NEXT GENERATION SCIENCE STANDARDS

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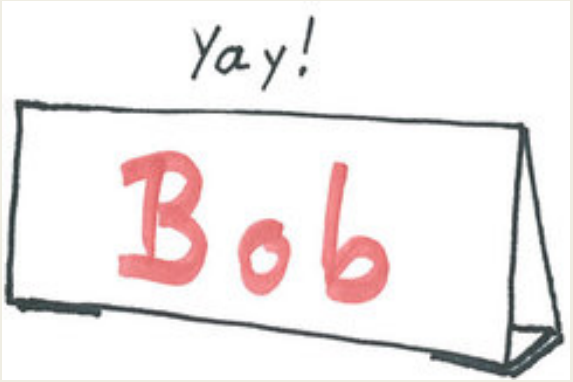
Create a name tent



- Create a name tent
- On the back answer the following question:

What does science instruction currently look and sound like in your classroom?

Content Objective: Teachers will explore the NGSS Framework.

- What does “three-dimensional learning” look like?
- How do “practices” help students make sense of phenomena and/or to design solutions to problems?
- How do “crosscutting concepts” provide ways of looking at phenomena across different science disciplines?
- How do “core ideas” help focus K-12 science curriculum instruction and assessments on the most important aspects of science?

What you need to know…

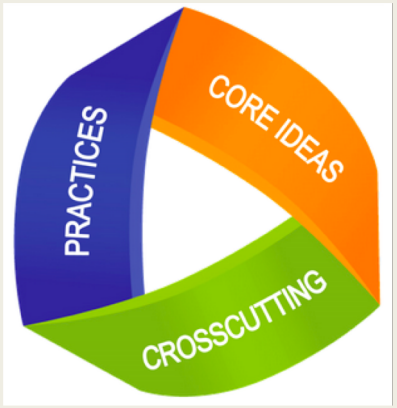
- Next Generation Science Standards (NGSS) are our New Mexico Science Standards
- LCPS Curriculum Resource – FOSS
- Other Resources can be found at BetterLesson.com

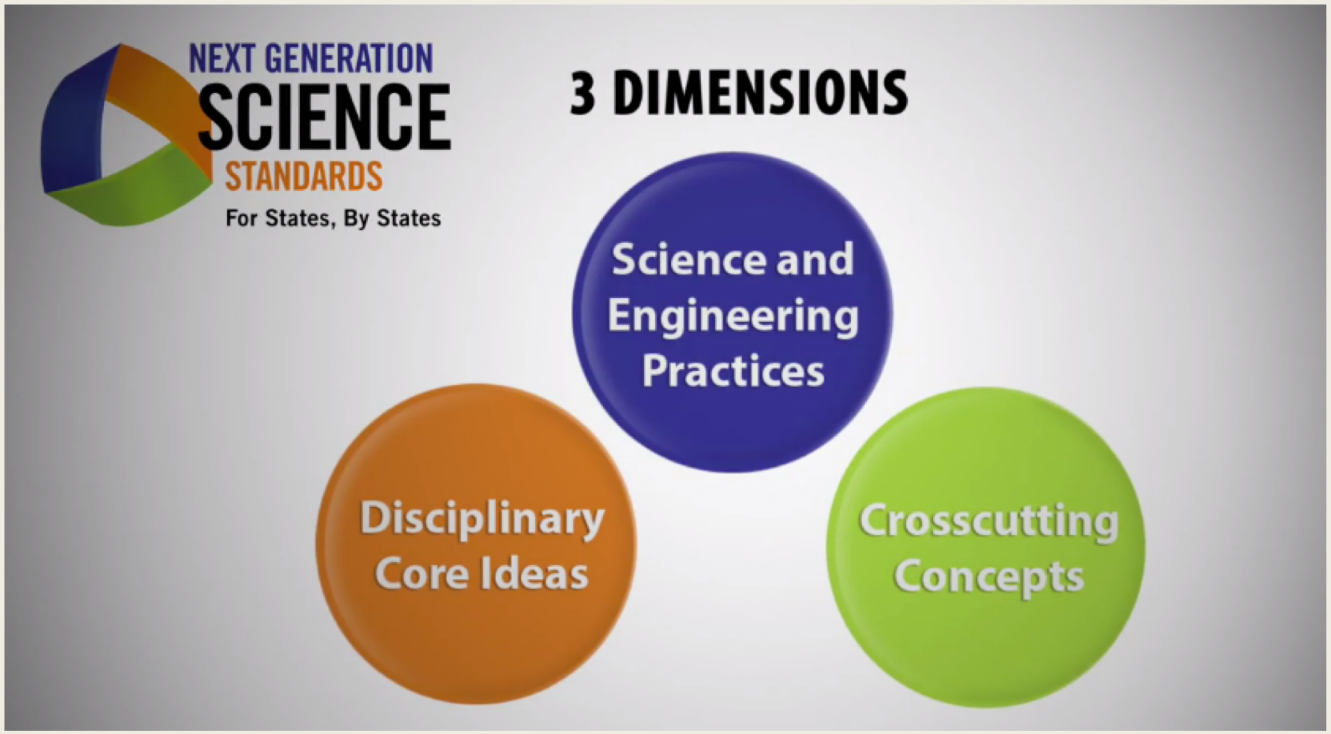
2017-2018	2018-2019
Schools will receive 2 Grades 1 - Same as 2016-2017 1 – (Base Grade for next year) With Science Scores and WIDA Scores Included	Your Science Scores and WIDA will now be included in you school grade.

