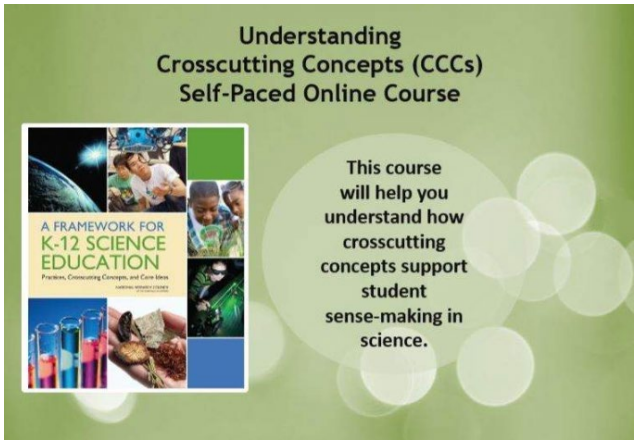
Understanding Crosscutting Concepts



Design Document

Version 1.0

1 Analysis

1.1 Purpose

Crosscutting concepts (CCCs) are a critical dimension when implementing the NGSS or Framework-based standards. One challenge I faced when providing instructor-led professional development about the NGSS was that science educators attending had a wide range of understanding of the CCCs; meeting all their learning needs in the allotted time was challenging.

A needs analysis was conducted using surveys and interviews; results showed a wider range of understanding of the CCCs when compared to the disciplinary core ideas (DCIs) or science and engineering practices (SEPs).

To address this challenge, a self-paced course will be developed to serve as a prerequisite for attending the professional development. This will create a shared baseline understanding of the CCCs so the time during the instructor-led sessions can be used more effectively.

1.2 Prior Educational Efforts

The audience for the instructor-led training (ILT) comes from diverse backgrounds where some participants have attended prior trainings or read materials about the three dimensions and others are novices to the CCCs. This is a prerequisite eLearning course so that participants attending the ILT attend with common understandings of vocabulary and have had opportunity to reflect on how CCCs can be integrated with the curriculum they currently teach.

1.3 Proposed Course Delivery Method

Rise eLearning course – self-paced

1.4 Length of Training

1-2 hours

1.5 Target Audience

K-12 science educators, district science specialists/coordinators, science coaches, higher education faculty, and school or district administrators tasked with implementing the NGSS or Framework-based standards.

1.6 Course Prerequisites

- None – this will be the prerequisite course

1.7 Training Recommendations

- Required as prerequisite training prior to attending the full-day instructor led workshop, "Implementing Three-Dimensional Science Standards".
- Recommended for background learning for any science educator or administrator interested in implementing three-dimensional science standards, even if they do not attend the full-day workshop.

1.8 Learning Goals/Objectives

1. Describe why crosscutting concepts are a critical dimension for science instruction and student sense-making.
2. Identify the seven crosscutting concepts and how they develop as students progress through the grade bands.
3. Develop strategies for incorporating crosscutting concepts into your instructional sequence.

1.9 Training Outline

Lesson 1. Introduction	
Instructional Goal	Provide background information and objectives.
Lesson Components	
1.1	a. Course description b. Objectives c. Copyright Info

Lesson 2. What are Crosscutting Concepts	
Instructional Goal	Describe why crosscutting concepts are a critical dimension for science instruction and student sense-making.
Lesson Components	
2.1	a. What are CCCs b. Video of CCCs in the classroom c. Purpose of CCCs in student learning

Lesson 3. Patterns (PAT)	
Instructional Goal	• Identify PAT as a crosscutting concept and describe how they develop as students progress through the grade bands. • Develop strategies for incorporating the crosscutting concept of PAT into your instructional sequence.
Lesson Components	
3.1	a. Information and links to the Framework b. Progression of learning c. Implications for instruction d. Prompts for students

Lesson 4. Cause and Effect (CE)	
Terminal Objective	• Identify CE as a crosscutting concept and describe how they develop as students progress through the grade bands. • Develop strategies for incorporating the crosscutting concept of CE into your instructional sequence.
Lesson Components	
4.1	a. Information and links to the Framework b. Progression of learning c. Implications for instruction d. Prompts for students

Lesson 5. Scale, proportion, and quantity (SPQ)	
Instructional Goal	• Identify SPQ as a crosscutting concept and describe how they develop as students progress through the grade bands. • Develop strategies for incorporating the crosscutting concept of SPQ into your instructional sequence.
Lesson Components	
5.1	a. Information and links to the Framework b. Progression of learning c. Implications for instruction d. Prompts for students

Lesson 6. Systems and system models (SYS)	
Instructional Goal	• Identify SYS as a crosscutting concept and describe how they develop as students progress through the grade bands. • Develop strategies for incorporating the crosscutting concept of SYS into your instructional sequence.
Lesson Components	
6.1	a. Information and links to the Framework b. Progression of learning c. Implications for instruction d. Prompts for students

Lesson 7. Energy and Matter (EM)		
Instructional Goal		• Identify EM as a crosscutting concept and describe how they develop as students progress through the grade bands. • Develop strategies for incorporating the crosscutting concept of EM into your instructional sequence.
Lesson Components		
7.1	a. b. c. d.	Information and links to the Framework Progression of learning Implications for instruction Prompts for students

Lesson 8. Structure and Function (SF)		
Instructional Goal		• Identify SF as a crosscutting concepts and describe how they develop as students progress through the grade bands. • Develop strategies for incorporating the crosscutting concept of SF into your instructional sequence.
Lesson Components		
8.1	a. b. c. d.	Information and links to the Framework Progression of learning Implications for instruction Prompts for students

Lesson 9. Stability and Change (SC)		
Instructional Goal	• Identify SC as a crosscutting concept and describe how they develop as students progress through the grade bands. • Develop strategies for incorporating the crosscutting concept of SC into your instructional sequence.	
Lesson Components		
9.1	a. Information and links to the Framework b. Progression of learning c. Implications for instruction d. Prompts for students	

Lesson 10. Resources		
Instructional Goal	• Provide external resources that were cited during the course so they can further learn about CCC	
Lesson Components		
10.1	a. Framework for K-12 Science Education b. Prompts for Integrating Crosscutting Concepts Into Assessment and Instruction c. Using Crosscutting Concepts to Prompt Student Responses d. Appendix G: Crosscutting Concepts (NGSS)	

2 Evaluation Plan

1.1 Type of Evaluation

Participants will complete satisfaction surveys (Kirkpatrick's Level 1)

Participants of the full-day instructor-led workshop will complete satisfaction surveys (Kirkpatrick's Level 1) at the end of the workshop. Compare results of those who completed this prerequisite course to results of learners who only attended the workshop.