

Key Experiences with the K–12 Learning Standards for Science

Introduction

The Washington State K–12 Learning Standards for Science (WA Science 2026) build on the *Next Generation Science Standards* (NGSS) by focusing on learning experiences that support meaningful science learning. Educators can use the Key Experience tags to find, plan for, and strengthen the learning experiences that are most important for students throughout their science education.

Because all students should take part in five key science learning experiences every year, each grade level includes at least one standard in each Key Experience category. The tags identify where these experiences are included in the standards and highlight opportunities for high-quality science instruction.

The Key Experiences provide opportunities for students to:

- Investigate phenomena and questions
- Lead scientific investigations
- Lead engineering design processes
- Learn about the outdoors and their communities
- Explore environmental and sustainability issues, including climate-related challenges

Student-Led Investigations [INV]

Why Student-Led Investigations Matter

Student-led investigations help students:

- Pursue questions that matter to them and make sense of phenomena through their own observations and evidence.
- Learn how scientific knowledge is developed, tested, and refined rather than simply accepting information from others.
- Develop critical thinking skills by evaluating evidence, considering alternative explanations, and defending claims.
- Build the scientific literacy needed to use information, make informed decisions, and participate in a complex world.

Using Student-Led Investigation Opportunities in the Standards

Student-led investigation tags [INV] identify standards where students take ownership of the investigation process. Students use observations, questions, and evidence to plan and carry out investigations that help them explain phenomena and answer important scientific questions.

Teachers support this work by gradually giving students more responsibility while providing guidance and maintaining connections to learning standards. When students make decisions about what questions to pursue, what evidence to collect,



and how to interpret their results, they experience science as a process of discovery rather than a collection of facts. Students will:

- Develop their own investigable questions from observations of a phenomenon.
- Design and carry out investigations, making decisions about methods, tools, variables, and data collection.
- Analyze evidence, evaluate explanations, and revise their thinking as new information emerges.
- Communicate and defend explanations based on evidence, while considering alternative interpretations.

Student-Led Engineering Design [ENG]

Why Student-Led Engineering Designs Matter

Student-led engineering design helps students:

- See themselves as capable problem-solvers who can improve the world around them.
- Apply science and engineering knowledge to address authentic challenges in their communities and environment.
- Learn that effective solutions are developed through testing, evidence, failure, and redesign.
- Build the creativity, collaboration, and decision-making skills needed for future careers, civic life, and everyday problem-solving.

Using Student-Led Engineering Design Opportunities in the Standards

Student-led engineering design tags [ENG] identify standards where students should take ownership of the engineering design process. Students define problems, establish criteria and constraints, develop and test solutions, and use evidence to improve their designs. Teachers support this work by creating structures that gradually transfer responsibility to students while providing appropriate guidance, resources, and feedback. When students make decisions about what problems to solve, how success should be measured, and how designs should improve over time, they experience engineering as a process of innovation rather than the construction of a predetermined solution. Students will:

- Identify meaningful problems that affect people, communities, or the environment.
- Define criteria and constraints, then develop and test multiple possible solutions.
- Collect and analyze performance data to evaluate the effectiveness of designs.
- Revise, redesign, and optimize solutions based on evidence, feedback, and tradeoffs.

Science Outdoors [OTDR]

Why Outdoor Learning Matters

Outdoor learning helps students:

- Experience science where it happens by investigating phenomena in the natural and built environments around them.

- Develop observation, investigation, and problem-solving skills through authentic experiences with the world in which they live.
- Build curiosity, confidence, and a stronger connection to their community and local environment.
- Promote students' mental, physical, and emotional well-being while fostering curiosity, exploration, and deeper connections to place, community, and the natural world.

Using Outdoor Learning Connections in the Standards

Outdoor learning tags [OTDR] identify standards that provide strong opportunities for students to investigate phenomena beyond the classroom. Outdoor learning does not require access to wilderness areas or special field sites. Teachers can use these standards to connect learning to schoolyards, neighborhoods, community spaces, and other local environments where students can directly observe the systems they are studying. By moving science learning into real-world settings, students experience science as part of the places where they live, learn, and play.

Students will:

- Investigate nearby systems and observable events through observation, data collection, mapping, monitoring, or field studies.
- Explore interactions between natural and human-designed systems, such as stormwater runoff, urban heat islands, pollinator habitats, or playground structures.
- Connect scientific concepts to places they know and care about, strengthening their sense of place and community.
- Engage in collaborative, hands-on learning experiences that support curiosity, well-being, and a deeper understanding of the world around them.

Climate Learning [CLIM]

Why Climate Learning Matters

Climate learning helps students:

- Understand how Earth's climate system works and how climate change is shaping the world they live in.
- Use evidence to make informed decisions in the face of increasingly complex environmental, social, and economic challenges.
- Prepare for future careers, civic responsibilities, and everyday decisions in a changing and less predictable climate.
- Explore how communities can adapt to climate impacts, reduce risks, and build more resilient futures.

Using Climate Learning Connections in the Standards

Climate tags [CLIM] identify standards that connect science learning to climate-related concepts, which focus specifically on understanding Earth's changing climate system, its impacts, and potential responses. Climate learning is not intended to be a separate unit, but a lens through

which students understand how Earth systems are changing and how communities are responding. Teachers can use these standards to connect grade-level science concepts to local, regional, and global climate phenomena while helping students examine how evidence informs decisions about adaptation, mitigation, resilience, and sustainability. Students will:

- Investigate local climate-related phenomena such as wildfire smoke, drought, flooding, extreme heat, changing snowpack, or shifting ecosystems.
- Analyze climate and environmental data to identify patterns, evaluate evidence, and develop evidence-based explanations.
- Explore how communities, governments, businesses, and Tribal Nations are responding to climate impacts and planning for the future.
- Consider the scientific, environmental, economic, cultural, and community impacts of different climate-related decisions and solutions.

Environmental and Sustainability Education [ESE]

Why Environmental and Sustainability Education (ESE) Matters

Environmental and Sustainability Education helps students:

- Understand how natural systems, human communities, and everyday decisions are interconnected.
- Recognize how individual and collective actions can impact ecosystems, resources, and community well-being.
- Develop environmental literacy, systems thinking, and a sense of responsibility for caring for place.
- Investigate real-world challenges, evaluate possible solutions, and make informed decisions that contribute to sustainable futures.

Using ESE Standards

Environmental and sustainability tags [ESE] identify standards that provide rich opportunities for phenomenon-based learning, student investigations, and engineering design. The ESE standards were designed to complement grade-level science standards. They can be bundled with other standards to create authentic, community-connected learning experiences without requiring separate units of study. Teachers can use these standards as a lens for connecting science learning to local environmental systems, sustainability challenges, and community issues that students can observe and investigate firsthand. Students will:

- Investigate local issues related to water quality, biodiversity, resource use, food systems, or energy.
- Analyze environmental data and evaluate evidence from multiple sources and perspectives.
- Consider the scientific, environmental, social, cultural, economic, and community impacts of different decisions and solutions.
- Apply science and engineering to propose, test, or evaluate approaches that support sustainable and resilient communities.

Conclusion

The Washington State K–12 Learning Standards for Science envision science classrooms where students are not simply learning about science but actively doing science and engineering. Through student-led investigations, student-led engineering design, outdoor learning, climate learning, and environmental and sustainability education, students are empowered to ask questions, make sense of complex systems, use evidence to support decisions, and develop solutions to challenges that matter to them, their communities, and their futures.