PENNSYLVANIA SCIENCE, ENVIRONMENTAL LITERACY AND SUSTAINABILITY, AND TECHNOLOGY AND ENGINEERING STANDARDS IMPLEMENTATION MAP

The implementation plan developed by the Pennsylvania Department of Education (PDE) aims to ensure that all students have access to an education that prepares them to succeed and become life-long learners. The conceptual shift in the Pennsylvania Science, Environmental Literacy and Sustainability, and Technology and Engineering Standards reflects a new vision for K–12 science education. This includes learning that is three-dimensional and connects disciplinary core ideas, science and engineering practices, and crosscutting concepts. Students must be engaged in explaining phenomena and designing solutions.

PDE is committed to ensuring the success of these shifts by providing sustained support and leadership. Implementation requires individuals who clearly understand the vision of the standards. State and local leaders will need to create professional learning communities to build educators' capacity for transforming the teaching of science, environmental literacy and sustainability, and technology and engineering to establish dynamic classrooms in our schools.

The plan focuses on curriculum, assessment, professional development, leveraging cross-content connections, and communication. It includes all levels of our educational system: the PDE, intermediate units, school districts, individual schools, and classroom teachers.

This focus aims to ensure the following:

1. Equity for all students

2. Leadership to guide the improvement of science education

3. Engaging in three-dimensional teaching and learning

4. Effective professional development for leaders and teachers

5. Building capacity and collaborating with multiple networks across the commonwealth to ensure a common goal and focus

6. Understanding and communicating the shifts required for successful implementation

7. A coherent plan that is used by all stakeholders

Table of Contents

Standard Implementation Framework: Curriculum

Goal: Seek, create, and disseminate resources to support stakeholders as the draft Pennsylvania Science, Environmental Literacy and Sustainability, and Technology and Engineering Standards implementation moves forward, and provide instructional resources aligned with the Pennsylvania Science, Environmental Literacy and Sustainability, and Technology and Engineering Standards that are designed to meet the diverse needs of all students.

Lead organizations	2022–2023	2023–2024	2024–2025
Pennsylvania Department of Education (PDE)	• Develop an implementation plan for state-level activities and recommendations for districts. • Develop/release guidance for developing curricula and selecting classroom resources based on crosswalks and proposed standards. • Ensure that all guidance, rubrics, and recommendations for curricula and instructional materials include cross-grade alignments. • Identify standards/strands in the new standards that can be included in professional development (PD) to demonstrate how best to implement new standards. • Develop a curriculum framework. • Develop learning progressions. • Develop evidence statements. • Develop a district-level rubric of programs as they relate to standards.	• Develop a Science Curriculum Toolkit. • Identify exemplary resources, materials, and tools for curriculum development and instructional use. • Develop and roll out different types of support resources, supporting materials, and best-practice recommendations. • Ensure that materials-adoption processes focus on the new standards. • Develop rubrics for identifying exemplary programs.	• Monitor district-level progress in rolling out new resources. • Continue to identify exemplary supplemental instructional materials and make them available (e.g., post on Standards-Aligned System [SAS]).
Standards-Aligned System (SAS)	• Crosswalk existing standards with proposed new standards. • Post the curriculum framework.	• Review existing materials and resources to determine their alignment with the new standards. • Populate new standards resources. • Post Science Curriculum Toolkit.	• Populate new standards resources.

Lead organizations	2022–2023	2023–2024	2024–2025

Intermediate Unit (IU)	• Develop an action-planning template including goals, timeline, and accountability.
	• Disseminate curriculum frameworks.
	• Disseminate learning progressions.
	• Assist member districts with—
	  – developing an implementation plan,
	  – alignment with new standards, and
	  – curricular needs for implementing instructional shifts.
		• Disseminate resources and guidance from PDE and provide ongoing support for implementing the new standards.
		• Provide or plan for ongoing curricular support.
		• Monitor adoption processes focused on the new standards.
			• Support district implementation of the new standards and curricula.
			• Monitor district-level progress in curriculum development and implementation.