- Science is tested in grades 4, 7, and 11 and is a cumulative test and tied to graduation rates.

Which students does NGSS target?

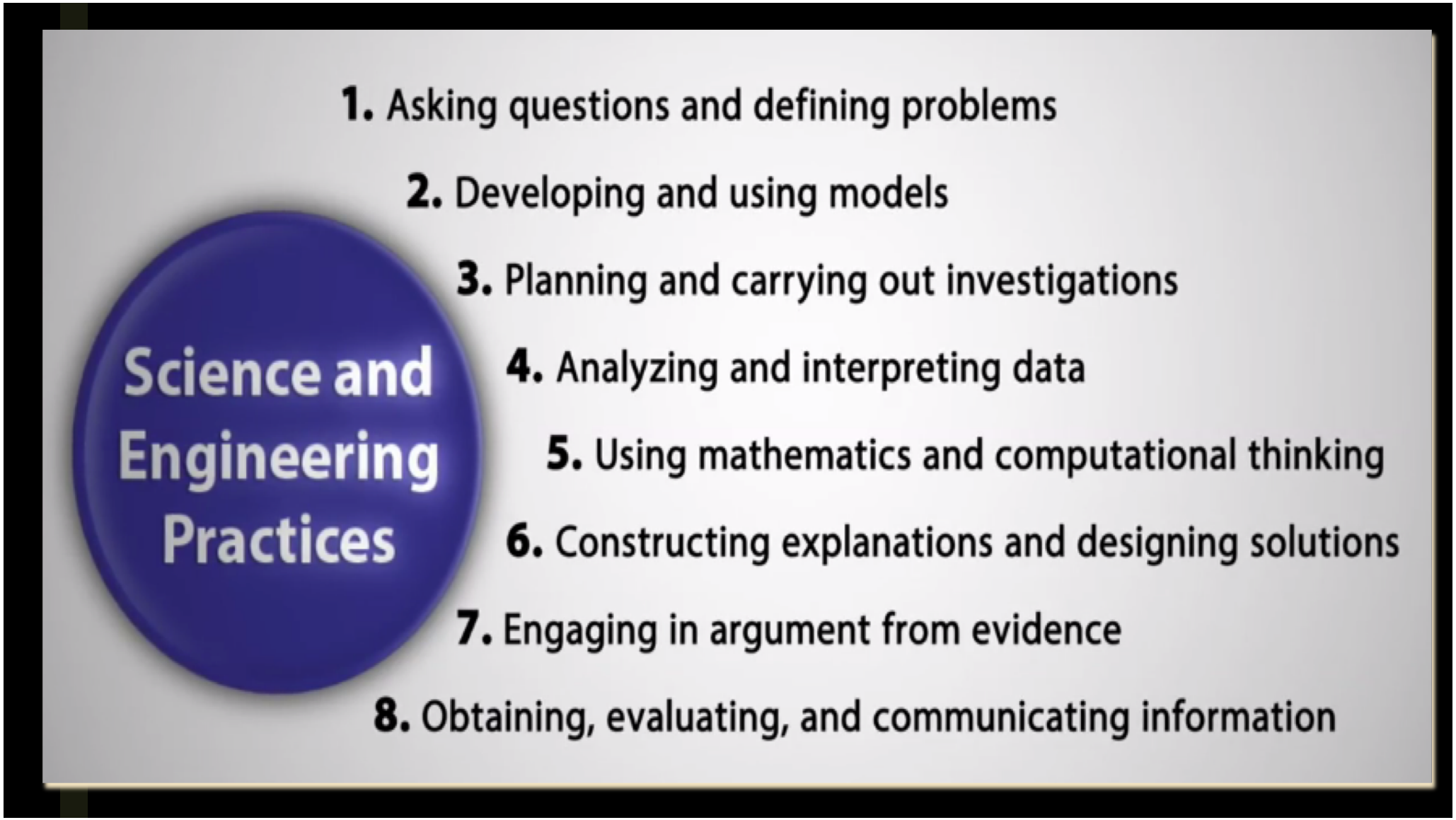
What is Three-Dimensional Learning?





