Good Morning!

Find a seat at any table

On tables you will find cards that have statements written on them.

Find a statement that grabs your attention.

NM STEM Ready! Science Standards Educational Leader Training

Yanira Vazquez, Director, Math and Science
Patricia Carden, Math Specialist, Math and Science
Marcia Barton, STEM PD Specialist

Welcome!

NGSS
+
New Mexico 6
Specific Standards
=

science standards

Goal 1

To build a three-dimensional learning framework for science.

Criteria for Success:

- *I can recognize science learning includes the use of disciplinary core ideas, the science and engineering practices, and crosscutting concepts in a classroom environment.*

Goal 2

To ground ourselves in the structure of

The NM STEM Ready! Science Standards

Criteria for Success:

- *I can describe the structure of the NM STEM Ready! Science Standards to stakeholders.*

Goal 3

To learn about the significance of the 5 innovations for classroom instruction

Criteria For Success:

- *I can explain the innovations and the significance they have on instruction.*

Team Builder

Which statement on the picture cards caught your attention and why?

AND

Where are you on the NM STEM Ready! Science Standards journey?

NORMS

Look over the NORMS and think about which one you want to try out today. Turn to your shoulder partner to talk about which NORM you chose and why.

Engineering Design

The NM STEM Ready! Science Standards include a commitment to integrate **engineering design** into the structure of science education at all levels.

- **APPENDIX I – Engineering Design**

Engineering Design

Please find the Engineering design handout in your folder.

Lets get ready to do science!!!

Phenomena

https://www.youtube.com/watch?v=u0osv1-khBs

Launch

- How do engineers design planes to protect the cargo?

- Thinking like an engineer, determine the best design for an airplane to keep cargo protected during a flight.

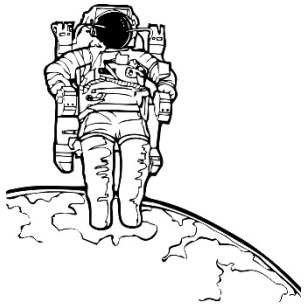
Find the Role Cards….

Engineer- Leads the design and construction of the plane with input from the group.

Illustrator- Creates the diagram of the final airplane and how it safely protects the cargo.

Technical Writer- Leads the creation of the technical paper to describe how the group used the engineering design to create the solution.

Team Leader- Makes sure every member of the group has a part in the task and that the solution meets the constraints and criteria.



Explore

Find the ziploc bag on your table.

Airplane!

Project Overview

Your aeronautical team's task is to build an airplane to carry cargo safely from Point A to Point B

Explore

- Your team will have 40 minutes to complete the task.

- At the end of 40 minutes, your team should have accomplished:
  - the design solution
  - diagram
  - technical paper

Feedback

- Two stars – describe two positive aspects (stars) of the work.

- One wish – express a wish about how the group might strengthen the work.

Summary

- We generated and compared multiple solutions when we…
- We met the criteria and constraints when we...
- We designed the optimal solution when we…
- We applied engineering design when we...

Fishbowl

- Are all students engaging in the lesson's activities?
- How did the lesson incorporate multiple means of engagement, expression, and representation?
- What supports allowed students to engage in sophisticated science and engineering practices?
- How were students using evidence to support their claims?

Reflection of Goal 1

Please pull out “A New Vision for Science Education”

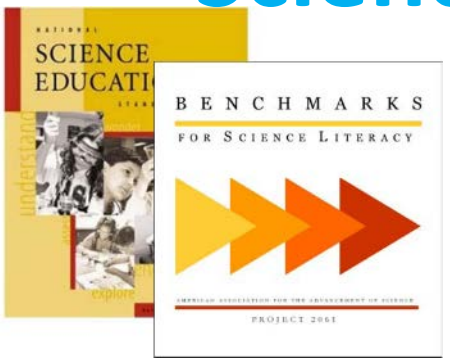
(Think, Pair, Share)

Three-dimensional learning in a classroom environment looks like…….

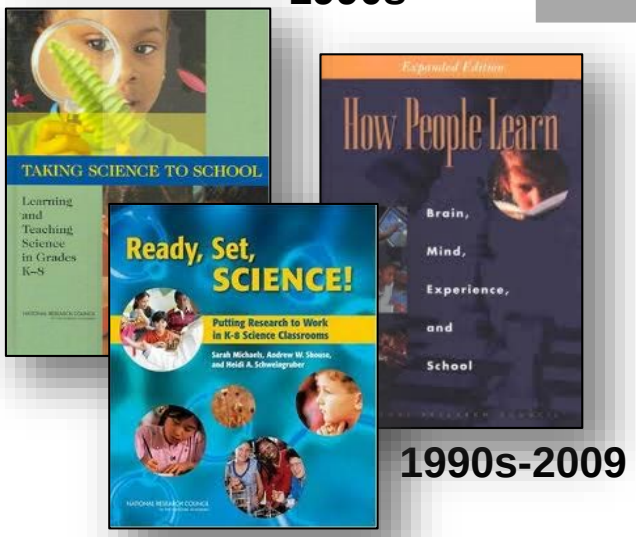
Reaching Goal 2

Connect science experience with the structure of the NM STEM Ready! science standards