District	• Review old curricula for alignment with the new standards using crosswalk. • Develop an implementation action plan. • Identify current curricular materials aligned with the new standards.	• Review district curricula using PDE-provided materials and IU resources. • Identify and adopt new curricula, resources, and instructional tools. • Provide PD to support understanding of curricular shifts and implementation.	• Monitor full implementation of all district curricula. • Provide PD as needed to support implementation. • Continue to expand supplemental curricular materials in the classroom.
School administrator	• Review standards with staff and identify instructional shifts as they relate to current curricula and resources. • Support identified shifts in instruction to align with the new standards.	• Implement new curricula as appropriate. • Ensure that necessary PD occurs as needed.	• Monitor full implementation of all district curricula, with ongoing PD for new and veteran teachers. • Continue to implement school-specific supplemental curricular materials.
Teacher	• Identify classroom needs in implementing instructional shifts.	• Begin to use new curricula and instructional materials as available. • Work with colleagues to identify and/or use curricular materials that align with the new standards.	• Implement district curricula. • Refine materials as needed for classroom instruction.

Standard Implementation Framework: Assessment

Goal: Develop and transition to draft Pennsylvania Science, Environmental Literacy and Sustainability, and Technology and Engineering Standards-aligned assessments that support the improvement of teaching and learning and provide information that may be used for accountability.

Lead organizations	2022–2023	2023–2024	2024–2025
PDE	• Finalize a timeline for statewide assessment transition. Include an item field testing plan and how this will be integrated into existing statewide assessments. • Finalize Pennsylvania Assessment Anchors and Eligible Content (AA/EC). • Develop a plan to address changes to Pennsylvania Classroom Diagnostic Tools (CDT). • Define a detailed transition plan that includes item development, pilot testing, opportunity to learn, first-year operational implementation, and standard-setting. • Include an item-type transition timeline in the plan. • Evaluate possible effects on statewide accountability systems and develop a transition plan (e.g., Pennsylvania Value-Added Assessment System (PVAAS). • Begin to implement the timeline for statewide assessments. • Develop a transition plan for statewide accountability systems that depend on statewide assessments.	• Adjust the assessment implementation timeline, as necessary. • Begin to implement the transition plan for statewide accountability systems that depend on statewide assessments (e.g., PVASS). • Continue to implement the timeline for statewide assessments.	• Complete the implementation of the timeline for statewide assessments, culminating in standard setting on new assessments. • Continue to implement the transition plan for statewide accountability systems that depend on statewide assessments (e.g., PVASS).
SAS	• Develop a plan to review assessment items for alignment with grade level and standards. • Develop a plan to create new assessment items appropriate for each grade level.	• Begin plan implementation with the assessment center. • Update assessment documents as they become available (e.g., AA/EC, CDT). • Develop and populate new assessment items on SAS.	• Continue implementation and adjust, as necessary.

Pennsylvania Science, Environmental Literacy and Sustainability, and Technology and Engineering Standards Implementation Map

4

Lead organizations	2022–2023	2023–2024	2024–2025
IU	• Provide resources to districts for developing common assessments. • Develop depth-of-knowledge (DOK) assessment guidance for new standards. • Identify necessary areas of coverage. • Develop assessments to help the transition to new standards.	• Provide PD on DOK assessment items for new standards. • Support revisions of district-wide assessments to support the transition. • Develop district assessment plans aligned with the new standards. • Develop an observation tool based on three-dimensional (3-D) teaching and learning. ("Look for's")	• Support transition plans for district accountability systems. • Distribute and train administrators on using teacher observation instruments.
District	• Evaluate existing districtwide assessments (common assessments) to determine whether a transition plan is necessary. • Evaluate possible effects on districtwide evaluation systems. • Develop and implement assessments to help the transition to new standards; focus instruction on new standards.	• Continue to revise districtwide assessments to support the transition. • Continue to monitor district results to address instructional changes needed.	• Continue to revise districtwide assessments to support the transition. • Continue to monitor district results to address instructional changes needed.
School administrator	• Communicate with and support teachers in implementing the district assessment plan at the building level. • Identify PD on assessment (common assessments) for teachers.	• Support teachers in participating in state and district assessment development. • Review teacher observation tools based on the expectations of the new standards. • Revise assessments as needed to ensure they fully focus on the new standards. • Support PD for implementing new assessments.	• Continue to revise assessments as needed to ensure they fully focus on the new standards. • Support teachers in participating in state and district assessment development. • Support PD for implementing the new assessments.
Teacher	• Review existing assessments and their alignment with new standards and identify necessary changes. • Identify PD opportunities to assist in the transition.	• Begin the transition to implementing new assessment items for the new standards. • Engage in PD opportunities in state and district assessment development. • Ensure that assessment aligns with instruction.	• Continue to use only assessments based on the new standards. • Engage in ongoing PD opportunities for teachers to be involved in state and district assessment development. • Use districtwide common assessments.

