

Integrating the “E” in STEM

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STEM Leadership Practicum

NASA Endeavor STEM Teaching Certificate

In December 2016, New York State (NYS) approved the adoption of the New York State Science Learning Standards (NYSSLS), which were based off the Next Generation Science Standards (NGSS). The transition from old to new standards signifies a shift from isolated content-focused instruction to unified three-dimensional learning that incorporates content, science & engineering practices and crosscutting concepts. In addition, specific standards have been integrated to address Engineering, Technology and Science Applications (ETS).

To address the shift in pedagogical practices, I presented a professional development workshop to the Science Department at my current school in which I address how to embed three-dimensional learning and the Engineering Design Process into science lessons. The workshop was titled “Integrating the E in STEM” and it was presented to 11 science and special education teachers (7th & 8th grade) and the 7th grade Assistant Principal at John W. Dodd Middle School on Monday, March 18, 2019 from 2:45 to 3:45 pm.

The goal of the workshop was to effectively demonstrate how to use the 5E Instructional Model to implement three-dimensional learning experiences and to embed the Engineering Design Process in the learning experiences. The NYSSLS addressed in the workshop are MS-ESS 3-3, MS-ETS 1-1, MS-ETS 1-2, MS-ETS 1-3 & MS-ETS 1-4. The source of inspiration was an assignment completed for a course (The E in STEM) taken through the NASA Endeavor STEM Teaching Certificate Program. The assignment ask us to design a three-dimensional lesson that

integrated the Engineering Design. The resource provide during the course was the Teach Engineering website and NASA’s e-clips 5E Instructional Model.

I began the workshop by explaining the NASA Endeavor STEM Teaching Certificate Program (basic information and requirements) and providing the link to the current application. During the workshop I mentioned that the inspiration for this presentation was one of the assignments completed in the course entitled “The E in STEM”. I provided a side-by-side comparison of different engineering design models to inspire them to use the one that best fits participant needs. I explained each part of the 5E Instructional model beginning with the ENGAGEMENT (a clip from the movie Deep Water Horizon - based on the 2010 oil spill in the Gulf of Mexico). The EXPLORE section was accomplished through investigating an interactive website entitled “ANATOMY OF AN OIL SPILL”; the interactive allows participants to explore different aspects of a real oil spill. Participants were able to EXPLAIN the negative impact of an oil spill on an ecosystem by interacting with virtual activities for Biomagnification and Bioaccumulation. During the ELABORATE section, participants viewed a short clip on the significance of loss in biodiversity. To EVALUATE the lesson, participants designed method to minimize the impact of an oil spill. An optional closing activity could be to EXTEND this lesson into discussing laws that protect the environment and how these laws are being threatened by the current administration.

Once I modeled using the resources to design three-dimensional learning activities and incorporated the engineering design process, I gave the participants a chance to explore three resources: Teach Engineering, Try Engineering and Engineering is Everywhere. The purpose of the activity was to find an inspiring activity through one of the resources and identify how they would be able to incorporate into a lesson they currently do with their students. The workshop ended with a short survey in which they indicated if the information was worthwhile and which activity they could potentially see themselves using in the near future.

Participants responded well to the workshop. This was evident through some of the comments mentioned through the survey. One teacher suggested an improvement to my lesson stating it could incorporate the “mercury levels of bluefin tuna in Long Island and how it has impacted the economy due to pollution.” This could easily be used as engagement and data from different bodies of water could be analyzed to explore further this phenomenon. Another participant mentioned his/her greatest takeaway was the “the Oil Spill engage moment”; this participant added in the comments section he/she would be interested in learning of other possible lessons that integrate the 5E instructional model. Others commented on the usefulness of resources provided and the clear application of the 5E model.

After the workshop, I sent an email to the participants thanking them for their time and their thoughtful comments or suggestions. I encouraged them to ask questions and to explore further the resources provided during the presentation. I also mentioned that a copy of the presentation

was shared with all of them and if they were interested in putting into practice what they learned in the workshop, I would be glad to collaborate with any of them. Two teachers expressed an interest in further developing three-dimensional lessons using the 5E model and incorporating the engineering design process.

