

# Stepping into STEM

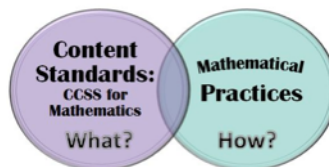
Science (and math) is a way of thinking much more than a body of knowledge.”  
- Carl Sagan



Mrs. Santley used graham crackers (hundreds), pretzel sticks (tens) and goldfish (ones) to practice place value with her students.

## Here's the M in STEM!

How much do you know about the differences and similarities between the two sets of the California Common Core State Standards for Mathematics? The Standards for Mathematical Content are the “WHAT” students should be learning each grade and the Standards for Mathematical Practice (SMP’s) are “HOW” students should be engaged in the content standards. The SMP’s address the “habits of mind” that students should develop focusing on application, reasoning, communication, and representation of the content. The SMP’s are the heart and soul of the CCSSM. An in-depth look at the SMP’s will take place at the upcoming Math Professional Development - Day 2.



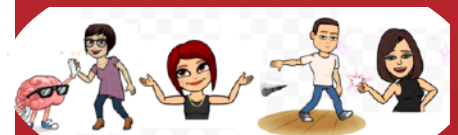
## Tech Corner

Looking for a new idea? Would you like your students to tap into their creative, tech-savvy minds? How about using web-page design as a year-long travel journal for virtual field trips? If you are interested, let me know ([rblock@llcsd.net](mailto:rblock@llcsd.net)). I have some ideas I would love to share with anyone that feels their class is ready to take the next step in technology use. Did you know technology TOSAs take requests? If you would like us to implement something in your classroom and have us help you work through a new idea, just ask and we will make it happen.



## Contributors

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**SCIENCE ON TWITTER**  
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## The Science and Engineering Practices

### What are the practices? How and why should we implement them?

Just as math has the Standards of Mathematical Practices (SMP's), Science and Engineering Practices are one of the three dimensions of NGSS. Engaging in the practices helps students understand how scientific knowledge develops and understand the work of engineers. The practices allow students to actually participate in science which ignites their curiosity and captures their interest.

The practices are a good place to start as you shift your science instruction toward NGSS. You can begin by choosing a practice that would complement your science lesson, and highlight it throughout your instruction. The 8 practices are the same for students K - 12, however there is a progression of expectations which can be found in [Appendix F of NGSS](#).

**Asking Questions and Defining Problems** Students at any grade level should be able to ask questions of each other about the texts they read, and the phenomena they observe. Scientific questions are questions whose answers require explanations supported by evidence. Engineering begins by defining a problem such as creating a tool that will support an object at a specific height. However, engineering can also involve questions such as: what materials are we allowed to use? Or, what is the criteria?

**Developing and Using Models** Models include diagrams, physical replicas, mathematical representations, and computer simulations. It is important students recognize their models are not perfect replicas of the phenomena they are studying. Models can be used for many purposes depending on the lesson: to prompt questions and explanations, generate data, or communicate ideas to others. It is acceptable and expected that students will either add to their models or create new, detailed models as they gain knowledge about a phenomena.

**Engaging in Argument from Evidence** Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, building models and using evidence to evaluate claims.

“Any education that focuses predominantly on the facts of science without developing an understanding for how those facts were established misrepresents science and marginalizes the importance of engineering.”

- National Research Council

**Planning and Carrying Out Investigations** At all grade levels students are expected to engage in investigations that range from those structured by the teachers to those that emerge from the students own questions. Investigations are a great way for students to collect evidence and build on their own understanding. Engineering investigations are used to compare different solutions and determine which is the best.

**Analyzing and Interpreting Data** Once collected, data must be presented in a form that can reveal patterns and relationships. Students will organize and interpret data through tabulating and graphing.

**Using Mathematics and Computational Thinking** Mathematics is a tool that is key to understanding science. Engaging in computational thinking involves strategies for organizing data, creating sequences of steps, and using simulations.

**Constructing Explanations and Designing Solutions** The goal of science is to construct explanations for phenomena. Students are expected to construct their own explanations as well as apply standard explanations they learn about from their teachers or reading. In engineering the goal is to design a solution to solve a problem.

**Obtaining, Evaluating and Communicating Information** Any education in science and engineering needs to develop students' ability to read and produce content specific text. Ultimately, we want our students to become critical consumers of information. Communicating information can be done in many ways: using tables, diagrams, graphs, models, as well as orally, in writing, and through extended discussions.

## ENGINEERING ZONE

This month's engineering challenges have a winter focus. In order to address the new grade level engineering standards make sure to follow the engineering design [process](#). To get to the engineering challenges, just click on the links below.

TK - 1: [Winter Deer Pen](#)

2 - 3: [Arctic Hare Trap](#)

4 - 5: [Fun, Forces, and Sleds!](#)



Mrs. Lopez's students built a pumpkin tower.