

Boston Harbor: A Living Laboratory

Grade: Grade 5/6

Place of Focus: Boston Harbor

Massachusetts Curriculum Framework for Science and Technology/Engineering Standards

- **5-ESS3-1.** Obtain and combine information about ways communities reduce impact on the Earth's resources and environment by changing an agricultural, industrial, or community practice or process.
- **4-PS4-1.** Develop a model of a simple mechanical wave (including sound) to communicate that waves (a) are regular patterns of motion along which energy travels and (b) can cause objects to move.
- **4-ESS2-1.** Make observations and collect data to provide evidence that rocks, soils, and sediments are broken into smaller pieces through mechanical weathering and moved around through erosion.
- **3-ESS3-1.** Evaluate the merit of a design solution that reduces the damage caused by weather.

Lesson Overview

This lesson will introduce students to the ideas of field science, participatory science, and how the Stone Living Lab is using this kind of science to answer urgent questions about climate change in Boston. Students will learn that science can be done anywhere, by anyone, and that there are many tools to help us do science in our communities. Students will begin to explore the ways scientists can answer questions about climate change in Boston.



Essential Question

How do we know something is changing?

Guiding Question

Where is science happening in my community?

Learning Objectives

By the end of the lesson, participants will be able to:

- Explain the term "living laboratory" and begin asking scientific questions
- Explain the mission and research focus of the Stone Living Lab
- Generate ideas on how to measure change in an environment
- Engage auditory senses to start asking questions in a scientific way

Lesson Preparations

Time

1 hour, in classroom

Materials and Supplies

- Google Slideshow
- Name tags

Lesson Outline

Lesson Motivation / "The Hook"

This is the first of three lessons centered on the work of the Stone Living Lab: climate change, Boston Harbor, and participatory science.

The goal of this first lesson is to familiarize students with the SLL and introduce the concept of participatory science, breaking down the preconceived notion that scientists are exclusively white, male, and work in labs.

Introduction

Overview of the day / the next few months

- Group circle
- Introductions
 - Name tag creation (to use for future programs)
 - Explain the role of the Stone Living Lab in the classroom: will be working with the students over the next few months
 - Provide context: this is the first of four lessons
 - Essential question: How do we know something is changing?
- Ice breaker: rhythm detective
 - A person is chosen to leave the room. A player in the circle is chosen to start a rhythm. Using their hands or feet, players clap, snap, stomp or otherwise develop a rhythm. Everyone in the circle copies the rhythm. The leader changes the rhythm every few seconds and the rest of the group must follow suit, following the leader. The person who has been out of the room returns to the middle of the circle and tries to figure out who is leading the rhythm. They have three guesses. If they guess correctly, the leader of the rhythm becomes the detective, and the previous detective chooses the next rhythm leader. If the detective cannot identify the rhythm leader in three guesses, they choose the next detective and someone else becomes the rhythm leader.



Lesson Activity: Slideshow Presentation

How do we know something is changing?

What do you think about when you hear the word "Laboratory"? (15 min)

- Crowd source images and descriptor words
- Draw what students verbalize

All of these people are scientists. What do you notice about where they are working? (15 min)

- Include pictures of scientists conducting research at various outdoor sites
- Are there any differences or similarities between what we discussed and what you see here?
- What do you notice about where these scientists are working?
- All these places are laboratories!
- Laboratory: a place where you can ask questions, create theories, and test them out

How do we answer questions about the natural environment? (20 min)

- Show pictures of our living laboratories
 - Examples: beach, marsh, island, living shoreline
 - Defining a lab as a place where you can ask questions, develop theories, test them out
 - Are there any differences or similarities between the laboratory you drew and the laboratories you see here?
- Show map of Boston Harbor
 - Do you recognize this area? What is this map showing?
 - Our Laboratory is the whole harbor, including the Boston Harbor Islands and the communities inside this circle
 - Point out where you are currently located with a star
 - The Stone Living Lab asks questions about changes on the coast, climate change, and how we can work with nature to adapt
 - What do we know about "climate" and "climate change"?

Lesson Activity (cont.)

Living in New England, we can see change often! One of the most common ways we might be able to see change is in the form of seasons. We want to know: How do native species change from season to season? How will climate change affect the seasons? How will climate change affect the native species that change with the seasons? (15 min)

Generate Curiosity

- We can observe with all of our senses. Now we'll observe by listening
- Soundscape: Rockies Urban Wild
- Fist of sounds
 - Create a fist
 - Listen to this soundscape and lift a finger as soon as you hear a new sound
 - How many specific sounds can you hear?

Conclusion and Reflection

What knowledge and skills were gained?

- Students will understand that observations can be measured
- Students will understand that science can be done anywhere, and that anyone can be a scientist
- Students will understand that there are many strategies to adapt to climate change, including nature-based approaches