Standard Implementation Framework: Professional Development

Goal: Facilitate high-quality professional learning opportunities for educators to ensure that every student has access to teachers who are prepared to teach and facilitate student learning to the levels of rigor and depth required by the draft Pennsylvania Integrated Standards for Science, Environment, Ecology, Technology and Engineering.

Lead organizations	2022–2023	2023–2024	2024–2025

PDE	• Provide PD modules on—
	  – the structure and understanding of new standards, including their instructional implications and conceptual shifts from existing standards;
	  – the integration of math and English language arts (ELA) into science, including research on language acquisition;
	  – expectations for performance and performance shifts; and
	  – 3-D teaching and learning.
	• Offer train-the-trainer sessions for IUs to deliver professional-development-modules.
	• Produce PD on strengthening the connections between K–5 standards and curricula and Grade 6–12 standards and curricula.
	• Work with teacher certification institutions on preparing future teachers with new standards.
		• Expand PD modules on—
		  – 3-D teaching and learning with a focus on equity,
		  – natural phenomena and sense-making, and
		  – integrating ELA and math into science with implications for English learners.
		• Support IUs with PD needs.
			• Conduct PD focusing on new standards.
			• Set PD targets for integrating PD across subjects (new standards and other) focusing on common aspects (e.g., academic language, DOK).

SAS	• Budget for 5-hour Act 48 PD: Implementation of New Standards.	• Implement 5-hour Act 48 program: Introduction to New Standards.	

Lead organizations	2022–2023	2023–2024	2024–2025
IU	• Participate in state-level training. • Use PDE-developed modules to train school district science leaders. • Develop a long-term PD plan for IU districts.	• Conduct PD focusing on 3-D teaching and learning, natural phenomena, and sense-making. • Assist districts by providing PD regarding common assessments and DOK.	• Offer training for school district science leaders. • Continue PD as needed.
District	• Identify district-level PD needs regarding expectations of performance and performance shifts, 3-D teaching and learning, assessments, and DOK. • Identify teacher leaders and train for PD within district.	• Conduct PD for expectations of performance and performance shifts. • Deliver PDE-provided PD regarding common assessments for new standards.	• Offer PD on using formative assessment related to new standards. • Conduct PD related to the use of new materials (especially if new materials are nontraditional: e.g., use of science materials, e-books).
School administrator	• Communicate to teachers PD opportunities from district, IUs, and state. • Identify high-priority PD needs by subject area and topic. • Include opportunities for teachers to collaborate on developing curricular materials and share across staff. • Reevaluate the PD plan. • Participate in PD to understand expectations and shifts required by implementing the new standards.	• Provide teachers time in their schedules to understand the differences between the old and new standards. • Prepare teachers for expectations of instructional shifts. • Identify teacher leads for PD. • Continue to include opportunities for teachers to collaborate on implementing curricular materials. • Reevaluate the PD plan.	• Support and continue PD on new standards. • Reevaluate the PD plan.
Teacher	• Participate in PD opportunities as provided. • Request PD as needed.	• Actively participate in PD opportunities with staff at the building or district level. • Identify areas of strength and weakness in instruction, and partner with staff to support and be supported.	• Identify areas of strength and weakness in instruction, and partner with staff to support and be supported. • Continue to actively participate in PD opportunities.

Standard Implementation Framework: Leveraging Cross-Content Connections

Goal: Identify connections across multiple curricular areas.

Lead organizations	2022–2023	2023–2024	2024–2025
PDE	• Develop and identify common language regarding awareness and rollout of the new standards. • Make model course mapping for middle/high school available, with implications for testing (PSSA/Keystone) and graduation requirements. • Develop guidance and communication for integrating DOK and academic language demands into new standards implementation.	• Identify the supports needed for districts to implement course mappings. • Communicate common language across content areas. • Reevaluate areas of need in cross-content connections.	• Continue to use common language in communications and policy. • Reevaluate areas of need in cross-content connections.
SAS	N/A	• Communicate common language across content areas. • Post necessary documents.	• Post necessary documents.
IU	• Establish a committee to develop cross-content connections. • Develop resources for cross-content connections and common language. • Establish a committee to develop local connections. • Develop training for implementing cross-content connections based on PDE guidance and local needs.	• Focus on integrating other content-area standards into science. • Use common language in communications. • Focus on and provide PD that features cross-content areas.	• Focus on and provide PD that features integration of cross-content areas.
District	• Modify model course mappings for districts. • Identify academic language and literacy needs for the new standards. • Identify areas for potential cross-content connections. • Identify the curricular changes needed to implement common language and cross-curricular connections.	• Focus on integrating standards across subjects. • Implement the curricular changes needed to implement common language and cross-curricular connections.	• Focus on the full integration of standards across subjects. • Ensure that assessments reflect an integrated standards approach. • Continue to implement the curricular changes needed to implement common language and cross-curricular connections.

