

TIME: (1) 45-minute lesson

SCIENCE PROCESS SKILL: Measuring and graphing

SCIENCE CONCEPT: Zebra mussels vary in length and size.

BENCHMARKS:

Students should:
 Know that, when people care about what is being counted or measured, it is important for them to identify the units (three degrees Fahrenheit is different from three centimeters; three miles is different from three miles per hour).

Graphically display numbers to spot patterns that are not otherwise obvious, such as comparative size and trends.

Spread data out on a number line to see what the extremes are, where they pile up, and where the gaps are. A summary of data includes where the middle is and how much spread is around it.

Keep records of their investigations and observations and not change the records later.

OBJECTIVE:

Students will measure and graph the length of the ventral side of a sample of zebra mussels.

1

WHAT YOU OUGHT TO KNOW



Zebra mussels are found in a variety of lengths. They range in length from less than 1 mm to 45 mm or larger. Length measurements are made along the ventral side of the mussel, which is the straight edge. The enclosed Illinois Natural History Survey (INHS) sheet shows actual length data from three samples at one site on the Illinois River. The purpose of this activity is to determine the frequencies of shell lengths and to visually illustrate those frequencies by the use of graphs.



(11)

(11)

WHAT'S THE CONNECTION??

TO LANGUAGE:

Write a journal entry about the life of a zebra mussel. Have the students take the viewpoint of the zebra mussel.

TO MATHEMATICS:

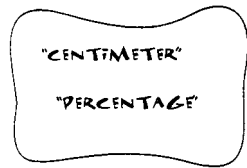
Calculate the average length of the sample of shells for each group and then for the class. Calculate the percentage of the numbers for each length. Discuss other ways to graph and have the students construct a pie graph for the group sample.

TO ART

Make an enlarged drawing of a zebra mussel using the grid method.

TO SOCIAL STUDIES:

Read an Illinois map to find the location of each zebra mussel sample site on the Illinois River (described in this activity). Consult monitoring agencies in your state to construct your own map of sample sites.



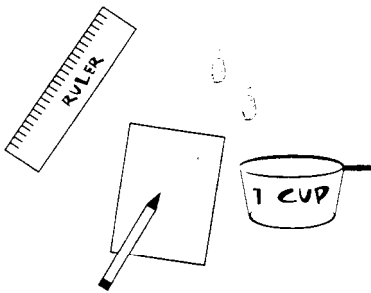
WORDS OF WISDOM

Centimeter (cm), data, maximum, millimeter (mm), minimum, percentage, ventral line (see also glossary on page 7)

RESOURCES AT THE READY

FOR EACH GROUP -

- Measuring cup
- Zebra mussel shells
- Metric rulers
- Graph paper
- Length Frequency Chart Data Sheet 5.1
- Length Frequency Bar Graph 5.2
- Grid Data Sheet 5.3
- Zebra mussel journal



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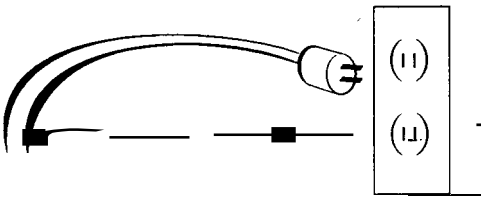
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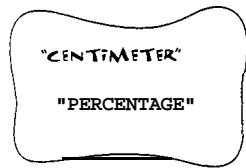
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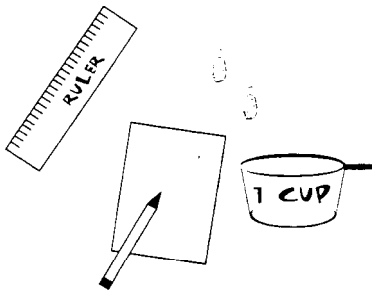
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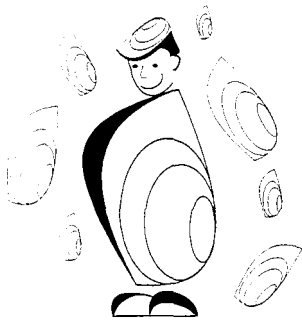
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GETTING YOUR ACT TOGETHER

Read the Illinois Natural History Survey Zebra Mussel Length Frequency Bar Graph 5.3 to familiarize yourself with the length frequency of live zebra mussels. This information is actual data taken from three samples along the Illinois River. You should prepare a larger summation chart of the information so that students can compare data.



TIME TO EXPERIENCE ZEBRA MUSSEL MANIA!!

1. Each group should become familiar with Data Sheet 5.1, the Zebra Mussel Length Frequency Chart. On this data table students will record zebra mussel shell length, number, total, and frequency (or percentage).
2. One student from each group should measure 100 ml of zebra mussels with the measuring cup and bring them back to the group.
3. Students will measure each shell in millimeters (mm) along the ventral line and tally the number of each one on the data table.
4. Students should total the number of shells for each length by adding up the tallies.
5. Students should total the number of all shells and then compute the percentage for each length. They then can determine the maximum and minimum lengths for each sample. (Note: Teacher should note these lengths on the board.)
6. Show the students the Illinois River Data (Bar Graph 5.2). Ask them to compare their sample to that made by scientists of the Illinois Natural History Survey. Were the percentages similar?
7. Each group should construct a graph based upon their data table illustrating the percentage of each length.

8. Each group should share measurements from their data sheet on the class summary sheet. Determine the class total percentages and maximum and minimum lengths. Is there a difference between data from the different working groups? Variation could well occur, which is the reason multiple samples are used to define a population.
9. Discuss the following questions:
 - a. What was the length of most of your zebra mussels?
 - b. What length of zebra mussels had the fewest numbers?
Why do you think this is?
 - c. Give an explanation of the distribution of the lengths of the zebra mussels.

WHAT DID YOU LEARN??

Can the students accurately measure a zebra mussel? When comparing the data table to the graph, are the zebra mussel groupings accurate? Can each student complete a graph and place the variables on the proper axis?

WAIT, THERE'S MORE. . .

Study other species' populations: measure lengths of tree leaves, snail lengths, other shell lengths, seed sizes, dandelion flower or flower stalk sizes, heights or weights of students in class and school.