

# The Sense of Wonder

**Grade:** 5th      **Season:** Spring      **Time:** 1 ½ hours  
**Group Size:** 1 class      **Ratio:** 1 adult to 5 students



## For the Teacher:

<b>Overview</b>	Students are introduced to naturalists as scientists and to author Rachel Carson as one example of a naturalist. Students listen to an excerpt from a book by Rachel Carson called <u>The Sense of Wonder</u> . Then, using a data collection sheet set up inside, students go into the field to search for wonder. Afterwards, they share their discoveries and draw conclusions.
<b>Subjects Covered</b>	Language Arts, Science
<b>MN Academic Standards Supported</b>	Helps support five standards in science and nine in language arts. See sections "2009 Minnesota Academic Standards in Science" and "2010 Minnesota Academic Standards in Language Arts."
<b>Skills Used</b>	Listening, observing, writing, discovering, concluding, sketching, organizing, spatial relationships, following directions, teamwork, exploring, examining, choosing, reflecting
<b>Performance Objectives</b>	After completing this activity, students will be better able to... <ul style="list-style-type: none"> <li>• Identify naturalists as one type of scientist</li> <li>• Describe three things a naturalist does (observe nature, record data, share discoveries with others)</li> <li>• List three qualities of naturalists (quiet, prepared, full of questions and wonder, in the moment, sharing, curious, respectful, observant, and patient)</li> <li>• Search for and find wonder (such as beauty, surprise, awe, delight, joy) in the prairie</li> <li>• Practice being naturalists and consider the possibility that they are naturalists</li> <li>• Identify and enjoy the prairie as one place for exploration and exploring as a positive choice or activity</li> </ul>
<b>Vocabulary</b>	Naturalist, scientist, journal, prairie, discovery, sketch, explore, inquisitive, wonder, awe

## For the PWLC Instructor:

<b>PWLC Theme</b>	The Prairie Pothole Region
<b>Primary EE Message</b>	The prairie pothole region is valuable and in need of restoration and protection.
<b>Sub-message</b>	Habitat: The prairie pothole region is a unique and rare ecosystem.
<b>PWLC EE Objective</b>	Identify the components and functions of a given ecosystem by observing, counting, and describing the animals and plants in that ecosystem.
<b>Materials</b>	Science notebooks or clipboards and paper, pencils, book <u>The Sense of Wonder</u> by Rachel Carson, Rachel Carson NWR poster, NWR boundary sign
<b>Location</b>	Classroom and any trail

## Background Information

The purpose of this lesson is to introduce 5<sup>th</sup> graders to naturalists as scientists. Using Rachel Carson as a role model, they have the opportunity to practice being a naturalist and consider themselves as naturalists.

By their example, naturalists have much to teach us about being scientists. Like all

scientists, naturalists make observations, record data, and share their discoveries with other scientists and with the public. They are skilled in exploring, observing, organizing, classifying, collecting, describing, inventing, and experimenting. In addition, many are talented artists and writers, daring travelers, and innovative researchers. It is naturalists who developed the concepts of species, extinction, and microorganisms, who invented microscopes that could make bacteria visible to humans. The scientific contributions, passion, and purpose of naturalists improve our quality of life and call us to live in balance with the land.

In this field investigation, former U.S. Fish and Wildlife Service employee and well-known author Rachel Carson serves as the naturalist model. Born and raised in Pennsylvania, Carson had an interest in nature even as a young child. Carson and her mother bonded over long walks in the woods where her mother taught her the names of plants, birds, insects, and animals. Her first written work was published at age 10 in a children's magazine. Carson studied biology in college and graduate school, but she also had a passion for writing. She was able to combine these passions into her career when she wrote publications and radio scripts for the agency that would become the U.S. Fish and Wildlife Service. In her first three books, Carson used her love of the water to explore themes of the ocean. Her books Under the Sea Wind, The Sea Around Us and The Edge of the Sea were love stories to the ocean.