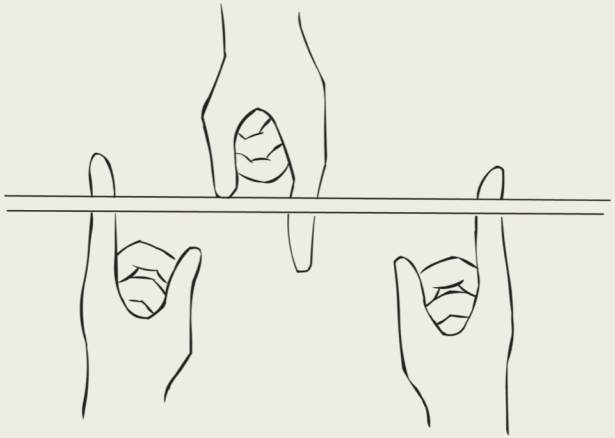
What are Science and Engineering Practices?

Science Practices are the behaviors that scientists engage in as they investigate and build models and theories about the natural world and the key set of Engineering Practices that engineers use as they design and build models and systems.


Science and Engineering Practices
1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

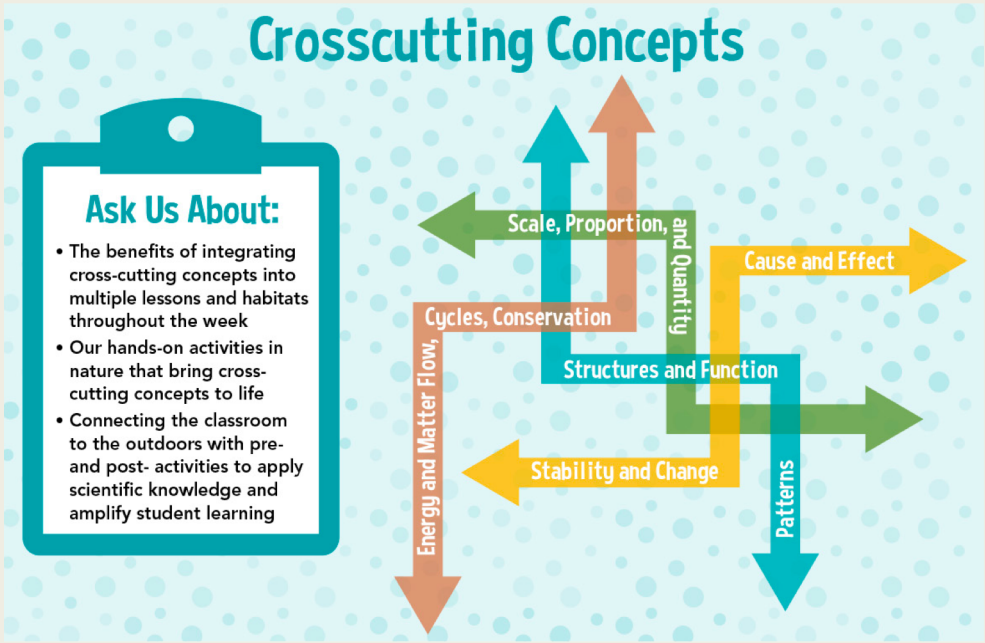
Magic Stick Challenge

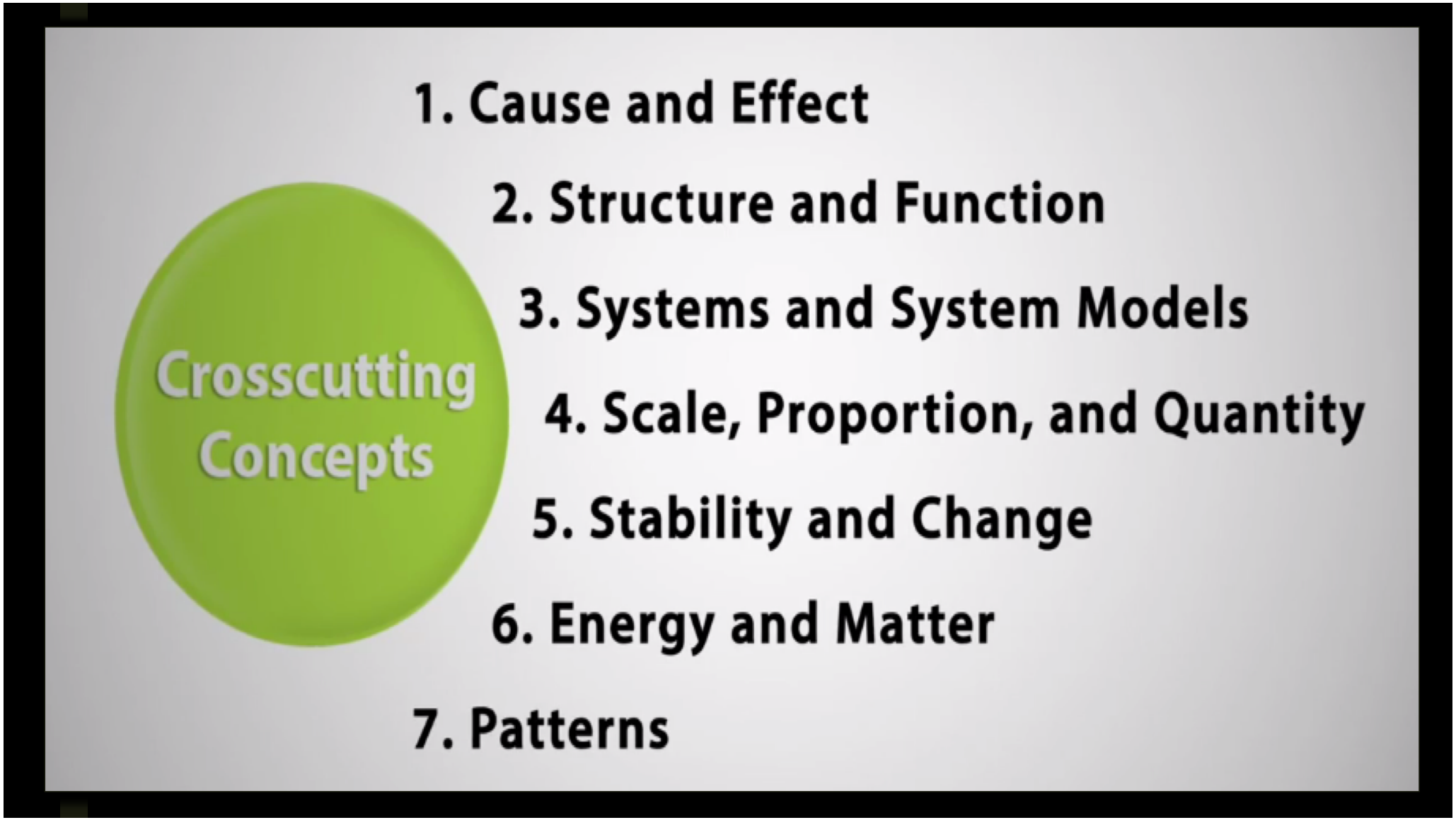
- Every team member has to keep both index fingers in constant contact with the stick at all times. If even a single team member loses contact, the team has to start over at chest height again.
- The stick can only be resting on the index fingers. So team members can't wrap a finger over the top of the stick or slide fingernails over the stick, etc. (you cannot force the stick down.)
- Every team member must be standing and the starting point is chest height of the tallest person in the team.
- The goal is to lower the stick to the ground.
- You will have 6 minutes for this challenge



