Leveraging students’ authentic questions about COVID-19 to motivate meaningful engagement with science

Heather Milo
The Institute for School Partnership (ISP) connects Washington University with the surrounding K-12 community to inspire and empower educators and students with the resources they need to succeed.

*We identify best practices in teaching and learning and implement these practices in local schools, particularly those with the most vulnerable and underserved students.* We translate the most current research in education into learning opportunities for educators at all levels.
The Institute for School Partnership Programs

- Broader Impact
- STEMpact
- Master of Science in Biology for Science Teachers
- Math314
- Code.org Regional Partner
- St. Louis Teacher Residency
- mySci
- Tech314
- Charter School Sponsorship
- Graduate Certificate Programs
- Everyday mySci
- TLI Transformational Leadership Initiative

Programs:
- Campus/Community Connections
- Curriculum & Materials
- Professional Development
- Leadership & Team Training
- Educator Recruitment & Retention
- WashU Faculty K-12 Schools Interaction
- Embedded Classroom Coaching
- STEM Career Awareness & Interest
Best science teaching practices in partnership with Hawthorn Leadership School for Girls
Implementing Best Practices prior to COVID-19

According to teacher leaders, scientists, and educational researchers, the kinds of experiences that science learners (and teachers) across grades K-12 need and should be able to do:

- Understand, use, and interpret scientific explanations of the natural world
- Generate and evaluate scientific evidence and explanations
- Understand the nature and development of scientific knowledge
- Participate productively in scientific practices and discourse

SOURCES:

*Taking Science to School: Learning and Teaching Science in Grades K-8* (2007)
*A Framework for K-12 Science Education Standards* (2012)
*Ambitious Science Teaching* (2018)
Understand, use, and interpret scientific explanations of the natural world

The question we asked: *Why does regular sugar make rock candy and Splenda doesn’t?*

<table>
<thead>
<tr>
<th>The Best Explanation</th>
<th>(tape the explanation strip here)</th>
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</thead>
<tbody>
<tr>
<td>We think this is the best because...</td>
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<thead>
<tr>
<th>An Okay Explanation</th>
<th>(tape the explanation strip here)</th>
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<tr>
<td>We think this is just okay because...</td>
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<tr>
<th>The Worst Explanation</th>
<th>(tape the explanation strip here)</th>
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<tr>
<td>We think this is the worst explanation because...</td>
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1. Contains a **claim** and 2 pieces of **evidence**.
2. Contains strong **reasoning** that completely answers the question by connecting the unique molecular composition with the unique behavior of Splenda and that of sugar.
3. Contains connecting words that increases writing fluency:
   - “I know this because…”
   - Also…
   - Since…
   - Like…
The COVID-19 shutdown

- The last day of in-person classes: Tuesday, March 17, 2020.

- Hawthorn moved their Spring Break to March 23-27 and used this time to prep and plan for distance learning in April.

- On April 13, Mary and Heather virtually facilitated a lesson to elicit and discuss students’ questions about the COVID-19 pandemic phenomenon.
COVID-19 Distance Learning Module

I. Have we seen anything like this before?

II. How does COVID spread and how can we prevent it?

III. What does the future look like (and how do we know)?
Generate and evaluate scientific evidence and explanations

The scene:
On March 16, 2020, the Imperial College London COVID-response team published a scientific paper that outlined a “worse-case scenario” of 510,000 deaths in the U.K. assuming the country would continue doing nothing to respond to the COVID-19 outbreak. In response to this study, the country (along with the U.S.) made preparations for a public lockdown. As of April 25, 2020, “only” 18,000 deaths have been recorded in the U.K.’s hospitals. That’s 28 times fewer than predicted by the initial projections.

4. When the Imperial College London team revised their initial model-based projections, some news media outlets reported that the team had an error in the initial model. This worried many people that scientists are making mistakes. Some people even argued: we shouldn’t trust what these scientists say because their models are wrong. Knowing what you know about models, do you agree or disagree with this statement? Use the CER Checklist on the next page to remind yourself what makes a good argument.
Implications and Reflections

- Despite the school shutdowns, we were able to engage students in generating and evaluating scientific evidence and explanations.

- An anchoring phenomenon that is both complex and relevant helped us reframe science from “recreating school at home” to fostering authentic, equitable learning experiences with flexible goals. The design of this unit resulted in higher attendance during synchronous Zoom meetings, more submitted work, and a safe space for students to share how the pandemic had impacted their lives.

- The public, central space for students’ questions (i.e. a “driving question board” or “summary table”) was instrumental to motivating their subsequent investigations. It is a useful tool to help teachers and students take stock of what they asked, what they did, and what they learned as a result.
Questions for Further Investigation

- What if students’ questions do not lead to important disciplinary core ideas they’re supposed to learn within a unit of instruction?
- How are teachers currently using the coherent kit-based curriculum (mySci) with students?
- How do teachers make decisions about what to adapt and how are they adapting?
- Are teachers and students using the kit materials?