Jul 29th, 1:45 PM - Jul 9th, 2:45 PM

Identifying Quality Science Instructional Material

Doug Paulson
Minnesota Department of Education, doug.paulson@state.mn.us

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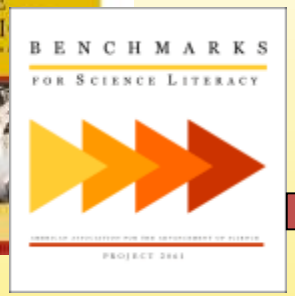
John Olson, Science Specialist
Doug Paulson, STEM Specialist
Minnesota Department of Education

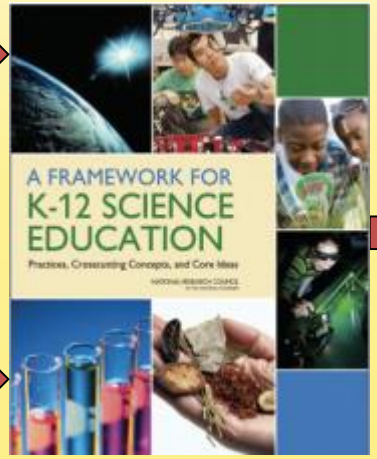
Building on the Past; Preparing for the Future



1990s

1990s-2009

Phase I



1/2010 - 7/2011

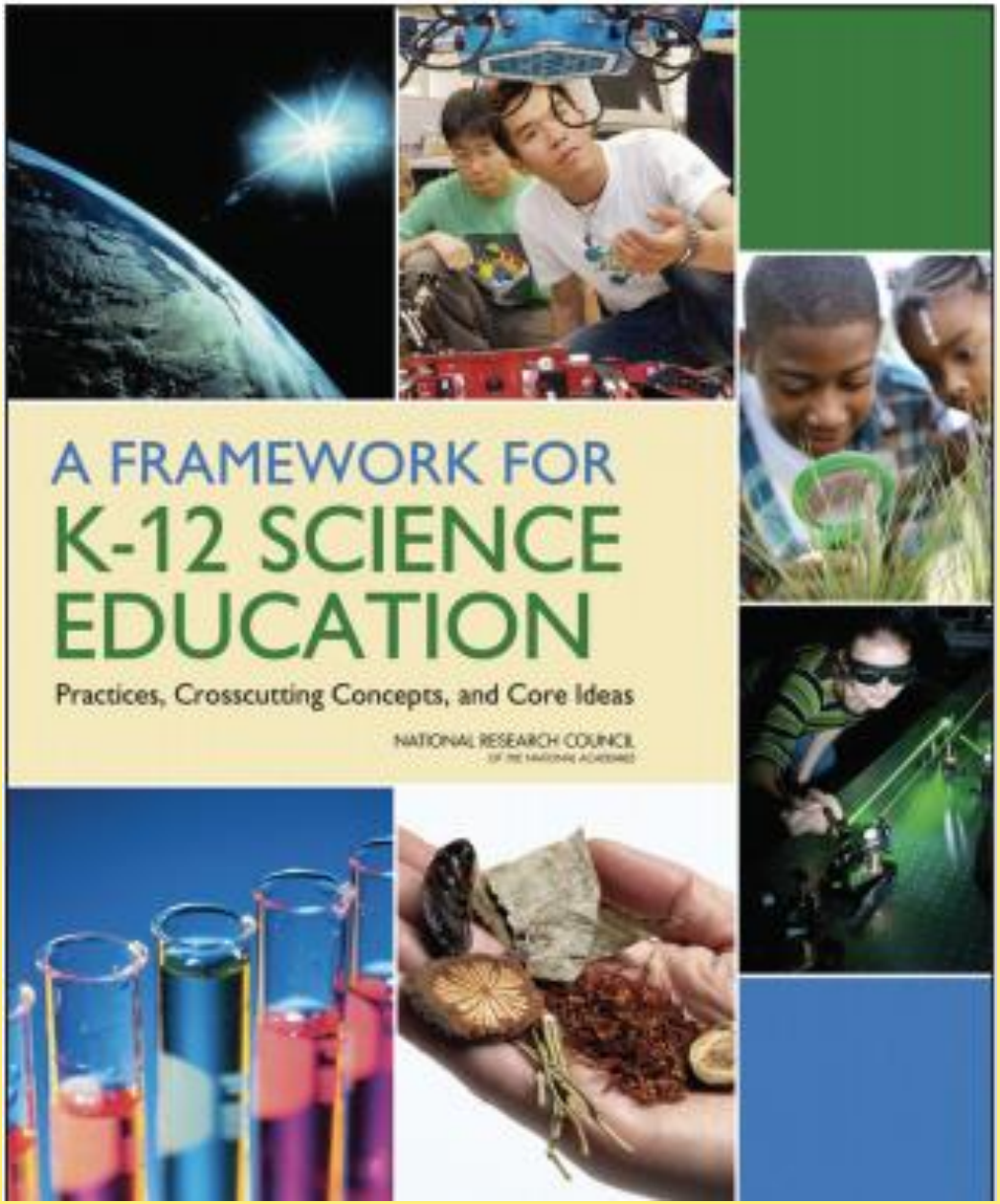
Phase II

July 2011 – April 2013

Phase III

State Standards

Mn 2017-18



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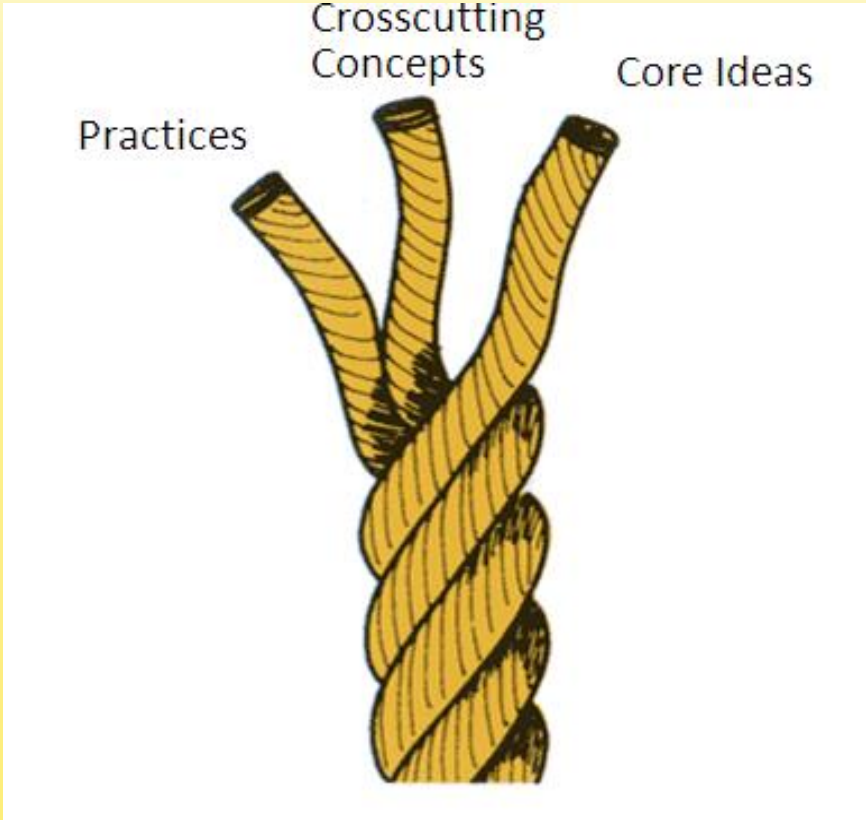
Three Dimensions of Science Learning

