



Four Winds Nature Program: Alignment with Learning Standards

Over the last several years, Four Winds has developed new place-based science instructional units that align with the *Next Generation Science Standards* (NGSS). These units are posted online at nearbynature.fwni.org. The NGSS are based on *A Framework for K-12 Science Education*, which articulates a vision “in which students, over multiple years of school, actively engage in scientific and engineering practices and apply crosscutting concepts to deepen their understanding of the core ideas in these fields. The learning experiences provided for students should engage them with fundamental questions about the world and with how scientists have investigated and found answers to those questions.” We agree! And *Nature Program* units can be an important part of a school’s science curriculum, helping children reach the performance expectations as they explore nearby nature.

The *Next Generation Science Standards* define three major dimensions to be integrated in science education for grades k-12:

- Dimension 1: Scientific and Engineering Practices
- Dimension 2: Crosscutting Concepts that unify the study of science and engineering through their common application across fields, and
- Dimension 3: Disciplinary Core ideas in four areas: physical sciences; life sciences; earth and space sciences; and engineering, technology, and applications of science.

Next Generation Science Standards and The Nature Program

Each month’s *Nature Program* unit begins by introducing a natural phenomenon that children can explore, observe, wonder about, question, and discuss. The learning activities address several NGSS Disciplinary Core Ideas (Dimension 3) per the grade band endpoints in *A Framework for K-12 Science Education*. These are detailed in the unit summary for each topic. In addition to learning important science content, *Nature Program* students engage in the NGSS Science Practices (Dimension 1) by:

1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating and communicating information

Nature Program students reflect on the Crosscutting Concepts (Dimension 2).

1. Patterns
2. Cause and effect
3. Scale and proportion
4. Systems and system models
5. Energy and matter
6. Structure and function
7. Stability and change

Common Core and The Nature Program

In addition to the science standards, *Nature Program* lessons also support many aspects of the *Common Core State Standards -- English Language Arts and Mathematics*.

Supplemental materials available online for each unit include:

- Unit summary
- Vocabulary for children and a children’s bibliography
- Helpful ideas for spending time outside with students and science/nature journal prompts
- Integration resources for language arts, mathematics and other nature-based learning.

Below is a chart that identifies the *English Language Arts* standards included in each workshop. There are frequent opportunities to address *CCSS-Mathematics* in each unit as well. Mathematics is the language of science, so we frequently have kids counting insect legs, looking for patterns, taking measurements, creating graphs and charts, and more.

Activity	Common Core Standards
Puppet shows and slide shows	<p>Common Core Reading for Informational Texts</p> <ul style="list-style-type: none"> • Standard 1: Refer to details and examples in a text. • Standard 4: Ask and answer questions to help determine or clarify the meaning of words and phrases in a text. • Standard 7: Use information gained from illustrations and the words in a text to demonstrate understanding of the text. <p>Common Core Speaking and Listening</p> <ul style="list-style-type: none"> • Standard 1: Participate in collaborative conversations. • Standard 2: Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
Discussions at the end of activities	<p>Common Core Speaking and Listening</p> <ul style="list-style-type: none"> • Standard 1: Participate in collaborative conversations.
Making and sharing journal entries	<p>Common Core Writing</p> <ul style="list-style-type: none"> • Standard 1: Write opinion pieces. • Standard 3: Write narratives in which they recount two or more appropriately sequenced events. • Standard 3: Write narratives to develop real or imagined experiences or events. • Standard 10: Write routinely over extended time frames and shorter time frames for a range of tasks, purposes, and audiences. <p>Common Core Speaking and Listening</p> <ul style="list-style-type: none"> • Standard 4: Tell a story or recount an experience with appropriate facts and relevant, descriptive details. • Standard 5: Add drawings or other visual displays to descriptions as desired to provide additional detail.
Closing thoughts	<p>Common Core Speaking and Listening</p> <ul style="list-style-type: none"> • Standard 4: Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly. • Standard 6: Speak audibly and express thoughts, feelings, and ideas clearly.
Throughout the workshop	<p>Common Core Language</p> <ul style="list-style-type: none"> • Standard 6: Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases...and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).



Unit Summary: Spiders

Spiders come in a variety of shapes, colors and sizes, but they all share some specific characteristics: two body parts, a hard exoskeleton and eight legs. They all make silk, too, though not all weave webs. Here we take a close look at web spinners and wandering spiders, examine their anatomy, and consider their special adaptations. We'll learn about their lives as small predators, and scout outdoors for spiders and webs.

