

Science Standards Recommendations Committee

Recommendations for Standards Revisions

The Science Standards Recommendation Committee convened five times between March 2016 and July 2016 as part of a comprehensive, transparent, and Tennessee-specific standards review process. As part of its review of the revised standards, the Committee heard detailed presentations of the new standards from the Educator Advisory Team leads. The Committee also solicited and reviewed multiple types of feedback. Data and comments collected from the public website on standards were considered, along with feedback gathered through a series of regional roundtable conversations. Additional feedback from a team of Tennessee higher education faculty and the Southern Regional Education Board (SREB) was also considered.

The Committee developed the following recommendations for revision to the science standards. The Committee calls for the science educator advisory teams to use these recommendations to revise the standards again, with the expectation that the new revisions will be presented to the Committee in July 2016 for their consideration ahead of the State Board meeting on July 22, 2016.

1. Create a visual representation highlighting Disciplinary Core Ideas and key content across grades K-8 and high school courses. This visual should illustrate the vertical progression of standards and be included in the introduction.
2. Strengthen grade level and course level introductions to better highlight the key content that will be covered in each grade and course.
3. Consider whether the description of the Cross-cutting Practices and their role can be expounded upon in the overall introduction or grade/course introductions. Additionally, consider highlighting the embedded nature of the practices by underlining, bolding, italicizing, or typing in different colors key phrases so that they are more visible to teachers.
4. Reexamine the topic of scientific literacy in the introductions.
5. Consider adding in a section on the specific role of literacy in the science classroom.
6. Reexamine the language of the standards to ensure that verbiage is consistent with that of the K-12 Framework and across all grade levels. Consider providing additional clarification in the introductions on the grade level expectations for key vocabulary from the Framework. For example, what does it mean to use models in Kindergarten versus 4th grade versus Chemistry? Other concepts to consider include investigating, modeling, research, argumentation, scientific world, scientific findings, criteria for constraints, evolution, and integration of evidence.
7. Review and consider if clarity and specificity can be improved in the following standards:
 - a. Kindergarten: K.ETS1.1, K.LS1.1, K.LS1.3, K.PS1.3
 - b. 1st Grade: 1.ESS1.3
 - c. 2nd Grade: 2.ESS1.1, 2.ETS1.1

- d. 3rd Grade: 3.ESS1.1, 3.ESS2.1, 3.ESS2.3, 3.ESS3.2, 3.ETS1.2, 3.LS2.1, 3.PS1.1
 - e. 4th Grade: 4.LS2.1
 - f. 5th Grade: 5.PS1.2, 5.PS2.5, 5.LS1.1, 5.ESS1.6, 5.ETS1.2, 5.ETS2.1
 - g. 6th Grade: 6.ETS1.1, 6.LS2.2, 6.LS2.4, 6.LS4.1
 - h. 7th Grade: 7.PS.1.5, 7.PS.1.6, 7.ETS2.1, 7.LS.1.6
 - i. 8th Grade: 8.ESS1.1, 8.LS4.2
 - j. Biology I: Biol.LS1.1, Biol.LS1.3, Biol.LS1.7, Biol.LS1.5
 - k. Biology II: Bio2.LS4.28, Bio2.LS4.22
 - l. Anatomy and Physiology: HAP.LS1.14
 - m. Physical Science: PSCI.PS1.5
 - n. Chemistry I: CHEM1.PS1.3
8. Modify phrasing or move to increase clarity in the following standards:
- a. 5.PS1.4: Leave the first part of the standard in 5th grade and consider moving the chemical change aspect of the standard to after 7.PS1.5.
 - b. 8.LS4.4: Check grammar for the word “describing” and revisit the phrasing “Develop a scientific explanation describing...”.
 - c. 8.PS4.4: Recommend moving to ESS2 and number it ESS2.5 since it bundles well there rather than sitting as an unrelated overly specific standard in PS4.
 - d. ECO.ETS2.2: Recommend leaving out second sentence and including specific recommendations in the support document (interview an environmental scientist, job shadow, guest speaker, TED talks, etc.).
9. Consider adding in a standard in middle school that specifically references using the Periodic Table as a tool.
10. Revise standards that require particular equipment that all schools might not have access to. For example, Physical Science standard PSCI.PS1.12 specifies the use of pH meters which some schools might not have available.
11. Review the alignment between Chemistry I and Chemistry II and ensure that all standards in Chemistry I are essential, rather than enhanced standards. Ensure that Chemistry II standards are appropriate for Chemistry II rather than needing to be in Chemistry I or AP Chemistry. For example, CHEM1.PS1.14, CHEM1.PS2.2, CHEM1.PS2.3, CHEM1.PS3.2, CHEM1.PS1.7. For example, CHEM2.PS1.16, CHEM2.PS1.15, CHEM2.PS1.8, CHEM2.PS1.7, CHEM2.PS1.9, CHEM2.PS1.6, CHEM2.PS1.14, CHEM2.PS1.1, CHEM2.PS1.5, CHEM2.PS1.10, CHEM2.PS4.1.

Science Standards Recommendations Committee

Additional Recommendations from July 7, 2016

1. Pg. 13: Add ETS to the progression chart
2. Grade and Course Level Overviews: Add ETS1 and ETS2 to the tables in each overview
3. Grade and Course Level Overviews for Chemistry I and Chemistry II: Add in a DCI table for each
4. Document Order: Alphabetize the high school order
5. Pg. 39, 43, 47 (6-8th grade Overviews): Edit the last sentence to read “By the end of ____ grade, it is expected that students should be able to demonstrate the skills and content knowledge **in the thematic approach** emphasized in the following standards....”
6. Pg. 8: Revise the Middle School Progression section
7. Pg. 14: Merge mathematics and literacy “Recommended Mathematical and Literacy Skills for Science Proficiency” and shift the mathematical paragraph to the first paragraph under the new heading
8. Pg. 15: Delete “in” in the following sentence: “Provide a balance of appropriate sources **in** beyond the textbook”
9. Pg. 15: Change the headings to eliminate the question statement of “What should ____ do?” Revise the current subheading that read “_____should;” to “_____ responsibilities:”
10. Pg. 15: Edit the first bullet point under the heading “Teachers should” to read the following: “Encourage the use of science and engineering practices to guide the development of literacy skills in science.”
11. Pg. 16: Add “listen” to the section of the graphic that states “Literacy is...”
12. Pg. 36: Edit 5.PS1.4 to read “Evaluate the results of an experiment to determine whether the mixing of two or more substances results in a change of properties.”
13. Pg. 40: Edit 6.LS2.2 to read: “Determine the impact of competitive, symbiotic, and predatory interactions in an ecosystem.”
14. Pg. 45: Delete standard 7.ETS2.1
15. Pg. 49: Delete standard 8.ESS1.1

Science Standards Recommendation Committee Members

Dr. Sally Pardue - Chair

Ms. Jeannie Cuervo - Vice Chair

Mrs. Jan Allen Brewer

Ms. Marsha Buck

Dr. Kent Gallaher

Ms. Lorrie Graves

Mrs. Annette Hurd

Ms. Kattie Nash

Ms. LaToya Pugh

Mr. Mark Weeks