



## FRESHWATER STREAMS:

# What lives in our freshwater stream?

### DIVE DEEPER:

1. Did you have any questions as you watched the video? Take some time to explore and research the topics that sparked your curiosity.

GOT IT!



2. Be the expert. See next page. Using what you learned, we are going to use macroinvertebrates as indicators of stream health. First, we will identify macroinvertebrates found in three different streams. Next, we will divide these macroinvertebrates into three categories of species – Tolerant, Facultative, or Sensitive. Finally, we will calculate a score for each stream that tells us how healthy that stream is.

GOT IT!

If a stream is healthy, we could expect to find many healthy things living in it. If the stream is unhealthy, we could expect to find few things living in it, or find it full of unhealthy creatures. When we conduct a biological survey of a stream, we study the things that live in the water and make inferences about the environment in which they live.

For the next portion of this investigation, you will need two things:

1. First, watch the Video: Freshwater Stream Health  
[cbf.org/news-media/multimedia/video/cbf-education-videos/freshwater-stream-health.html](http://cbf.org/news-media/multimedia/video/cbf-education-videos/freshwater-stream-health.html)
2. Second, find the Macroinvertebrate Key from the Pennsylvania Department of Environmental Protection attached to this document.  
*You will use this resource to identify macroinvertebrates and calculate a score for your stream, revealing how healthy (or not so healthy) it is.*

### Application

Below are three lists of macroinvertebrates found in three different streams. Using the Macroinvertebrate Key provided by the Pennsylvania Department of Environmental Protection, find each macroinvertebrate. Below each critter is a T, F, or S. These stand for Tolerant, Facultative, or Sensitive. Once you find all the Macroinvertebrates in the list, categorize them into the following categories.

- Tolerant Species,
- Facultative Species
- Sensitive Species

Using the scoring charts below, add the totals for the three categories to come up with each stream's score. Finally, determine how healthy or unhealthy each stream is based on its score.

### Macroinvertebrate Data Set 1

6 leeches  
 10 whirligig beetles  
 2 waterpennies  
 10 caddisflies (stick houses)

### Macroinvertebrate Data Set 2

7 gilled snails  
 3 scuds  
 5 crayfish  
 3 stonefly nymphs  
 1 damselfly nymph  
 2 leeches  
 1 waterpenny  
 2 pouch snails  
 1 isopod

### Macroinvertebrate Data Set 3

1 crane fly larva  
 6 crayfish  
 7 scuds  
 3 pouch snails  
 2 gilled snails  
 4 dobsonfly larvae  
 11 mayfly nymphs  
 5 stonefly nymphs  
 1 dragonfly nymph  
 2 caddisfly larvae  
 (no house, no tails)  
 4 planaria  
 19 whirligig beetles  
 1 caddisfly larva (2 tails)

### Macroinvertebrate Data Set 1

Tolerant Species

Facultative Species

Sensitive Species

\_\_\_\_\_ x 1 = \_\_\_\_\_  
Tolerant Total

\_\_\_\_\_ x 2 = \_\_\_\_\_  
Facultative Total

\_\_\_\_\_ x 3 = \_\_\_\_\_  
Sensitive Total

TOTAL SCORE = \_\_\_\_\_ Overall, how healthy is this stream based on its score?\*

### Macroinvertebrate Data Set 2

Tolerant Species

Facultative Species

Sensitive Species

\_\_\_\_\_ x 1 = \_\_\_\_\_  
Tolerant Total

\_\_\_\_\_ x 2 = \_\_\_\_\_  
Facultative Total

\_\_\_\_\_ x 3 = \_\_\_\_\_  
Sensitive Total

TOTAL SCORE = \_\_\_\_\_ Overall, how healthy is this stream based on its score?\*

### Macroinvertebrate Data Set 3

Tolerant Species

Facultative Species

Sensitive Species

\_\_\_\_\_ x 1 = \_\_\_\_\_  
Tolerant Total

\_\_\_\_\_ x 2 = \_\_\_\_\_  
Facultative Total

\_\_\_\_\_ x 3 = \_\_\_\_\_  
Sensitive Total

TOTAL SCORE = \_\_\_\_\_ Overall, how healthy is this stream based on its score?\*

\* Scoring: 27+ = Excellent, 22-26 = Very Good, 17-21 = Good, 11-16 = Fair, Less than 11 = Poor

## Be the Expert

Now that you've scored the three streams, match them with the written descriptions below. Read the physical descriptions of three streams below: Stream A, Stream B, and Stream C. Based on what you know about the characteristics of a healthy stream, match the macroinvertebrate data sets 1, 2, and 3 from above to the stream where they live using the descriptions below.

### Stream A

This stream runs through a cow pasture. There is a fence keeping the cows out and a few shrubs along the water. The water is moderately clear and has no distinct smell. The banks are steep, without a lot of shade. The streambed is a mix of rocks and sediment.

### Stream B

The water is clear and doesn't have a noticeable smell. There are a few downed trees in the water and lots of trees on the banks that hang over the stream. The streambed is rocky, with some sediment on the bottom in the slower-moving parts of the stream. In the faster-moving parts, there are pebbles and stones that create bubbles and movement, or riffles. The water feels cool.

### Stream C

This stream is choked with trash. It smells like dead fish and the bottom is mostly muddy. It's hard to see the bottom because the water is so murky. The water flows sluggishly. The banks are steep and covered in grass, but there are a few areas that are just dirt.

