Pennsylvania's New Science, Technology & Engineering, and Environmental Literacy & Sustainability Learning Goals

Parent Guide for Grades 3–5

S	TE	ELS
Science	Technology and Engineering	Environmental Literacy and Sustainability

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 your 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 3–5.

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 3–5, your child will begin to form deeper understanding of concepts and skills previously learned in grades K–2, such as evaluating methods for collecting data, revising models based on evidence, solving problems, and analyzing data to make sense of phenomena.

Students in grades 3–5 will explore questions such as:

Technology and Engineering

Technology and engineering during grades 3–5 may explore questions including:

- Which solution is the best to solve a real-world problem?
- How can designs be improved?
- How do engineers improve existing technologies to increase their benefits, decrease known risks, or meet societal demands?

Environmental Literacy and Sustainability

Environmental literacy and sustainability during grades 3–5 may explore questions including:

- How do living organisms, including humans, affect their environment and how does their environment affect them?
- How are local environmental issues connected to larger local environment and human systems?
- How do people depend on and change the environment?

Earth and Space Sciences

Earth and space sciences during grades 3–5 may explore questions including:

- Why do some constellations disappear in the winter?
- How can water, ice, wind, and vegetation change the land?
- How can we keep buildings from collapsing during an earthquake?

Physical Sciences

Physical sciences during grades 3–5 may explore questions including:

- What allows us to see the world around us?
- How is energy transferred?
- When matter changes, does its weight change?

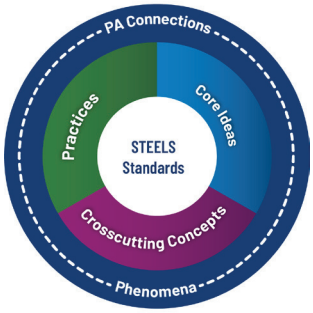
Life Sciences

Life sciences during grades 3–5 may explore questions including:

- How do organisms vary in their traits?
- Why do some flowers have such colorful petals?
- Where do mushrooms get their nourishment?

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 *less* like:	Possible classroom activities look *more* like:
Students have infrequent exposure to science, technology and engineering, and environmental literacy and sustainability instruction or related activities.	Students engage with science, technology and engineering, and environmental literacy and sustainability concepts as a core part of instruction and are encouraged to connect lessons to their own personal and local Pennsylvania experiences.
Students memorize definitions with little understanding, like "atoms are small particles that make up matter."	Students collect data from compressing air in a syringe to grasp a hard-to-see concept like matter.
Students draw food webs for generic environments disconnected from real-world phenomena or problems.	Students construct scientific arguments about how matter and energy move through ecosystems to figure out what happens to their garbage.
Students review the characteristics of various rocks and minerals.	Students gather evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a local landscape over time.
Students have infrequent exposure to discussions or activities related to engineering design.	Students consider or apply engineering design principles throughout each grade level.
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.