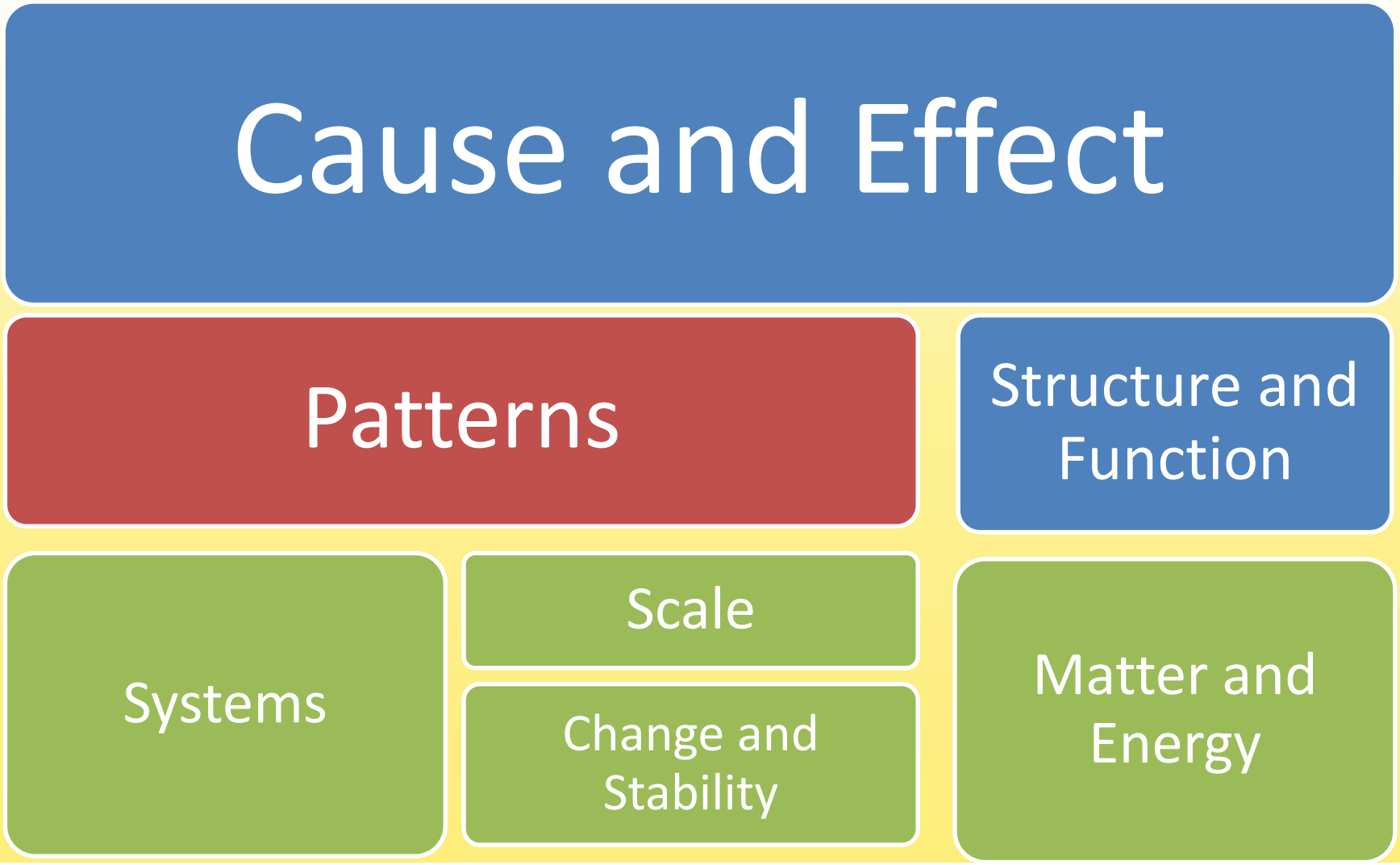
I. **Scientific and Engineering Practices**

