Water quality in a bag

How can we test water safety and quality?

Materials

- Paper bags (lunch size)
- Water quality cards (print and cut)
- Macroinvertebrate cards (print and cut)

Teacher preparation

Prepare the Stream in a Bag Samples by printing off the macroinvertebrates that are provided below. Print only the front (single sided) of each organism if you want your students to research the organism. Print double sided if you have less time and you want the name of each organism to appear on the back of the card. There are 12 organisms per printed page. Please use the spreadsheet on the following page to determine the placement and number of organisms in each bag based upon water quality. The spreadsheet will help you determine the number of sheets to be printed based upon the number of bags to be prepared.

Directions

1. Show the students the water quality bags containing the macroinvertebrate cards. Explain that each bag represents a natural stream and that they will find a number of different macroinvertebrates that occupy that stream in their bag.
   - Ask the students what types of organisms live in a stream?
   - Ask the students if different streams contain different organisms? If so, why?
2. Pass out one water quality bag to each group.
3. Explain that the students will need to identify the organisms that are living in their stream (inside of the bag) and determine the stream's water quality using the water quality card provided to them.
4. As the students identify the macroinvertebrates walk around to see if they need help. You can provide identification cards, books, and Internet resources to help them succeed. If you have printed the name of the back of the cards the students should be able to quickly check off the organisms on the water quality card.
5. Have the students arrange themselves into groups according to their stream quality. Have each group examine which organisms were found in their stream. Were some of those organisms found in different streams? If so, Why?
6. Discuss why some organisms can be found in all water quality categories while others cannot tolerate different pollution levels. Can "Poor" water quality macroinvertebrates live in "Excellent" water quality? (Yes, but tend not to due to competition with "Excellent" organisms). Can "Excellent" macroinvertebrates survive in "Poor" quality water? (No, they cannot tolerate polluted waters).
7. Discuss why some streams have worse living conditions than others. What can be done to improve water quality?

Water quality/ organisms	Number per bag	Multiply by number of bags	Total	Divide by number per sheet	Pages printed
Excellent quality					
Caddisfly Larvae	3			12	
Hellgramite	2			12	
Mayfly Larvae	5			12	
Gilled Snails	2			12	
Rifle Beetle Adult	1			12	
Stonefly Larvae	2			12	
Water Penny Larvae	4			12	
Dragonfly Larvae	2			12	
Crayfish	1			12	
Damselfly Larvae	3			12	
Good to fair quality					
Beetle Larvae	2			12	
Clams	2			12	
Crane Fly Larvae	3			12	
Crayfish	3			12	
Damselfly Larvae	4			12	
Dragonfly Larvae	5			12	
Scuds	2			12	
Sowbugs	4			12	
Fishfly Larvae	3			12	
Alderfly Larvae	3			12	
Watersnipe Larvae	2			12	
Water Penny Larvae	2			12	
Midge Larvae	3			12	
Leeches	1			12	
Poor quality					
Aquatic Worms	7			12	
Blackfly Larvae	4			12	
Leeches	3			12	
Midge Larvae	6			12	
Lunged Snails	2			12	
Crayfish	2			12	
Beetle Larvae	2			12	
Dragonfly Larvae	1			12	

Water quality index

Excellent

- ☐ Caddisfly Larvae
- ☐ Hellgramite
- ☐ Mayfly Larvae
- ☐ Gilled Snails
- ☐ Rifle Beetle Adult
- ☐ Stonefly Larvae
- ☐ Water Penny Larvae

Good–fair

- ☐ Beetle Larvae
- ☐ Clams
- ☐ Crane Fly Larvae
- ☐ Crayfish
- ☐ Damselfly Larvae
- ☐ Dragonfly Larvae
- ☐ Scuds
- ☐ Sowbugs
- ☐ Fishfly Larvae
- ☐ Alderfly Larvae
- ☐ Watersnipe Larvae

Poor

- ☐ Aquatic Worms
- ☐ Blackfly Larvae
- ☐ Leeches
- ☐ Midge Larvae
- ☐ Lunged Snails

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- ☐ Water Penny Larvae

Good–fair

- ☐ Beetle Larvae
- ☐ Clams
- ☐ Crane Fly Larvae
- ☐ Crayfish
- ☐ Damselfly Larvae
- ☐ Dragonfly Larvae
- ☐ Scuds
- ☐ Sowbugs
- ☐ Fishfly Larvae
- ☐ Alderfly Larvae
- ☐ Watersnipe Larvae

Poor

- ☐ Aquatic Worms
- ☐ Blackfly Larvae
- ☐ Leeches
- ☐ Midge Larvae
- ☐ Lunged Snails

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