While Carson intended to continue with other projects she became increasingly concerned about the toll the pesticide DDT was taking on natural landscapes. Her final book, Silent Spring, aimed to raise public awareness about DDT and the harm it can cause to the environment. Her careful research and vivid imagery helped catapult the issue into public consciousness. Even though she was dying of breast cancer, Carson found the strength to stand up to her critics and testify in front of Congress with her findings in the book. Through her efforts and those of others, DDT was ultimately banned for sale in the United States but is still being used in other parts of the world.

Carson's book The Sense of Wonder still inspires people who work to promote the study of nature. Carson talks about wonder as being that feeling which fills you with admiration, amazement or awe ([www.dictionary.com](http://www.dictionary.com)). She writes "I sincerely believe that for the child and for the parents seeking to guide him, it is not half as important to *know* as to *feel*."

In writing this story, Carson wanted to help parents gain confidence exploring nature with their children. She thought nature exploration and study were crucial to a child's development and well-being. Carson writes that a sense of wonder can serve as "an unending antidote against the boredom and disenchantment of later years, the sterile preoccupation with things that are artificial, the alienation from sources of our strength." By hearing an excerpt from The Sense of Wonder and then going into the field to look for wonder, students learn that searching for wonder is a fun and worthwhile pursuit.

### Teacher Preparation

- To maximize outdoor classroom time at the PWLC, teachers may

- Conduct steps 2 through 7 in the section “Field Investigation Procedure” at school. Upon arrival at the PWLC, the PWLC instructor may conduct a quick review before proceeding, allowing for more time in the outdoor classroom.
- Organize students into small groups, each group led by a chaperone, everyone wearing nametags.
- We highly recommend conducting one or more of the suggested extensions before your visit in order to integrate this field investigation into the classroom study of scientists, naturalists, biographies, prairie, wetlands, character, human impacts on the environment, or other topics. (See section, “Teacher-Led Extensions/Adaptations/Assessment Ideas.”)
- Please help save paper. Bring your students’ science notebooks or journals to record their field data and discoveries in. If science notebooks are not available, please inform the PWLC staff that you will need paper and clipboards when booking your date.

### PWLC Staff Preparation

Organize and prepare materials. Select an appropriate field site.

### Field Investigation Procedure

1. In the classroom, welcome students, teachers, and chaperones to the Prairie Wetlands Learning Center.
2. Ask students to tell you what a naturalist is. What kind of job is that? (scientist) What does a naturalist do? (observes nature, writes things down, shares discoveries with others) Record their answers on the white board as students record them in their notebooks. Are *they* naturalists?
3. Ask students to tell you the qualities of a naturalist. How does a naturalist behave outside? Record a list on the white board and fill in any qualities they may have missed. A completed list includes prepared, quiet, observant, patient, curious, respectful, full of wonder, inquisitive, in the moment, and sharing. Students should also record this list in their notebooks.
4. Briefly introduce Rachel Carson as a naturalist and author. See section, “Background Information,” for details.
5. Set up a T-chart with the students to discuss the two kinds or definitions of wonder. Use student responses to fill in both sides of the chart. Ask for examples of wonder questions for the left side of the chart (I wonder what’s for dinner? I wonder what we’re doing in science tomorrow?) Ask for examples of amazing things for the wonder-amazing side of the chart. (Joe Mauer when he hits a homerun, my mother, a loon, a sunrise...)

