

STEM Leadership Seminar SCED 545

**By
Star Treff**

I. Title of Project

Integrating Picture books and Engineering Challenges in Elementary Classrooms

II. Curriculum Topics, School Name(s), Number of Educators, Grade Level(s)

Cooley Ranch Elementary is a public school located in Colton, California. We serve students from TK-6th grade. We have a staff of 24 teachers on campus. We have 565 students on our campus. We just started an new ELA adoption last year,"Wonders." My 6th grade teammate and I focus on 1 NGSS STEAM unit per month. Teachers are able to use us as a resource if they want to do STEAM on campus. We have invited all classes to see 1 of our STEAM activities to get an idea of what the culminating activity looks like. NGSS is slowly starting to be implemented on our campus. Project Based Learning is beginning to become more popular and used by those who have been trained on our campus. PBL and STEAM units have many similarities. Also, next year they will be piloting project lead the way for our engineering pathway at the high school level.

The participants from Cooley Ranch Elementary included; 4 Kindergarten, 4 First grade, 3 Second grade, 3 Third grade, 2 Fourth grade, 2 Fifth grade, 3 Sixth grade teachers and 1 Assistant Principal. There were a total of 22 participants in this professional development.

III. Standards Addressed

There were a variety of NGSS, ELA, and ELD standards addressed during the this professional development. See below

Lower Grade: NGSS Standards addressed

K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Upper Grade:NGSS Standards addressed

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.

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Lower Grade:ELA Standards Addressed:

Kinder:[CCSS.ELA-LITERACY.L.K.4](#) Use words and phrases acquired through conversations, reading and being read to, and responding to texts.

[CCSS.ELA-LITERACY.SL.K.1](#) Participate in collaborative conversations with diverse partners about *kindergarten topics and texts* with peers and adults in small and larger groups.

1st:[CCSS.ELA-LITERACY.L.1.4](#) Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using frequently occurring conjunctions to signal simple relationships.

[CCSS.ELA-LITERACY.SL.1.1](#) Participate in collaborative conversations with diverse partners about *grade 1 topics and texts* with peers and adults in small and larger groups.

2nd:[CCSS.ELA-LITERACY.L.2.4](#) Use words and phrases acquired through conversations, reading and being read to, and responding to texts, including using adjectives and adverbs to describe

Upper Grade ELA Standards Addressed

3rd:[CCSS.ELA-LITERACY.L.3.4](#) Demonstrate understanding of word relationships and nuances in word meanings

[CCSS.ELA-LITERACY.SL.3.1](#) Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 3 topics and texts*, building on others' ideas and expressing their own clearly.

4th:[CCSS.ELA-LITERACY.L.4.4](#) Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

[CCSS.ELA-LITERACY.SL.4.1](#) Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts*, building on others' ideas and expressing their own clearly.

5th:[CCSS.ELA-LITERACY.L.5.4](#) Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

[CCSS.ELA-LITERACY.SL.5.1](#) Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 5 topics and texts*, building on others' ideas and expressing their own clearly.

6th:[CCSS.ELA-LITERACY.L.6.4](#) Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, choosing flexibly from a range of strategies.

[CCSS.ELA-LITERACY.SL.6.1](#) Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

IV. Summary of Project

My goal of this project was to show my colleagues that the jump to STEAM is not much different than what they are already doing, it is an addition to, not something new. I also wanted to show them the new literature that is geared towards STEAM. The PD showed them Picture books that could easily be linked to

a STEAM activity. I wanted to make sure they saw that engineering can be accomplished at all levels. So, I made sure to modify the lessons for both upper and lower grade. In the lesson the goal was for them to see the Engineering Design process come to life.

V. Pre-questions Survey List

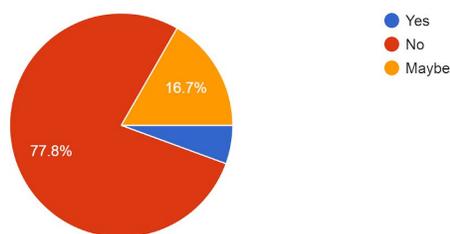
Pre-assessment Survey Questions:

- *What do you know about Stem/Steam?
- *How comfortable are you with incorporating STEM?
- *Have you read and STEM/STEAM books to your class?
- *Would you be interested in ideas of how to incorporate a children's book or E.L.A. with a STEAM challenge?
- *What do you want to learn more about when it comes to STEAM?
- *What do you want to know more about?

