

Go Macroinvertebrate! Card Game (Go Fish Style)

This lesson was adapted from Trout Unlimited's [Catch the Critter Game](#)

Description:

This lesson is designed to introduce students to the importance of aquatic benthic macroinvertebrates (macros) through a fun and engaging card game in the style of “Go Fish.”

Objectives:

- Learn different classes of macros and their different biotic values to the stream
- Explore different pollution tolerances of macros
- Recognize the appearance of various types of macros
- Develop awareness on how stream health can be measured by the collection and assessment of macros

Vocabulary:

Aquatic benthic macroinvertebrates, biotic index, indicator species, pollution tolerance, taxonomy (e.g. order, family, genus, species)

Materials:

- [Catch the Critter Cards](#) – printed out and cut into cards, laminated if possible
- Go Macro Scorecard

Background Information:

Aquatic macroinvertebrates are critical to stream ecosystems. Many species are herbivores that eat the algae, aquatic plants, and fallen tree leaves in a stream. Others are

predators that prey on smaller invertebrates, or even on small fish. Some swim in the water column, while others cling to rocks or leaves. But no matter what their adaptations, macroinvertebrates are key species to have in streams. To begin introducing macros to your students, we recommend using the Exploring Macroinvertebrates lesson and extensions.

Knowing what pollution levels these macroinvertebrates can tolerate can help scientists and students get a picture of the health of a stream. Because of this, macroinvertebrates are considered indicator species since they can serve as a measure of the health of an ecosystem. Critters such as leeches, midges, and many worms can live in almost any water, polluted or not. Mayflies, stoneflies, and caddisflies, on the other hand, can only live in very pristine, clean, cool water. A stream with less pollution tolerant macroinvertebrates could likely support trout, and a stream without them would likely not be hospitable to trout (or be clean enough for our drinking water supply). When scientists see clean-stream-only insects in the stream, then they know that the stream is doing well. Scientists also often look for biodiversity. The more different types of animals live in a stream, the healthier it is, as long as many of the organisms are those that require excellent water quality. Scientists use macroinvertebrates to calculate a biotic index, which is a metric that assesses stream health based on the pollution tolerance and abundance of the organisms present.

Method:

- Divide students into groups of no more than five.
- Pass out scorecards and explain how to complete them. The goal is for each student to have a matching pair of macros.
- Assign each group a card deck of at least 30 macro cards and distribute 3 cards to each student in the group.
- When a student has a matching pair, they will set them down and to the side, face up. These will no longer be used in a game. Single cards do not win students any points.
- In order to get a matching pair, when it is one student's turn, they can ask another student in the group if they have a certain card (e.g. "do you have a mayfly larva?").
 - If the other student has the requested card, they must give it to their peer.
 - If the other student does not have the card, they will say "Go Macroinvertebrate" and their peer must select a random card from the stack.
- The game ends when the stack of random cards is depleted and all pairs are matched.
- Students will mark pairs on their scorecard, and whoever has the highest number of points (based on tolerance level), wins!

Discussion:

- Is it better to find macros with low or high pollution tolerance in a stream?
- How do you think macros are collected?
- How do we determine if a stream is healthy through collection of macros?
- How do macros connect to trout?
- Where do you typically find macros?

- What are the functions of macros in a stream other than for testing for water quality?

Extension:

- Take your students on a field trip to conduct macroinvertebrate sampling and analysis. This is a fantastic activity to pair with your spring trout release!
- Provide a lesson on the lifecycles of specific macros. [This website](#), for examples, shows when three different types of macros (caddisflies, mayflies, stoneflies) will hatch.
- Explore the [functional feeding groups](#) of macroinvertebrates. For example, we have shredders that shred detritus (e.g. caddisflies), grazers that feed on algae and other attached organisms (e.g. snails), predators that feed on animal tissue (e.g. dragonflies), or collectors that filter debris from the water (e.g. true flies).
- Dive deeper with your students into taxonomy (*Dear King Phillip Came Over For Good Spaghetti* – Domain, Kingdom, Phylum, Class, Order, Family, Genus, Species). Most generally we refer to macros in terms of order (e.g. Ephemeroptera are mayflies), but each order contains different families, genus, and species that can also be considered.
- Use the Exploring Macroinvertebrates lesson to learn practice identification skills and learn more about macros.
- Purchase [Carolina Biological Macro Cards](#) to create a more advanced Go Macro Game or a "sampling" activity. This requires also creating a new scorecard.

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Player Name: _____

GO MACROINVERTEBRATE! Imagine that you are a trout stream and the cards you pair during the game are the critters living in your stream. Let's see how healthy you are by looking at those critters.

Each pair counts as one point. Record each point in the tables below. Then, do the math. Your cards can be divided into three groups:

Tolerance Level 1: VERY pollution-sensitive

These macroinvertebrates are very sensitive to pollution. They only live in clean cold-water streams.

Macroinvertebrate Name	Points
Mayfly nymph	
Stonefly larva	
Caddisfly larva	
Dobsonfly larva	
Water penny larva	
Total	
<i>Multiply your total by 3!</i> Total x 3	=

Tolerance Level 2: Somewhat pollution-sensitive

These macroinvertebrates are only a little sensitive. They can live in streams that have a little pollution.

Macroinvertebrate Name	Points
Dragonfly Larva	
Crayfish	
Clam	
Scud	
Blackfly Larva	
Total	
<i>Multiply your total by 2!</i> Total x 2	=

Tolerance Level 3: NOT pollution-sensitive

These macroinvertebrates are not sensitive at all. They can live in warm, dirty, polluted streams.

Macroinvertebrate Name	Points
Worm	
Midge Larva	
Leech	
Total	
<i>Multiply your total by 1!</i> Total x 1	=



What is the total score for your stream?

It is good for streams to have many macroinvertebrates and many types of macroinvertebrates. It is an especially good sign if a stream has a lot of Level 1 macroinvertebrates.

+ +
 Level 1 points Level 2 points Level 3 points

=

↪ your total points!

