

Nature-Based Learning

Science Ideas Guide: Preschool - Grade 2




What can I do outside today?



What Can I Do Outside Today?

Introduction

What children learn in science before kindergarten connects directly to what they will do in elementary school and beyond. This guide is designed to help educators explore how nature-based and outdoor learning can support science standards in preschool through second grade. It builds on the *Early Childhood Outdoor Learning Ideas Guide* and aligns with the Early Childhood Indicators of Progress (ECIPs). While the focus is on science, many of the activities also support other areas of learning.



Lifelong learning begins with play, and outdoor play is a powerful, research-backed way to support children's development in all learning environments, including kindergarten and higher grades. Through play, children use imagination, exploration, and inquiry to build cognitive and social-emotional skills, as well as the confidence to try new experiences. Outdoor play also gives children important physical activity and opportunities to practice motor skills. As they play together, children naturally explore science concepts like size, weight, and motion. Educators play a key role in guiding this learning, supporting scientific discovery, building vocabulary, and encouraging teamwork. Through nature-based exploration, children develop a deeper connection with and appreciation for the natural world.

“Our biggest successes in this [outdoor learning] project have been the ways in which we have taught students to care for the natural world around them. Students know and learn the different habitats and understand that when we are outside we are in the habitat of other living things. Students have developed an understanding of stewardship for all living things in their environment. Not only are students in community with one another, they have learned to be in community with their natural environment.”

~ Harambee Elementary School

Outdoor education

Education that occurs mostly in the outdoors and is focused on engagement with the outdoor environment

Nature-based education

Nature as the central organizing feature of the curriculum and a focus is made on children forming a connection with the natural world and how the natural world supports children's development. It can be conducted indoors or outdoors

What Can I Do Outside Today?

What can I do outside?

This guide highlights activities that can be done in different outdoor settings and gives learners opportunities to explore science practices in preschool through second grade. Our goal is to help educators connect outdoor activities—many they may already be using—to grade-level science benchmarks.

The following pages show how the Early Childhood Indicators of Progress (ECIPs) align with science practices for each activity in the *Nature-Based Learning Ideas Guide Birth to Pre-K*. Because each science practice connects to multiple benchmarks, teachers have flexibility in how outdoor activities align to K–2 standards, depending on the focus of the lesson. Sample benchmarks are included as examples, but most activities can connect to several. Educators are also encouraged to collaborate and identify additional nature-based activities that support K–2 science benchmarks, as well as other subject areas. More information, along with resources to support implementation, is available on the Minnesota Department of Education (MDE) [Science Standards Implementation webpage](#).

Another valuable resource for early elementary science is [Rise and Thrive with Science: Teaching PK–5 Science and Engineering](#), developed by the National Academies of Sciences, Engineering, and Medicine. This resource emphasizes that children learn science best by engaging in the same practices real scientists and engineers use. It includes classroom examples, evidence-based strategies, and an [interactive website](#) for quick access to materials.

Find More Outdoor and Nature Learning Resources:

- [Minnesota Department of Education, Early Education Outdoor Learning](#)
- [Department of Children, Youth, and Families, Early Childhood Outdoor Learning](#)

Happy exploring!

What students do in science before kindergarten directly relates to what they do in early elementary and beyond.

According to Minnesota Statutes 2022, section 120B.018, subdivision 3, "benchmark" means specific knowledge or skill that a student must master to complete part of an academic standard by the end of the grade level or grade band.

Use a magnifying glass to look at nature items



ECIPS

- **ST1: Observe and Question**
 - Describes similarities and differences.
- **ST 2: Investigate**
 - Explores and notices properties in objects.
 - Explores objects with the intention of finding out something specific.
- **ST 5: Inquiry**
 - Communicates with others about questions, actions, ideas, observations, or results.

Benchmark O.L.1.2.1.2

- Make observations of plants and animals to compare the diversity of life in different habitats. (P: 3, CC: 1, Cl: LS4) Emphasis is on the diversity of living things in a variety of different habitats and patterns across those habitats.

K-2 Practice Elements

- **P1: Asking Questions and Defining Problems**
 - Ask questions that can be answered by an investigation
- **P3: Planning and Carrying out Investigations**
 - Make observations (firsthand or from media) to collect data that can be used to make comparisons.
 - Make predictions based on prior experiences.
- **P8: Obtaining, evaluation and Communicating Information**
 - Communicate information or design ideas and/or solutions with others in oral and/or written forms using models, drawings, writing, or numbers that provide detail about scientific ideas, practices, and/or design ideas.



Create a weather station to observe each day at school



ECIPS

- **ST1: Observe and Question**
 - Uses past experiences to generate new questions.
 - Expresses curiosity and/or makes predictions after observing something that occurs repeatedly.
- **ST 2: Investigate**
 - Starts with a useful, general approach to investigation even if details may be lacking.
- **ST 3: Experiment**
 - Makes a logical prediction of an expected outcome.

Benchmark O.E.2.1.1.2

- Make daily and seasonal observations of local weather conditions to describe patterns over time.** (P: 4, CC: 1, CI: ESS2)
 - Examples of qualitative observations may include descriptions of the weather (such as sunny, cloudy, rainy, and warm). Examples of quantitative observations may include numbers of sunny, windy, and rainy days in a month. Examples of patterns may include that it is usually cooler in the morning than in the afternoon and that different months have different numbers of sunny days versus cloudy days in different months.