II. **Crosscutting Concepts**

III. **Core Ideas**



Crosscutting Concepts

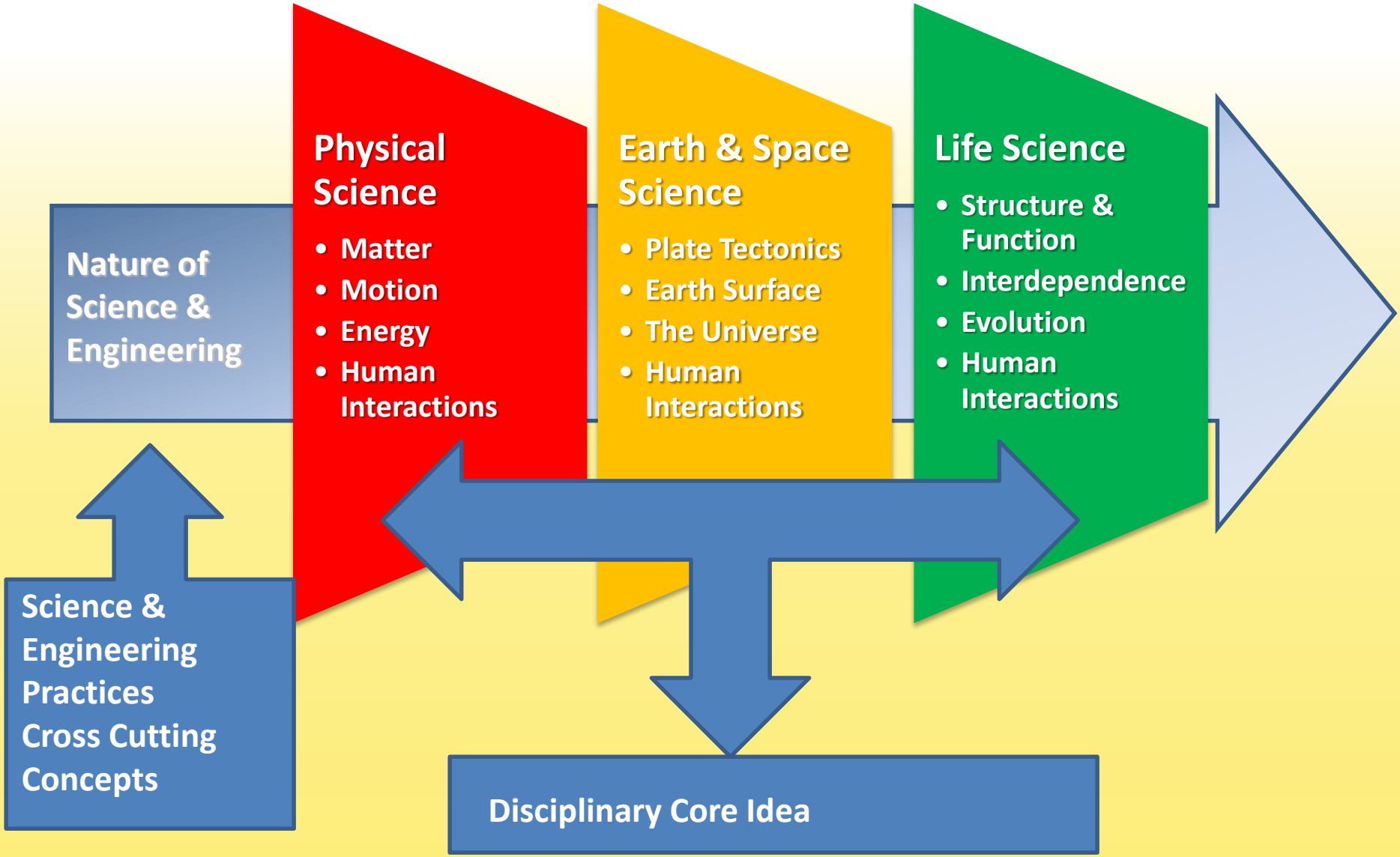


Science and Engineering Practices

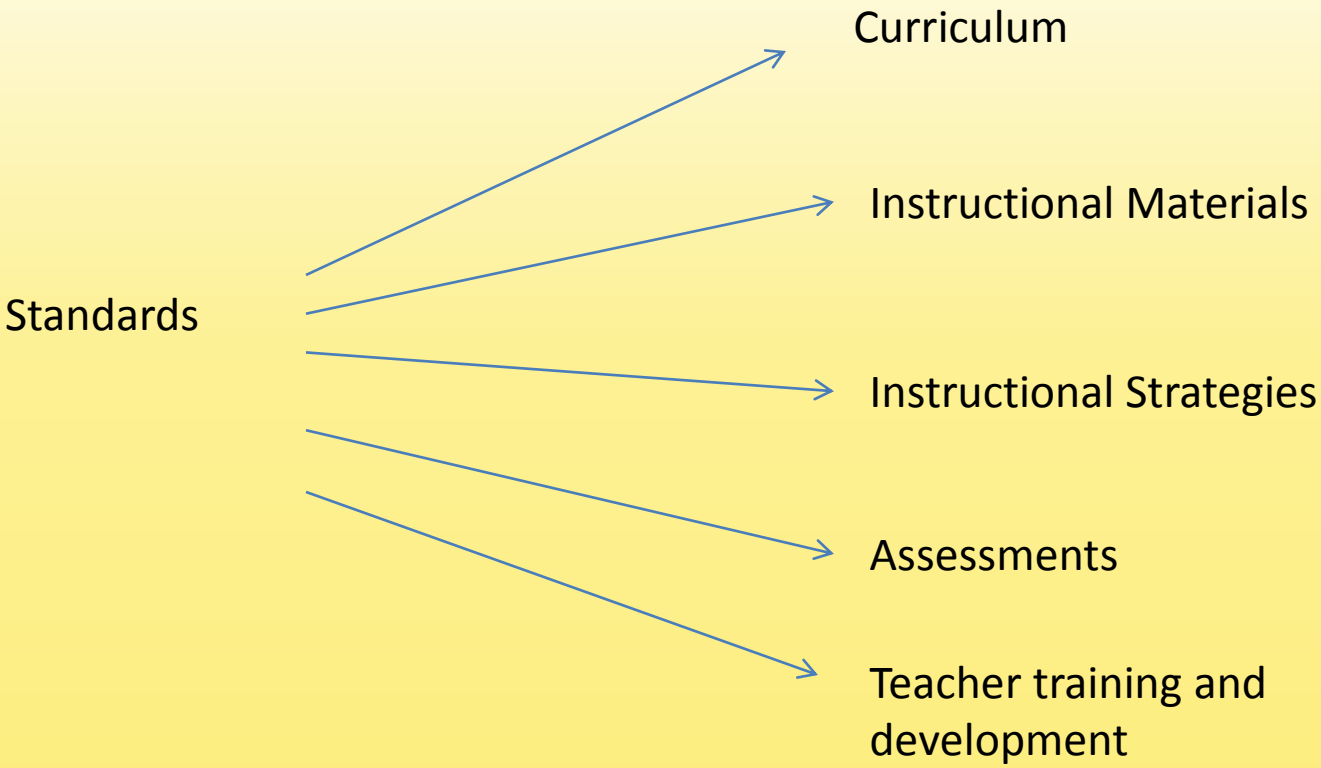
1. Asking Questions (Science) and Defining Problems (Engineering)
2. Developing and Using Models
3. Planning and Carrying Out Investigations
4. Analyzing and Interpreting Data
5. Using Mathematics, Information and Computer Technology, and Computational Thinking
6. Constructing Explanations (Science) and Designing Solutions (Engineering)
