

Mars Rover Celebration NGSS Alignment

WEEK 5: DESIGNING AND BUILDING
LESSON 11: BRAINSTORM AND PRELIMINARY DESIGN
GRADE LEVEL: 6-8

PERFORMANCE EXPECTATIONS

In the NGSS framework, one of the important things that teachers need to do is explicitly identify when Science and Engineering Practices (SEP) and Cross Cutting Concepts (CCC) are being covered. The SEP's and CCC's are pervasive throughout the Mars Rover Celebration curriculum. The tables here are intended to assist the teacher in deciding when to mention that an SEP or CCC is part of the material being presented.

Lesson Objectives		
Students who demonstrate understanding can: <ul style="list-style-type: none"> Identify, become familiar with and use the Engineering Design Process Use the Engineering Design Process to sketch a reasonable drawing of the rover that will be built Use the steps of the Engineering Design Process to sketch a Mars Rover prototype Develop a concept map to communicate requirements and features of the rover 		
MS Engineering Design		
MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet criteria and constraints of the problem.		
SCIENCE AND ENGINEERING PRACTICES (SEP)	DISCIPLINE CORE IDEAS (DCI)	CROSSCUTTING CONCEPTS (CCC)
Asking Questions and Defining Problems Define a problem that can be solved through the development of an object, tool, process, or system and includes multiple criteria and constraints, including scientific knowledge that my limit possible solutions	ESS1: Earth's Place in the Universe: ESS1.A: The Universe and Its Stars ESS1.B: Earth and the Solar System ETS1: Engineering Design: ETS1.A: Defining and Delimiting Engineering Problems	System and System Models Models can be used to represent systems and their interactions- such as inputs, processes, and outputs- and energy and matter flows within systems
Obtaining, Evaluating and Communicating Information		

Integrate qualitative science and technical information in written text with that contained in media and visual displays to clarify claims and findings

SUMMARY OF THE THREE DIMENSIONS

The 5E lesson model provides the 5 phases of learning that helps to facilitate the process of science understanding. Teachers are encouraged to use the table below to help align their teaching methods with the embedded Science and Engineering Practices (SEP), Disciplinary Core Ideas (DCI) and Cross Cutting Concepts (CCC) present in the lesson.

5E MODEL PHASE	SCIENCE AND ENGINEERING PRACTICES (SEP)	DISCIPLINE CORE IDEAS (DCI)	CROSSCUTTING CONCEPTS (CCC)
ENGAGE	Asking Questions and Defining Problems	Earth and the Solar System	Systems and System Models
EXPLORE	Asking Questions and Defining Problems	Earth and the Solar System	Systems and System Models
EXPLAIN	Obtaining, Evaluating and Communicating Information	Earth and the Solar System Defining and Delimiting Engineering Problems	Systems and System Models
ELABORATE	Obtaining, Evaluating and Communicating Information	Earth and the Solar System Defining and Delimiting Engineering Problems	Systems and System Models
EVALUATE	Performance Expectations	Performance Expectations	Performance Expectations