

Education Module

TITLE:

Data Collection, presentation, and analysis of small living animals collected using 3 different traps.

AUTHOR:

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GRADE LEVEL/SUBJECT:

Middle School Math/Science

Grade 6

5 - 50 minute periods

CURRICULUM STANDARD: AAAS BENCHMARKS PROJECT 2061**SECTION 1, THE NATURE OF SCIENCE**

By the end of the 8th grade, students should know that:

- **1B Scientific Inquiry:** Scientists differ greatly in what phenomena they study and how they go about their work. Although there is no fixed set of steps that all scientists follow, scientific investigations usually involve the collection of relevant evidence, the use of logical reasoning, and the application of imagination in devising hypotheses and explanations to make sense of the collected evidence.

SECTION 2, THE NATURE OF MATHEMATICS

By the end of the 8th grade, students should know that:

- **2C MATHEMATICAL INQUIRY:** Mathematicians often represent things with abstract ideas, such as numbers, or perfectly straight lines, then work from those ideas alone.

SECTION 12, HABITS OF MIND

By the end of the 8th grade, students should:

- **12A Values and Attitudes:** Know that often, different explanations can be given for the same evidence, and it is not always possible to tell which is correct.

- **12D Communication Skills:** Know how to organize information in simple tables and graphs and identify the relationships they reveal.
- **12D Communication Skills:** Be able to read simple tables and graphs recorded by others and describe, in words, what they show.
- **12D Communication Skills:** Understand writing that incorporates circle charts, bar and line graphs, and diagrams.
- **12E Critical-Response Skills:** be aware that there may be more than one good way of interpreting a set of findings.

OVERVIEW:

During the course of a five-day lesson, groups of 3 to 4 students will have the opportunity to construct small animal traps that will be placed in 3 varying and diverse habitats. Students will collect and record data regarding animal type and number, along with specific weather conditions such as air temperature and humidity. Students will organize data, using a variety of representations including bar graphs and pie charts to express their data. Students will compare data collected at different locations and formulate hypothesis for the differences.

PURPOSE:

There are several purposes to this lesson:

- To provide students with meaningful experiences, from which data is gathered and used, supplying a context for instructional purposes.
- To strengthen student's ability to analyze data while taking into consideration factors that may affect results.
- To enable students to collect worthwhile data for use in an effort to better understand the nature of scientific exploration.

LEARNING OBJECTIVES:

- Groups of students will contemplate the form and function of their individually constructed traps while effectively communicating reasonable explanation and or understanding pertaining to the success or failure of the trap.
- Students will improve data collection skills by having the opportunity to gather real and meaningful that will be used in a variety of applications.
 1. Students will use collected information to gain familiarity with the use of visual representations of data such as line graphs, bar graphs, and circle graphs to express, compare, and analyze their data.
 2. Students will develop communication skills necessary to present I information and findings in a logical and reasonable manner.

VOCABULARY:

Biodiversity
Ecosystem
Bar graph
Circle Graph
Line graph

Native Species
Pooter Trap
Potato Trap
Pitfall Trap

MATERIALS:

Each group:

Animal Identification Chart
Data Collection sheets
Flags to Mark Locations
Magnifying glass
Pencil
Sm. paint brush
Empty glass jar for specimens
Blunt tweezers

Pooter Group (2 groups)

Clear glass jar w/ lid
Modeling clay
2 flexible drinking straws
Facial Tissue
2 Clear jar w/ lids
Rubber band
Procedures to build trap

MATERIALS (cont.)

Pitfall Trap Group (2 groups)

2 empty plastic food containers
4-6" deep x 3-4" dia.
2 small pieces of bait
(Cheese or peanut butter)
Trowel
4 small flat stones
4 large stones
Plywood or stiff cardboard
Procedures to build trap

Potato trap (2 groups)

1 large potato
Sm. Paring knife
Teaspoon
Wooden skewers
Transparent plastic wrap
Procedures to build trap

PREPARATORY ACTIVITIES – DAY ONE:

(5 minutes)

- Although students will have had some experience with data collection, prior to this activity, the teacher should review that data is what scientists use to answer a specific question, and that the manner in which data is collected is crucial. For example, all data is carefully, neatly, consistently and honestly recorded to arrive at meaningful results.
- As students are familiar with types of information shown with circle, line, and bar graphs, quickly review information.

(10 minutes)

- Assign student groups and allow students to sit with their groups as overview is given.
- Provide a short overview for the project and group responsibilities:
Groups of students will be collecting insects using 3 different methods.
Groups will be responsible for the collection and presentation of data.

(15 minutes)

- Discuss data:
Review data collection sheets
Discuss what constitutes valuable data.
Provide the weather section of a newspaper and discuss what conditions might affect data and what should be recorded on the data collection sheets.

DAY ONE (cont.)

(10 minutes)

- Class discussion regarding habitats and ecosystem. Students will review the living and non-living components of an ecosystem and discuss whether or not/why the land surrounding the school might qualify as an ecosystem and to what type of inhabitant. Ask students to name some of those animals/insects. Create graphic organizer on the board.

(10 minutes)

- Briefly discuss each trap as a class.
Solicit student ideas regarding ideal placement on school grounds.

Day Two

(20 minutes)

- Allow students to gather necessary materials and to build traps.
- Teacher will review procedures and location of individual trap placement on school grounds with each group, while overseeing construction.

(20 minutes)

- Allow students to carefully place their traps and/or choose precise locations in the designated areas on school grounds.

(10 minutes)

- Regroup as a class, discuss challenges
- Briefly review data collection procedures

Day Three

(5 minutes)

- Review data collection procedures with students
- Retrieve important information regarding weather conditions and time of day

(10 minutes)

- Allow groups to collect traps for indoor inspection.

(20 minutes)

- Students will count and identify (to the best of their ability) all small animals within their trap using the small animal identification charts. Data tables will be completed.

DAY THREE (cont.)

(10 minutes)

- Group discussion of findings
- Group discussion of appropriate graphs that may be used to present their data.

(5 minutes)

- Traps should be replaced in original location.

Day Four

(10 minutes)

- Allow groups to collect traps for indoor inspection.

(25 minutes)

- Students will count and identify (to the best of their ability) all small animals within their trap using the small animal identification charts. Data tables will be completed. Weather information will be recorded.

(10 minutes)

- Individual groups will discuss how results should be presented to the class, based on their findings. Students will most likely use a bar graph to show quantities of small animals found or circle graphs to show percentages of quantities of all animals found.

(5 minutes)

- Traps should be replaced.

Day 5

(5 minutes)

- Students retrieve traps

(10 minutes)

- Students record necessary information on data collection sheets

(20 minutes)

- Each group of students creates a circle, line, or bar graph to visually represent their findings.

(15 minutes)

- Group discussion exploring reasons for differences in small animals found in each of the three traps.

