

## WQM K-2

### SQM Rock Rub Method

#### Background and Directions








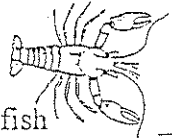
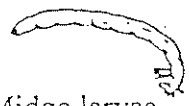




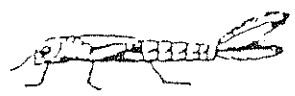








Student – Teacher/adult Ratio of 3 or 4:1 recommended

1. Locate a shallow (1-3 inches) and easily accessible riffle with few slippery rocks and boulders; a predominance of sand and gravel suggested. The site must have clear, free of hazards and gentle grade slope access to the water. Water temperature of 25 degrees Celsius/78 degrees Fahrenheit or higher recommended.
2. Tell students they will go “hunting for bugs” under rocks in the stream. All animals need a home; water bugs need a home or habitat too, they live in the “riffle area” of a stream. Where the water is shallow and water tumbles over rocks. Most bugs found in the water are “young” and others are “adults”. The young are growing up underwater. Many of them will turn into adults, crawl out of the water and fly away.
3. With help, students will identify the bugs by picture and classify them into three groups. Based on what they find, the bugs will tell them how clean the stream water is.
4. When in the riffle, students will look around the rocks for crayfish, minnows or other life. Students will pick up and observe the underside of small rocks, looking for crawling and bugs hugging the rocks called “clingers”. With help, they will pick up rocks then wash-wipe the rocks in a shallow pan of water.
5. Students will be asked to observe the different sizes, shapes and colors; similarities are used to group the bugs into the same “family”—they are related. Notice how the bugs move—different bugs move in special ways to get their food. Keeping the bugs and hands wet, students will be encouraged to gently pick up or handle bugs that don’t have pinchers (no Crayfish or Dobsonflies please). [This is avoided if the students are likely to put their hands in their mouth and possibly come in contact with pathogens.] Notice that some bugs are soft and tender while others are tough and can be handled easily.
6. Students are asked to compare the bugs with the picture key and check off those that are present. The number of bugs are added up, with certain bugs or “special” ones getting a higher score, as they can only live in a cleaner water. The three scores are added up at the bottom of the sheet, and the quality of the water determined. [If the addition and multiplication is inappropriate, then identify Group 1 and 3 bugs to determine which are pollution tolerant and summarize that the water is “clean” or “polluted” respectively.]
7. As bugs homes are in the riffle, all are gently returned to the area they were taken from. Hands are washed or cleaned immediately afterward. Assessment may be done before the bugs are returned.
8. Questions asked:
  - What differences in color, shapes and size did you see? How are some still related?
  - Identify a bug in each of the three groups (assuming they were there). Or, point to a bug on the data sheet and ask the student to find it in the tray or rock.
  - How do some of the bugs move under water?
  - What do bugs eat?
  - Is the water polluted or clean?

## Stream Quality Assessment

Water quality can be determined from the diversity of organisms living within the stream or river. Below is a chart indicating the tolerance level of various aquatic organisms. Why did you find a lower diversity and some different species below the pipe than above?

What type of stream quality will your "sample" indicate?  
Place an "x" on each species you find. Place only one "x" per blank.

Group 1: live only in clean water	Group 2: can tolerate a little pollution	Group 3: can live in polluted water
 Water penny beetle larvae _____	 Cranefly larvae _____	 Black fly larvae _____
 Stonefly nymph _____	 Beetle larvae _____	 Aquatic worms _____
 Caddisfly larvae _____	 Crayfish _____	 Midge larvae _____
 Dobsonfly larvae (Hellgrammite) _____	 Scud _____	 Other "fly" larvae (Diptera) _____
 Mayfly nymph _____	 Damselfly nymph _____	 Leeches _____
 Riffle Beetle Adults _____	 Dragonfly nymph _____	 Pouch Snails _____
 Gilled snails _____	 Clams _____	 Other snails _____
	 Sowbug _____	
Number of "x"s in Group 1 _____ x 3	Number of "x"s in Group 2 _____ x 2	Number of "x"s in Group 3 _____ X 1
Total: _____	Total: _____	Total: _____
Stream Quality Index: Excellent > 22 Good 17-22 Fair 11-17 Poor 0-11 (Grand total of 1 + 2 + 3)		