



Instructional Spotlight: A Student View of the New Science Standards

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Overview

In 2016, a K-12 Science Steering Committee was formed to look at current practice and to develop a vision for Science education in Shrewsbury. Shortly thereafter the Department of Elementary and Secondary Education (DESE) formally adopted new Science standards, and the work to align our curriculum to reflect new priorities began.

From the start, this curriculum initiative was a team effort. Instructional Coaches/Curriculum Coordinators at the Elementary level partnered with Middle level Science Curriculum Coordinator Ms. Pamela Poitras to further their own learning and to design support structures for classroom teachers. Collaboration across levels was critical, because embracing the new standards meant mastering new content. Importantly, curriculum leaders at both levels were committed to supporting teachers as they built their understanding. For that reason, the team purposefully moved slowly and in step with pilot teachers. The goal was to implement gradually, with fidelity. Just as importantly, teams collaborated to ensure a smooth transition for students. In many ways, the work in Science mirrored the approach to adopting new Mathematics curriculum.

Different Content, Similar Approach

The Mathematics and Science [standards](#) emphasize rigor, coherence and connection to career and college readiness. Further, both documents stress the importance of attending to Science practices as well as learning outcomes for students.

Emphasis in STE Standards	Implication for Curriculum and Instruction
Relevance: Organized around core explanatory ideas that explain the world around us	The goal of teaching focuses on students analyzing and explaining phenomena and experience
Rigor: Central role for science and engineering practices <i>with</i> concepts	Inquiry- and design-based learning involves regular engagement with practices to build, use, and apply knowledge
Coherence: Ideas and practices build over time and among disciplines	Teaching involves building a coherent storyline over time and among disciplines

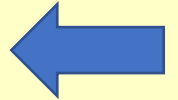
The goal of this instructional spotlight is to familiarize you with the Science practices and how they feature in the implementation of the new curriculum. The student part of the presentation will highlight one practice in particular, namely developing and using models.

Asking Questions and Defining Problems

A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world works and which can be empirically tested.

Developing and Using Models

A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations.



Planning and Carrying Out Investigations

Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters.

Analyzing and Interpreting Data

Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis.

Using Mathematics and Computational Thinking

In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; statistically analyzing data; and recognizing, expressing, and applying quantitative relationships.

Constructing Explanations and Designing Solutions

The products of science are explanations and the products of engineering are solutions.

Engaging in Argument from Evidence

Argumentation is the process by which explanations and solutions are reached.

Obtaining, Evaluating, and Communicating Information

Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity.

Next Steps

By 2019-2020, all teachers at the Elementary and Middle level will fully implement the new Science curriculum. As we anticipate next steps, it's important to acknowledge the hard work of the pilot teachers and our curriculum leaders. In developing model lessons and units, these pioneers successfully translated the initial vision of the Science Steering Committee into engaging, rigorous and authentic learning experiences for our students.