Thirsty? SIP - Engaging Students and Communities in Water-Related State Inquiry Projects (SIPs)

Michelle Young, Glendale
Lalitha Murali, Glendale
Jennifer Clark, Glendale
Susan Kridler, MPS
Peter Reynolds, Learn Deep
Joost Allard, Learn Deep
Travis Tangen, WARF
Kevin Anderson, DPI

tinyurl.com/wsst-water-22
What is your vision for science learning?

“[By] the end of 12th grade, *all* students have some appreciation of the beauty and wonder of science; possess sufficient knowledge of science and engineering to engage in public discussions on related issues; are careful consumers of scientific and technological information related to their everyday lives; are able to continue to learn about science outside school; and have the skills to enter careers of their choice, including (but not limited to) careers in science, engineering, and technology.”
What are you doing now?

Introduce yourself to a neighbor or two and share:

1) Work your students do that connects to the local community
2) Why is that important?
Why inquiry? Why local?

State Connections - [dpi.wi.gov/science/water](http://dpi.wi.gov/science/water)
Sharing - [https://siftr.org/WisconsinWater/](https://siftr.org/WisconsinWater/)
Standards
Scientific Literacy
Engagement
Why Water?

Share thinking, partners, universality, etc.
What could this look like?

Parking lot sweep example

Locate your site
Locate and measure a 10 ft. x 10 ft. impervious surface (paved playground, parking lot, sidewalk, etc.). Mark the perimeter with chalk, marker, or tape. You can use pavement corners or cracks to serve as benchmarks that can be used as a guide to sample the same area again another time.
- You can measure 10 foot string(s) to make the marking faster or use rulers or meter sticks
- If possible try to mark an area near where water runs off into a sewer, field, or street gutter.
- Multiple student groups can mark different spaces around your school for the project as well.

Sweep
(set a schedule to sweep the same area - weekly, monthly, quarterly, etc.)
Sweep - Using a dustpan and broom to gently transfer the materials into the clear containers
You can decide how you want to organize your sweep collection(s)
Option 1 - 'stack' sample collections in the same container (separate layers with paper or other item)
Option 2 - use a separate container for each collection
Labeling and marking (do one or a combination of the following)
- Label the container to indicate the sample location area, the date, and group name on the container
- You can determine and add estimated amounts for volume or concentration

Add water to the top of the container

Salt
Place a drop of the liquid on a refractometer to measure salt concentration.

Vath

Leaves

When leaves are left on sidewalks, streets, and parking lots they collect water and can release ‘leaf tea’ in the water flow that impacts the health of ponds, lakes, and streams.
Can you measure or estimate the amount of nitrates and/or phosphates that the wet

Does the salt concentration change in different areas of the school parking lot?
Is there salt present in the Fall, Winter, and Spring?
How does salt affect the environment and the living and non-living things in the ecosystem?

Are there different ways to apply salt that can keep
Collaborative Learning Experience Design

STEM Studio
The Fellows Vision

A series of three interdisciplinary projects where:

- Students engage in meaningful, authentic work
- Students collaborate across school and district boundaries to share resources, data, ideas, findings
- We, as teachers, work together to create and guide these opportunities
Focus: Water Inquiry

**Our Water, Our Stories**
Students talk with each other, people in their lives, and others in the broader community involved in the provision or use of water and tell the stories of what clean water means to our community.

**Our Water, Our Design**
Students collaborated to design and build a prototype or model of a device to test water for qualities they care about.

**Our Water, Our Community**
Students identified a location in their community, examine how it uses or is impacted by water and the issues posed by the current systems, and proposed an equitable, sustainable solution.
What could it look like for your students?

Who would you want in the room to design/plan an inquiry based project?
What does it look like in a classroom?

Students are ENGAGED in discourse to create and share models to figure out phenomena related to scientific principles about water. Students EXPERIENCE and make sense of phenomena by observing and designing investigations that generate data.

Students EXPLAIN and ARGUE their claim using evidence from their investigations.

Using Phenomena to Drive Student Inquiry

Standard: Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance (water) when thermal energy is added or removed.
Students learn about water in our community while making connections to curricular components and class content. Aligned with Common Core State Standards & NGSS.

"I learned a lot about science and what scientists do in the real world"
Our Water, Our Design

“It helps to show how we think and [what] we are thinking”
Our Water, Our Community

Through this work students engage with issues and design solutions for problems they see in their community.

Fieldwork provides opportunities for real-world connections, collaboration with experts in the field, enhances understanding and allows for perspective beyond the classroom.

Students have opportunity to demonstrate understanding of learning in a variety of ways via projects & presentations, and capstone projects—then these are used to assess standards.
What assets are available in your community?

Where/how might your students explore water/water issues in your community?
What does it look like in an Innovation Lab?

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<th>GE i-Lab Instructor</th>
<th>Classroom Teacher</th>
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<td>Lesson Plan incorporating subject area standards</td>
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<td>Fabrication Skills Integration in GE Lab</td>
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<td>Fabrication Tool Student Proficiency</td>
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<td>Resource Coordination</td>
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<td>Be Passionate</td>
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<tr>
<td>Equipment Acquisition</td>
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What does it look like in an Innovation Lab?

- Learn Deep Fellows Program Water Projects
- Freshwater 101 Simulation
- Curated field experience tied to freshwater resources
- Alverno Aquaponics Greenhouse
- Water sampling
- Water properties lab in Alverno biology lab
What does it look like in an Innovation Lab?

- Learn Deep Fellows Program Water Projects
- Freshwater 101 Simulation
- Curated field experience tied to freshwater resources with partnerships i.e., Hawthorne Glen, Watershed,
- Water sampling, Saukville
What assets are available in your own school?

What resources exist within your school to support deeper inquiry?
What does partner involvement look like?
What does partner involvement look like?

Collecting macroinvertebrates in Saukville to determine the health of the Milwaukee River.

Snowshoeing at Oak Ridge Farm
A Vision for PBL 2.0

Community Engaged, Collaborative Learning Experiences where:

- Students can discover their passions and pathways to pursue them
- Teachers have the support of the broader community to plan and offer a rich set of experiences for their students
- Projects are designed not just to build the skills/knowledge of students, but the capacity of schools and partners to do even more
Final Comments/Questions?

Learn Deep
● website: learnddeep.org/
● Fellows Program: learnddeep.org/programs/fellows-program/
● inspirEd Learning Community: community.learnddeep.org

State Inquiry Project - Water dpi.wi.gov/science/water