <li>1. In partners or small groups, without leaving their seats, students will record different observations about the room around them.</li> <li>2. Students will move around the room to complete an <u>observation chart</u> with partners or small groups. Then they will share with the larger group.</li> <li>3. Students will then gather species cards they found and sit in groups to classify the different species.</li> <li>4. Students will write down 3-2-1 (three things you learned, two things you found interesting, one question you still have) for the BCI presentation.</li> <li>5. Students will read <u>Reading A-Z Amazon Rainforest</u> book and record text codes of things they learned, things they already knew and questions they have as they read.</li> <li>6. Have students construct sensory chart to record Nature Walk observations in their science/ journal notebooks.</li> </ol>

**Phase Two: Explore the Concept**

Students encounter hands-on experiences in which they explore the concept further. They receive little explanation and few terms at this point, because they are to define the problem or phenomenon in their own words. The purpose at this stage of the model is for students to acquire a common set of experiences from which they can help one another make sense of the concept. Students must spend significant time during this stage of the model talking about their experiences, both to articulate their own understanding and to understand another's viewpoint.

**In this part of the lesson, students will work on science notebooking by recording their observations of the natural world while on a nature walk. They will use their observation journals to create a descriptive narrative about their nature walk which focuses on which organisms they identified and how that organism fits into the ecosystem. Also, students will begin an experiment on decomposition where they create a decomposition column. They must decide which materials to add to the column and how often they need to water the column. While they make observations over the next few weeks, they will work on their writing and learn about carbon and nitrogen cycles.**

When studying ecology it is important to differentiate between populations, communities, and ecosystems. A population is a group of organisms that are of the same species and live in a certain area. A community consists of all the different populations within a given area. An ecosystem includes a community of living organisms and its physical environment.

Ecology is the study of the interactions between living things and their environment. Organisms obtain their needed resources (food, water, light, etc.) from the environment. They react to changes in their environment as well as cause changes. Organisms can be producers, consumers, or decomposers. The roles organisms play is dependent on the ways they obtain energy and how they interact with other organisms.

What's the teacher doing?

**Descriptive/ Narrative Writing**

1. Write down anticipation list on board.
2. Tell students to bring a camera in order to document their observations on the sense walk.
3. Tell students to bring a science notebooks and pencils record sensory details. Review the list of things that the Students' observations should include like:
  - o Sensory details
  - o the animals that are in the area such as birds, squirrels, etc.
  - o the vegetation in the area (the size, shape, color, etc. of this vegetation)
4. Have students create a descriptive word bank for things they see, smell, hear and touch.
5. After students return, have them add a column for questions about their observations.

Observations	Questions
A foot-long log lies at the bottom of a tree	What happens to a log or branch once it falls off a tree?

What are the students doing?

**Descriptive/ Narrative Writing**

1. Ask students to name different natural things (living and non-living) that they expect to find.
2. Students will walk in the woods and complete the observation sheet.
3. Students will take pictures of their nature observations to use as part of their project.
4. Differentiation for word banks:
  - a. Students can enter their word banks into the wordle.com web page to create a wordle.
  - b. Help other students with Spanish-English Dictionaries.
5. Once students have made and shared their observations, they should create questions about the ecosystem based on these observations. Make a table, placing the observations on the left side of the board and questions on the right.
6. Students will discuss why the list is different from what they thought at the beginning.
7. Students will add observations to their science journal and begin a rough draft of their nature walk.
8. Students will take this draft through the writing process.

<p>A bird is perched on top of a tree</p>	<p>Where does a bird get its food?</p>	
<ol style="list-style-type: none"> <li>6. Once each student has been given an opportunity to ask a question, they can be posted on a bulletin board in the room.</li> <li>7. Pass out rubrics for narrative on Nature Walk.</li> </ol>		
<p><b><u>Expository Writing</u></b></p> <ol style="list-style-type: none"> <li>1. Ask students what they noticed about the forest floor?</li> <li>2. Create a table with observations about the floor and questions which lead them to consider the importance of decomposition.</li> <li>3. Present the <a href="#">Bottle Biology lesson on Decomposition</a> and explain that they will work in small groups to make long term observations about what happens to the leaf litter on the forest floor and consider its importance to the ecosystem.</li> </ol>		<p><b><u>Expository Writing</u></b></p> <ol style="list-style-type: none"> <li>1. Students will construct a decomposition column in small groups.</li> <li>2. Students will design their experiment and make decisions about which debris to add to their column as well as how many air holes and water to add to their column each week.</li> <li>3. Students will complete the observation table each couple days using descriptive words.</li> </ol>

**Phase Three: Explain the concept and define terms**

Only after students have explored the concept does the curriculum and/or teacher provide the scientific explanation and terms for what they are studying. The teacher may present the concepts via lecture, demonstration, reading, or multimedia (video, computer-based). Students then use the terms to describe what they have experienced, and they begin to examine mentally how this explanation fits with what they already know.

**In this part of the lesson, students will use the teacher’s example to revise and correct their own narrative and complete a presentation using technology to share with the class. Students will also analyze their decomposition column and learn about the carbon and nitrogen cycles and how it affects the ecosystem.**

What’s the teacher doing?