The professional development workshop was successful based on the survey and the interest of some teachers. Comments reflected a clear understanding of how the 5E model can be used to create three-dimensional lessons. Participants were able to identify engineering design lesson ideas gathered from the Teach Engineering resource provided during the workshop. Although no one commented on the engineering design, it was evident through the survey that participants were willing to incorporate the engineering design because they successfully identified lessons from the Teach Engineering website that incorporated such design. The ideas and resources provided during the workshop will allow participants to experience first hand how to develop STEM integrated lessons that exemplify three-dimensional learning practices and the engineering design process which has become a recurring theme in the NYSSLS. This has been made possible through my participation in the NASA Endeavor STEM Teaching Certificate Program and the execution of this professional development workshop.

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Timestamp	Email Address	Name	What do you teach?	Please confirm attendance.
3/18/2019 14:35:07	vanvidalon@freeportschools.com	Vidalon, Vanessa	Science 7 Honors	Yes, I attended the workshop.
3/18/2019 14:36:40	robfallot@freeportschools.com	fallot, rob	8 sci	Yes, I attended the workshop.
3/18/2019 14:36:45	krisantamaria@freeportschools.com	Santamaria, Kristen	Grade 7 Life Science	Yes, I attended the workshop.
3/18/2019 14:38:35	wilbehrens@freeportschools.com	Behrens, William	7th Grade Life Science	Yes, I attended the workshop.
3/18/2019 14:38:37	petcapaccio@freeportschools.com	Capaccio, Peter	Earth science	Yes, I attended the workshop.
3/18/2019 14:39:09	jimhauser@freeportschools.com	Hauser, James	Grade 7 inclusion science	Yes, I attended the workshop.
3/18/2019 14:39:18	jencotrone@freeportschools.com	Cotrone, Jennifer	7th Grade Science	Yes, I attended the workshop.
3/18/2019 14:39:59	kimkavazanjian@freeportschools.com	Kavazanjian, Kimberly	7,8	Yes, I attended the workshop.
3/18/2019 14:40:13	kelholtz@freeportschools.com	Holtz, Kelly	8 inclusion	Yes, I attended the workshop.
3/18/2019 14:40:37	rosjean-baptiste@freeportschools.com	Rosette Jean_Baptiste	Science grade eight	Yes, I attended the workshop.
3/18/2019 14:41:03	geoplakas@freeportschools.com	Plakas, Georgia	8 physical science general	Yes, I attended the workshop.

Survey - Integrating the "E" in STEM

* Required

1. How much of the material presented today can you apply to your classroom? *

Mark only one oval.

1 2 3 4

very little a lot

2. How was the pacing of the material presented? *

Mark only one oval.

1 2 3 4

too slow too fast

3. How satisfied do you feel with the information you received from the presenter? *

Mark only one oval.

1 2 3 4

unsatisfied very satisfied

4. How do you feel about trying to use at least one of the resources in your classroom? *

Mark only one oval.

1 2 3 4

not comfortable at all very comfortable

5. What was your greatest takeaway from the presentation? *

6. Copy the link of one lesson you can see yourself integrating into your classroom instruction. *

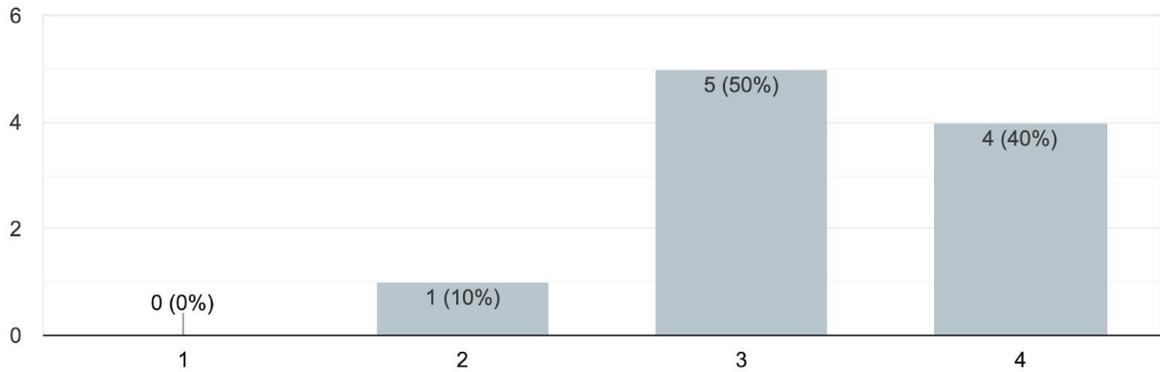
7. Comments? Questions? Suggestions?

