High School Teacher Externship Program Seattle & King County - Public Health



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Washington Alliance For Better Schools
(2015 - Cohort)

For our externship, we learned how the 21st Century Skills, including Communication, Collaboration, Teamwork, and Networking are highly desirable for new employees across industries.

The externship experience included shadowing KCPH/EHSD employees, including:

- Plumbing Inspection
- Pest Control
- Hazardous Waste Collection and Storage
- Restaurant Inspection
- Pool Inspection

In addition to shadowing, we also met with employees who shared information about:

- Equity and Social Justice
- The Tacoma Smelter Plume Dirt Alert program
- Investigation of lead exposure and toxicity
- "Green" cleaning alternatives
- Toxicological analysis of toxic algae growth at Greenlake
- Efforts to study the effect of global warming on the frequency of harmful algal blooms in Puget Sound

After careful consideration of the externship learning opportunities, connection with Next Generation Science Standards (High School Life Science Standards), timing within the school year, and available classroom resources, I decided to assemble a PBL focusing on harmful algal blooms.

HS-LS2-2 — Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

HS-LS2-7 — Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

Reducing the Frequency of Harmful Algal Blooms in Puget Sound

David Swart

Biology and Chemistry Teacher School: Highline High School District: Highline Public Schools

Externship Host: Greg Wilson of King County Public Health / Environmental Health Sciences Division (KCPH/EHSD)

Timing: This Problem-Based Learning (PBL) assignment occurred at the end of our first unit (Cells and Homeostasis) and was followed by the Energy, Matter, and Organization unit. It provided foundational knowledge for an Ecology unit that will occur prior to the Biology End-of-Course Exam.

Meet the Problem: How Can We Reduce the Frequency of Harmful Algal Blooms (HABs) in Puget Sound?



Students Became Invested When:

- They saw images of a recent algal bloom at a local city park
- They met representatives from the Environmental Science Center located at the park
- They identified and contacted stakeholders who are personally invested in the health of Puget Sound

<u>Field Trip:</u> In collaboration with Christine Froschl of the Environmental Science Center, students attended a field trip to Seahurst Park where they actively engaged in:

- Modeling the effect of pollution on Puget Sound water quality
- Water quality testing from multiple water sources in the park
- Collecting plankton from Puget Sound using a plankton tow
- Identifying the plankton collected in their plankton tow samples
- Separating waste into recycling, food waste, and garbage
- Modeling toxin bioaccumulation in the local aquatic ecosystem

Problem-Based Learning:

- Students researched a variety of possible solutions to reducing the frequency of HABs, with small groups each selecting one possible solution.
- Working together, student groups researched why their selected solution would reduce HABs and identified a stakeholder who would be interested in their solution.
- Students connected with stakeholders via email, sharing ideas and asking questions
- Stakeholders were invited to presentation day, where students presented their projects on tri-folds.

Measured Outcomes:

- Tri-fold posters were evaluated for quality and completion as measures of learning and engagement. On presentation day, students interviewed stakeholders about career pathways.
- The unit exam included self-reported measures of student growth in understanding of key HAB-related concepts
- Christine collected and analyzed pre- and post-field trip surveys of student awareness of and attitudes towards various environmental issues related to HABs.

Acknowledgements

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Class Field Trip to Seahurst Park

