

STEM Takes Flight Professional Development Workshop

Post workshop practices

Topic: *Pre-Lab Activity -- Each class had different lab topics, but all did this activity as a pre-activity to their lab. Topics were Ampere's Law for 2 classes and Torque for the other 2. This activity was used to focus their attention on group dynamics within a lab activity and to introduce the idea of assigned roles within a lab group.*

Presenter(s): *J. Allen Burton*

Date: *March 14-15, 2019*

Lesson Timeframe: *35 minutes of the period followed by the standard physics lab activity*

STEM Takes Flight Workshop Resources Used:

1 –NASA Internships website

2 – I used the penny activity with a few modifications:

Materials: *Pennies and PowerPoint slides*

Please explain why these workshop materials were used in this lesson:

The workshop highlighted the need to better focus my efforts at developing group work skills within my students. I felt that this activity was a perfect introduction to some systemic changes I'd like to make with how I conduct labwork in my classes. In particular, I plan on using assigned roles within lab groups that rotate throughout the term. The workshop not only helped identify a need within my class, but also provided resources and motivation to address that need.

Teacher level: *I think that any teacher could run this activity with minimal extra training. I think it is helpful to have participated in the Penny activity before conducting it but not totally necessary. I ran the activity with our faculty at our meeting this month to help me share what I took away from the workshop.*

Student level: *No prior knowledge needed*

Learning styles supported: *Primarily kinesthetic*

Overview of the lesson:

1 – I begin with a discussion of opportunities at NASA with a focus on internships. I highlighted that NASA is interested in finding people who communicate well orally and in writing as well as work well in groups. All of which were major themes in the workshop activities and discussions.

2 – I used the penny activity with a few modifications:

- One hand completely off limits for entire activity
- Each person claims a corner of table as the work space and pennies must be moved during pass
- 6 rounds of practice with one “competition” at end
 - Curve-ball at end when they are not competing as group, but rather are selecting the best people and practices learned across groups to make a dream team to beat a target time (Facilitates real scientific community pooling learning and simulates challenges of managing a larger group discussion/decision)
- Required roles within the group:
 - Team Manager
 - Facilitate discussions
 - Final responsibility for decisions
 - Data Analyst
 - What data can we collect to help decision making?
 - Collect and communicate data
 - Efficiency Lead
 - Observe and communicate inefficiencies
 - Push all decisions to consider efficiency
 - Quality Assurance Director
 - Observe and communicate issues that could derail progress

3 – Conducted typical physics lab activity but with assigned group roles

Lesson Objectives (in addition to the physics content specific objectives not listed here):

- Students will be able to discuss the value of group roles when working on a group project.
- Students will be able to find the NASA internship website, research internship positions, and apply for an internship if desired.
- Students will be able to identify the three primary skills desired by NASA when assessing potential employees/interns.

Lesson Content (Warm-up activities/review; Instructions; Follow-up activities):

1 – Warm-up: Discuss with your table group your perceived dream jobs in the fields of science and engineering.

2 – Discussion:

- Ask each table for a summary of their responses
- Discuss NASA workshop experience ending with the ranking of NASA the best liked government job.
- Ask what skills students think NASA looks for in employees and then communicate the three we heard repeated at Wallops from each presenter.
- Have students pull out their laptops and direct them to the NASA internship website while sharing with them the opportunities and how to pursue them.

3 – Conduct the modified penny activity as described above.

4 – Discuss how the roles impacted the efforts of the group.

5 – Conduct the standard physics lab for that class but with assigned roles for members of the group.

Assessment (*How will you know the lesson was successful?*):

Informal assessment will come from observations of group dynamics and a brief discussion writing prompt at the conclusion of the lab. These will not be graded but will guide the students in reflecting and internalizing the experience and will help inform me as to the effectiveness of the activity.

Approximately how many students do you anticipate this activity impacted?

74 students

Additional comments:

Students enjoyed a change of pace which, in turn, opened them up to the concepts shared in the lesson.