Metrics are used to analyze and interpret biological data by condensing lists of organisms into relevant biological information. In order to be useful, metrics must be proven to respond in predictable ways to various types and intensities of stream impacts. This activity explores one of the metrics (biotic index) used to determine the condition of the macroinvertebrate community.

1. Divide the participants into four groups.
2. Randomly distribute 12 cards to each group.
3. Each group must determine the overall stress tolerance score and rating.
4. The first step is to determine which macroinvertebrates fall into the **high**, **moderate** or **low** categories.
5. The table on the next page provides a list the major groups and their categories.
6. Then calculate your index score by multiplying the number of cards in each category by the category value (Low = 2; Moderate = 5; High = 8).
7. Add the together the result from each category and divide by 12.
8. Compare your result to the scale provided to determine your rating.
9. See the example below:

Low	Moderate	High
Golden stonefly Roach-like stonefly Swimming mayfly Case building caddisfly Total = 4 4 x 2 = 8	Crawling mayfly Netspinning caddisfly Dragonfly Crane fly Riffle beetle Total = 5 5 x 5 = 25	Damselfly Non-biting midge Aquatic worm Total = 3 3 x 8 = 24
Total from all categories = 8 + 25 + 24 = **57**		
Community Stress Tolerance 57 ÷ 12 = 4.75 This number is rounded to one decimal place so your final answer is **4.8**		

Excellent	Good	Fair	Poor
< 3.0	3.1 – 4.5	4.6 – 6.0	> 6.0

The rating for this macroinvertebrate community is **fair**.

Select cards from the matching game to make your own combinations.

Macroinvertebrate Stress Tolerance Table

Non-Insect Groups

1 2 3	Low	Mussels				
4 5 6	Moderate	Operculate snails Pea clam Asian clam	Amphipods Crayfish			
7 8 9 10	High	Non-operculate snails Aquatic worms	Isopods Leeches	Flatworms		

Insect Groups

1 2 3	Low	Stoneflies Clinging mayflies	Casebuilding caddisflies Swimming mayflies	Net-wing midge Free-living caddisfly	Water penny	Watersnipe fly
4 5 6	Moderate	Crawling mayflies Burrowing mayflies Other beetles	Netspinning caddisflies Dragonflies Black fly	Riffle beetle Dixid midge Dance fly	Crane fly Alderfly	Fishfly/Hellgrammite
7 8 9 10	High	Damselflies Non-biting midge	Biting midge	Other flies		