

Macroinvertebrate Investigation - Bugs Don't Bug Me

Summary

Students will collect live macroinvertebrates from a river or stream. They will then classify and count the invertebrates and use that data to determine the EPT index.

Main Core Tie

Science - Kindergarten

[Standard 1 Objective 1](#)

Additional Core Ties

Science - 1st Grade

[Standard 1 Objective 1](#)

Science - 1st Grade

[Standard 1 Objective 2](#)

Science - 1st Grade

[Standard 4 Objective 1](#)

Science - 1st Grade

[Standard 4 Objective 2](#)

Science - 2nd Grade

[Standard 1 Objective 1](#)

Science - 2nd Grade

[Standard 1 Objective 2](#)

Science - 2nd Grade

[Standard 4 Objective 1](#)

Science - 2nd Grade

[Standard 4 Objective 2](#)

Science - 3rd Grade

[Standard 2 Objective 1:](#)

Science - 4th Grade

[Standard 5 Objective 2](#)

Science - 4th Grade

[Standard 5 Objective 4](#)

Science - 5th Grade

[Standard 5 Objective 2](#)

Science - Kindergarten

[Standard 1 Objective 2](#)

Science - Kindergarten

[Standard 4 Objective 1](#)

Science - Kindergarten

[Standard 4 Objective 2](#)

Time Frame

1 class periods of 30 minutes each

Materials

Kick nets* (see [Appendix G](#) (pdf) for instructions on building your own kicknet)

- Plastic tubs (1 per 5 students)*
- Large transfer pipettes (1 per student)*
- Plastic petri dishes (1 per student)*
- Magnifying glasses (1 per student)*
- Dichotomous keys Buckets (2) Waders

* Available for loan at USU Water Quality Extension or through your local Extension office. Please contact USU Water Quality Extension for details 435-797-2580 or

<http://extension.usu.edu/waterquality>

Background for Teachers

PURPOSE:

To introduce students to living aquatic macroinvertebrates in a field setting.

BACKGROUND:

Many macroinvertebrates make their homes in riffles and pools of gravel-bed streams. By turning over stones and examining the underside, you may find aquatic macroinvertebrates. Aquatic macroinvertebrates are often used as an indicator of water quality. The orders of Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies) are generally sensitive to pollution. Water Quality Biologists use these three orders to calculate an EPT index to determine the quality of a water body. If we find families from these three orders of invertebrates living in a stream or river the water is most likely not impacted from pollution. However, it is important to remember that the absence of these families does not always mean the quality is poor. There could be other reasons these families are not present (please see Appendix F -- Discussion Questions for more information).

Instructional Procedures

PROCEDURE:

Choose your sample site. Be sure to take into account the safety of your students (see [safety tips](#) (pdf) on page #4).

Explain to your students how to collect a macroinvertebrate sample.

One student will wade into the stream and place the net so the mouth of the net is perpendicular to and facing the flow of water.

Another student will stand upstream from the net and disturb the stream bottom with his/her feet and hands.

Students can carefully pick up and rub stones directly in front of the net to remove attached animals. The stream bottom materials and organisms will be carried into the net by the current.

Tell the students to continue this process until they see no more organisms being washed into the net.

Have the students hold the sample over a plastic tub, and use a bucket of stream water to wash the organisms into the tub.

Have students sort and identify the macroinvertebrates using the transfer pipettes, magnifying glasses, petri dishes, and dichotomous keys. List the number of different families on the table below and calculate an EPT index.

A different "family" refers to animals that are related (e.g., all mayflies) but have enough different physical characteristics that they can easily be divided into separate groups. (See dichotomous key).

Discuss the different invertebrates the students found and what types of land uses might be impacting the site (see Background from "Water Pollution Graphing" lesson).

Aquatic Invertebrate Group (Orders)	Number of different found
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Mayflies (Order Ephemeroptera)	
Stoneflies (Order Plecoptera)	
Caddisflies (Order Trichoptera)	
TOTAL	

Total "families" equals EPT Value:

- > 10 Not affected (excellent water quality)
- 6-10 Slightly affected (good water quality)
- 2-5 Moderately affected (fair water quality)
- <2 Severely affected (poor water quality)

NOTE:

A low EPT value does not always mean poor water quality. Factors other than pollution, such as physical characteristics of the stream or river, may cause the absence of some invertebrates.

Extensions

Have students rate the quality of the water using the EPT Value found above (or Water Quality Rating Index found in the Utah Stream Team Manual) found above. Have students sample other sites along the same stream or from two different types of water bodies (stream and lake) for comparison. Discuss what is different or similar between sites. You can also keep a yearly record and have students compare their sites over time.

Bibliography

This lesson plan was developed by the Utah State University Water Quality Extension.

Authors

[Utah LessonPlans](#)