

EXCELLENCE *in* TEACHING CONFERENCE

Making STEM a Force for Good

Session 2: Break-out Session Task Card

Task Instructions

1. Read the first vignette individually. (*You may want to mute your video and audio momentarily*)
2. Record **either** a noticing or wondering about the vignette related to each of the three elements of our theme.
Example: "I notice that the lesson directly addresses important math concepts of ratio and proportion when students are asked to scale-up the blueprint drawings."
Example: "I wonder if embedding the science in the context of food desserts would begin to surface issues of equity?"
3. When you are finished with #1 and #2 for the vignette, unmute your video to indicate that you are ready.
4. You will then have the opportunity to talk as a group about improving each vignette.
5. You will repeat steps #1 - #4 for each of the three vignettes before having a closing discussion.

Vignette 1: Mr. Lampy's Rube Goldberg Machines

As the culmination of a physics unit on the conservation and transfer of energy, Mr. Lampy's class is challenged to develop Rube Goldberg Machines that extinguish a lit candle in no fewer than ten steps. Students work in groups and have a structured brainstorming activity in which they walk through the Ask, Imagine, and Plan steps of the engineering design cycle, each developing a plan for their group's Rube Goldberg machine. Groups must then discuss their plans and a final plan is developed that includes at least two elements from each students' plan. Students bring in materials from home and build the Rube Goldberg machines in class. Once built, they annotate their designs to show where each transfer of energy takes place and they must calculate the potential and kinetic energy of the system at five different locations. At the end of the project, groups reflect on how they worked as a group, including how they valued the contributions of each member and they reflect on their own contributions to the group's outcome.

Analysis

STEM

I notice/I wonder...

A Force

I notice/I wonder...

For Good

I notice/I wonder...

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Center for STEM Education

<https://stemeducation.nd.edu>

Vignette 2: Mrs. Leon's Waste Reduction

Students from Mrs. Leon's environmental club noticed the extensive amount of trash and waste that filled the garbage and recycle bins after each lunch period. Drawing on students' eagerness to reduce waste created at the school, she challenged students in her math class to think about ways in which they could attack the problem. Students worked in groups to identify different potential solutions. The class negotiated the solutions they thought might be most impactful and invited the administration to their class to hear their plans, which included an awareness campaign as well as a competition between lunch shifts to see who could reduce the most waste from their lunches.

Analysis

STEM

I notice/I wonder...

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Vignette 3: Ms. Martinez's Climate Science

Ms. Martinez has developed a unit based on the Next Generation Science Standards focused on climate and human impact. Students are learning about the greenhouse effect and the mechanism for climate change. Using various forms of evidence, including long-term temperature trends, sea-level rise, carbon dioxide levels, and human carbon emissions, Ms. Martinez has students develop models for how the earth's climate is changing. Students also read about the differential impact that climate change is having and is predicted to have on different populations, particularly those most vulnerable. At the end of the unit, students took a test in which they showed their understanding of the mechanism for climate change, analyzed a new, simple data set related to climate, and identified two ways in which changes in climate will affect marginalized populations.

Analysis

STEM

I notice/I wonder...

A Force

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For Good

I notice/I wonder...