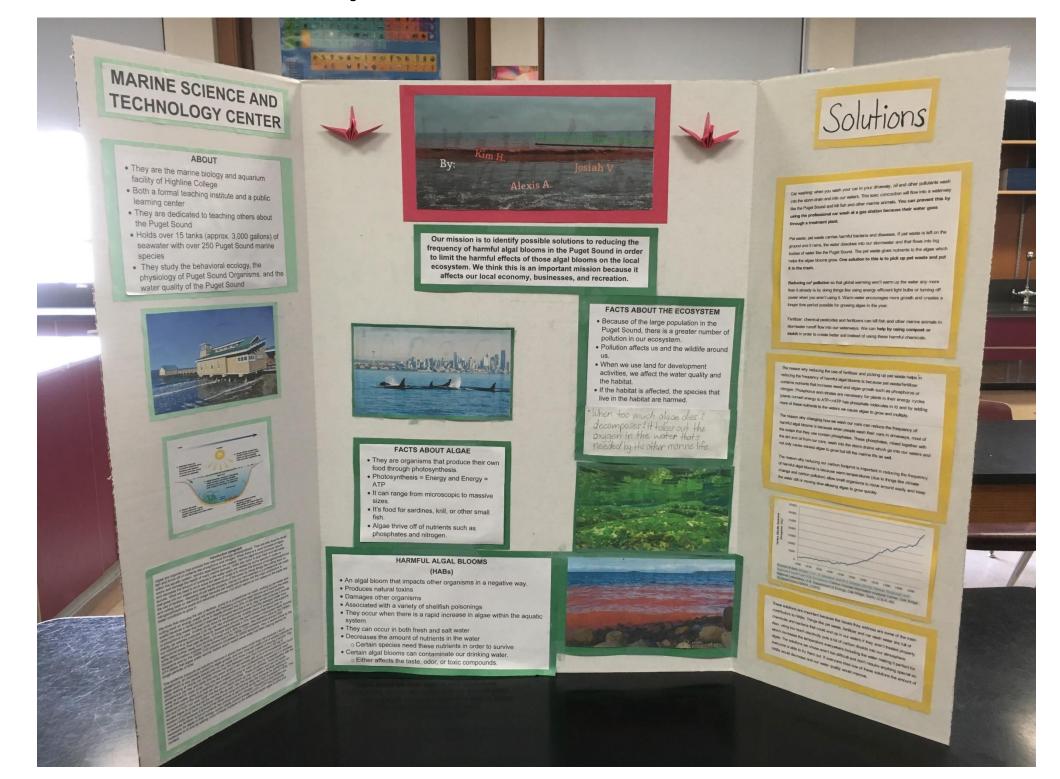






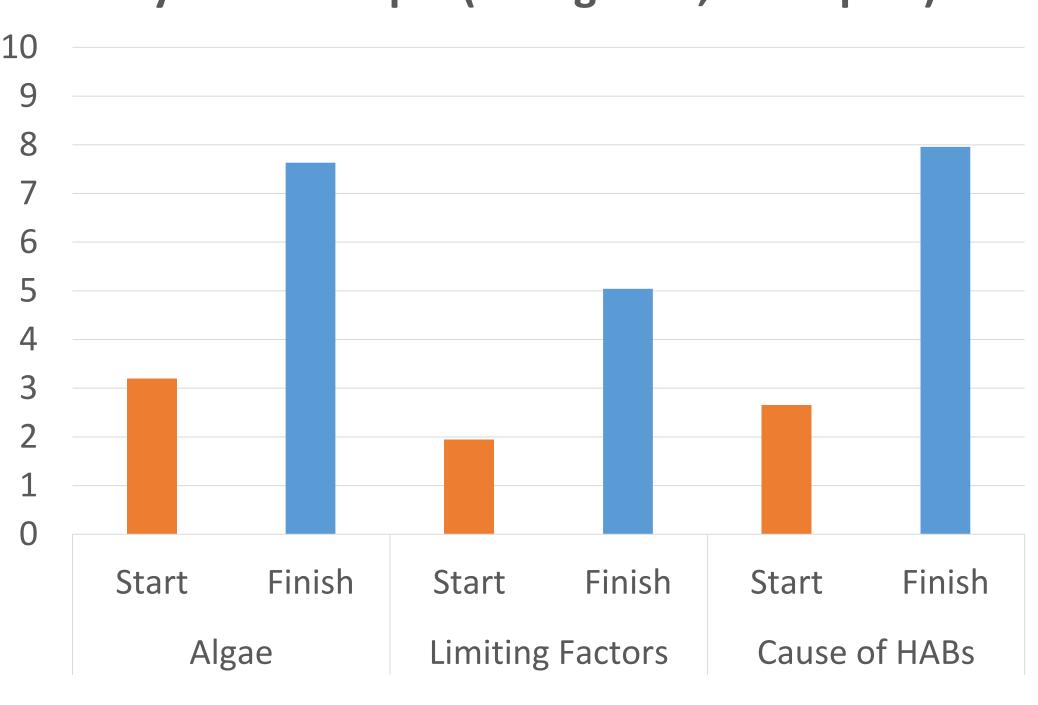


Example of Student Work



Measurement of Student Growth

Change in Self-Reported Student Understanding of Key PBL Concepts (1=beginner, 10=expert)



Analysis of a pre- and post- survey administered by the Environmental Science Center found:

- 13% increase in use of car washes
- 9% increase in checking for car leaks
- 8% increase in fixing car leaks
- 14% increase in awareness of car leaks
- 25% decrease in use of streets or driveways for car washes
- 10% decrease in use of single-occupant cars