Infusing Your STEM Curriculum with Real World Connections
About Me

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Infusing Your Curriculum

About Marymount

01 N-12 all girls’ school in New York City
02 RSHM Network of Schools
03 "Challenge, shape, and change the world"
04 Innovative Curriculum
05 Apple Distinguished School
06 1:1 iPad/Laptop Program
Presentation objectives

Goal #1
How do we bring real-world connections into a STEM curriculum?

Goal #2
How may student demonstrate their knowledge through meaningful representations?
How Students Learn

Question: What is "good" teaching and learning?

- **Concept 01**: Emphasis on collaboration and hands-on learning.
- **Concept 02**: Connection with real-world problems.
- **Concept 03**: Moving from a fixed to a growth mindset.
Your Weekend Weather

Class: Atmospheric Science

Students research, write, film and produce the weekend weather for New York City.

Available on
YouTube
Spotify
Socratic Questioning

Key questions

01 Questions for clarification
02 Questions that probe assumptions
03 Questions that probe reasons and evidence
04 Questions about viewpoints and perspectives
05 Questions that probe implications + consequences
06 Questions about the question
Place-Based Learning

Key ideas

01 Integrates scientific and cultural knowledge
02 Integrates local landscapes and environments
03 Locations become places when we give them meaning
04 PBT is teaching situated in place for greater context
05 Teach with authentic experiences in that place
06 Place itself becomes the context
Technology Tools

For learning

01 Any mobile device
02 Adobe Spark
03 Google Earth
04 iMovie or Video Editing Tool
05 Image Annotation App
06 Copyright/Royalty free images, videos, music
Student-Developed Questions

Students are given a real-world video.

Then
1. Ask as many questions as you can.
2. Connect to NGSS cross cutting concepts.
3. Identify top three questions.

Activity developed by: Chris Resch and Joan Fei
Infusing Your Curriculum

Group #4: Newton's Laws of Motion.

Rules!
1) Ask as many questions as you can!
2) Do not stop to discuss, judge, or answer any questions.
3) Write down every question exactly as it is stated.
4) Change any statement into a question.

Sophia, Milena, Annamarie

Why was the cart shaking?
Did the carts shaking affect its path?
When was the ground last repaved?
Who pushed the cart?
How long were you pushing the cart?
What was the weight of the cart?
How far were you from the parked cars?
How bumpy was the ground?
How high was the parking lot?
How hard was the cart pushed?

What was the distance that the cart traveled?
With how many hands did you push the cart?

Did the holes in the cart have an effect on its motion?
Was one of the wheels spinning while it was pushed?
At what velocity did the cart start to curve?

Energy Matter

Systems Science

Is the floor level?

Why was the cart turned to the left at the end?

Why was the time of day it was?

Was it windy?

How heavy were the items in the bags?
Santa Monica

What questions would this video generate?
Student-Developed Question

Students are given a real-world video.

Then
1. Ask as many questions as you can.
2. Connect to cross cutting concepts.
3. Identify top three questions.
Biology Question

Los Angeles, CA

Why do the palm trees bend toward the left?
How are they able to be so tall and skinny?
Question

Why are the clouds darker on the bottom and brighter on the top?
Physics Question

Germany

What forces are exerted on the bike? Why doesn’t it fall?
Activity
Your Turn
LACC Room 505

What photos might you take and what questions might you ask?
Question #1
How do we connect curriculum to the real world?

Question #2
How do we connect curriculum to the school’s mission?

Question #3
How do we boost student enrollment?
Students engage in service learning activities to strengthen their understanding of AP course material and skills, using what they have learned to tackle real-life social issues.
The talkSTEM Family

talkSTEM impacts all learning spaces, both formal and informal.

**talkSTEM community members:**

- **Create**
  - walkSTEM videos on campuses, in museums, zoos, neighborhoods, or other settings.

- **Join**
  - our growing, global walkSTEM community.

- **Teach**
  - using our educator guides that supplement short walkSTEM videos, extending learning for pre-K-12 students.

- **Get Inspired**
  - by reading/viewing our talkSTEM Forum posts. These are submitted by thought leaders in the STEM ecosystem.

- **Mentor**
  - girls and underrepresented youth using real world-based and observable STEM activities.

- **Play**
  - interactive, real world-based games on mobile device

- **Use**
  - customized augmented reality tools.