Powered by



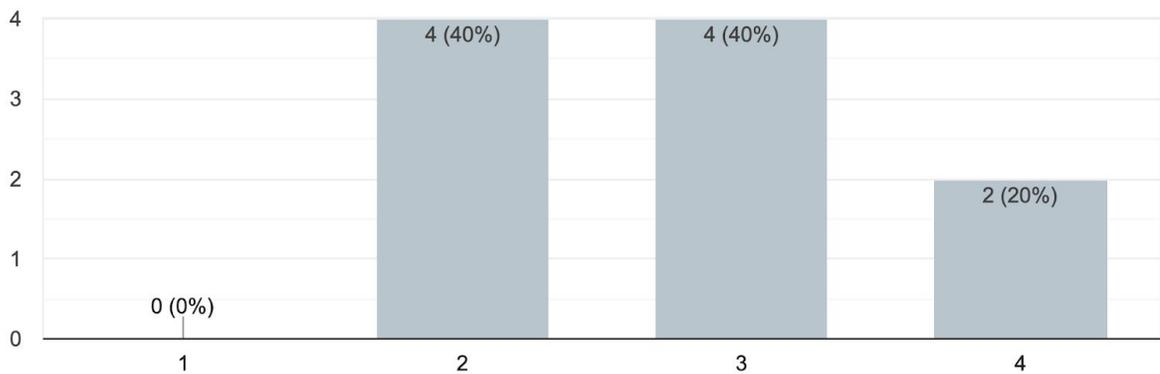
How much of the material presented today can you apply to your classroom?

10 responses



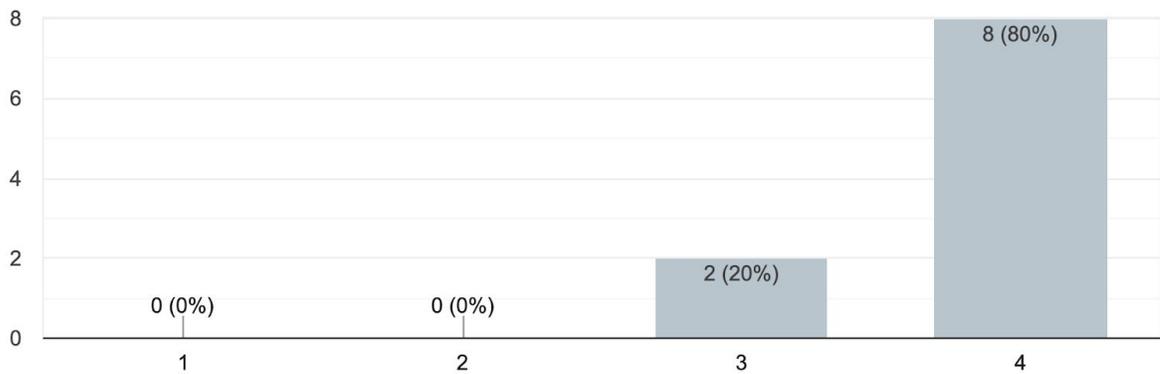
How was the pacing of the material presented?