<u>Wonder- A Question</u>	<u>Wonder-Amazing</u>

6. Start a wonder word list for continuation during the reading. Wonder words are synonyms for “wonder” such as beauty, surprise and mystery.
7. Read the night sky section of The Sense of Wonder. See section, “Excerpt from The Sense of Wonder.” Begin the reading with the paragraph which contains the quote “What if I had never seen this before? What if I know I would never see it again?” Ask students to jot down any wonder words they hear; individual words which are synonyms for “wonder.”
8. Invite students to join you on a search for wonder outside. Help them prepare their journal or notebook page. At the top of their investigation page, they should write the title “Searching for Wonder.” Be sure to include the date and the location (PWLC). On the white board, model what their data sheet will look like by dividing the page into quadrants. Allow them to choose four wonder word from a list (such as joy, mystery, thrill, excitement, love, awe, surprise, beauty, delight) and title each quadrant with one of the four words. Instruct the students that they can write and/or sketch and label examples of those kinds of wonder in each quadrant.
9. After lining up at the door, remind everyone that they are naturalists and should practice being naturalists in the field. How should they behave? (quiet, observant, patient, etc.) In the field, they must stay in their small group with their chaperone and stay on the trail.
10. Allow for as much time as possible in the field. Move from group to group to answer questions, model good naturalist behavior, and remind students to record their wonder on their investigation sheets.
11. During outdoor time, have students sit quietly and still for up to 15 minutes to observe nature. Space them about five meters apart from each other along a section of trail. This allows for personal reflection and a more intimate experience in nature without interference from classmates.
12. Back indoors, wrap up by asking a few students to share the wonder they found with the class. Reread the first paragraph of the excerpt and ask students to free write on their experience. (What if I never saw this before? What if I knew I would never see it again?). Ask a few students to share with the class. How can they be more open to sensing wonder? Ask them how or who they could share this discovery with when they return home? (Tell a friend or relative, write a poem or paint a picture to give away, etc.) Does your sense of wonder end when you leave the PWLC? Encourage them to keep going outside anywhere they are to search for wonder; it is free and is a good, healthy choice of activity. Thank them all for coming to the PWLC and invite them to return again.

### *Weather Alternatives*

Field investigations take place rain or shine. Everyone should dress appropriately for the weather. In the event of unsafe weather (lightning, high winds) or pouring rain, everyone must come indoors.

The PWLC staff will make every effort to make your travel worthwhile despite the weather and can prepare indoor, age-appropriate plans. The PWLC staff also welcomes teacher input into these plans. Some possible alternatives might include:

- From The Sense of Wonder, read the excerpt which begins, “A rainy day is a perfect time for a walk in the woods” accompanied by projected images. Go outside for a very short amount of time, even if only under the deck to search for wonder. Complete the investigation page accordingly.
- Watch a thunderstorm stationed at windows and doors in the dining hall with one or two windows cracked open. Read the excerpt from The Sense of Wonder about the senses of smell and hearing, accompanied by projected images. Complete the data page accordingly.
- Bring wetland plants and invertebrates inside for students to use to search for wonder, and provide hand lenses to assist. Read the excerpt about “small things” from The Sense of Wonder. Complete the data page accordingly.
- Read Rachel Carson, Preserving a Sense of Wonder by Thomas Locker and Joseph Bruchac. Use the PowerPoint images along with the story and then discuss how the student can develop a sense of wonder.
- Provide reading stations with children’s books about naturalists. Students can rotate from station to station and read about different naturalists and take notes about their favorite one. Compare and contrast how the naturalists are the same and how they are different. Possible naturalists include Wilson Bentley, Laura Ingalls Wilder, Byrd Baylor, Aldo Leopold, Lewis and Clark, Sacajawea, John Muir, Theodore Roosevelt and Henry David Thoreau.
- Tour the exhibit area and watch prairie wetlands videos with the objective of searching for wonder. Complete the data page accordingly.

### *PWLC Staff-Led Adaptations*

PWLC instructors can incorporate music as part of the beginning slide show about Rachel Carson. This would be a way to reach students who have a stronger musical intelligence.

### *Teacher-Led Extensions/Adaptations/Assessment Ideas*

- Using the data recorded at the PWLC, guide students in writing about their search for wonder in the form of a poem such as a haiku, cinquain, couplet, or another form of writing. Allow students to read their poetry aloud in class during a poetry slam or post their poems with illustrations in the hallway or classroom. Another option would be to read some of the poetry aloud for them so they may hear and learn from each other. Some of these poems could also be shared through the district, school, or class newsletter.
- Students may research and share the biographies of other famous naturalists, many of whom are also authors or artists or all of the above. Some possibilities include Byrd Baylor, John Muir, Aldo Leopold, John James Audubon, Lewis and Clark, Ernest Thompson Seton, Laura Ingalls Wilder, Chief Luther Standing Bear, George Washington Carver, and Theodore Roosevelt.
- Take students outdoors at school or a nearby park to search for wonder. Set up data pages similar to the one used at the PWLC. After the excursion, compare and contrast wonders between the two locations. What might account for any differences? (Habitat, weather, site features, progression of season, etc.)

