

Recommendations of the Science Standards Content and Steering Committees

Regarding Next Steps on Proposed Amendments to Chapter 4

In response to the Charge to the Committee adopted on September 8, 2021

December 1, 2021



Agenda

1. Process

- How have we developed these recommendations?

2. Recommendations based on the charges from the Academic Standards/Chapter 4 Committee, organized thematically

- What are we recommending?

3. Sample standard

- What will this look like for a teacher?

Process

- September-November 2021
- Content & Steering Committee meetings (combined)
 - 5 meetings
 - Attendance: 23 to 35; average 26 participants
- Working group/Content Committee meetings
 - 25 meetings
 - Attendance: 5 to 16; average 11 participants
- Hours: 60-80/person
- Votes via Google Forms: 2
- All documents and meetings open to all committee members.

Committee Member Panel

Content Committee Members (representing 60-member Content Committee)

1. Kathleen Blouch, *Lebanon Valley College*
2. **Steve Kerlin, Ph.D.**, *Stroud Water Research Center*
3. **Carrie Lankford**, *Red Lion Area School District*
4. Nanette Marcum-Dietrich, Ph.D., *Millersville University of Pennsylvania*
5. **Gina Mason**, *Palmyra Area School District*
6. Brienne May, *Franklin Regional School District*
7. Justin Ogline, *Ferndale Area School District*
8. Tarrea Potter, *Chesapeake Bay Foundation*
9. *Jeff Remington, *Palmyra Area School District*
10. Brian Suter, *Neshaminy School District*

Steering Committee Members (representing 18-member Steering Committee)

1. Jesse Maine, *Titusville Area School District*
2. *Ben Smith, *Lincoln Intermediate Unit 12*

Presenters in bold. (*) indicates member of both committees.



Gaining Consensus on Recommendations

1. Content Committee working groups
 - Discuss, draft, vote

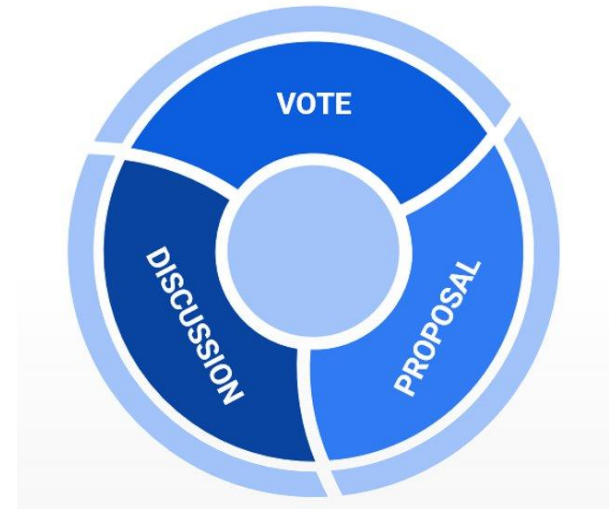
If consensus is reached,

2. Steering Committee
 - Approve or provide feedback
3. Content Committee
 - Approve, refine, or reject feedback

If approved,

4. Formal vote by Google Form (open to all members)
 - Green: I support the response
 - Yellow: I neither support nor disagree
 - Red: I don't agree, and I will lead the content and steering committee in an additional meeting to consider revisions of the language.

If "red" response, return to process.



Environmental Education Skills & Content

- Theme of Committee's charges: Ensure essential principles of EE are incorporated (NAAEE) & address EE content through 5th Domain or other construct (2002 PA E&E Standards and NAAEE)
- Committee's charges associated with the theme: 1 & 2
- Levels primarily impacted: K - 12
- Recommendations:
 - The committee proposes a fifth domain, "Environmental Literacy & Sustainability" (ELS)
 - 1) ELS.1 Agricultural and Environmental Systems and Resources
 - 2) ELS.2 Environmental Literacy Skills
 - 3) ELS.3 Sustainability and Stewardship
 - Three-dimensional
 - Aligned K-12, and with the other proposed PDE standards
 - The committee utilized:
 - National Council for Agriculture, Food & Natural Resources (AFNR)
 - North American Association of Environmental Educators (NAAEE)
 - Existing PA Environment and Ecology standards, environmental education research
 - Examples from other states that recently addressed similar gaps in environmental literacy and sustainability, including California, Louisiana, Maryland, Virginia, Washington, and Wisconsin.