UNIT VOCABULARY

Adaptation	Exoskeleton	Cephalothorax
Abdomen	Spinnerets	Pedipalps
Fangs	Chelicerae	Molt
Prey	Predator	Silk
Cobweb	Funnel web	Orb web
Sheet web	Dragline	Spiderling

SUGGESTED OUTDOOR ACTIVITIES

Spider Search
Journal Activity
Upper Grades Challenge: Investigating
Spider Numbers
Spider Vibrations
Spider Truth or Fiction
Sharing Web

Introduction: begin to explore and ask questions about spiders.

Spiders Up Close: observe closely and compare a variety of different live spiders.

Make a Spider: construct an accurate model of a spider.

Puppet Show: meet different kinds of spiders and learn about some of the special adaptations of web-building and wandering spiders.

Spider Search: observe spiders and look for evidence of spiders outside.

Journal Activity: record observations about a spider and its habitat.

Upper Grades Challenge: Investigating Spider Numbers: compare the number of spiders found in different habitat types.

Spider Vibrations: model and experience how spiders use the sense of touch to feel vibrations and locate prey.

Spider Truth or Fiction: review some of the interesting facts about spiders.

Sharing Web: share some thoughts, observations and feelings about spiders.

BOOKS FOR KIDS

Barton, Bethany, *I'm Trying to Love Spiders*, Viking Books for Young Readers, 2015.

Morgan, Emily, *Next Time You See a Spiderweb*, NSTA Kids, 2016.



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SPIDERS ALIGNMENT WITH NEXT GENERATION SCIENCE STANDARDS

When working with your students on the following Disciplinary Core Ideas (DCI), consider using and making connections to activities from this Four Winds unit to support students' learning. The DCI's listed here are taken from Grade Band Endpoints in *A Framework for K-12 Science Education*. Additionally, our activities give children opportunities to engage in many of the Science and Engineering Practices and reflect on the Crosscutting Concepts as identified in the Next Generation Science Standards.

Grades K-2 Disciplinary Core Ideas

- **LS1A:** All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find and take in food, water and air. p.144
- **LS1C:** All animals need food in order to live and grow. They obtain their food from plants or from other animals. p.147
- **LS1D:** Animals have body parts that capture and convey different kinds of information needed for growth and survival – for example, eyes for light, ears for sounds, and skin for temperature or touch. Animals respond to these inputs with behaviors that help them survive (e.g. find food, run from a predator). p.149
- **LS2A:** Animals depend on their surroundings to get what they need, including food, water, shelter, and a favorable temperature. Animals depend on plants or other animals for food. They use their senses to find food and water and their body parts to gather, catch, eat, and chew the food. p.151
- **LS3A:** Organisms have characteristics that can be similar or different. Young animals are very much, but not exactly, like their parents and also resemble other animals of the same kind. p.158
- **LS3B:** Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. p.160

Grades 3-5 Disciplinary Core Ideas

- **LS1A:** Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior and reproduction. p.144
- **LS1C:** Animals and plants alike generally need to take in air and water, animals must take in food, and plants need light and minerals. p.148
- **LS1D:** Different sense receptors are specialized for particular kinds of information, which may then be processed and integrated by an animal's brain, with some information stored as memories. Animals are able to use their perceptions and memories to guide their actions. Some responses to information are instinctive – that is, animals' brains are organized so that they do not have to think about how to respond to certain stimuli. p.149
- **LS3A:** Many characteristics of organisms are inherited from their parents. Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. p.158
- **LS4B:** Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. p.164
- **LS4D:** Scientists have identified and classified many plants and animals. p.167

Grades 6-8 Disciplinary Core Ideas

- **LS1C:** Animals obtain food from eating plants or eating other animals. p.148
- **LS1D:** Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. p.149
- **LS4D:** Biodiversity is the wide range of existing life forms that have adapted to the variety of conditions on Earth, from terrestrial to marine ecosystems. p.167

SPIDERS ALIGNMENT WITH COMMON CORE STANDARDS

In addition to science content, activities in this unit also can help students to practice the following mathematics and language arts concepts. The Common Core Standards listed here are in addition to the ones that our activities typically address, as listed in the Four Winds document, *The Nature Program: Alignment with Learning Standards*.

Grades K-2 Common Core Standards

- **Mathematics Standard K.CC:** Count to 100 by ones and tens. Understand the relationship between numbers and quantities; connect counting to cardinality. Count to answer "how many?" questions about as many as 20 things.

Grades 3-5 Common Core Standards

- **Reading for Informational Text Standard 7:** Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages).
- **Mathematics Standard 3.MD:** Tell and write time to the nearest minute and measure time intervals in minutes.