Which macroinvertebrate data set goes with each of the streams described above?

Draw a line to match the macroinvertebrate data with its matching stream.

Macroinvertebrate Data Set 1 •

• Stream A:

Macroinvertebrate Data Set 2 •

• Stream B:

Macroinvertebrate Data Set 3 •

• Stream C:

Why did you pair them the way you did? What clues did you use? Explain your answer.

## Activity

If you can, go to your local stream and see what macroinvertebrates you find.

What do they indicate about the health of your local stream?

Can you complete your own macroinvertebrate survey and give your stream a score? \_\_\_\_\_

If so, how did your stream do?

Using what you have learned, can you identify any problems with your local stream and suggest possible solutions to make it better?

Identify the Problem(s):

Possible Solution(s):

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### DIVE DEEPER:

**Test Your Knowledge**

Test your knowledge of freshwater macroinvertebrates

[High School Students](#)  
[Middle School Students](#)



**Learn More**

Learn more about macroinvertebrates found in the Susquehanna River watershed.

[Susquehanna Video](#)

**Check Out a Video**

Watch this excellent video from the Smithsonian. It discusses why healthy streams are important to the Chesapeake Bay region and how scientists determine the health of a stream.

[Smithsonian Video](#)

**Explore**

Watch scientists from Penn State University hunt for macroinvertebrates to determine the health of a stream.

[Penn State Video](#)



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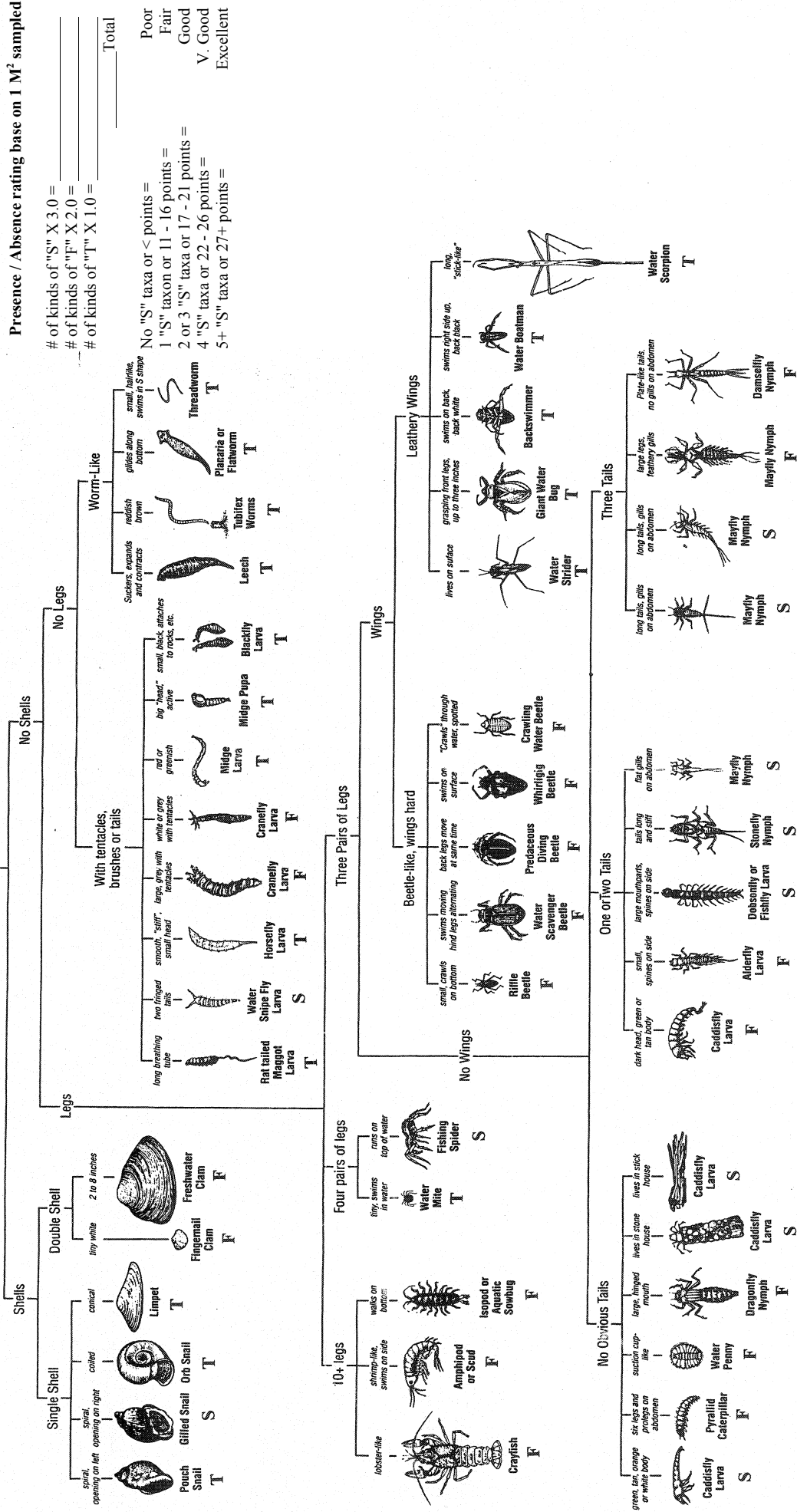
# INVESTIGATION

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# MACROINVERTEBRATE KEY

## Pennsylvania Department of Environmental Protection

### Key to Macroinvertebrate Life in the River



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