

Presentation of Lessons

Each presentation will be repeated twice EXCEPT where noted

Variables and Constraints for Food Banks

Joseph Warfel, Northwestern University

Mathematics

Joseph will present two lessons about the use of algebra to create mathematical models of logistics operations at food banks. The format and structure of the lessons could be applied to any field to create similar lessons about how algebra can be used to describe, understand, and control real-world systems.

Introduction to NetLogo

Madison Fitzpatrick, Northwestern University

Science, Math, Computer Science

In this session, we will introduce Netlogo, an agent-based modeling environment, as a tool that can be used to teach scientific skills and concepts to students at all levels. Participants will learn how to create a Netlogo lesson that will help their students understand important topics in science and gain proficiency in science practices, particularly as defined in the Next Generation Science Standards

The Period of Oscillating Springs

Scott Mayle, Northwestern University

Physics

This is an inquiry based lesson that puts the students in the seat of the scientist trying to figure out the mechanics of how springs works. To do so, students will be asked to come up with the methodology to measure specific properties of a spring and create mathematical models to describe these properties. The goal is to have the students do this lab to discover things they did not already know. Not simply to reaffirm a previously taught lesson.

Sink Holes: Getting to the Bottom of the Problem

Suzy Trzaskus, Niles North High School, Niles, IL

Earth Science

In this 3 period activity, students will investigate the causes of sink holes through reading, observations, and experimentation. Students will apply engineering practices to make a workable model of sink holes. This activity will give a potential framework on designing an activity that has been aligned to NGSS and the Common Core.



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Is There Life in Other Worlds?

Meagan Morscher, Northwestern University

**Earth Science/Astronomy,
Mathematics, Biology**

Students use probability and estimation to answer a very interesting question: *How many intelligent civilizations might there be in our galaxy that are trying to communicate with us right now?* To start, they review the rules of basic probability using examples like dice and the lottery. Next they design an algorithm for answering the following real world question, using probability: *How many red cars are there in Chicago?* Students gain practice dealing with problems that do not have a “correct” answer, as well as assessing their solutions to these problems. They develop skills that can be applied in a variety of contexts, including the likelihood of life in other worlds, and at the same time learn about the significance of doing complex estimates in STEM.

Understanding Networks: The LINKS Lab

Dr. Kai Orton, Northwestern University

****Note: Lesson will be presented in session 1 only***

Math, Biology, Social Science

Dr. Orton will introduce computational thinking and systems thinking concepts using a NetLogo:Hubnet simulation of a social network. The LINKS Lab is a series of activities under development, guided by the newly released NGSS standards that will introduce students to: 1) concepts in network science and systems thinking, 2) data visualizations and abstractions, 3) understanding the math behind simple and complex networks.

DNA Sequencing and Evolutionary Trees

Dr. Kai Orton, Northwestern University

****Note: Lesson will be presented in session 2 only***

Biology

Dr. Orton will introduce bioinformatics and computational biology as emerging disciplines that allow us to deepen our understanding of biological processes and medical phenomena. She will demonstrate two lesson plans based on computational biology that focused on DNA sequencing and understanding the gene sequence differences that underlie evolution.