10 responses



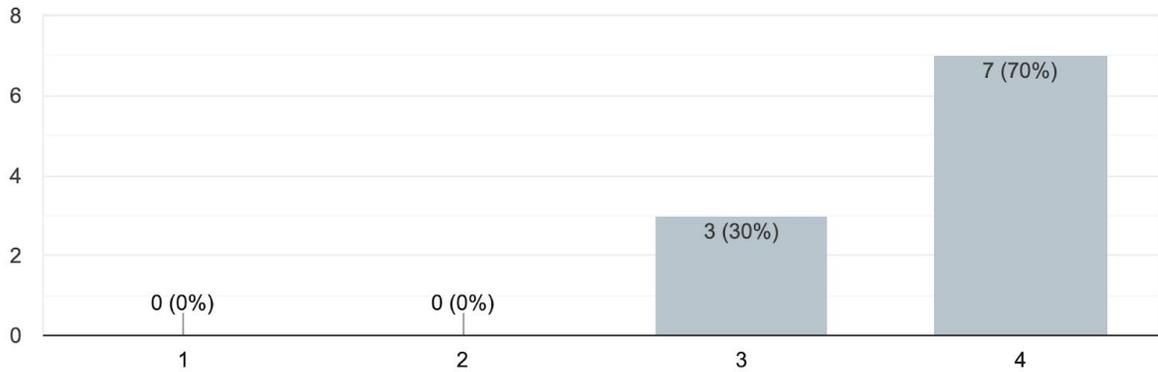
How satisfied do you feel with the information you received from the presenter?

10 responses



How do you feel about trying to use at least one of the resources in your classroom?

10 responses



What was your greatest takeaway from the presentation?

10 responses

- Learned so much about engineering in STEM lessons!
- great interactive lessons
- loved the biodiversity clip.
- new ways to teach
- the different ways to express the 5 E's in stem education
- I learned about good websites for resources.
- New resources
- the Oil Spill engage moment
- Useful websites and resources I can use to create new lessons.
- The application of the 5 Es

Copy the link of one lesson you can see yourself integrating into your classroom instruction.

10 responses

https://www.teachengineering.org/lessons/view/cub_life_lesson01

<https://www.teachengineering.org/>

https://www.teachengineering.org/lessons/view/cla_lesson7_household_energy

https://www.teachengineering.org/lessons/view/cub_bernoulli_lesson01

Engineering adventures & Video Engage

https://www.teachengineering.org/lessons/view/cub_brid_lesson02

https://www.teachengineering.org/lessons/view/cub_simple_lesson04

Engineering activities

https://www.teachengineering.org/activities/view/usf_stormwater_lesson02_activity4

Comments? Questions? Suggestions?

6 responses

Great ideas for lessons

Since you used bio- accumulation of fish it would be cool to discuss the mercury levels of blue fin tuna off L.I and how it has impacted the economy due to pollution.

I learned various websites that can be used to teach how human impact can have an affect on marine life.

More possible lesson we can use in order to use the 5E

Great resources

It was a wonderful workshop.

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How much of the material presented today can you apply to your classroom? *

	1	2	3	4	
very little	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	a lot

How was the pacing of the material presented? *

	1	2	3	4	
too slow	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	too fast

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How do you feel about trying to use at least one of the resources in your classroom? *

	1	2	3	4	
not comfortable at all	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	very comfortable

What was your greatest takeaway from the presentation? *

Learned so much about engineering in STEM lessons!

Copy the link of one lesson you can see yourself integrating into your classroom instruction.

*

https://www.teachengineering.org/lessons/view/cub_life_lesson01

Comments? Questions? Suggestions?

This form was created inside of Freeport Union Free School District.

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What was your greatest takeaway from the presentation? *

great interactive lessons

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new ways to teach

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https://www.teachengineering.org/lessons/view/cub_bernoulli_lesson01

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What was your greatest takeaway from the presentation? *

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Engineering adventures & Video Engage

Comments? Questions? Suggestions?

I learned various websites that can be used to teach how human impact can have an affect on marine life.

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What was your greatest takeaway from the presentation? *

I learned about good websites for resources.

Copy the link of one lesson you can see yourself integrating into your classroom instruction.

*

https://www.teachengineering.org/lessons/view/cub_brid_lesson02

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What was your greatest takeaway from the presentation? *

New resources

Copy the link of one lesson you can see yourself integrating into your classroom instruction.

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https://www.teachengineering.org/lessons/view/cub_simple_lesson04

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What was your greatest takeaway from the presentation? *

the Oil Spill engage moment

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Engineering activities

Comments? Questions? Suggestions?

More possible lesson we can use in order to use the 5E

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Comments? Questions? Suggestions?

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What was your greatest takeaway from the presentation? *

The application of the 5 Es

Copy the link of one lesson you can see yourself integrating into your classroom instruction.

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None

Comments? Questions? Suggestions?

It was a wonderful workshop.

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