

# Penn State Extension

## 4-H Stream Teams: How To...

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### ...Complete a Kick-Net Stream Study

*Stream studies that collect and sample aquatic macroinvertebrates can be done a number of different ways using lots of different types of equipment. Using a kick-net is one way to complete this type of study, and it is a method that provides you with scientific results that you can use to compare the water quality between multiple studies or samples.*

#### • DEFINITIONS:

**Kick-net:** A 1 x 1 meter square mesh net with a pole handle on each side that is used to collect aquatic macroinvertebrates in a stream.

**Aquatic Macroinvertebrates:** Animals without a backbone that live at least part of their lives in water and are large enough to see with the naked eye. In a freshwater environment in Pennsylvania, common aquatic macroinvertebrates include crayfish, snails, leeches, worms, clams, and a variety of insects. Observing these animals can tell us about the condition of the water where the study is taking place.



#### • HOW TO USE THE KICK-NET:

*Your kick-net probably came with its own set of directions which you should follow, but these general instructions should provide you the information you need to put your net to work:*

1. **Insert the poles** into the side-pockets of your kick-net.
2. **Choose a site in the stream where a small riffle occurs** (an area where water is flowing over rocks creating a light churning effect in the water).
3. **Enter the water below the study site** and approach it by walking upstream so that you don't disturb the study area before the net is in place.
4. **Insert the net into the water** vertically, standing behind it (downstream), then tip the net downstream so that it is at a 45° angle to the water (see picture above).
5. **Place several medium-sized rocks on the bottom of the net** to hold it down and prevent debris from flowing under it.
6. **Start sampling** in the collection area (*about a one meter length upstream from the net*).
  - First, lift larger rocks in the collection area & scrub underwater with your fingers, to dislodge organisms
  - After scrubbing use your feet to kick & stir up the streambed, in the collection area, for at least one minute.
7. **Remove the rocks from the bottom of the net** and then lift the bottoms of the poles out of the water (keep the top of the net above water at all times).
8. **Carry the net out of the water & lay it on a flat surface** or table for macroinvertebrate removal and ID.
9. Afterwards, be sure to **rinse the kick-net in the stream**, removing any debris and allow it to air dry.

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**• MACROINVERTEBRATE REMOVAL AND IDENTIFICATION:**

Once you have your net laid out flat, you will remove any macroinvertebrates (macros) and place them in trays or collection dishes filled with stream water.

**USEFUL TOOLS FOR THIS PROCESS:**

- White dish pans for holding collected macros in water
- White ice cube trays for sorting different types of macros in water
- A white sheet or drop cloth to lay the net on for contrast and ease of seeing organisms
- Small paint brushes for delicate removal of macros from the net
- Spoons & eyedroppers for moving macros in water
- Magnifying glasses
- Identification Guides (the 4-H Project Book *Water Quality Matters!* has an ID guide)



For a scientific study: Use a macroinvertebrate count procedure such as that in the *Izaak Walton League's Save Our Streams Program* (modified below).

**MACROINVERTEBRATE COUNT**

In the chart below, check the line to the left of the name of each organism found. Add up the number of checks and record at the bottom, then multiply by the given value based on the organisms' sensitivity to pollution.

Sensitive	Somewhat Sensitive	Tolerant
<input type="checkbox"/> caddisfly larvae	<input type="checkbox"/> beetle larvae	<input type="checkbox"/> aquatic worms
<input type="checkbox"/> hellgrammite	<input type="checkbox"/> clams	<input type="checkbox"/> blackfly larvae
<input type="checkbox"/> mayfly nymphs	<input type="checkbox"/> crane fly larvae	<input type="checkbox"/> leeches
<input type="checkbox"/> gilled snails	<input type="checkbox"/> crayfish	<input type="checkbox"/> midge larvae
<input type="checkbox"/> riffle beetle adult	<input type="checkbox"/> damselfly nymphs	<input type="checkbox"/> pouch (& other) snails
<input type="checkbox"/> stonefly nymphs	<input type="checkbox"/> dragonfly nymphs	
<input type="checkbox"/> water penny larvae	<input type="checkbox"/> scuds	
	<input type="checkbox"/> sowbugs	
	<input type="checkbox"/> fishfly larvae	
	<input type="checkbox"/> alderfly larvae	
	<input type="checkbox"/> atherix	
<input type="checkbox"/> # of types found	<input type="checkbox"/> # of types found	<input type="checkbox"/> # of types found
<input type="checkbox"/> above # multiplied by 3	<input type="checkbox"/> above # multiplied by 2	<input type="checkbox"/> above # multiplied by 1
Now <b>add together the three final values</b> from each column for your <b>total index value</b> = _____		

**WATER QUALITY RATINGS:** Excellent (>22)    Good (17-22)    Fair (11-16)    Poor (<11)

Don't forget to return all of your macros to the stream when you are finished observing them.

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• **EVALUATING YOUR RESULTS:**

Did you get the results you were expecting? Maybe the stream is in excellent condition when you thought it would be poor. It's hard to get an excellent result by accident, so maybe it's time to reconsider the reasons you thought it would be unhealthy. If you were expecting good results and got fair or poor, here are some things to consider...

1. A single kick-net stream study can help to make initial observations about the water quality in a local stream, but to get a complete picture of the water's health, it is useful to complete more than one study in the same location over a period of time.
2. The best times of year to complete a kick-net stream study are in late spring and early fall.
3. Weather conditions might effect your results and you should consider them when determining the health of your stream:
  - Have there been recent heavy rains that may have washed a lot of the macros away?
  - Has an extended lack of rain caused the water flow to slow to a trickle, reducing the local macro population?

If you still feel like the results are not as good as they should be, then you might have discovered evidence of a recent pollution event or significant change in nearby land use. Perhaps this is an opportunity for further experiments and investigations.



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• **A FEW IMPORTANT REMINDERS:**

1. Please remember that anyone aged 16 or older must have a valid fishing license to participate in kick-net stream studies (or any study involving catching organisms in the stream) and at least one supervising person must have a fishing license when working with a group of youth all under age 16.
2. Be certain that you have landowner permission to enter the stream at your study site, or that you are completing your stream study on public lands.
3. Do not complete kick-net stream studies or similar activities in trout approved streams during the trout stocking season (when those streams are closed to fishing activities).