

A Living Laboratory: Activity Template

We are creating a cross-disciplinary collection of teaching activities that use the best practice approaches fostered in the “Living Lab”: adoption of City Tech’s General Education Student Learning Outcomes, George Kuh’s High Impact Educational Practices, place-based learning, open digital pedagogy (the OpenLab), and formal assessment methods.

Share your best practices with your colleagues! Use this form to record a favorite activity; an activity can be as small as an in-class exercise or as large as a semester-long project. Your description can be short or extensive – take as much space as you need.

Activity Title:	Quantitative reasoning project: explain the importance and the changes in dissolved oxygen levels in the Hudson river.
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Activity Description:

The project consists of four parts:

Part 1: Research hypothesis. Students will be asked to come up with hypothesis that answers two questions: how the dissolved oxygen levels in New York Harbor change over the course of the year, and what causes these changes.

Part 2: Data and planning. Students are provided with monthly data on dissolved oxygen levels in the Hudson River, and NYC average monthly temperatures. They will be asked to examine the data and make a plan for scientific analysis, using various statistical methods – detailed explanations and ideas will be offered to them to choose from.

Part 3: Analysis and results. This is the execution of Part 2, where they will do the math and report the results.

Part 4: Conclusion. Students need to submit at least one page typed report on their findings.

Learning Goals:

The main purpose of the project is to stimulate students’ critical thinking and quantitative reasoning skills by applying math to real world data. Students will learn to formulate research statements, analyze data, draw conclusions and communicate their results. It is worth 15% of their final grade.

Timing:

The project will be assigned 3 weeks before the end of the semester. They are expected to deliver Part 1 a week after that, and finish the entire project by the end of the semester. A five page handout is prepared and delivered to the students, and ½ hour in-class discussion of the purpose of the project will be presented during lecture time. In subsequent classes about 10 minutes will be spent on Q&A about the project. OpenLab will also be utilized for discussion and submission of the final written report, along with further links and research materials.

Logistics:

To prepare for the project students only need to know the class material about the methodology of the analysis. All instructions will be clearly explained in the five page handout. Further research into the topic will be encouraged by doing online searches.

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General Education SLOs:

Which of City Tech's [General Education Student Learning Outcomes](#) does this activity address?

Inquiry/Analysis: Understand and employ both quantitative and qualitative analysis to describe and solve problems, both independently and cooperatively.

Breadth of Knowledge: Understand and appreciate the range of academic disciplines and their relationship to the fields of professional and applied study.

Communication: Communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means, and in more than one language.

High Impact Educational Practices:

Which of [George Kuh's High Impact Educational Practices](#) does this activity incorporate? Does it use the [OpenLab](#) for [open digital pedagogy](#)? Does it include [place-based learning](#)? Choose all that apply and/or add your own.

George Kuh's High Impact Educational Practices:

- | | |
|--|--|
| <input type="checkbox"/> First-year seminars and experiences | <input type="checkbox"/> Common intellectual experiences (core curriculum) |
| <input type="checkbox"/> Learning communities | <input type="checkbox"/> Writing-intensive courses |
| <input checked="" type="checkbox"/> Collaborative assignments and projects | <input type="checkbox"/> Undergraduate research |
| <input type="checkbox"/> Diversity and global learning ("difficult differences") | <input type="checkbox"/> Service- or community-based learning |
| <input type="checkbox"/> Internships | <input type="checkbox"/> Capstone courses and projects |
| <input checked="" type="checkbox"/> Open Digital Pedagogy (the OpenLab) | <input type="checkbox"/> Place-Based Learning |

Other (please describe):

Assessment:

For the critical thinking (Part 1) this time I will include and use the value rubric distributed last time. For the analysis and conclusion I will verify if the students followed their plan, if the calculations they performed were correct and if their conclusion matches the results they obtained.

Reflection:

The last time I assigned this project I realized how challenging it is for the students to think independently and come up with a plan to solve a problem on their own without being provided with a formula or a theorem (which is the usual algebra setup). However they were positive in general and the only request was to have more time in the future (last time I assigned everything in the week before the finals).

Additional Information:

Assignment instructions will be uploaded in a separate file on OpenLab.