7. Engaging in Argument from Evidence
8. Obtaining, Evaluating, and Communicating Information

Framework Page 42

Science Standards

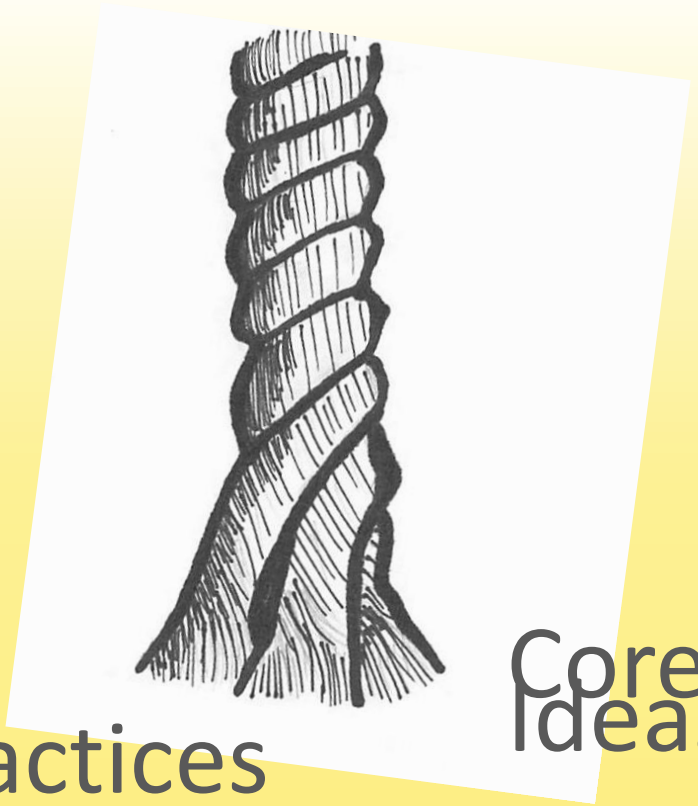


Implementing Standards



Rationale: What's the Purpose of the EQuIP Rubric

Engaging in Three-Dimensional Learning



Core Ideas

Practices

Crosscutting Concepts

Minnesota Department of Education

equip
Educators Evaluating

An Analogy

Three-Dimensional Learning is like making a really great meal.