- **Engage**
  - visitors at informal learning spaces in unexpected ways grounded in STEM concepts.

- **View**
  - diverse professionals in a wide range of STEM-related careers sharing their perspectives.

- **Connect**
  - to school, corporate, and other campuses

**talkSTEM**
Developing future generations of female and underrepresented STEM leaders.
walkSTEM Dallas

Institutional Partners & Public Places
1. Dallas Arboretum
2. Dallas Love Field Airport
3. Downtown Dallas
   A. Dallas Arts District
   B. Dallas Public Library
   C. Dallas City Hall
   D. West End Historic District
4. Fair Park
5. Girl Scouts STEM Center of Excellence
6. NorthPark Center
7. Southern Methodist University
8. Trinity River Audubon Center
9. UT Southwestern Medical Center
10. Capitol One (Pamlico campus)
11. Dallas Zoo
12. West End Hall
13. Latino Cultural Center
14. Mt. Auburn Elementary School (DISD)
15. Solar Preparatory School for Girls (DISD)
16. St. Philip's School and Community Center
17. Tom C. Gash Elementary School (DISD)

* Available on ObiCopt, a free, location-based app
** Self-guided
*** Scheduled events on talkSTEM Academy
**** Edited by Span

talkSTEM
Bringing STEM to public spaces in Dallas.
Social Justice Issue

How do we build scientific literacy in public spaces?
Step #1
Identify a local, national, or international location for which a visitor could experience physics in a real-world scenario.

Step #2
Identify four specific stops that demonstrate four different physics concepts. The stops need to be in close proximity.

Step #3
Identify the specific physics concept at each location and develop a How or Why question about that stop.
Design Worksheet: Design a walkSTEM Stop

Name:

Use this worksheet for each walkSTEM stop that makes up your walkSTEM experience. Be sure to address how each stop will help participants gain valuable experience that relate to the theme.

Stop #1

1. Location #1 and Object:

2. What physics concept(s) is/are demonstrated at this location?

3. Write three questions might you seek to answer at this location. Indicate your final question.

1. What will your tour participants learn and/or while at this stop? Will they complete a simple activity or will you provide examples, such as photos or models, in your presentation? In other words, how will they develop an answer to your question?
Sample Location
Santa Monica Pier
West Coaster: Conservation of Energy
Pacific Wheel: Rotational Dynamics
Sea Dragon: Simple Harmonic Motion
Question #1: West Coaster
Physics Concept: Conservation of Energy
Question: Why does the height of the first hill determine the motion of the roller coaster?

Question #2: Pacific Wheel
Physics Concept: Rotational Dynamics
Question: Why is it important for the individual cars to swing back and forth?

Question #3: Sea Dragon
Physics Concept: Simple Harmonic Motion
Question: How would you determine the period of motion and the amplitude of motion for the Sea Dragon?
2021 walkSTEM

WalkSTEM

London, England

walkSTEM Tour of the London, England
Created in Adobe Spark with copyright free images and video.

Project shared with London Tourism Office.
Project Assessment

Knowledge
- Thorough and effective explanation of physics concepts.
- Complex topics explained in straightforward manner.
- Appropriate scientific language.
- Physics described matches location.

Media
- Visuals to support language is clear and detailed.
- Well-defined flow between slides; appropriate pacing.
- Clear, confident narration.
- No background knowledge required.

Connection
- walkSTEM is manageable and well-connected.
- Topic and significance is clear.
- Purpose of presentation clearly stated and obvious to audience; physics is clear.
New for 21-22

Summer Planning

Because the scope of the project was widened so that any location could be "walkSTEM'd," students will select their locations and complete their tour designs during the summer prior to AP Physics C: Mechanics.

Different Representations

To build agency in understanding the place of physics in the real world, students will create their tours in Google Earth, taking advantage of Google Street View and Google Photosphere.

Lab Component

Using guidelines from Pivot Interactives, students will design an inquiry-based lab to support the learning provided by their walkSTEM Tours.
Recap of today's presentation

**Summary 1**
Rigorous AP curricula may be enhanced with service learning projects.

**Summary 2**
Girls’ preferred learning styles can be supported using hands-on, real-world projects.

**Summary 3**
talkSTEM/walkSTEM is a platform by which these connections may be represented.

**Summary 4**
Students should be in charge of their learning and should readily "publish" their work.
Contact + Presentation

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For More Information

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