These results are what pushed me in this direction for my campus staff

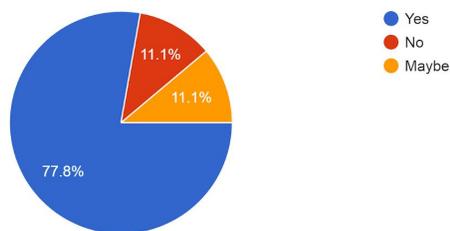
Have you read any STEM children's books to your class?

18 responses



Would you be interested in ideas of how to incorporate a children's book or E.L.A. with a STEAM challenge?

18 responses



Pre-Survey Link: <https://bit.ly/2DdYjtj>

VI. Brief Description of the Actual Professional Development Training

After reviewing my Survey and focusing in on a specific theme, I was provided by Administration was 1 hour on Wednesday, February 13th, 2019. I began by

setting each station up in the library and teachers sitting with their specific grade levels. Then, I set up the required supplies they would need to complete their engineering challenge using Nasa's E.D.P. The meeting began, I explained to the teachers the goals of the presentation. In addition, I had set-up picture clues through the whole slideshow, without mentioning them, to see if they would pick up on them. I also showed them the results of the pre-survey that was done and how I came up with the idea for this Professional Development, with their input from the survey. Then, I explained the teacher side of STEAM, so they knew how to set up this project if they wanted to try it on their own. Then, I went on to explain the student part of setting up a STEAM lesson, the expectations you would have for the students.

After all the background information was finished, I started my STEAM lesson, I asked the teachers if they could guess the focus of the lesson we would be exploring. Through the clues on the slideshow and my Brooklyn bridge t-shirt, they guessed bridges correctly. I explained to them, that is how I get the students engaged is by leaving clues of the upcoming STEAM theme. Then, I showed the teachers the STEAM series written by Andrea Beaty and one of the books in the series we would be focusing on, "Iggy Peck, Architect." We watch a read-aloud on youtube. Then, I posed the problem to the teachers: Problem: How does bridge design affect weight capacity? After I showed 3 sets of videos, 1 for lower grade, 1 for upper grade, and a fun fact video about 3D printers printing bridges. Then I gave them their challenge, You and your team will design and engineer a bridge made out of straws(upper grade) or cardboard(Lower grade). Then I gave them their constraints: The bridge must be strong enough to hold 5 blocks on top of it. Discuss what type of bridge you would like to make, what shapes you would like to use? Draw your idea in your journals. I explained they would have a 20 minute time limit. After the 20 minutes, the lower grade teachers had finished their bridges with success and the upper grade teachers still needed additional time. We discussed the activity as a group. Finally, I ended by giving them possible extension activities for bridge Art and possible rubrics for both levels.
Slideshow Link: <https://bit.ly/2DeoDmX>

VII. Brief Outline of the Activities in the Pick-up Unit

Lower Grade: After reading the book, "Iggy Peck Architect," written by Andrea Beaty, The activity that the students will be doing will be to make a bridge that covers a 24in. Space between 4 text books. Two stacked up on each side with a length of 24in. between them. The bridge must be durable enough to hold 5 wooden blocks. The materials you can use are: rulers, textbooks, wooden blocks, cardboard, tape, and scissors. (Lower grade is making a bridge out of cardboard.)

Upper Grade: After reading the book, "Iggy Peck Architect," written by Andrea Beaty, The activity that the students will be doing will be to make a bridge that covers a 24in. Space between 4 text books. Two stacked up on each side with a length of 24in. between them. The bridge must be durable enough to hold 5

wooden blocks. The materials you can use are: rulers, textbooks, wooden blocks, straws, tape, and scissors. (Upper grade is making their bridge out of straws.)

