

# Student Handout #1

## Using Abiotic and Biotic Parameters to Monitor Water Quality: A Field Experiment

Following your teachers instructions on collection techniques, gather data on the abiotic characteristics of the stream you are sampling.

**Date:**

**Time:**

**Weather:**

**Streambed description:**

**Other Observations:**

|                                 |  |
|---------------------------------|--|
| <b>Stream flow</b>              |  |
| <b>pH</b>                       |  |
| <b>Temperature</b>              |  |
| <b>Dissolved Oxygen</b>         |  |
| <b>Biological Oxygen Demand</b> |  |
| <b>Nitrate</b>                  |  |
| <b>Phosphate</b>                |  |
| <b>Turbidity</b>                |  |
| <b>Colliform Bacteria</b>       |  |

# Pollution Tolerance Index

The Pollution Tolerance Index uses indicator organisms and their pollution tolerance levels to determine the overall, long-term health of a stream. Organisms are collected and identified to which tolerance groups they belong using student handout #2. Each of the three tolerance groups are given an index value. The water quality value is determined by multiplying the number of kinds of organisms in each group by that groups index value. By adding all the numbers from each group, a single index value is calculated. By referring to the index value chart, a rating of water quality is given.

For example:

In one sample, students collected caddisflies, mayflies, stoneflies, dragonflies, crayfish, clams, blackflies, and midges. According to the chart (student handout #2) each representative in group one carries a value of 3. Mayflies, caddisflies, and stoneflies are all found in group 1, therefore each representative is given a value of 3. Dragonflies, crayfish, and clams are all found in group 2, therefore each representative is given a value of 2. Blackflies and midges are all found in group 3, therefore each representative is given a value of 1.

| <b>representatives</b> | <b>Group 1 points</b> | <b>Group 2 points</b> | <b>Group 3 points</b> |
|------------------------|-----------------------|-----------------------|-----------------------|
| caddisflies            | 3                     |                       |                       |
| mayflies               | 3                     |                       |                       |
| stoneflies             | 3                     |                       |                       |
| dragonflies            |                       | 2                     |                       |
| crayfish               |                       | 2                     |                       |
| clams                  |                       | 2                     |                       |
| blackflies             |                       |                       | 1                     |
| midges                 |                       |                       | 1                     |
| <b>total points</b>    | <b>9</b>              | <b>6</b>              | <b>2</b>              |

Adding the totals from each group gives an index value of **17**. Referring to the following Index Table indicates that this stream has good water quality.

| <b>Cumulative Index Value</b> | <b>Stream Quality Assessment</b> |
|-------------------------------|----------------------------------|
| 23 or greater                 | Excellent                        |
| 17-22                         | Good                             |
| 11-16                         | Fair                             |
| 10 or less                    | Poor                             |

