Section 2 Aquatic Macroinvertebrates

Your team of biologists are surveying two streams. Identify the macroinvertebrates in each stream and answer questions about them. Calculate the Biotic Index Score for each stream and determine the health of each stream. The number of each type of organisms that was collected by your team is indicated after the organism.

Stream A Macroinvertebrate Identification

Organism ID **No. of organisms collected** **Class**

Organism A1 _____ (3 organism found) _____

Organism A2 _____ (1 organisms found) _____

Is this organism an herbivore, carnivore, or omnivore? _____

Organism A3 _____ (4 organisms found) _____

Organism A4 _____ (2 organisms found) _____

Organism A5 _____ (1 organisms found) _____

Is this organism an herbivore, carnivore, or omnivore? _____

Organism A6 _____ (4 organism found) _____

Organism A7_____ (3 organism found) _____

Organism A8_____ (1 organism found) _____

Stream A Biotic Index Score: How Healthy is Stream A?

Calculate the Biotic Index Score for each stream and determine the health of each stream. Multiply the number of organisms found in each class (1-4) by their class number. Divide the total value by the total number of organisms in classes 1-4 to determine the Biotic Index score for Stream A. (Class 5 are air breathing macroinvertebrates and will not be included in this particular index score.)

Total Organisms Total Value

No. of organisms from class 1 _____ x 4 = _____

No. of organisms from class 2 _____ x 3 = _____

No. of organisms from class 3 _____ x 2 = _____

No. of organisms from class 4 _____ x 1 = _____

TOTAL ORGANISMS (a)_____ TOTAL VALUE(b)_____

Divide totaled value (b)_____ by total no. of organisms (a) _____ for index score: _____

How Healthy is the Steam?
Excellent …… 3.60+
Good …….. 2.60 – 3.59
Fair…… 2.10 – 2.59
Poor …… 1.0 - 2.09

How Healthy is Stream A? _____

Correct points earned for Stream A = _____ /32 points

Stream B Macroinvertebrate Identifiation

Organism ID	No. of organisms collected	Class
Organism B1 _____	(1 organism found)	_____
Organism B2 _____	(1 organisms found)	_____
Organism B3 _____	(3 organisms found)	_____
Organism B4_____	(3 organisms found)	_____

Complete or incomplete metamorphosis? _____

Organism B5_____	(1 organisms found)	_____
Organism B6_____	(3 organisms found)	_____
Organism B7_____	(2 organisms found)	_____
Organism B8_____	(2 organisms found)	_____

Which organism found in Stream B belongs to the life cycle of Organism B8? Organism _____

Does organism B8 have a complete or incomplete life cycle? _____

Circle the correct food chain:

Diatoms → Mayfly larvae → Damsel fly larvae → Brook Trout

Caddis fly larvae → Mayfly larvae → Damsel fly larvae → Bluegill

Dinoflagellates → Damsel fly larvae → Mayfly larvae → Brook Trout

Which organism in Stream B requires has external gills and requires the most dissolved oxygen?_____

Stream B Biotic Index Score: How Healthy is Stream B?

Calculate the Biotic Index Score for each stream and determine the health of each stream. Multiply the number of organisms found in each class (1-4) by their class number. Divide the total value by the total number of organisms in classes 1-4 to determine the Biotic Index score for Stream B. (Class 5 are air breathing macroinvertebrates and will not be included in this particular index score.)

Total Organisms Total Value

No. of organisms from class 1 _____ x 4 = _____

No. of organisms from class 2 _____ x 3 = _____

No. of organisms from class 3 _____ x 2 = _____

No. of organisms from class 4 _____ x 1 = _____

TOTAL ORGANISMS (a)_____ TOTAL VALUE(b)_____

Divide totaled value (b)_____ by total no. of organisms (a) _____ for index score: _____

How Healthy is the Steam?
Excellent ..... 3.60+
Good ..... 2.60 – 3.59
Fair..... 2.10 – 2.59
Poor ..... 1.0 - 2.09

How Healthy is Stream B ?_____

Points earned for Stream B = _____ / 35 points

Tie Breaker: Why can Blood Midge survive in low oxygen environments?_____

Section 3 Water Analysis

Part A Salinometer

Using the Hydrometer or Salinometer that your team constructed, measure the salt concentrations. List the order from lowest salt concentration to the greatest salt solution and state the percent salt concentration.

	Lowest			**Highest**
Salt Solution Order (A-D)				
% Concentration				

(Salt solution order scores: 2 points for correct order, 1 point for 1 difference)
(% concentration scores: 2 points for the exact percent salt solution, 1 point for 1 percent low or high, 0 points for more than 1 point difference)

Part A Points _____/16

Part B Section 3

_____1. An ocean typically has a percent salinity of _____.

_____2. Which of the water samples above is most likely to have the least amount of oxygen? (A, B, C, or D)

_____3. Which is saltiest?
- a. Ocean water
- b. River water
- c. Estuary water
- d. Great Lakes

_____4. The percent salinity in an estuary is:
- a. 1%
- b. 5%
- c. 10%
- d. depends on the rise and fall of the tide.

_____5. Scientists measure the amount of salt in the water (salinity) in:
- a. ppt = parts per ton
- b. ppt = parts per thousand
- c. ppm = parts per million
- d. gpb = grains per bucket

_____6. Which of the following is not a measure of water clarity?
- a. algae populations
- b. turbidity
- c. secchi disk measurements
- d. alkalinity

Part B Points _____/6

Total points earned for Section 3 Part A and B = _____/22 points

Tie Breaker Questions (only scored if needed for breaking a tie):

Describe the effect on the pH of nearby water from:

a farm applying lime to an alfalfa field._____

a coal burning factory._____

a pine forest._____

Name the three ways oxygen gas is dissolved in a stream: