



State of the Schoolyard

Grade: Grade 6

Place of Focus: Cohasset Middle Schoolyard, Cohasset, MA

Citizen Science Protocol: Globe Observer, Seek iNaturalist, Nature's Notebook, Field Drawing

Massachusetts Curriculum Framework for Science and Technology/Engineering Standards

- **7.MS-LS2-1.** Analyze and interpret data to provide evidence for the effects of periods of abundant and scarce resources on the growth of organisms and the size of populations in an ecosystem.
- **7.MS-LS2-4.** Analyze data to provide evidence that disruptions (natural or human-made) to any physical or biological component of an ecosystem can lead to shifts in all its populations.

Future lessons can incorporate:

- **8.MS-ESS1-1b.** Develop and use a model of the Earth-Sun system to explain the cyclical pattern of seasons, which includes Earth's tilt and differential intensity of sunlight on different areas of Earth across the year.
- **8.MS-ESS2-5.** Interpret basic weather data to identify patterns in air mass interactions and the
 - relationship of those patterns to local weather.
- **8.MS-ESS2-6.** Describe how interactions involving the ocean affect weather and climate on a regional scale, including the influence of the ocean temperature as mediated by energy input from the Sun and energy loss due to evaporation or redistribution via ocean currents.
- **8.MS-ESS3-5.** Examine and interpret data to describe the role that human activities have played in causing the rise in global temperatures over the past century.



Learning Objectives

By the end of the field lesson, students will:

- Explain the importance of having abundant and long-term data when assessing changes in climate and habitats
- Explain the role of local data collected by citizen/community scientists in understanding the environmental impacts of climate change
- Collect cloud data such as amount, height, and type of clouds using the Globe Observer app
- Collect tree data such as height, species, and changes in foliage using the Nature's Notebook app
- Observe and identify animal species using Nature's Notebook and Seek iNaturalist apps (expected animals to observe include insects, birds, and possibly squirrels)
- Describe their observations to their classmates and explain their data collection methods

Pre-Visit Learning

Prior to the site trip, students should understand:

Pre-visit slideshow

- What is weather?
- What is climate?
- Why is weather data important for analyzing changes in climate?
- What data will I be collecting during the field visit?
- How do I navigate the observation apps?
- How can I identify species of trees, birds, and insects?

Essential Questions

What is going on in our schoolyard habitat and how do we know?



Guiding Questions

1. Why is long-term data important?
2. What animal and plant species live in our schoolyard?
3. How are plant and animal species in our schoolyard changing?

Field Visit Preparations

Time

Pre-visit learning: 1 class period (55 minutes)

Pre-visit procedures: 15 minutes

Field Visit: 30 minutes

Post-visit discussion: 10 minutes

Materials and Supplies

| <i>Material</i> | <i>Amount</i> | <i>Price / Link</i> |
|--|---------------|---------------------|
| Massachusetts Field Guides | 2 | <u>\$15.62</u> |
| Binoculars | 2 | <u>\$16.97</u> |
| <i>The Laws Guide to Nature Drawing and Journaling</i> | 1 | <u>\$25.49</u> |
| <i>iPad</i> | 3 | <u>\$269.99</u> |



Logistics

- Students will leave the school in their class group
- Our meeting point will be at the back corner of the school's property
- Students will work in groups of 3 or 4 to complete specific observation tasks

Scientific Protocol

- Students will work in the following groups to collect data and observations about the wooded area surrounding the school
 - Globe Explorer: Clouds
 - Nature's Notebook: Trees
 - Nature's Notebook: Animals
 - Seek iNaturalist
 - Nature Drawings
- Students can use field guides to aid in their species identification

Field Visit Outline

Introduction

- When we arrive at the meeting point, I will remind students of the following expectations:
 - Do not pick up animals.
 - Poison ivy has 3 leaves (show a picture as a reminder!). Students should avoid poison ivy and make sure any plants they touch are not poison ivy!
 - Do not pick up sticks bigger than your forearm.
 - Do not pluck leaves or flowers from plants.
 - No yelling
 - If you see a bee or wasp, walk away from it quietly. Do not swat at it.
 - I must be able to see you from the grass (do not go deep into the woods!). *(cont. next page)*



Introduction (cont.)

- I will remind students of why we are collecting data outside today (to act as a data point so as we continue to collect data, we can start to notice trends).
- I will guide groups to where they should make their observations and make sure they are set up with their app or supplies.

Learning Tasks

- I will circulate to different groups as they make their observations to help with any identification or questions they may have.
- Students will spend 15 minutes collect data in groups using the following protocols:
 - Globe Explorer: Clouds
 - Nature's Notebook: Trees
 - Nature's Notebook: Animals
 - Seek iNaturalist
 - Nature Drawings

Reflection

After the 15-minute observation period, students will meet back at the meeting point and we will travel back to the different observation locations. Groups will discuss what they observed or identified. This will take approximately 10 minutes.



Post-Visit Learning

- When we go back inside the classroom, students will hand back their supplies and we will discuss how and why our observations will be helpful in the future. Students can make predictions about what changes they may see if they make observations again in a few weeks, months, or years in the future.
- We will discuss how changes in the environment will affect plants and animals. I.e: In the winter, how will snow affect low growing plants? Insects? Birds? If plants flower too early, how will that affect pollinators? Will that affect other species?
- We will discuss how changes caused by humans can impact the environment. I.e: What would happen to bird or insect populations if trees were cut down to make the school field bigger?
- The idea of having abundant, long-term data will be reemphasized and students will be reminded that an after school extra curricular group will be going outside several times this school year to collect data and observations.

Full Unit Outline

- In an after school extracurricular club, students will visit the same trees and locations and record their observations. This will take place around 6 times during the school year.
- During this club, students will also delve into relevant curricular topics such as the reasons for seasonal weather changes (**8.MS-ESS1-1b**), weather patterns (**8.MS-ESS2-5**), and effects of the ocean on weather and how ocean temperature changes due to climate change will impact local weather (**8.MS-ESS3-5** and **8.MS-ESS2-6**).

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Full Unit Outline

- At the end of the school year, students will present their findings to an environmental science high school class as a “State of the Schoolyard” presentation.
- Students may also have the opportunity to present their findings at a school committee meeting at the end of the school year.
- In future years, students will be able to compare data to previous years and make predictions about trends they observe.