The cooking techniques are the **practices**.

The main ingredients are the **core ideas.**

The herbs and spices are the **crosscutting concepts.**

The Rubrics Design

The EQuIP rubrics are designed to evaluate:

- **Lessons that include instructional activities and assessments aligned to the NGSS that may extend over a few class periods or days**
- **Units that include integrated and focused lessons aligned to the NGSS that extend over a longer period of time**
- **The rubric is NOT designed to evaluate a single task or activity**
- ***The rubrics do not require a specific template for lesson or unit design***

EQuIP Rubric

EQuIP Rubric for Lessons & Units: Science

I. Alignment to the NGSS	II. Instructional Supports	III. Monitoring Student Progress
e lesson or unit aligns with the conceptual shifts of NGSS: A. Grade-appropriate elements of the science and engineering practice(s), disciplinary core idea(s), and crosscutting concept(s), work together to support students in three-dimensional learning to make sense of phenomena and/or to design solutions to problems. i. Provides opportunities to use specific elements of the practice(s) to make sense of phenomena and/or to design solutions to problems. ii. Provides opportunities to construct and use specific elements of the disciplinary core idea(s) to make sense of phenomena and/or to design solutions to problems. iii. Provides opportunities to construct and use specific elements of the crosscutting concept(s) to make sense of phenomena and/or to design solutions to problems. iv. The three dimensions work together to support students to make sense of phenomena and/or to design solutions to problems. A unit or longer lesson will also: B. Lessons fit together coherently targeting a set of performance expectations. i. Each lesson links to previous lessons and provides a need to engage in the current lesson. ii. The lessons help students develop proficiency on a targeted set of performance expectations. C. Where appropriate, disciplinary core ideas from different disciplines are used together to explain phenomena. D. Where appropriate, crosscutting concepts are used to explain phenomena from a variety of disciplines. E. Provides grade-appropriate connection(s) to the Common Core State Standards in Mathematics and/or English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects.	The lesson or unit supports instruction and learning for all students: A. Engages students in authentic and meaningful scenarios that reflect the practice of science and engineering as experienced in the real world and that provide students with a purpose (e.g., making sense of phenomena and/or designing solutions to problems). i. The context, including phenomena, questions, or problems, motivates students to engage in three-dimensional learning. ii. Provides students with relevant phenomena (either firsthand experiences or through representations) to make sense of and/or relevant problems to solve. iii. Engages students in multiple practices that work together with disciplinary core ideas and crosscutting concepts to support students in making sense of phenomena and/or designing solutions to problems. iv. Provides opportunities for students to connect their explanation of a phenomenon and/or their design solution to a problem to their own experience. v. When engineering performance expectations are included, they are used along with disciplinary core ideas from physical, life, or earth and space sciences. B. Develops deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts by identifying and building on students' prior knowledge. C. Uses scientifically accurate and grade-appropriate scientific information, phenomena, and representations to support students' three-dimensional learning. D. Provides opportunities for students to express, clarify, justify, interpret, and represent their ideas and respond to peer and teacher feedback orally and/or in written form as appropriate to support student's three-dimensional learning. E. Provides guidance for teachers to support differentiated instruction in the classroom so that every student's needs are addressed by including: i. Suggestions for how to connect instruction to the students' home, neighborhood, community and/or culture as appropriate. ii. Appropriate reading, writing, listening, and/or speaking alternatives (e.g., translations, picture support, graphic organizers) for students who are English language learners, have special needs, or read well below the grade level. iii. Suggested extra support (e.g., phenomena, representations, tasks) for students who are struggling to meet the performance expectations. iv. Extensions for students with high interest or who have already met the performance expectations to develop deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts. A unit or longer lesson will also: F. Provides guidance for teachers throughout the unit for how lessons build on each other to support students developing deeper understanding of the practices, disciplinary core ideas, and crosscutting concepts over the course of the unit. G. Provides supports to help students engage in the practices as needed and gradually adjusts supports over time so that students are increasingly responsible for making sense of phenomena and/or designing solutions to problems.	The lesson or unit supports monitoring student progress: A. Elicits direct, observable evidence of three-dimensional learning by students using practices with core ideas and crosscutting concepts to make sense of phenomena and/or to design solutions. B. Formative assessments of three-dimensional learning are embedded throughout the instruction. C. Includes aligned rubrics and scoring guidelines that provide guidance for interpreting student performance along the three dimensions to support teachers in (a) planning instruction and (b) providing ongoing feedback to students. D. Assessing student proficiency using methods, vocabulary, representations, and examples that are accessible and unbiased for all students. A unit or longer lesson will also: E. Includes pre-, formative, summative, and self-assessment measures that assess three-dimensional learning. F. Provides multiple opportunities for students to demonstrate performance of practices connected with their understanding of disciplinary core ideas and crosscutting concepts and receive feedback.

