Name: _____Period: _____ Date: _____

Simulation 2: Bioindicators and Water Quality in the Chesapeake Bay Watershed

Background:

The quality of a water environment affects the organisms that live there. Conversely, the organisms that live in a water environment are an indication of the water quality. If the water quality is known, the type of organisms found there can be predicted. Or if the organisms are known, the water quality can be predicted.

Using living organisms to assess water quality is called a “bio-assessment”. Those living organisms used are “bio-indicators”. Bio-indicators record the *impact* of varying environmental conditions. A bio-assessment provides a historical perspective on the condition of the water body, unlike the instantaneous view given by chemical sampling of abiotic factors. Bio-assessments can tell us about water quality because of the different tolerances of organisms to environmental conditions.

This simulation is a “match game”. Eight different sites in the greater Richmond, Virginia area have been chosen. All are a part of the Chesapeake Bay Watershed and have an impact on the bay itself. Some information (abiotic factors) is known about the water environment on that particular day. Compare that water environment with the “organism” cards. Water quality (abiotic factors) requirements are provided for each organism. The organisms include macroinvertebrates, as well as some fish-vertebrates.

Procedure:

1. You will receive a bag with 8 “water quality” environment cards and 15 “organism” cards.
2. Place the “water quality” environment cards out on your desk.
3. Using the data provided on the cards, determine which organism(s) can live in each of the different environments.
4. Each site must have at least 1 organism, though most will have more. Record on the “Results” table which organisms might be found in that environment. *Note: The same organism can be found in several different environments.*
5. Once you have found environments for all 15 organisms, answer the questions in the discussion and conclusion section. **Be sure to use complete sentences!**

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Results Table:

Environment Location	Possible Organisms
Site1: Mathematics and Science Center Pond	1. 2. 3. 4. 5.
Site 2: Three Lakes Park – Henrico County	1. 2. 3. 4. 5.
Site 3: James River – Pony Pasture – City of Richmond	1. 2. 3. 4. 5.
Site 4: Swift Creek – Chesterfield County	1. 2. 3. 4. 5.
Site 5: Rappahannock River	1. 2. 3. 4. 5.
Site 6: James River – Surry, Virginia	1. 2. 3. 4. 5.
Site 7: Lake Anna	1. 2. 3. 4. 5.
Site 8: Tuckahoe Creek	1. 2. 3. 4. 5.

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Discussion

1. Where could the most organisms live? Why?

2. Where could the fewest organisms live? Why?

3. Tuckahoe Creek is a swamp. What effect does this have on the dissolved oxygen? Why?

4. Site 3, James River at Pony Pasture is on the Falls of the James. Site 6, James River at Surry is downstream, closer to the Chesapeake Bay. Which one had a higher amount of dissolved oxygen? Why?

5. Dominion Virginia Power built Lake Anna for the North Anna Nuclear Power Station. The temperature of the lake water averages seven degrees higher than typical water temperature in that area. What effect would this have on aquatic organisms? (Think about seasons.)

Conclusion:

The term “biodiversity” is often used to describe the different kinds of life found in an environment. Write a statement connecting biodiversity with optimum water quality (abiotic factors).