Pennsylvania Science, Environmental Literacy and Sustainability, and Technology and Engineering Standards Implementation Map

8

Lead organizations	2022–2023	2023–2024	2024–2025
School administrator	• Support district implementation. • Identify areas of need for PD.	• Include lead teachers in providing lessons learned during implementation and planning meetings, as necessary. • Support the implementation of cross-content connections.	• Ensure that ongoing PD opportunities are cross-subject to continue collaboration. • Continue to support the implementation of cross-content connections.
Teacher	• Identify cross-content connections and common language across sets of standards.	• Continue to collaborate with other teachers to identify opportunities for cross-content connections and consistent use of language. • Integrate new standards' cross-content connection links into planning and instruction.	• Continue to collaborate with other teachers to identify opportunities for cross-content connections within lessons.

Standard Implementation Framework: Communication

Goal: Design and establish systems of effective communication among stakeholders regarding draft Pennsylvania Science, Environmental Literacy and Sustainability, and Technology and Engineering Standards to continuously identify areas of need and disseminate information.

Lead organizations	2022–2023	2023–2024	2024–2025
PDE	• Communicate actions for each phase of the transition process. • Ensure the communication of new standards to all appropriate areas in the state. • Continue to disseminate talking points and materials for various audiences, including FAQs, ensuring that language is consistent across messengers. • Develop and share focused messages about new standards and the integration of ELA and mathematics into science.	• Share the progress of the transition. • Highlight the positive impact effects of the new standards. • Continue to disseminate talking points and materials for various audiences, including FAQs, ensuring that language is consistent across messengers.	• Update the public and stakeholders on the progress of implementation and successes related to implementation. • Continue communications that highlight the positive effects of the new standards; ensure that strands are continued across years. • Showcase data results. • Continue to disseminate talking points and materials for various audiences, including FAQs, ensuring that language is consistent across messengers.
SAS	• Post information and documents as available. • Post highlights on NewsFeed.	• Post information and documents as available. • Post highlights on NewsFeed.	• Post information and documents as available. • Post highlights on NewsFeed.
IU	• Clearly articulate actions of support for implementing the new standards. • Use common language developed by the state. • Communicate timelines and PDE's expectations for districts. • Use shared messages and be consistent about integrating ELA and mathematics into science. • Ensure that messaging is consistent for all districts.	• Update messages, as necessary. • Identify the positive and negative aspects of implementation and communicate with PDE regarding potential solutions. • Ensure that all districts are informed using information from PDE.	• Continue updates on implementation.

Lead organizations	2022–2023	2023–2024	2024–2025
District	• Provide clear expectations of accomplishments for each phase of the transition process. • Communicate to stakeholders the transition from previous standards to new standards. • Describe the effects of adoption on district programs. • Prepare FAQs for teachers to share with parents. • Develop and share focused messages about new standards integration.	• Share progress on the transition. • Highlight the positive and identify mitigation strategies for any negative aspects or effects of the new standards, with district-level specifics. • Update messages and FAQs, as necessary.	• Continue to update the district on transition status. • Continue communications that highlight positives and that identify mitigation strategies for any negative aspects of new standards implementation; ensure that strands are continued across years. • Begin to showcase data results for the district. • Update messages and FAQs, as necessary.
School administrator	• Ensure that messaging to school staff is clear and consistent, with timelines, shifts, and other impacts. • Keep content-appropriate teachers informed using information from district and state. • Communicate district talking points and key messages for teachers to share with parents, including timeline, and introduce the "language" of the new standards.	• Ensure that all teachers are informed, using information from district and state. • Ensure that teachers are using talking points and key messages with parents.	• Begin to identify data results for the school. • Support teachers in communicating expectations of performance and performance shifts to parents, leveraging standards language.
Teacher	• Understand key talking points and share them with parents. • Include PA science standards language in communications with parents.	• Communicate expectations of performance and performance shifts to parents, leveraging standards language.	• Continue to communicate expectations of performance and performance shifts to parents, leveraging standards language.