What are Crosscutting Concepts?

Crosscutting concepts are concepts that have application across all disciplines of science. As such, they provide a way of linking the different disciplines of science.




Crosscutting Concepts
1. Cause and Effect
2. Structure and Function
3. Systems and System Models
4. Scale, Proportion, and Quantity
5. Stability and Change
6. Energy and Matter
7. Patterns

Brainstorm at your tables.
How can the Phenomena of weather be viewed using crosscutting concepts?

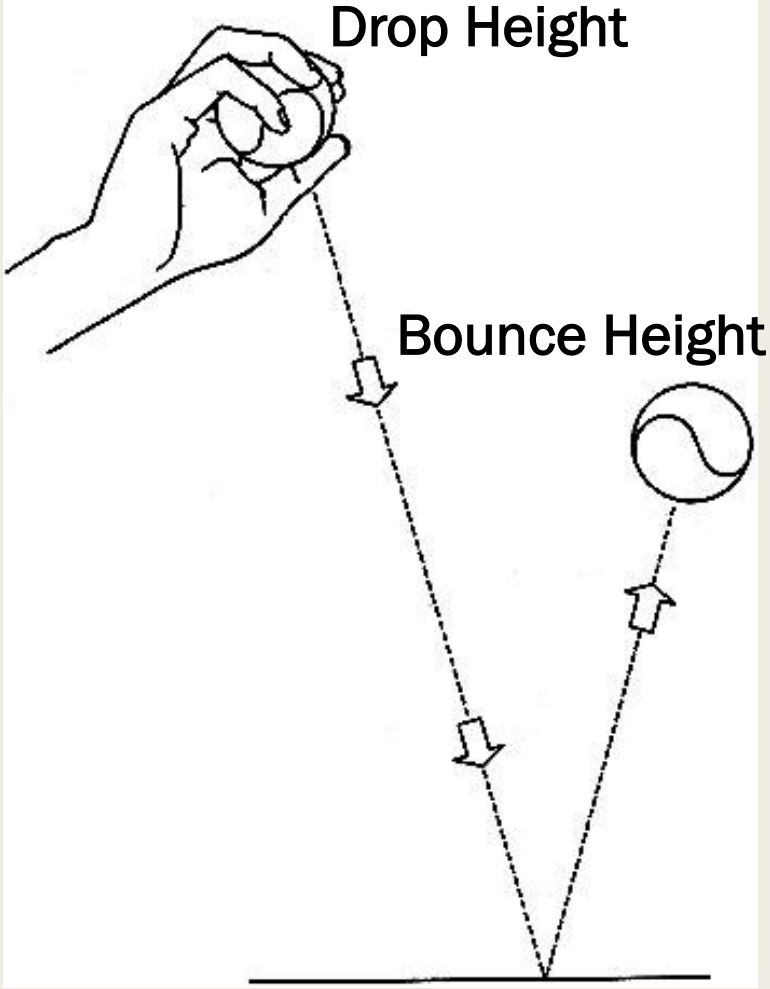
What are Disciplinary Core Ideas?