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Category I, Criterion A

A. Grade-appropriate elements of the science and engineering practice(s), disciplinary core idea(s), and crosscutting concept(s), blend and work together to support students in three-dimensional learning to make sense of phenomena and/or to design solutions to problems.

Category I, Criterion A, Sub-Criterion i

i. Provides opportunities to use specific elements of the practice(s) to make sense of phenomena and/or design solutions to problems.

Category I, Criterion A, Sub-Criterion ii

ii. Provides opportunities to construct and use specific elements of the disciplinary core idea(s) to make sense of phenomena and/or design solutions to problems.

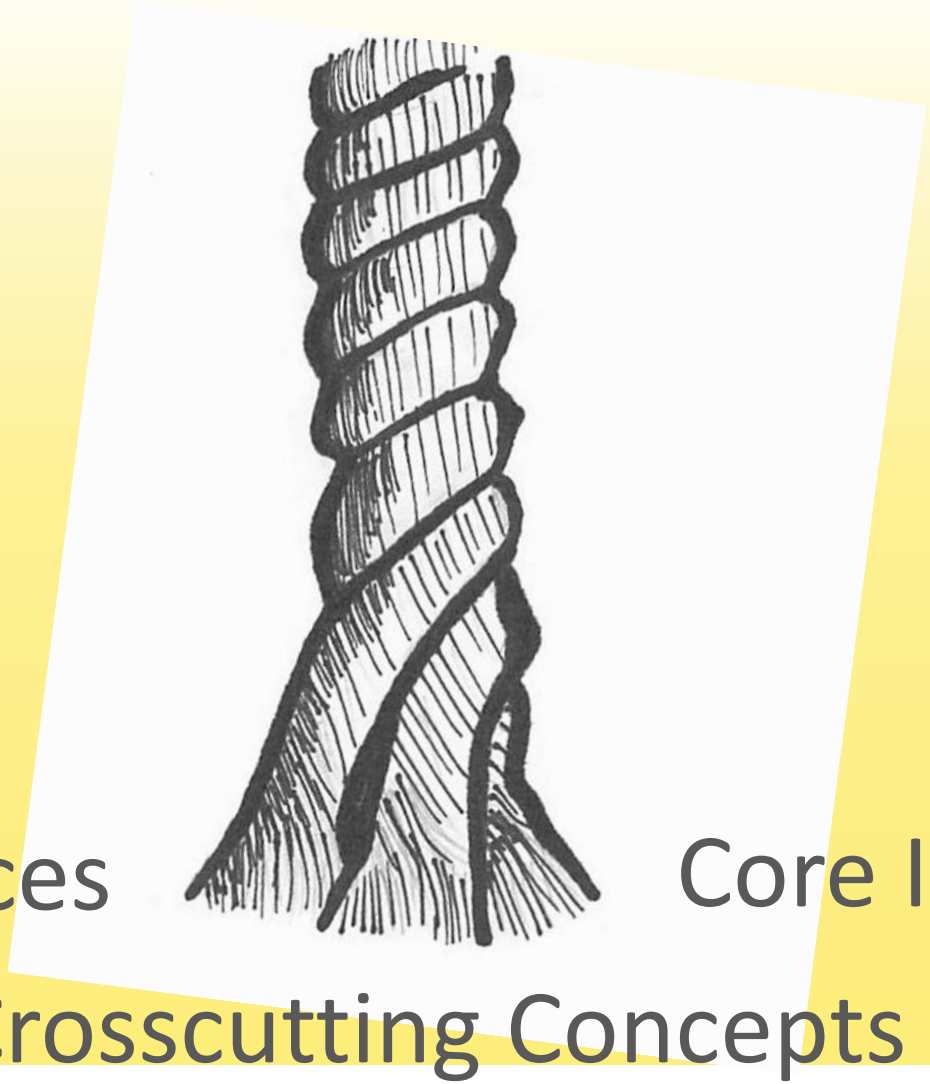
Category I, Criterion A, Sub-Criterion iii