Development of the Next Generation Science Standards (NGSS)



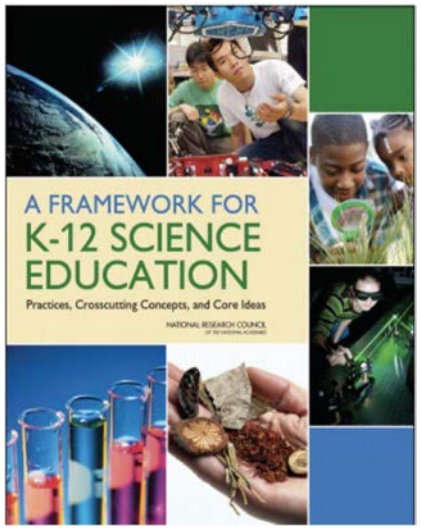
1990s



1990s-2009

Previous national science education efforts

Step 1



2010-2011
National Research Council (NRC) develops Conceptual Framework

Step 2

NEXT GENERATION SCIENCE STANDARDS

April 2013
Released for states' adoption

Adapted from NSTA web seminar: Karen Ostlund and Stephen Pruitt, *Introduction to the NGSS Second Public Draft*, January 2013

Welcome!

NGSS
+
New Mexico 6
Specific Standards
=

science standards

How to Read the Standards

- Please find the Engineering Design Standards in your folder.

What is a NM STEM Ready! science standard?

NEXT GENERATION SCIENCE STANDARDS
For States, By States

**Unless otherwise specified, "descriptions" referenced in the evidence statements could include but are not limited to written, oral, pictorial, and kinesthetic descriptions.*

3-5-ETS1-1 Engineering Design

Students who demonstrate understanding can:

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

The performance expectation above was developed using the following elements from the NRC document *A Framework for K- 12 Science Education*:

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

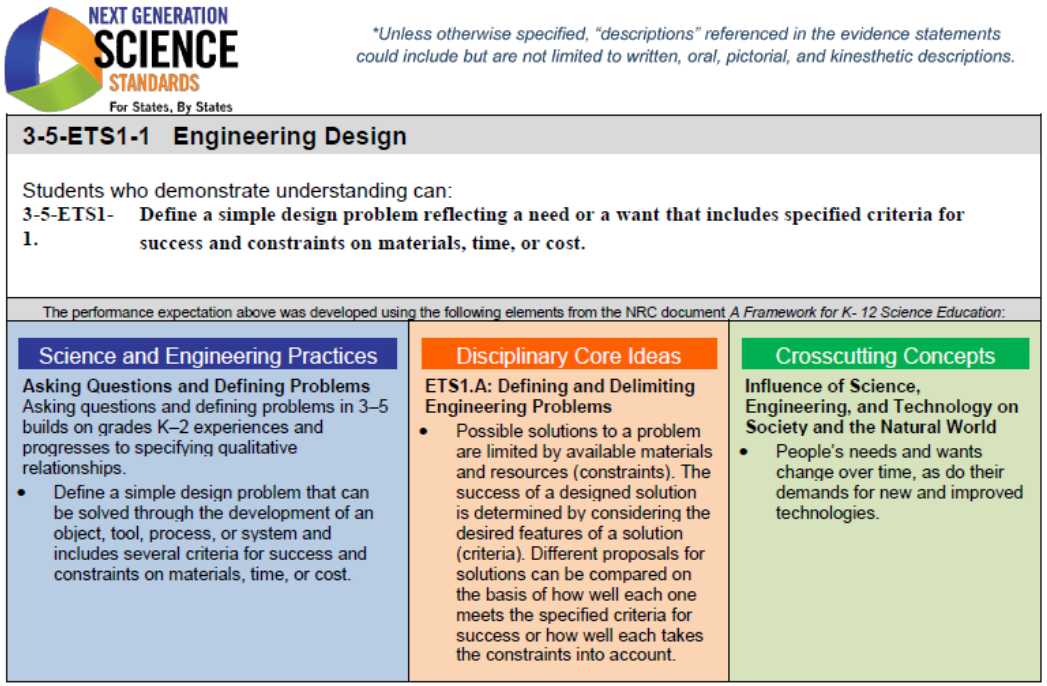
- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.

Crosscutting Concepts

Influence of Science, Engineering, and Technology on Society and the Natural World

- People's needs and wants change over time, as do their demands for new and improved technologies.

