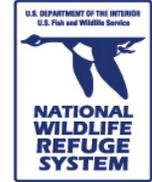


The Sense of Wonder



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

For the Teacher:

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|---------------------------------------|--|
| Overview | 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. |
| Subjects Covered | Language Arts, Science |
| MN Science Standards Supported | Helps support two standards. See section "Minnesota Academic Standards in Science" |
| Skills Used | Listening, observing, writing, discovering, concluding, sketching, organizing, spatial relationships, following directions, teamwork, exploring, examining, choosing, reflecting |
| Performance Objectives | <p>After completing this activity, students will be able to...</p> <ul style="list-style-type: none"> • Identify naturalists as one type of scientist • Describe three things a naturalist does (observe nature, record data, share discoveries with others) • List three qualities of naturalists (quiet, prepared, full of questions and wonder, in the moment, sharing, curious, respectful, observant, and patient) • Search for and find wonder (such as beauty, surprise, awe, delight, joy) in the prairie • Practice being naturalists and consider the possibility that they are naturalists • Identify the prairie as one place for exploration and exploring as a positive choice or activity |
| Vocabulary | Naturalist, scientist, journal, prairie, discovery, sketch, explore, inquisitive, wonder, awe |

For the PWLC Instructor:

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

Background Information

The purpose of this lesson is to introduce 5th 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). 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 unyielding 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

- 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.

- 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 nature, scientists, prairie, habitats, animals, or other topics. We believe that such integration enhances student motivation for learning in other curricular areas. Please see section, "Teacher-Led Extensions/Adaptations/Assessment ideas."

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. Organize students into small groups, each led by a chaperone, and inform chaperones of their role in following through on instructions for students.
3. 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?
4. 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.
5. Briefly introduce Rachel Carson as a naturalist and author. See section, "Background Information," for details.
6. 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 Bower when he hits a homerun, my mother, a loon, a sunrise...)

Wonder- A Question

Wonder-Amazing

7. Read the night sky section of The Sense of Wonder accompanied with projected images in a PowerPoint file. 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?” Direct students to write these two questions down at the bottom of their investigation page. Ask the students to imagine that they were having the experience described in the book.
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 in small groups with chaperones 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. Ask everyone to choose one wonder and answer the questions on the bottom of their page as a free write (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.) 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 the musical intelligence.

Teacher-Led Extensions/Adaptations/Assessment Ideas

- To maximize outdoor classroom time at the PWLC, teachers may conduct steps 2 through 6 or 7 in the section “Field Investigation Procedure” at school.
- 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.

Minnesota Academic Standards in Science

This lesson helps support the following state standards:

Strand I. HISTORY AND NATURE OF SCIENCE

Substrand C. Scientific Enterprise

Standard: Recognize that science and technology involve different kinds of work and engages men and women of all backgrounds

Benchmark 1. Describe different kinds of work done in science and technology

Benchmark 2. Identify men and women of various backgrounds and ages who have been involved in science and technology, both past and present

Strand I. HISTORY AND NATURE OF SCIENCE

Substrand A. Scientific World View

Standard: The student will understand that communication is essential to science.

Benchmark 1. 1. The student will know that current scientific knowledge and understanding guide scientific investigation.

Benchmark 2. 2. The student will recognize that clear communication of methods, findings and critical review is an essential part of doing science.

References and Resources

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

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

This field investigation was developed and written by Prairie Wetlands Learning Center Staff, U.S. Fish and Wildlife Service. Thanks to the Prairie Science Class naturalist Deb Strege. Thanks to the following teachers for reviewing this lesson plan: Dorothy Doll, St. Henry's in Perham; Nancy Jacobson, Frazee; Vanessa Jacobson, educator/home school parent, Fergus Falls; and Diane Wisness, Morning Sun, Fergus Falls.

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 sharedeven 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.”