<u>Disciplinary core ideas</u> are the big ideas of science that provide scientist and engineers with the concepts and foundations to make sense of phenomena and/or design solutions to problems.

Life Science	Physical Science
LS1: From Molecules to Organisms: Structures and Processes	PS1: Matter and Its Interactions
LS2: Ecosystems: Interactions, Energy, and Dynamics	PS2: Motion and Stability: Forces and Interactions
LS3: Heredity: Inheritance and Variation of Traits	PS3: Energy
LS4: Biological Evolution: Unity and Diversity	PS4: Waves and Their Applications in Technologies for Information Transfer
Earth & Space Science	**Engineering & Technology**
ESS1: Earth's Place in the Universe	ETS1: Engineering Design
ESS2: Earth's Systems	ETS2: Links Among Engineering, Technology, Science, and Society
ESS3: Earth and Human Activity	

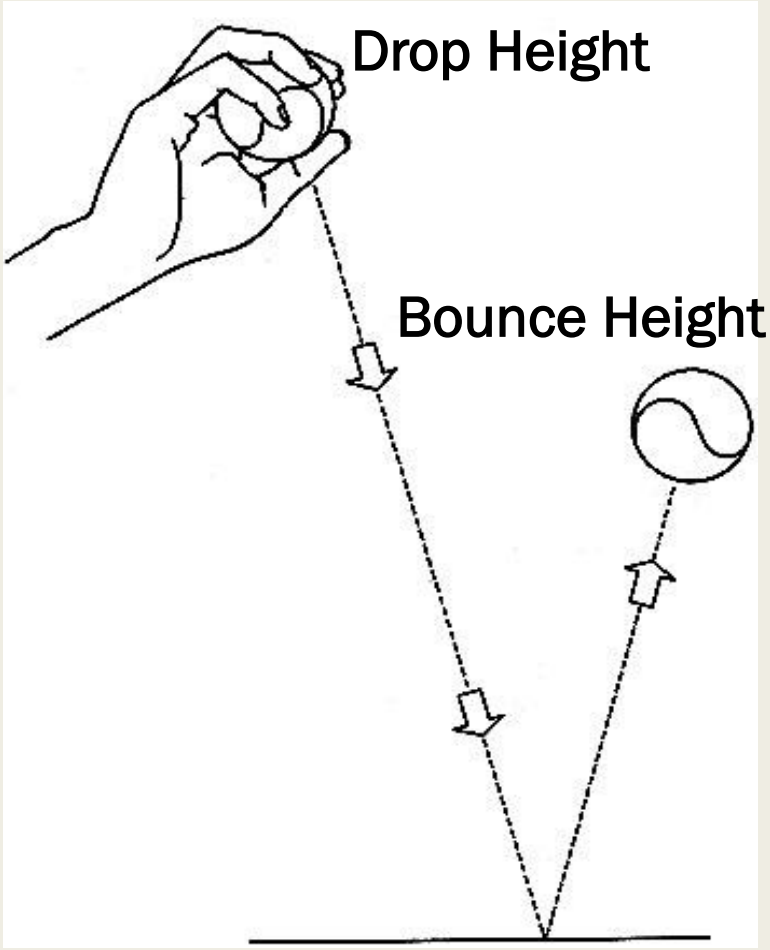
Task – The Golf Ball Drop

- In groups of 3 – Investigate the height that a golf ball bounces off a hard surface.
- Gather and analyze your data from at least 4 trials.