**Descriptive/ Narrative Writing**

1. Present the video from the Panama Nature walk and discuss what observations were made during the walk.
2. Show an example of a completed observation chart, notebook journal and completed narrative writing.
3. Show video presentation of the observations.
4. Pass out rubric for presentation.

What are the students doing?

**Descriptive/ Narrative Writing**

1. Watch video and discuss similarities and differences of Panama nature walk with Wisconsin nature walk.
2. Use the examples of observation chart, notebook journals and narrative descriptive writing to revise and correct their own writing.
3. Create a presentation to display their observations and narrative such as PowerPoint, Prezi, or PhotoStory.

**Expository Writing**

1. Review scientific process with students.
2. Discuss carbon and nitrogen cycles using intro to ecology handout and youtube examples.
  - a. [Carbon cycle model in Spanish](#)
  - b. [Discovery Education “The Carbon Cycle”](#)
  - c. [Carbon cycle poster in Spanish](#)
  - d. [Youtube carbon cycle in Spanish](#)
3. Review expository writing and its purpose.
4. Pass out rubric for decomposition expository paper.

**Expository Writing**

1. Students will analyze decomposition observations and create an expository paper which describes the process of decomposition and the individual components of their experiment.
2. Students will finish expository papers and publish them as a brochure, booklet or flipchart.

**Phase Four: Elaborate the Concept**

Students elaborate on their understanding of the concept. They are given opportunities to apply the concept in unique situations, or they are given related ideas to explore and explain using the information and experiences they have accumulated so far. Interaction between the students is essential during the elaboration stage. By discussing their ideas with others, students can construct a deeper understanding of the concepts.

**In this part of the lesson, students will share their nature walk observations by presenting their Powerpoint, photostory, or other presentation tool. Then students will create a group expository paper explaining the decomposition process. We will discuss why nutrient cycling is important and how it relates to the ecosystem at large. A focus on human- environment interaction will help students to understand how changing our environment affects us.**

What's the teacher doing?

**Descriptive/ Narrative Writing**

1. Give students a presentation response rubric to fill out for each presentation.

What are the students doing?

**Descriptive/ Narrative Writing**

1. Students will finalize their nature walk technology presentations and present to other students.

**Expository Writing**

1. Present Peer Review to students.
2. Collect expository writing.

**Expository Writing**

1. Students will complete a self reflection and a peer review of the brochures/ presentations.



### **Persuasive Writing**

1. Ask students to discuss how the nutrient cycle relates to us.
2. Create a food web with class.
3. Discuss the larger implication of scientific research.
4. Show interview videos of Panamanian scientists discussing their research and the larger implication of their research.
5. Ask students to identify problems or risks to the environment.
6. Brainstorm a list of environmental themes for a collage and briefly discuss each theme with the class.
7. Discuss the types of material students will need to find to address their themes (e.g., environmentally-friendly behaviors, pictures of the natural world—animals, plants, strong headlines, etc).
8. Display collages around the school to spread the messages of the students in the class.
9. Assist students in individual research and handout acceptable research sites for them to use.
10. Pass out [persuasive organizer](#) and model writing persuasive essay.

### **Persuasive Writing**

1. Students will discuss problems and risks to the environment and choose one problem to research further.
2. Students will conduct online research of a chosen topic and investigate possible solutions to the problem.
3. Students will write a persuasive paper that presents the problem and possible solutions to the environmental problem.
4. Ask students to evaluate the larger implications for the unit.
5. Have students select an environmental theme. Ask them to think of a message they want to send to people about the theme. Explain to students that the collage they create should express the message and their feelings about the theme they selected.
6. Have students cut pictures, words, phrases, from old magazines, newspapers and such to illustrate their themes. Students will glue these onto construction paper in collage form.
7. Students will create a persuasive writing about the unit to accompany the environmental theme in their collage.
8. Have students break up into small groups and share their collages. Have students discuss the message each collage portrays.
9. Students who finish early can find current events articles regarding environmental themes that they can present to the class.

**Phase Five: Evaluate students' Understanding of Concept**

The final stage of the model has a dual purpose. It is designed for the students to continue to elaborate on their understanding and to evaluate what they know now and what they have yet to figure out. Evaluation of student understanding should take place throughout all phases of the instructional model. The evaluate stage, however, is when the teacher determines the extent to which students have developed a meaningful understanding of the concept.

**In this part of the lesson, students will present and reflect on three pieces of writing: narrative, expository and persuasive. The narrative is presented using a technology presentation tool, the expository is presented as a brochure or booklet and the persuasive essay will be read as a speech.**

What's the teacher doing?

**Descriptive/ Narrative, Expository & Persuasive Writing**

1. Evaluate presentations and nature walk narrative.
2. Evaluate expository pamphlet/ booklet expository writing.
3. Evaluate persuasive writing essay and research.

What are the students doing?

**Descriptive/ Narrative, Expository & Persuasive Writing**

1. Students will write a reflection paper about their nature walk narrative.
2. Students will exchange pamphlets or booklets with a peer and complete a peer review feedback form.
3. Students will read their persuasive writing essay as a speech for the class.