

Science Forward

Research Poster Project Scaffolding Suggestions

When I teach SF, the research poster project is the largest portion of a student's final grade. It represents the culmination of a semester's worth of being engaged in the process of science. Because it's such a large undertaking, I typically scaffold this out for the students. This document is based on what I have done in the past five years of Science Forward.

Students work in groups of three or four on this project and (usually) receive the same grade on a 4 (exceptional) to 1 (incomplete) scale. The science process is slightly out of order due to the nature of scheduling the BioBlitz. As such, students typically do the data collection portion first (at the BioBlitz) and then I hold the results back from them until they come up with a testable question. It helps focus them to have the experience at the BioBlitz with the scientists they are training with before they actually come up with an empirical question.

The final output of this project is a research poster to be presented at the end of semester conference (the STEAM Festival). I start having work done for this project immediately following BioBlitz. I'll put in some suggested times, but these will change depending on the actual timing of BioBlitz and fall holidays.

Part 1 – Participate in BioBlitz – Early September

I use the “What is Science?” video in the first week of class, so usually we have already had a discussion about observation, measurement, and the empirical nature of science before BioBlitz happens. This helps students understand what the data collection goal of the BioBlitz is. If the semester schedule allows, I also do an activity about what is and is not a scientific question. I come up with a few tricky ones that the students have to discuss about whatever field of science we happen to be discussing the day this activity happens. If they are not empirical questions, students have to say why and then change the question to something that actually can be tested. They should be thinking about testable questions when they are at BioBlitz.

Part 2 – Propose a question – Middle-end of September (after BioBlitz)

I have each student propose a question based on their experience at the BioBlitz. It does not have to be related to the specific taxon they were looking for, but it needs to be testable with the BioBlitz data and/or additional related data from an open source. I usually let them look at previous BioBlitz data on this site (<https://macaulay.cuny.edu/eportfolios/bioblitz/category/data/>), which also has links to other data sources. You can also find more open data source suggestions on this OER here: <https://macaulay.cuny.edu/eportfolios/scienceforward/course-materials/digital-resources/> Note: We don't end up using all the proposed questions. I usually have students choose their favorites and group them by interest.

Part 3 - Project proposal worksheet – Early October

At this point, I have some dedicated time in class for the groups to work together, in addition to asking them to meet (in-person or virtually) outside of class. Some instructors might want the students to write this part up as an actual grant proposal. Before this part of the assignment is due, I have my students do an in-class grant proposal activity that is usually timed with my Urban Ecology module so that students are thinking about studies you can conduct in the city. Because I want to save some time in case students want to re-visit the park and collect more species observations, I usually don't have them write this up as an actual grant proposal. I just collect answers to the following questions in worksheet format:

1. **What is the final version of the question you are interested in asking?**

2. **List some keywords to use when searching for related scientific literature.** Be specific!
3. **Where will your data come from? Do you need to collect new data? Please describe.**
4. **What will you be measuring or comparing? What are the dependent and independent variables?**
5. **Please make a list of your methods.** If you are using existing BioBlitz data, you do not need to describe those data collection methods on this worksheet, but you do need to describe how you are extracting the relevant data from the entire BioBlitz data set.
6. **Why is this question interesting to you? Why should others care about this topic?**

Part 4 - Annotated bibliography – Middle-end of October

Question #2 above leads directly to the next part of the assignment - an annotated bibliography. I require at least 3 references per person in the group and they must be from relevant, peer-reviewed, primary literature. At this point in the semester, I've already discussed searching academic databases and we've read quite a few peer-reviewed papers.

Part 5 – Results Figures and Main Findings – End of October or Beginning of November

This part is basically a draft of the results section of the group's poster. They must submit all figures they plan on using as well as bullet points for the main findings shown in these figures. At this point in the semester, we've already covered some basic descriptive statistics and basic statistical hypothesis testing. Often students will be asking questions for which a specific analysis is needed and in those cases, I will meet with them as a group and go over what is appropriate. Some suggestions are listed in the BioBlitz Resources page of our OER.

Part 6 – Poster Draft - Middle of November

The next part submitted is a draft of the entire poster designed in PowerPoint. Before this is due, we have an in-class workshop about poster design with examples of good posters and some fun examples of terrible posters. Colin Purrington's website (<https://colinpurrington.com/tips/poster-design>) is a great resource for this type of workshop.

Part 7 – Poster Talk Practice – End of November

Student groups bring in revised .pdf or .pptx files of their poster that we project and view as a class. I tell students to not print before this practice because it's one more opportunity for me to give them feedback. Groups present the poster as if we are at the STEAM Festival. The format is a 2-3 minute talk that highlights the main question and findings using the poster as a visual aid.

Part 8 – Poster Printing – Early December

Posters are printed at MHC and students should pay attention to announcements for the poster printing schedule.

Part 9 - The STEAM Festival – Early December

The poster conference half of the STEAM Festival is where students will present their work. At this event, students should take shifts at their poster so that they can explore the poster rooms and seminar 1 rooms. I have my students do a peer review of some other group's poster that they hand in during class after the event.

Part 10 – Peer-Review Sheet and STEAM Festival Discussion – after STEAM Festival

Peer-review sheets are completed individually. We have a whole-class discussion about the students' experiences at the STEAM Festival.