- Make a regular habit (daily, weekly, monthly, or seasonally) of taking students outside to explore, discover, and wonder. Provide them with a mission while in the field that relates to language arts, math, art, science, or a combination. Allow them to record their discoveries in their journal, and use their data as a springboard for discussion, writing, art, drama, math, or other applications.

## *2009 Minnesota Academic Standards in Science*

This lesson helps support the following state standards:

### **Strand 1 THE NATURE OF SCIENCE AND ENGINEERING**

#### **Substrand 1 The Practice of Science**

**Standard 2** Scientific inquiry requires identification of assumptions, use of critical and logical thinking, and consideration of alternative explanations.

**Benchmark 1** Generate a scientific question and plan an appropriate scientific investigation, such as systematic observations, field studies, open-ended exploration or controlled experiments to answer the question.

#### **Substrand 3 Interactions Among Science, Technology Engineering, Mathematics, and Society**

**Standard 2** Men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, have been involved in engineering design and scientific inquiry.

**Benchmark 1** Describe how science and engineering influence and are influenced by local traditions and beliefs.

### **Strand 3 EARTH AND SPACE SCIENCE**

#### **Substrand 4 Human Interactions with Earth Systems**

**Standard 1** In order to maintain and improve their existence, humans interact with and influence Earth systems.

**Benchmark 3** Compare the impact of individual decisions on natural systems.

### **Strand 4 LIFE SCIENCE**

#### **Substrand 2 Interdependence Among Living Systems**

**Standard 1** Natural systems have many components that interact to maintain the living system.

**Benchmark 1** Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs.

#### **Substrand 4 Human Interactions with Living Systems**

**Standard 1** Humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.

**Benchmark 1** Give examples of beneficial and harmful human interaction with natural systems.

## *2010 Minnesota Academic Standards in Language Arts*

This lesson helps support the following state standards:

### **Strand READING**

#### **Substrand Literature K-5**

**Standard** Read closely to determine what the text says explicitly and to make logical inferences from it; cite specific textual evidence when writing or speaking to support conclusions drawn from the text.

**Benchmark 5.2.1.1** Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

**Standard** Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.

**Benchmark 5.2.2.2** Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

**Substrand** Informational Text K-5

**Standard** Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.

**Benchmark 5.2.4.4** Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 5 topic or subject area.

**Substrand** Foundational Skills K-5

**Standard** (none)

**Benchmark 5.3.0.3** Know and apply grade-level phonics and word analysis skills in decoding words. a. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.

**Strand** WRITING

**Substrand** Writing K-5

**Standard** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

**Benchmark 5.6.4.4** Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

**Standard** Draw evidence from literary or informational texts to support analysis, reflection, and research.

**Benchmark 5.6.9.9** Draw evidence from literary or informational texts to support analysis, reflection, and research. b. Apply grade 5 Reading standards to informational texts (e.g., “Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point[s]”).

**Standard** 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 tasks, purposes, and audiences.

**Benchmark 5.6.10.10** 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.

**Strand** SPEAKING, VIEWING, LISTENING AND MEDIA LITERACY

**Substrand** Speaking, Viewing, Listening and Media Literacy K-5

**Standard** Prepare for and participate effectively in a range of conversations and collaborations with diverse partners, building on others’ ideas and expressing their own clearly and persuasively.

**Benchmark 5.8.1.1** Engage effectively in a range of collaborative

discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b. Follow agreed-upon rules for discussions and carry out assigned roles. c. Pose and respond to specific questions by making comments that contribute to the discussion and elaborate on the remarks of others. d. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions. e. Cooperate and problem solve to make decisions as appropriate for productive group discussion.

**Standard** Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally.

**Benchmark 5.8.2.2** Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

## **Strand** LANGUAGE

### **Substrand** Language K-5

**Standard** Determine or clarify the meaning of unknown and multiple-meaning words and phrases by using context clues, analyzing meaningful word parts, and consulting general and specialized reference materials, as appropriate.