What is a NM STEM Ready! science standard?



NEXT GENERATION SCIENCE STANDARDS
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Influence of Science, Engineering, and Technology on Society and the Natural World

- People's needs and wants change over time, as do their demands for new and improved technologies.

What did you experience during the science?

How did the science experience support the learning of the standards?

Overview of Performance Expectations

What Are Performance Expectations?

Performance Expectations state what students should be able to do in order to demonstrate that they have met the standard, thus providing clear and specific targets for curriculum, instruction, and classroom assessment.

equip
Educators Evaluating
Quality Instructional Products

Performance Expectations Build Learning Across Years

9-12

HS-PS1-1. Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.

6-8

MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

3-5

5-PS1-3. Make observations and measurements to identify materials based on their properties.

2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose

Modified from Brian Reiser

Who Should Meet Performance Expectations?

Educators Evaluating
Quality Instructional Products

How Are Performance Expectations Structured?

Performance Expectation		
Science & Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Connections to • Other science disciplines at this grade level • Other DCIs for older and younger students • Common Core State Standards in Mathematics and Language Arts		

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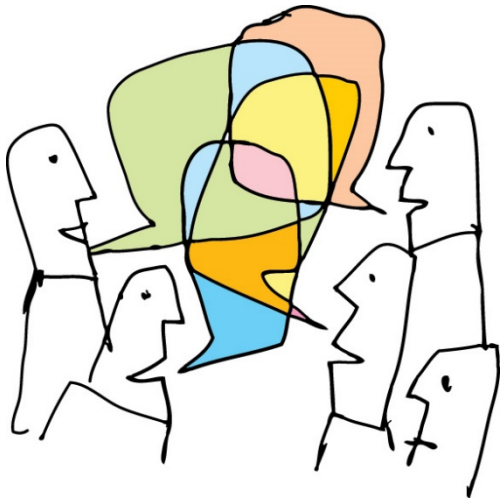
Educators Evaluating Quality Instructional Products

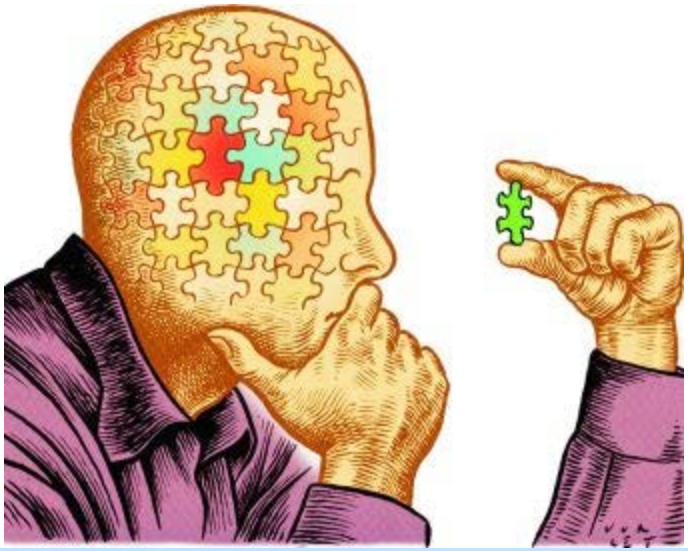
How would you explain a NM STEM Ready! science performance expectation to a colleague?

When we say performance expectations, we mean…



3-Dimensional Learning Directions

- Each table will have a different dimension to study
- Private think time to look over the information (5 min)



3-Dimensional Learning

- Create a poster about the dimension using the **language** in the appendix.
  - What are they?
  - Why are they important?
  - What does the dimension look like in a science classroom?
  - How would you share this information with stakeholders (teachers, parents, school board members)?

Reverse Gallery Walk

- Stay in your learning group. We will move the posters from group to group.
- Look at the posters as a group to talk about the 3-Dimensions. (6−7 minutes per table)
- As you talk, write down your learning on the structured stationery.

Summary of our learning

Look at the last question on the back of the structured stationery.

How would you describe the three dimensions of a NM STEM Ready! Science Standard to stakeholders?

- Private think time to answer this question.
- Turn to a partner and talk about your response.

Goal 3:
The Innovations

To learn about the significance of the 5 innovations on classroom instruction.

- I can explain the innovations and their significance for instruction.

The Innovations

- Private think time about the innovation you have.
- Write down your thoughts on the handout provided.
- Turn to a partner at your table, take turns talking about what you wrote.

Jingle and Mingle Jig Saw

- Find a person that you have not met.
- Take turns talking about your innovation (3a and 3b are both pink).
- Record your learning on the handout.
- **Continue** to find new people and learn together about the innovations.
- When you hear the JINGLE, time is up.

Reflection

The significance the innovations have on instruction is…..

3-2-1 Reflection

- Please fill out the 3-2-1 for your personal reflection.

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