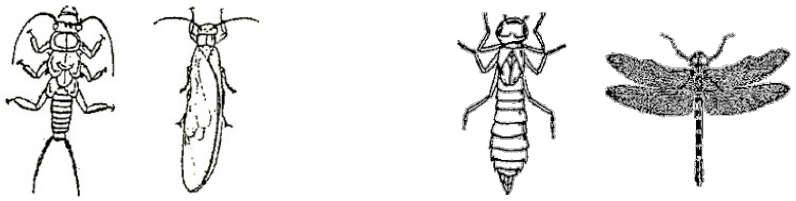
MACROINVERTEBRATES

Graph **macroinvertebrates** to identify good or poor water quality.

SUBJECT: Science
DURATION: 15-20 minutes
SETTING: Classroom



PURPOSE:

To describe and identify the quality of a stream site by analyzing its **aquatic macroinvertebrates.**

SUMMARY:

Students will learn about water quality **indicators** through the use of candy representing a "macroinvertebrate" sample. Sorting the candy and evaluating what is found will tell the students about the quality of water.

BACKGROUND:

Sometimes it is easy to tell if a stream is **polluted**. Strange colors and dead fish are **indicators** of poor water quality. But, biologists need to know about water quality problems long before they reach this point. Some of their most effective partners in detecting declining trends in water quality are **aquatic** macroinvertebrates because they respond rapidly to changes in water quality. To evaluate the health and productivity of a stream, biologists look at the types of macroinvertebrate species who live there. Different species have different tolerance levels to **pollution**. If many **pollution-intolerant species**, such as stonefly or caddisfly **nymphs** are present the water quality is probably good. Although the presence of certain species indicates good water quality, the absence of these species does not necessarily indicate bad water quality. Other factors besides pollution may have accounted for their absence.

<u>Sensitive or Intolerant Species:</u>
Organisms easily killed, **impaired** or driven off by bad water quality, include stonefly, dobsonfly and mayfly nymphs, caddisfly larvae, and water pennies.

<u>Somewhat Tolerant Species:</u>
Organisms have the ability to live under varying conditions. You may find them in good or poor quality water. These organisms include amphipods, scuds, beetle and crane fly larva, crayfish and dragonfly nymphs.

<u>Tolerant Species:</u>
Organisms are capable of withstanding poor water quality. These include leeches, aquatic worms, midge larvae and sow bugs.

MATERIALS:

Candy (i.e., Skittles or M&M's)
Small Plastic Bags (1 per group of students) Graph Paper
Colored Pencils
Macroinvertebrate I.D. Charts from the "Tools for Study" web page of this web site

PROCEDURE:

1. Divide the candy into the bags. You may have 1 bag per student or 1 bag per group of students. You should have about 30 pieces of candy per bag. Each bag represents aquatic macroinvertebrates collected from a study site.

2. Have the class assign an aquatic macroinvertebrate to each color of candy (or do this beforehand if you have visual displays). For example, red = stonefly nymph, yellow = crane fly larva, green = leeches. See chart below for an idea.

3. Distribute the graph paper to each student (or group). Have students set up a bar graph for the aquatic macroinvertebrate sample. Label the x-axis with the names of the candy colors that correlate to the macroinvertebrates. Label the y-axis with the numbers of macros.

4. Give each student or group a bag of candy. Have the students separate and count the number of candy they have in each color group and graph them on the paper. Use the colored pencils or crayons to fill in the bars. Have the students try to determine the quality of the water in their sample.

Example: Macroinvertebrate Sample Analysis

COLOR (M&M's)	MACROINVERTEBRATE
Red	Stonefly (Intolerant)
Orange	Caddisfly Larva (Intolerant)
Yellow	Beetles (Somewhat Tolerant)
Green	Crane fly Larva (Somewhat Tolerant)
Dark Brown	Leeches (Tolerant)
Blue	Midge Larva (Tolerant)

EXTENSION:
Discuss how each sample site is different. While some sites may indicate poor water quality, there may be other factors involved. Have the students **hypothesize** possible **pollutants**.