



Meeting New Neighbors: How to Study Your Butterfly Waystation

2nd-12th Grade

Duration

Pre-Visit: 20-30 minutes

Location

Nature Gardens or on-site school garden

Supplies

- Butterfly garden
- Field Journal
- Pencil
- Clipboard (optional)

Standards

NGSS

2-LS4-1, K-ESS3-1, 3-LS1-1, 3-LS4-2,

S+E Practices

1, 2, 3, 4, 5

Concepts

- Journals are tools researchers use to record and communicate observations and ideas.
- Ecosystems are communities of organisms and their physical environments
- Living organisms and their physical environments are both dependent on and essential to each other for the overall health of the ecosystem

Objectives

- Students will observe and record observations about the miniature ecosystem of the butterfly waystation
- Students will learn firsthand about the interactions between organisms in an ecosystem
- Students will practice long-term data gathering and analysis

Outline

1. Students will spend half of a determined data collection period simply observing, journaling, and drawing what they see.
2. Halfway through the designated time period, students will produce charts/graphs representing the information they've collected
3. Students will evaluate the quality of the data they've collected and make a plan for moving forward with better data collection.
4. Students will implement the changes for the last half of the observation period

Initial Observations

Introduce students to the idea of an outdoor classroom (for tips on taking students outdoors, see our resource at http://www.nhm.org/site/sites/default/files/for_teachers/pdf/Using%20the%20Outdoor%20Classroom%20Handouts.pdf) and explain that they'll be science journaling at a Butterfly Waystation. Journals are a tool essential to many kinds of scientists (biologists, chemists, geologists, botanists, paleontologist, and more!) who use them to record observations, data, questions, stories and ideas about what they notice and experience. Entries are often referenced over and over to review data, ask questions and re-think ideas or conclusions.

At the Butterfly Waystation or in the Pollinator Garden, they'll be using journals to record information about the ecosystem they (or you) have created. We'll be asking students to record and draw the different life forms they observe, noting any changes from the previous week, and describing any interactions between life forms, such as caterpillars eating leaves, insects eating other insects, and changes in life cycle stages in the organisms.

RECORD THE BASICS

Each session, make sure to record the date, the time of day, and the weather conditions (including temperature). This information will be useful in determining patterns in the data later, so make sure to save each data sheet or field journal entry.

DRAW WHAT YOU SEE

Students can draw the garden as a whole or focus in on specific organisms that they are interested in. Scientific drawings do not need to be beautiful or perfect representations, but are sketches that communicated what is noticed about something we are observing. Encourage students to draw large pictures so they can fit in more detail and focus on drawing what they actually see. If it's helpful, set timers for five- to ten-minute drawing sessions, with one-minute warnings.

DESCRIBE WHAT HAPPENS

If they prefer, they can also describe in writing what they're seeing. If a Monarch Butterfly chases another butterfly away from a plant, that's a useful note about territorial behavior. But even if students don't know the name of what's happening, just writing down a description of what happened is enough to help categorize it later. Some question prompts that might be helpful while walking around include

How are the insects using the plants? How are insects behaving towards members of the same species? What about members of different species? Which animal seems to be benefitting (getting the good stuff) from the interaction? Which animal seems to be losing out because of the interaction?

Halfway-point Data Analysis

Halfway through the data collection period (weeks, months, or a whole school year), ask students to collect and review all of their data sheets or journal entries. Then, ask them to create graphs, tables, or other figures representing what they observed.

ELEMENTARY

For younger students, ask each student to create his/her own bar graph of the number of different organisms they observed. It's okay if they didn't set out to count this information each time; they should just represent the number of organisms they drew or took notes on.

After each student has his/her bar graph, choose one observation date and compile the information into a class bar graph showing the number of organisms observed on that date.

2 Meeting New Neighbors

Invite discussion about the accuracy or correctness of the data. If 30 students saw a butterfly on one day, does that mean there were 30 butterflies in the garden? Why or why not? How could they avoid that problem in the future? What are some things they should do to get better information?

MIDDLE/HIGH SCHOOL

For older students, ask students to choose what kind of data they'd like to represent in a chart or graph based on what they're most interested in about their observations. Some options might include graphing the frequency of different types of behavioral interactions; changes observed in behavior or frequency on sunny days vs. cloudy days, or changes in appearance of organisms over time.

Then, ask students to write up a one-to-two-page plan for further investigation of the topic. What problems or issues can they identify with their current data? Are there any gaps or causal links they would need to fill in or establish in order to learn more? How would they fix those problems in future observations? Did this data bring up any other questions they'd like to explore? If so, how would they find out the answer?

Final Observations

Finally, ask students to adjust their journaling techniques to allow them to get better data. If they wished they had made a point to count each organism during every observation, they should do that. If they needed measurements on plant growth, they should make sure to record that going forward. It may be helpful to create a data sheet with clearly defined spaces for the information they want to collect, or to take time to make appropriate fields on each page of a journal.

At the end of the data collection period, ask students to create graphs again using the second half of their data, and evaluate the results of the changes they made in their collection techniques.