iii. Provides opportunities to construct and use specific elements of the crosscutting concept(s) to make sense of phenomena and/or design solutions to problems.

Category I, Criterion A, Sub-Criterion iv

iv. The three dimensions work together to support students to make sense of phenomena and/or to design solutions to problems.

What Does Alignment Look Like?



Practices

Core Ideas

Crosscutting Concepts

The Response Form

EQuIP Rubric for Lessons & Units: Science

Reviewer Name or ID: **Grade:**
Science Lesson/Unit Title:

I. Alignment to the NGSS

The lesson or unit aligns with the conceptual shifts of the NGSS:

Criteria	Specific evidence from materials and reviewers' reasoning	Suggestions for improvement
☐ A. Grade-appropriate elements of the science and engineering practice(s), disciplinary core idea(s), and crosscutting concept(s), work together to support students in three-dimensional learning to make sense of phenomena and/or to design solutions to problems. i. Provides opportunities to use specific elements of the practice(s) to make sense of phenomena and/or to design solutions to problems. ii. Provides opportunities to construct and use specific elements of the disciplinary core idea(s) to make sense of phenomena and/or to design solutions to problems. iii. Provides opportunities to construct and use specific elements of the crosscutting concept(s) to make sense of phenomena and/or to design solutions to problems. iv. The three dimensions work together to support students to make sense of phenomena and/or to design solutions to problems.		

A unit or longer lesson will also:

Criteria	Specific evidence from materials and reviewers' reasoning	Suggestions for improvement
☐ B. Lessons fit together coherently targeting a set of performance expectations. i. Each lesson links to previous lessons and provides a need to engage in the current lesson. ii. The lessons help students develop proficiency on a targeted set of performance expectations.		
☐ C. Where appropriate, disciplinary core ideas from different disciplines are used together to explain phenomena.		
☐ D. Where appropriate, crosscutting concepts are used to explain phenomena from a variety of disciplines.		
☐ E. Provides grade-appropriate connection(s) to the Common Core State Standards in Mathematics and/or English Language Arts & Literacy in History/Social Studies, Science and Technical Subjects.		

If the lesson or unit is not closely aligned to the Next Generation Science Standards, it may not be appropriate to move on to the second and third categories. Professional judgment should be used when weighing the individual criterion. For example, a lesson without crosscutting concepts explicitly called out may be easier to revise than one without appropriate disciplinary core ideas; such a difference may determine whether reviewers believe the lesson merits continued evaluation or not.

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Applying the Criteria to a Lesson

Individually, read through the sample lesson provided, and

- **Highlight evidence of science and engineering practices in BLUE**
- **Highlight evidence of disciplinary core ideas in ORANGE**
- **Highlight evidence of crosscutting concepts in GREEN**

Applying the Criteria to a Lesson

Still working individually, reason how the evidence fits together and connects to one or more criteria. Is there evidence to show that the practices, disciplinary core ideas, and crosscutting concepts:

- Work together to support students in three-dimensional learning to make sense of phenomena and/or to design solutions to problems, OR
- **Occur in isolation within the lesson**

Applying the Criteria to a Lesson

At your table, share and discuss

- **The evidence you have highlighted as individuals**
- **The reasoning that explains the connections you've made between the evidence and the rubric criteria**
- **Your judgments about whether or not you have sufficient and compelling evidence of the rubric criteria**

Applying the Criteria to a Lesson

Finally, as a group provide suggestions for improvement related to

- The incorporation of science and engineering practices, core ideas, and/or crosscutting concepts; and or
- The blending of these practices, core ideas, and/or crosscutting concepts to support students in three dimensional learning