

ACTIVITY SIX:

**FILTERING FOOLS**

TIME:

(1) 45-minute lesson

This activity is to be done by half the class at the same time as Activity Seven is done by the other half of the class.

SCIENCE PROCESS SKILL:

Inferring and model building

SCIENCE CONCEPT:

Zebra mussels use a biological siphon to filter large quantities of water.

**BENCHMARKS:**

Students should:

Know that scientific investigations may take many different forms, including observing what things are like or what is happening somewhere, collecting specimens for analysis, and doing experiments.

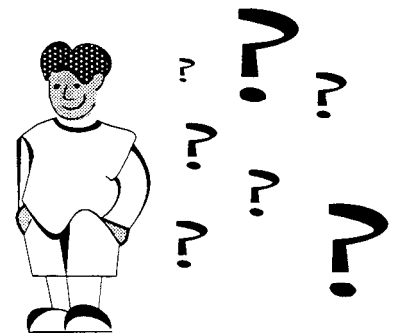
Know that seeing how a model works after changes are made to it may suggest how the real thing would work if the same were done to it.

Use numerical data in describing and comparing objects and events.

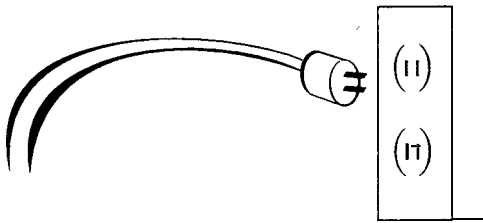
**OBJECTIVE:**

Students will construct a model to simulate how zebra mussels remove nutrients and particles from the water.

**WHAT YOU OUGHT TO KNOW**



Zebra mussels use water filtration to collect the nutrients needed to sustain life and grow. An adult zebra mussel can filter approximately one liter of water per day. A positive effect of this filtration is the increased clarity of the water filtered by the zebra mussels. However, on the negative side, the zebra mussels interrupt the food web for other life forms and change the ecosystem of the aquatic habitat. Additionally, even if the water is clearer, that does not mean the water is better.



## WHAT'S THE CONNECTION??

### TO LANGUAGE :

Research and write reports on another animal using filtration.

### TO MATHEMATICS:

Calculate the amount of water a given number of zebra mussels can filter.

### TO ART:

Design a filter that would keep zebra mussels from entering industrial pipes.

### TO SOCIAL STUDIES:

List where filters are used in your home, industry, business, etc.



## WORDS OF WISDOM

Filter, filtration, liter, nutrient, siphon, submerge  
(see also glossary on page 7)

## RESOURCES AT THE READY

### FOR EACH GROUP -

Two 2-liter drink bottles, clear  
(one for mixing dirt, one for 100 ml of water)

Four zebra mussel filter models for each group  
(made of film canister and tubing)

Several gallons of water

Cottonballs (13)

Bucket for the waste water

Four clear plastic cups for each group

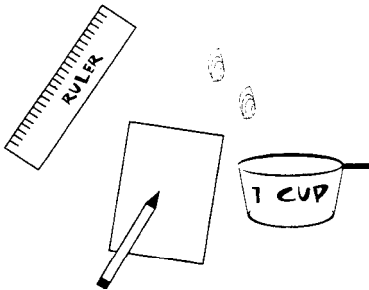
Measuring cup

Dirt (not potting soil)

Filtering Fools Data Sheet 6.1

Filtering Fools Observation Sheet 6.2

Zebra mussel journals

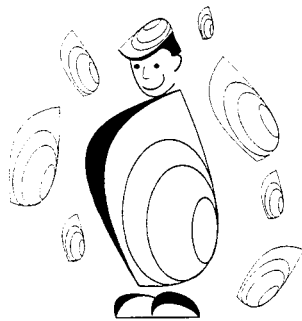




## GETTING YOUR ACT TOGETHER

This will be a wet and messy activity. You will probably need to have a mop on hand in case of spills. You will need to have an adequate supply of water nearby, or you will want to prepare for the lesson by having the water brought into the classroom. From the cafeteria, collect buckets, pickle jars, vegetable cans, even milk jugs to use for water, cleaning up, and collecting dirty water.

