

Harmful Algal Blooms: Problem Based Learning

We had a very successful first week of researching solutions to the problem of harmful algal blooms in our local environment. As a reminder, your mission:

Identify possible solutions to reducing the frequency of harmful algal blooms in Puget Sound in order to limit the harmful effects of those algal blooms on the local ecosystem.

One of the exciting realities of “problem-based learning” is that students are able to work together to find creative solutions to real-world problems. A single “right” answer doesn’t exist! Instead, there may be many possible solutions, and it is your mission to fully explore one of those solutions. To be successful, you and your group must dig deeply into the science supporting your solution, researching and understanding the key scientific thinking that will enable you and your group to defend your proposed solution.

How deep must you dig? As deeply as possible given the constraints. We only have until **Tuesday, November 3** to complete our work, and computer access at school is limited. By now, your group should have narrowed your focus to one solution and you should be researching the science that supports the solution. Here is an example:

On our field trip to Seahurst Park, we learned that excess fertilizer applied to lawns in our community can run off into local streams and be carried out to the Puget Sound where it can contribute to algal blooms. Therefore, one possible solution to decreasing the frequency of HABs is to encourage people to only apply fertilizer at the right time and in the appropriate amount.

Who is the stakeholder in this example? There are many! Homeowners concerned about their lawns, stores selling fertilizer, professional gardeners, the City of Burien (Parks and Recreation), King County Public Health, visitors to Seahurst Park, people who enjoy fishing near the coastline, pets who swim in the Puget Sound, marine life in the Puget Sound...the list goes on and on! Your job is to pick one stakeholder and focus your research efforts to help that particular stakeholder understand why a solution is necessary, how your solution will benefit them and the community, and why the solution is scientifically sound. Many of you successfully reached out to stakeholders and have begun the process of sharing your solutions and seeking feedback from your stakeholder. That is a huge success! Ideally, your stakeholder will join us on presentation day (Tuesday, November 3), but for some that may not be possible. If so, you will still present to the people who attend, and you will need to share your presentation with your stakeholder and ask for feedback. The details will vary for each group, and we will work out the details in small group conferences. As long as you make an effort to contact and communicate with your stakeholder, your grade will not be affected if your stakeholder cannot attend! Why do we need a stakeholder? For the same reason you must know your audience when writing a paper: understanding your audience (or stakeholder) allows you to focus your efforts. By connecting with an actual human being, you are joining a larger community of learners that extends well beyond the walls of our school. You are becoming part of the

network. Your efforts matter, and your stakeholder is there to help guide you, learn from you, and help hold you accountable to creating a project worthy of their time and your own.

About those presentations...each group will receive a large tri-fold presentation board to showcase their solution. Students will have class time on Tuesday and Wednesday to add content to the tri-fold. If you want to make your board look extra fancy, please bring in some supplies! Your group will decide how your tri-fold will look. Remember, your primary audience member is your stakeholder (even if they are not able to attend). You will want the tri-fold to appeal to your stakeholder. You will need to be sure your solution is clearly presented, with supporting scientific information presented in a way that is relevant to your stakeholder. That means a tri-fold presented to a fishing company representative will look quite different from one presented to an elementary school student. For example, while researching about the effect of phosphates in Puget Sound, you might find a data table from a local government agency in which phosphates entering local streams are measured weekly. Rather than present a huge table of numbers, your group should consider creating a graph summarizing the data and making the data easier to digest for your stakeholder. You would want to include information about what phosphates are, why they are normally a limiting factor in the ecosystem, and how an excess of phosphate affects HABs. The presentations will occur in a small-group setting, with stakeholders rotating between the groups. That means you will be presenting several times during the class period, and not several different people with differing reasons to be interested in solutions to reducing the impact of HABs.

You should also consider the reality that many people don't actually know what HABs are. In fact, many people don't really even know what algae are! Be sure to include the background information necessary to explain the big picture to your stakeholder. Even the most experienced stakeholder will appreciate a review of what algae are, how they fit in to the local ecosystem, why some algal blooms are toxic, and the difference between toxic and harmful algal blooms. Be sure to use our computer lab time on Monday and Thursday this week to include research into those questions. Remember, document your learning and resources you use in your group's Google Doc.

Finally, let's talk about grading. This is a big project! This work will represent 30% of your quarter grade. It will be worth a total of 100 points:

The research phase of the project is worth 50 points – see Research rubric

The presentation phase of the project is worth 50 points – see Presentation rubric

Individual grade multiplier – see Multiplier worksheet

The multiplier is only relevant for groups that are not functioning optimally. Remember, you worked together to pick groups for a reason. If the first week did not go smoothly, communicate with your team to set expectations for the team and for each member. The work load should be shared and balanced.

Questions? Comments? Concerns? Let's talk ASAP – do not wait until the last minute!