**Benchmark 5.10.4.4** Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies. b. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word.

## *References and Resources*

### **Books for Children**

- Aldo Leopold, Protector of the Wild by Della Yannuzzi
- Animals Christopher Columbus Saw, an Adventure in the New World by Sandra Markle
- Girls Who Looked Under Rocks, the Lives of Six Pioneering Naturalists by Jeannine Atkins
- Guess Who My Favorite Person Is? by Byrd Baylor
- Henry David's House/Henry David Thoreau edited by Steven Schnur
- John Muir, America's Naturalist by Thomas Locker
- John Muir, My Life with Nature by Joseph Cornell
- John Muir, Saving the Wilderness by Corinne J. Naden and Rose Blue
- Lewis and Clark, the Adventure Into the West by Frank Burd
- Rachel: The Story of Rachel Carson by Amy Ehrlich
- Rachel Carson, Preserving a Sense of Wonder by Thomas Locker and Joseph Bruchac
- Sacajawea, Wilderness Guide by Kate Jassem
- The Lewis and Clark Expedition, Join the Corps of Discovery to Explore Uncharted Territory by Carol A. Johnson



- The Other Way to Listen by Byrd Baylor
- The Sense of Wonder by Rachel Carson
- The Young Naturalist by Andrew Mitchell
- Walking with Henry, Based on the Life and Works of Henry David Thoreau by Thomas Locker

### **Books for Adults**

- A Sand County Almanac by Aldo Leopold
- Black and Brown Faces in America's Wild Places by Dudley Edmonson
- Black Elk Speaks, Being a Life Story of a Holy Man of the Oglala Sioux by John G. Neihardt
- Last Child in the Woods, Saving Our Children from Nature-Deficit Disorder by Richard Louv
- Last Stand, America's Virgin Lands by Barbara Kingsolver
- Naturalist by E.O. Wilson
- Rachel Carson: Witness for Nature by Linda Lear
- Silent Spring by Rachel Carson
- The Edge of the Sea by Rachel Carson
- The Great Naturalists by Robert Huxley
- The Sea Around Us by Rachel Carson
- The Story of My Boyhood and Youth by John Muir
- Trail of an Artist and Naturalist by Ernest Thompson Seton
- Under the Sea-Wind by Rachel Carson
- Women in the Field, America's Pioneering Women Naturalists, Marcia Meyers Bonta, editor

### *Credits*

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*Instructor material follows.*

## Excerpt from The Sense of Wonder

“Exploring nature...is largely a matter of becoming receptive to what lies all around you. It is learning again to use your eyes, ears, nostrils and finger tips, using your senses. For most of us, knowledge of our world comes largely through sight, yet we look about with such unseeing eyes that we are partially blind. One way to open your eyes to unnoticed beauty is to ask yourself. ‘What if I had never seen this before? What if I knew I would never see it again?’

“I remember a summer night when such a thought came to me strongly. It was a clear night without a moon. With a friend, I went out on a flat headland that is almost a tiny island, being all but surrounded by the waters of the bay. There the horizons are remote and distant rims on the edge of space. We lay and looked up at the sky and the millions of stars that blazed in the darkness. The night was so still that we could hear the buoy on the ledges out beyond the mouth of the bay. Once or twice a word spoken by someone on the far shore was carried across on the clean air. A few lights burned in cottages. Otherwise there was no reminder of other human life; my companion and I were alone with the stars. I have never seen them more beautiful: the misty river of the Milky Way flowing across the sky, the patterns of the constellations standing out bright and clear, a blazing planet low on the horizon. Once or twice a meteor burned its way into the earth’s atmosphere.

“It occurred to me that if this were a sight that could be seen only once in a century or even once in a human generation, this little headland would be thronged with spectators. But it can be seen many scores of nights in any years, and so the lights burned in cottages and the inhabitants probably gave not a thought to the beauty overhead; and because they could see it almost any night perhaps they will never see it.

“An experience like that, when one’s thoughts are released to roam through the lonely spaces of the universe, can be shared .....even if you don’t know the name of a single star. You can still drink in the beauty, and think and wonder at the meaning of what you see.”