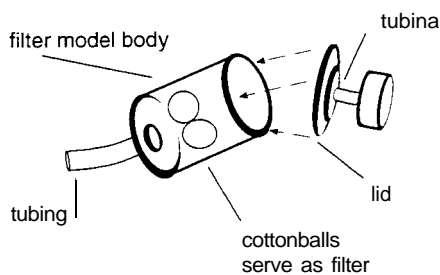
NOTE: You will want to consider teaching this lesson simultaneously with Activity Seven, "All Clogged Up." Copy one data sheet per group. Practice using the "zebra mussel filter model" ahead of time so you can explain and demonstrate its use to the students.



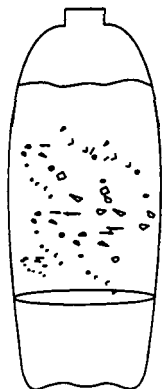
## TIME TO EXPERIENCE ZEBRA MUSSEL MANIA!!

1. Have students draw and label the zebra mussel filter model in their zebra mussel journals.
2. Have each group mix exactly 15 ml (1 T) of dirt with 2 liters of water. Shake to disperse the dirt (do not use potting soil).
3. Students should observe this water and record their observation under the unfiltered water category on the Filtering Fools Data Sheet 6.1.
4. Shake the 2-liter bottle well. Then add 100 ml dirty water to a clean 2-liter bottle and screw on the zebra mussel filter model.
5. Add two cottonballs to act as a filter, then secure the cap and tubing and begin the filtering action. The filtered water should be collected in a clear plastic cup. Save this water for comparison. Record the results of the filtration under the two cottonball column.

### FILTER MODEL ASSEMBLY



STEPS 1 - 3

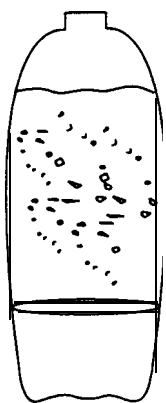


Mix 2 liters of water and 15 ml of dirt

STEP 4



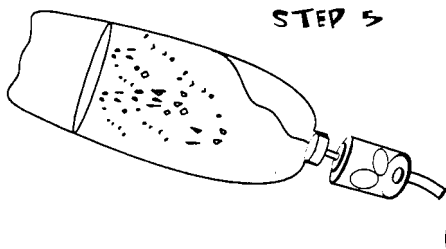
2 cottonballs



Screw the zebra mussel filter model on bottle.

Add the dirty water to a clean 2-liter bottle.

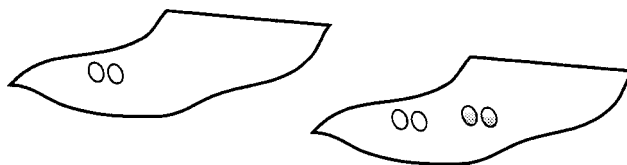
STEP 5



Save filtered water for comparison.



STEPS 6-7



Repeat steps 1-7 using 4 then 6 cottonballs.

6. Save the cottonballs used in each filtration to compare the colors. Save these cottonballs on a paper towel.
7. Compare clean cottonballs with the two cottonballs used to filter the cup of dirty water.
  - a. Predict how the water will appear if it is filtered using four cottonballs.
9. Repeat the activity using four, then six cottonballs.
10. Lay the cottonballs taken after filtering in order on the paper towels. Have the Reporters for each group prepare a presentation for the other groups completing Activity Seven. They should demonstrate the procedure and show the results gathered.
11. Empty the water and clean the equipment, including any spilled water.
12. Discuss with the class their results comparing the number of cottonballs with the success in filtration. The millions of zebra mussels found in rivers and lakes act in the same way as the cotton filters, except the mussels eat the food trapped in their filters. Because there are so many zebra mussels, tremendous amounts of materials can be removed from the water. One zebra mussel can filter up to a liter of water each day.
13. Have each group answer questions on the Filtering Fools Observation Sheet 6.2. Discuss the answers.

## WHAT DID YOU LEARN??

Did the students complete the worksheet correctly?

Is each student able to make some comparison of the filter model to the zebra mussel?

Can each student relate the huge number of zebra mussels to the large amount of water they are capable of filtering?

## WAIT, THERE'S MORE . . .

- Find and display filters that are used by people.
- Research how other mussels and organisms collect food using the filtering process. Make a list of these filter feeders.
- Lake Erie and Lake Michigan have become clearer because of zebra mussels. Find out how this was done.