Pennsylvania's New Science, Technology & Engineering, and Environmental Literacy & Sustainability Learning Goals Parent Guide for Grades K-2



# About the STEELS Standards: Reshaping Education for All Pennsylvania Students

To better prepare Pennsylvania students for college and careers, schools need to ensure that high-quality science, technology, engineering, environmental literacy, and sustainability education is accessible to all students — regardless of ethnicity or zip code.

The Science, Technology & Engineering, and Environmental Literacy & Sustainability (STEELS) Standards set high expectations for what all students should know and be able to do to provide all students access to a challenging education. These learning goals guide the study of the natural and human-made world by fostering children's growing curiosity about the world around them at a young age all the way through high school.

The STEELS Standards were developed based on research about how students learn best by Standards Writing Committees made up of Pennsylvania educators and experts in the field.

#### Fact: "Standards" are not

"curriculum." "Standards" provide clarity about what students should know and be able to do by the end of each grade level. "Curriculum" refers to the planned instruction that supports students to meet those expectations. Please contact your child's teacher or school if you have questions about their curriculum.

## How will Pennsylvania's STEELS Standards Prepare Students for Academic Success?

Ambitious academic standards are a powerful foundation to help students build a thorough understanding of science, technology and engineering, and environmental literacy and sustainability over time.

A strong education in these fields in elementary school will pave the way for increased success in middle school, high school, and beyond. The STEELS Standards enable teachers to offer all students interactive instruction that promotes analysis and interpretation of data, critical thinking, problem solving, and connections across the STEELS subject areas — with a high set of expectations for achievement in grades K–2.

The STEELS Standards enable classroom instruction to reflect a clearer picture of the real world, where solving problems often requires skills and knowledge from multiple subjects including reading, writing, speaking, listening, social studies, and mathematics.

# What is Pennsylvania's Vision for Science, Technology, Engineering, Environmental Literacy, and Sustainability Education?

The STEELS Standards reflect decades of research and advances in teaching and learning. To equip students to think critically, analyze information, and solve complex problems, the standards are arranged such that from elementary through high school — students have multiple opportunities to deepen knowledge and skills by building upon important concepts and expanding their understanding of connections across the STEELS subjects. Parents and guardians should understand that while some content might be similar to what it was in the past, it may look different from how they were taught. As the STEELS Standards are implemented in schools and LEAs, they will enable students to:

- Develop a deeper understanding of science, technology, engineering, environmental literacy, and sustainability beyond memorizing facts.
- Experience similar scientific, technology, and engineering practices as those used by professionals in the field.
- Build communication skills as they talk with other students to share, build upon, and revise their own thinking.

# How will Students Learn Science, Technology Engineering, Environmental Literacy, and Sustainability in the Classroom?

Each year, students should be able to demonstrate greater ability for connecting knowledge across and between the physical sciences, life sciences, Earth and space sciences, technology and engineering, and environmental literacy and sustainability.

During grades K–2, your child will begin to form skills such as understanding relationships between objects, planning and carrying out investigations, solving problems, and constructing explanations.

Students in grades K-2 will explore questions such as:

#### **Technology and Engineering**

Technology and engineering during grades K-2 may explore questions including:

- What is a local example of engineering design and/or use of technology?
- What materials or everyday products were used to construct the project?
- What kinds of community problems can be solved through engineering and technology?

#### **Environmental Literacy and Sustainability**

Environmental literacy and sustainability during grades K-2 may explore questions including:

- What are the ways people harvest and use natural resources?
- How can we use science ideas about a place's characteristics to address a local environmental issue?
- How do people from different cultures and communities express their beliefs about nature?

### **Earth and Space Sciences**

Earth and space sciences during grades K-2 may explore questions including:

- What are the different kinds of lands and bodies of water?
- Why is it usually cooler in the mornings than in the afternoons?
- What objects are in the sky and how do they seem to move?

## **Physical Sciences**

Physical sciences during grades K-2 may explore questions including:

- How does pushing or pulling an object change the speed or direction of its motion?
- How do objects change motion when they touch or collide?
- What are some effects of sunlight on Earth's surface?

## Life Sciences

Life sciences during grades K-2 may explore questions including:

- What do plants and animals need to live and grow?
- How does the insect survive the winter if the plant is dead?
- How are parents and their children similar and different?

# Multiple Dimensions of STEELS Standards Learning

The STEELS Standards emphasize distinct dimensions that help students learn. Each dimension is integrated into the STEELS Standards and — combined — the dimensions build a powerful foundation to help students build a cohesive understanding of these subjects over time.



#### Science, Technology, and Engineering Practices

A set of skills that scientists, technologists, and engineers use to explain the world or solve problems.

Example Practices: Communication; Planning and Carrying Out Investigations

#### **Disciplinary Core Ideas**

Explanatory ideas in each science discipline that scientists, technologists, and engineers use.

Example Disciplinary Core Ideas: Wave Properties; Weather and Climate

#### **Crosscutting Concepts**

Concepts that scientists, technologists, and engineers use to deepen their understanding of situations and make connections across subject areas.

Example Crosscutting Concepts: Cause and Effect; Structure and Function

Possible classroom activities look <i>less</i> like:	Possible classroom activities look more like:
Students have infrequent exposure to science instruction or related activities.	Students engage with science concepts as a core part of instruction and are encouraged to connect lessons to their own personal and local Pennsylvania experiences.
Students memorize the general structure and properties of matter.	Students figure out why a stick of butter melted when it was left in the sun and how some changes caused by heating or cooling can be reversed while others cannot.
Students examine insects or bugs on the playground or during special events such as science fairs.	Students observe the life cycles of beetles, butterflies, and pea plants to identify patterns that are common to all living things and design the best environment for them to thrive.
Students draw static pictures of the sun to demonstrate where it is at different times of the day.	After noticing an object's shadow moves during the day, students collect evidence to support claims about the movement of the sun by tracing an outline of its shadow at three different times during the day.
Students have infrequent exposure to discussions or activities related to engineering design or environmental literacy and sustainability.	Students consider or apply engineering design principles throughout each grade level for real-world technology and engineering problems and environmental issues.
Student discussions and activities are disconnected from mathematics or English/language arts instruction.	Student discussions and activities are thoughtfully integrated with mathematics and English/language arts instruction.

# How Can You Support Your Child's Success?

This new approach to teaching and learning is different than what it was in the past and you can actively support your child's success in the classroom!

- 1. Speak to your child's teacher(s) or administrator about how these important changes will affect instruction and assessment.
- 2. Check with your child's teacher(s) about the topics they're learning at school and what activities or related books you can read with your child to reinforce STEELS Standards learning at home.
- 3. Encourage your child to explore, experiment, and ask questions at home or in your neighborhood.