Expanding the reach of APS PhysicsQuest using STEP UP Principles

Jenna Tempkin, APS Public Engagement Intern
Nicole Schrode, Mentor & Public Engagement Program Manager
Three Main Projects:

1. PhysicsQuest Guidelines
2. PhysicsQuest Extensions
3. Facilitate Science Trust Project Workshop

Summer Goals:

- Learn more about physics outreach programs
- Develop curriculum
- Meet APS employees and other teachers
What is APS PhysicsQuest (PQ) ?

- Experiment kits for middle school teachers to use to introduce students to basic physics concepts
- Follows Next Generation Science Standards (NGSS)
- Focus on induction based learning
- Project Goals:
  - Make physics more accessible
  - Expose teachers and students to new physics concepts
  - Engage diverse and underrepresented students
  - Promote engagement in science
Changes to PhysicsQuest

- Spectra comics found to not engage students as much as planned
- Move away from focusing on old scientists and more towards introducing counternarratives
- Incorporation of STEP UP
  - Stronger focus on pedagogy
  - Increase reach
  - Make physics more available and relatable
What is STEP UP?

- National community of physics teachers that create lessons to inspire young women to pursue physics
- Careers in Physics and Women in Physics lessons
- Everyday Actions Guide (EAG) - Strategies for reducing marginalization in the classroom
PhysicsQuest Guidelines

What are the PQ Guidelines?

- To be used by future PQ reviewers and developers
- Created to ensure project goals and STEP UP components are included
- Split into 3 main sections

Process

- Met with 3 teachers involved with STEP UP to see what things they would look for in lessons
- Created draft based on recommendations and got feedback
Guidelines Highlights

Guidelines for Developers
We recommend that:
- Recommendations are included for how to facilitate activities with STEP UP methods from Everyday Actions Guide

Guidelines for Extensions
We recommend that:
- Specific links and resources are included
- STEP UP CiP and WiP lessons are included

Guidelines for PQ Team/Reviewers
We recommend that:
- Examples of counternarratives are included
- The activity promotes student development of science identity
PhysicsQuest Extensions

- "After the experiment" activities used to further engage students
- Three categories
  - Real World Connection
  - Suggestion for drawing, illustrating, or presenting content in a new way
  - Engineering or Design Challenge
- Connecting to underrepresented students:
  - Encouraging agency, ownership and student voice
  - Communal elements
  - Connection to solving critical problems in communities, broader societies, and the planet.
  - Incorporating ways that girls typically learn science

https://engage.aps.org/stepup/curriculum/everyday
PhysicsQuest Extensions Cont.

Process:
- Started by reading over the teachers manual to understand concepts at play
- Challenges of creating unique activities
- Once something was found/thought of I would modify it for PQ
  - Change materials
  - Include instructions / YouTube videos
- Progress Tracker
Real World Connection Extension

PQ 2009: Spots, Lines, and Lasers

“Have students google search Nobel Prize winner Donna Strickland to learn about her use of lasers”
Engineering or Design Challenge Extension

PQ 2018 Straw Rockets

“In this lab, students should learn about the relationship between kinetic and potential energy. Using this knowledge, students can be placed in groups and tasked with creating a marble roller coaster…”
Presenting Content in a New Way Extension

PQ 2023 Making Waves- Slinkys

“Act out a wave as a class or create a wave flip book…”
Acknowledgements

- Special thanks to my mentor Nicole Schrode for all of her help this summer

- Special thanks to Allie Lau, Zack Pruett, and Claudia Fracchiolla for their help with Science Trust Project

- Society of Physics Students and American Physical Society
Thank you!

Questions?

jtempkin25@gmail.com
tempkinj@lafayette.edu