VIII. What NASA data did you include?

1. Design Squad Global: <https://to.pbs.org/2GgnUIR>

2. Nasa's Engineering Design Process: <https://go.nasa.gov/2IiHwti>

3. NGSS Standards: <https://www.nextgenscience.org/>

4. ELA Standards: <https://bit.ly/2gA0bAH>

5. ELA Standards: <http://www.corestandards.org>

IX. Follow-up Activities & Post-questions Survey List

The suggested follow up activities that I mentioned in my presentation were, to invite an expert (Architect) to speak to the kids about Bridges. Also, I gave them the Claude Monet Bridge art activity. I also attached a reader's theatre activity that might be done in conjunction with or in lieu of the book. Finally, I made sure to include a rubric for upper grade that had a math component. The upper grade rubric has a budget that the students would need to stay under for them to build the bridge with limited resources. Since presenting my Professional development, I have had 2 second grade teachers really interested in trying the bridge activity in their rooms. They have both purchased the series of STEAM books suggested at the meeting.

Post-Survey questions:

Did the PD presented on Feb 13th answer some of your questions about STEAM?

Have you implemented any of the resources/links presented in the slideshow?

Do you think implementing STEAM would be doable in your classroom?

Would collaboration time be helpful to plan a STEAM lesson with your partner or team?

What other resources would be beneficial when it comes to STEAM?

What is Cooley Ranch missing when it comes to buy in and STEAM?

How could I improve on my PD next time I present it, or presenting it to the kids?

Post Survey Link: <https://bit.ly/2UBZKMG>

X. Outcomes

To investigate the success of the outcome of the PD I reflected back to the original learning goals presented to the staff and looked at the post-survey results.

The goals stated to the staff were as follows:

-We will discuss the structure of a good STEAM lesson

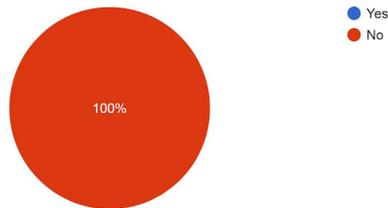
-We will connect an ELA book to a STEAM activity

-We will explore using the EDP

-We will modify for our grade levels

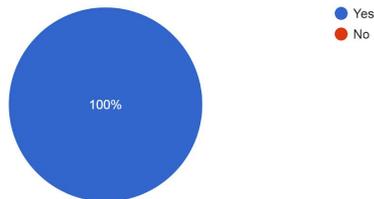
Have you implemented any of the resources/links presented in the slideshow?

12 responses



Do you think implementing STEAM would be doable in your classroom?

12 responses



After looking at the Post survey summary, I feel like the PD was more successful in it's short term-goal than in the long-term goal. The short term goal was to give my colleagues an example STEAM lesson that linked to and ELA book. The long term goal was to get teachers at all grade levels to step outside of their comfort zone to try something new inside of their classrooms. I also feel timing had a lot to do with the teachers not trying it for themselves. We were in the middle of judging a huge Art contest along with progress reports, parent conferences, and Spring Break. I did have many teachers they were going when were returned from break.

XI. Appendix:Classroom Activities/Unit Assessments

Beaty, A., Roberts,D. 2007. *Iggy Peck,Architect*. New York:Abrams Books For Young

Readers.

Rubric for Assessments:

Lower Grade:<https://bit.ly/2Grmczm>

Upper Grade:<https://bit.ly/2XiKSju>

The Upper Grade Rubric was based on The Arts in STEM: Advancing Meaningful Integration class, when we designed our own rubric and discussed and shared what a good rubric should contain. This rubric also has a math component or a budget requirement to help it simulate real life.

XII.Extension Activities:

Readers Theatre of the picture book, *Iggy Peck Architect*, also from The Arts in STEM: Advancing Meaningful Integration class <https://bit.ly/2ZhwTfm>

A final suggestion for extension was an investigation of Claude Monet's bridge art.



XIII. Include the names and contact information of four educators who attended the PD.

6th grade teacher;Yvonne Carrion:E-mail: Yvonne_Carrion@cjud.net

2nd grade teacher;Leah Wise:E-Mail: Leah_Wise@cjud.net

2nd grade teacher;Lisa Rios:E-Mail: Lisa_Rios@cjud.net

Spring 2019

4th grade teacher;Jo Ella Medina:E-Mail: JoElla_Medina@cjusd.net