K-2 Practice Elements

- **P1: Asking Questions and Defining Problems**
 - Ask questions based on observations to find more information about the natural and/or designed world(s).
- **P3: Planning and Carrying out Investigations**
 - With guidance, plan and conduct an investigation in collaboration with peers.
- **P4: Analyzing and Interpreting Data**
 - Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.
 - Compare predictions (based on prior experiences) to what occurred (observable events).



Go for a walk to listen and observe what is heard and seen



ECIPS

- **ST1: Observe and Question**
 - Explores or asks questions about new materials or the environment.
 - Notices (verbally or nonverbally) differences or similarities among materials, objects, and phenomena.
 - Describes differences and similarities.
 - Expresses curiosity and/or makes predictions after observing something that occurs repeatedly.

- **ST 2: Investigate**
 - Explores and notices properties in objects.
 - Starts with a useful, general approach to investigation even if details may be lacking.
 - Explores objects with the intention of finding out something specific.

K-2 Practice Elements

- **P1: Asking Questions and Defining Problems**
 - Ask questions that can be answered by an investigation.

- **P4: Analyzing and Interpreting Data**
 - Use observations (firsthand or from media) to describe patterns and/or relationships in the natural and designed world(s) in order to answer scientific questions and solve problems.

Benchmark O.L.2.1.1.3

- Record and use observations to describe patterns of what plants and animals (including humans) need to survive.** (P: 4, CC: 1, CI: LS1)
 - Examples of patterns may include that animals need to take in food, but plants do not; different animals need different kinds of food; plants require light; and that all living things need water.



Measure the diameter of a tree using yarn, compare with other trees in the area

ECIPS

- **ST1: Observe and Question**
 - Describes differences and similarities.
- **ST4: Evaluate**
 - Describes items by comparing, sorting, classifying, and/or organizing.

Benchmark 1.L.1.1.1

- Ask questions based on observations about the similarities and differences between young plants and animals and their parents. (P: 1, CC: 2, CI: LS3)
 - Examples of observations may include leaves from the same kind of plant are the same shape but can differ in size; and a particular breed of dog looks like its parents but is not exactly the same.

K-2 Practice Elements

- **P1: Asking Questions and Defining Problems**
 - Ask questions based on observations to find more information about the natural and/or designed world(s).
- **P5: Using Mathematics and Computational Thinking**
 - Use counting and numbers to identify and describe patterns in the natural and designed world(s).



Plant bulbs that will grow in the spring



ECIPS

- **ST3: Experiment**
 - Makes a simple plan to see what will happen.
 - Makes a prediction when prompted.
 - Makes a plan in advance with an intended outcome.
 - Demonstrates awareness that different materials and variables impact strategies and outcomes.

K-2 Practice Elements

- **P2: Developing and Using Models (?)**
 - Develop and/or use a model to represent amounts, relationships, relative scales (bigger, smaller), and/or patterns in the natural and designed world(s).

Benchmark 1.L.3.1.1.1

- Develop a simple model based on evidence to represent how plants or animals use their external parts to help them survive, grow, and meet their needs. (P: 2, CC: 6, CI: LS1)
 - Examples of external parts may include acorn shells, plant roots, thorns on branches, turtle shells, animal scales, animal tails, and animal quills.



Bring out measurement tools* to explore, sort, or find patterns in the natural world.

* Tool examples: measuring cups, rulers, thermometers, scales

ECIPS

- **ST1: Observe and Question**
 - Describes differences and similarities.
 - Expresses curiosity and/or makes predictions after observing something that occurs repeatedly.
- **ST2: Investigate**
 - Explores and notices properties in objects.
 - Uses many tools as intended (e.g., scissors or magnifying glass).
 - Explores objects with the intention of finding out something specific.
 - Uses tools in new and creative ways.
- **ST3: Experiment**
 - Makes a simple plan to see what will happen.
 - Makes a prediction when prompted.
 - Demonstrates awareness that different materials and variables impact strategies and outcomes.
 - Makes a logical prediction of an expected outcome.
- **ST6: Apply**
 - Recognizes different qualities to inform the development of a rule.
 - Develops and applies rules.
 - Compares findings to predictions or expected results and notices patterns in the findings.

K-2 Practice Elements

- **P1: Asking Questions and Defining Problems**
 - Ask and/or identify questions that can be answered by an investigation.
- **P3: Planning and Carrying out Investigations**
 - Evaluate different ways of observing and/or measuring a phenomenon to determine which way can answer a question.
- **P4: Analyzing and Interpreting Data**
 - Compare predictions (based on prior experiences) to what occurred (observable events).
 - Analyze data from tests of an object or tool to determine if it works as intended.
- **P6: Constructing Explanations and Designing Solutions**
 - Use information from observations (firsthand and from media) to construct an evidence-based account for natural phenomena.
 - Generate and/or compare multiple solutions to a problem.

Benchmark O.P.2.1.1.1

- Sort objects in terms of natural/human-made, color, size, shape, and texture, then communicate the reasoning for the sorting system. (P: 4, CC: 2, CI: PS1)
 - Emphasis is on using observations to describe patterns and/or relationships in the natural and designed world in order to answer scientific questions and solve problems.