3-Dimensional Language & Redundancies

- Theme of Committee's charges: Whether certain proposed standards lack clarity; lack three-dimensionality; or are similar to other standards.
- Committee's charges associated with the theme: 13, 14, 18, 20, & 21
- Levels primarily impacted: K - 5
- Recommendations:
 - Communication is part of three-dimensional learning and should be included: “use” → “use and share.”
 - Removed redundant text within a standard.
 - Retained (and clarified) a standard that is intended to build upon other standards.
 - The Environment and Ecology standards have been regrouped as the Environmental Literacy and Sustainability standards to vertically align K–12.

➤ Agriculture

- Theme of Committee's charges: How agriculture education is included for all students
- Committee's charges associated with the theme: 1, 2, & 6
- Levels primarily impacted: K - 12
- Recommendations: The committees have included agricultural education as the first standard in the 5th domain, Environmental Literacy & Sustainability, and assert that there is existing evidence of agricultural concepts in the K-5 proposed standards.

Climate Science

- Theme of Committee's charges: Addressing the topics of weather and climate, climate change, human impacts, and Earth's systems.
- Committee's charges associated with the theme: 4, 5, & 7-12
- Levels primarily impacted: K - 12
- Recommendations: The committee asserts that the intention of the standards is not to prescribe conclusions but to build students' capacity to engage in investigating issues, analyzing various scientific research and data, and developing informed conclusions.



Science and Engineering Practices (SEPs)

- Theme of Committee's charges: Whether there should be two practices in one standard; whether "communication" should be removed or added from the proposed standards.
- Committee's charges associated with the theme: 13, 15, 16, & 19
- Levels primarily impacted: K - 5
- Recommendations:
 - The science and engineering practices (SEPs) work together; practices do not operate in isolation; they unfold sequentially and overlap.
 - The practices should not be treated as standalone, so while there may be foci practices, there can be multiple that are occurring.
 - Communication is part of 3-dimensional learning.

Foundation Box Utilization

- Examples of SBE charges: Inclusion of PA's Environmental Rights Amendment
- SBE charges associated with these themes: 3, all
- Levels primarily impacted = K - 12
- Recommendation: Including specific environmental laws would fall under curricula implementation. References to this environmental law and others will be included in the standards' Foundation Boxes.

Sample Draft PE with Foundation Boxes (K-5)

Domain Environmental Literacy and Sustainability						
Core Idea Agriculture and Environmental Systems and Resources						
Performance Expectation (PE): Students who demonstrate understanding can: Categorize ways people harvest, re-distribute, and use natural resources.						
Clarifying Statements (Statements of knowledge to detail what the student should know and be able to do in the performance expectation.)						
Assessment Boundary						
Science and Engineering Practices (SEP) Engaging in Argument from Evidence	Disciplinary Core Ideas (DCI) ESS3.1 Earth and Human Activity ESS3.3- Human Impacts on Earth Systems PS3.2- Conservation of Energy and Energy Transfer ELS1.1 Agricultural Systems 3-5 TE 1-E Nature and Characteristics of Technology and Engineering 3-5 TE 4-H Impacts of Technology 3-5 TE 6-B History of Technology				Crosscutting Concepts (CCC) Cause and Effect Stability and Change Scale, Proportion, and Quantity Systems and System Models Agriculture Sustainability	
PA Connections: PA Career Ready Skills and PA Context						
Connections to Other Standards Content and Domains						
Agriculture (Agriculture, Food, and Natural Resources (AFNR) Career Cluster Content Standards)	Educational Technology (ISTE Standards for Students)	ELA (PA Core Standards: ELA)	Environment (NAAEE Guidelines for Excellence)	Math (PA Core Standards: Math)	PA Social Studies Standards	Technology and Engineering (ITEEA)
						

Contact/Mission

For more information on these academic standards please visit PDE's website at www.education.pa.gov/sciencestandards

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