Lesson 4
Analyzing Insect Data

Timeframe

1 Fifty minute class period

Target Audience

Middle School (6-8) Life Science but easily adapted to Grades 4-12

Materials

- Notecards
- Poster paper
- Colored yarn
- Tape

Contact:
SMILE Program
smileprogram@oregonstate.edu
http://smile.oregonstate.edu/

Description

In this activity students will analyze and interpret the data that they collected in various habitats. Students will create visual representations of the number and different types of organisms that they collected in each habitat and make connections between the organisms and different habitats.

Objectives

- Analyze local biodiversity data
- Make inferences about local biodiversity

Guiding Question

- What can we learn about biodiversity from our data?

Teacher Background

Data analysis is the process of interpreting the meaning of the data we have collected, organized, and displayed in the form of a table, bar chart, line graph, or other representation. The process involves looking for patterns—similarities, disparities, trends, and other relationships—and thinking about what these patterns might mean.

The process of collecting, organizing, and analyzing data is not always a simple, sequential process; sometimes a preliminary analysis of a data set may prompt us to look at the data in another way, or even to go back and collect additional data to test an emerging hypothesis. The ability to make inferences and predictions based on data is a critical skill students need to develop.

Data analysis is crucial to the development of theories and new ideas. By paying close attention to patterns, the stories behind outliers, relationships between and among data sets, and the external factors that may have affected the data, students may come to have a deeper understanding of the crucial distinction between theory and evidence.

Activity Introduction

Let students know that they are going to learn more about the biodiversity of insects within the habitats where they collected their specimens by analyzing and interpreting their data.

Activity

1. Have students get back into their original collection teams with their data sheets from Lesson 3. Tell students to order the organisms by their abundance, then divide them up among group members to be drawn at the appropriate size.

2. Tell students that they are going to do a scientific drawing of each of their organisms, and make the size of the drawing reflect how many individuals of each organism they collected in each habitat. That is, the most abundant organisms should have the biggest pictures, and the rarest organisms should have small pictures. Organisms that were found in multiple habitats will have multiple pictures, one for each habitat, reflecting their abundance in that habitat.

3. Provide students with notecards to create their drawings. Make sure all students have a standard for their drawing size before they start, example: 1-5 specimens = ¼ card, 5-10 specimens= ½ card, 10- 15 specimens = full card, etc. Have students label thier drawings using their agreed-upon organism names (Lesson 3) and the # found.

4. Once students have completed their organism drawings they should work as a team using their sketches from lesson 1 to create a map of their habitat (forest, grass, playground, etc.) on poster paper. Have

Next Generation Science Standards

DISCIPLINARY CORE IDEAS:

LS2.A: Interdependent Relationships in Ecosystems

PERFORMANCE EXPECTATIONS:

MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.

MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

PRACTICES:

Practice 1: Asking questions and defining problems

Practice 2: Developing and using models

Practice 7: Engaging in argument from evidence

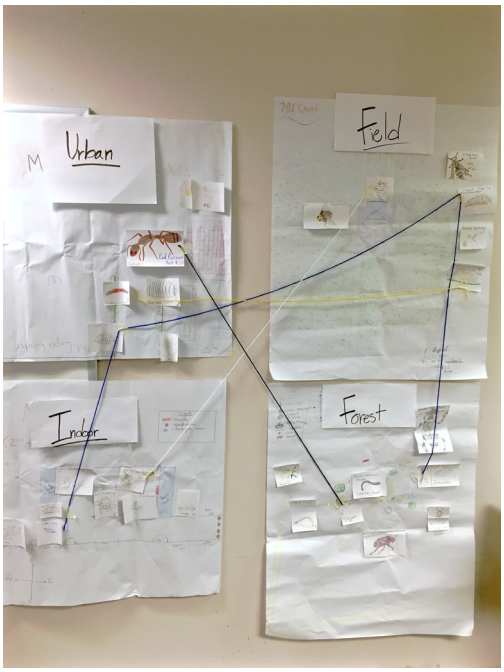
Practice 8: Obtaining, evaluting, and communicating information

CROSSCUTTING CONCEPTS:

- Patterns
- Systems and systems models
- Structure and function

students compare their original sketches and include details that might have been missed in each others individual drawings. Make sure students determine the dimensions of their habitat (i.e. Where is the map edge?) and think about the required elements of a map (scale, direction, etc.) Have students add a scale bar to their poster to indicate distance.

5. Once students are done with habitat drawings and specimen cards they can attach cards to the map. Groups can then post their findings at the front of the room and give a one-minute "habitat overview presentation".



6. After all groups have presented on their habitat, have students position their individual maps relative to each other to produce a composite mega-map. Try to have the students represent the distance between habitats. Give students 2-5 minutes to examine the larger map and look for patterns in the distributions of species, or any relationships between numbers of species (see Discussion questions below).

7. Have students note the difference and similarities in the organisms that they collected in the various habitats. Have each group share a connection that they observe between two habitats (e.g., a species that occurs in multiple habitats, or a pair of species that seems to occur together more often than not) and have a representative add a piece of colored yard to the organisms/habitats they are connecting. Continue having students make visual connections between the organisms within the different habitats.

Discuss

- Do any of these habitats have a much higher number of organisms than others? Why?
- Do any of these habitats have a higher diversity of species than others? Why?
- Do the habitats have overlapping species? Why?
- Did the organisms stay in specific habitats? Why not?
- Are there patterns in the types of organisms that occur together? Are there types of organisms that are never seen together at all?
- What would happen if we changed the configuration or representation of the habitats? (What would happen to the total number of organisms, or to overall biodiversity, if a building was placed in between two habitats, or if one or more habitats were entirely removed)

Have students think about how much time they invested in their collections. Would they have found more insects if they'd collected differently, longer, or more extensively? How many organisms/species do they think are really out there? Remind students that their collection only covers one week of data collection, and it is one of many methods to study local biodiversity. There may be much more diversity to discover at different times of year and using different methods and equipment. Hopefully, this activity did show them that the more they look around, the more diversity they will see!

Extension

To reinforcement the interconnectedness of organisms, have students do the "Insect Tea Party" activity. You might also choose to do this at the start of the unit to get them thinking before they jump into analyzing their own data.

Resources

http://nationalgeographic.org/activity/analyzing-bioblitz-data/

https://www.teachervision.com/skill-builder/graphs-and-charts/48946.html

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