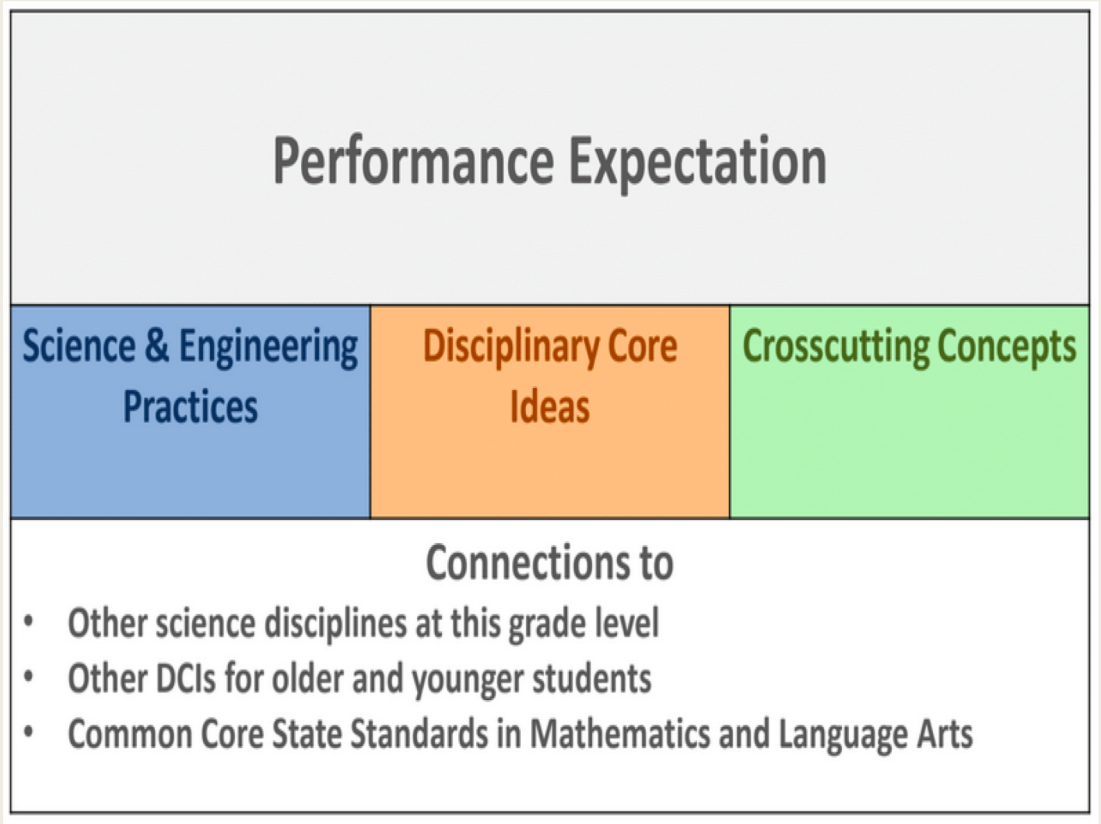
Task – The Golf Ball Drop

- Discuss – What patterns did you notice in your data?
- Can you predict future motion with the information you found?
- Describe the science behind the pattern you observed. Why is it happening?



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.



Next Generation Science Standards

3-PS2-2 Motion and Stability: Forces and Interactions

Students who demonstrate understanding can:

3-PS2-2. **Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.** [Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a see-saw.] [*Assessment Boundary: Assessment does not include technical terms such as period and frequency.*]

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

Planning and Carrying Out Investigations

Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.

Connections to Nature of Science

Science Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns.

How

Disciplinary Core Ideas

PS2.A: Forces and Motion

- The patterns of an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.)

What

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions.

Connections

Performance Expectations

- The Performance expectations combine practices, core ideas, and crosscutting concepts into a single statement.
- Performance expectations are your **Criteria for Success** and tell you what students need to **do** to demonstrate understanding.
- NM State Standards are content standards that indicate the facts and knowledge which should be learned.
- Effective 2018-2019 **NM State Science Standards** are Next Generation Science Standards!

Time for NGSS Shifts!