

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:	Modeling local maritime traffic in the New York/New Jersey area.
Your Name:	Johann Thiel
Department:	Mathematics
Course:	MAT 2580 Introduction to Linear Algebra
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Activity Description:

Provide a brief description of the activity.

Students will work in groups, writing a report on a mathematical problem in linear algebra. They will use tools and techniques learned in class to model the maritime traffic flow between ports managed by the Port Authority of New York and New Jersey.

Learning Goals:

What do you aim to achieve with this activity?

One of the goals of this activity is to get students to work on a problem that is significantly more computationally intensive than most of the problems in the textbook. I want to show them how powerful MATLAB is and how it can be leveraged to solve real-life problems.

I also want students to gain some experience in writing about mathematics. This project will not only ask them to solve a problem, but to explain their solution in great detail to another person. Students will have to make their case by explaining how they computed the solution to the problem (and now just writing down several formulas) and what they can conclude from their computations.

Timing:

At what point in the lesson or semester to you use this activity? How much classroom time do you devote to it? How much out-of-class time is expected?

This assignment will be given out near the end of the semester, about 4 weeks before the semester ends. Groups will have 2.5 weeks to complete the assignment. I will spend about 15 minutes introducing the project on the first day that I hand it out. My plan is to devote at least two 20-minute segments of time from subsequent classes for students to work in groups and ask questions. I expect that the students will take at around 4-5 hours to complete the assignment. With the help of MATLAB, the computations should be fairly routine; the write-up is where most of their time will be spent.

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Logistics:

What preparation is needed for this activity? What instructions do you give students?

The assignment will be posted on the course website. Additionally, I plan on spending in-class time to explain the project's requirements. I will also allocate time from future class meetings to answer questions and to give groups a chance to work together while I am available. The project is meant to build off of several lessons in the second half of the course. I am providing them with all of the data they need to complete the project, so no outside research is needed.

General Education SLOs:

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

Communication – Communicate in diverse settings and groups using written means.

Inquiry/Analysis – Employ scientific reasoning and logical thinking. Understand and employ both quantitative and qualitative analysis to describe and solve problems, both independently and cooperatively.

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 checked="" 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 type="checkbox"/> Open Digital Pedagogy (the OpenLab) | <input type="checkbox"/> Place-Based Learning |

Other (please describe):

Assessment:

How do you assess this activity? What assessment measures do you use? Do you include your evaluation in grade calculations?

I plan on evaluating this assignment using the following criteria:

1. Mathematical content – This includes appropriate methods and computations.
2. Validity of assumptions – This includes making reasonable and necessary assumptions for the model.
3. Conclusion and recommendations – This includes how the questions are answered and whether or not answers are reasonable based on computations.
4. General organization – This includes following guidelines, neatness and appropriate grammar.

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Reflection:

How has this assignment impacted your teaching? What challenges did you encounter and how did you address them? What feedback did students provide? How would you imagine this activity being used in different disciplines?

This activity has not yet been used.

Additional Information:

Please share any additional comments and further documentation of the activity - e.g. assignment instructions, rubrics, examples of student work, etc. These could be in the form of PDF or Word files, links to posts or files on the OpenLab, etc.

Assignment link: http://jathiel.com/NYCCT/S14/MAT2580/2580_proj.pdf