2026 Water Eco Station Team Name:

1. Earth's Usable Freshwater: Although water covers approximately 71% of the Earth's surface, only about 2.5% of the total water is freshwater. Of that small freshwater percentage, a significant amount is locked away in ice caps, glaciers, or deep underground aquifers.
   Roughly what percentage of the total global water supply is readily accessible as usable freshwater for human consumption (surface water in lakes/rivers and shallow groundwater)?
   A. < 1%
   B. ~3%
   C. ~10%
   D. ~25%

   (3 points)

2. How does high water temperature affect the ability of a stream to support aquatic life? Circle the best answer.
   A. It increases the amount of dissolved oxygen available.
   B. It decreases the metabolic rate of fish.
   C. It decreases the ability of water to hold dissolved oxygen.
   D. It increases the solubility of nutrients.

   (3 points)

3. A watershed is best described as: Circle the best answer.
   A. An place where water is stored for future transport.
   B. An area of land that drains to a common body of water.
   C. A type of aquatic biome.
   D. Ocean currents.

   (3 points)

4. Impervious Surfaces: How does increasing the percentage of impervious surfaces (like parking lots) in a watershed affect local streams? Circle the best answer.
   A. It increases groundwater recharge.
   B. It reduces the velocity of stormwater.
   C. It increases "thermal shock" by washing hot water into streams.
   D. It decreases the likelihood of downstream flooding.

   (3 points)

12 Possible Page Points

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5. Identify the macroinvertebrate specimens provided. You may use common or scientific names. Determine whether they are pollution sensitive, somewhat pollution sensitive, or pollution tolerant.

1 point each

Specimen	Identification	Pollution Sensitivities
Specimen 1		
Specimen 2		
Specimen 3		

(6 points)

6. **Matching Aquatic Macroinvertebrates**

Draw a line to match the Organism with its Sensitivity to Pollution

1 point each

Organism	**Sensitivity to Pollution**
1. Mayfly Nymph	A. Group 1 (Sensitive): Requires clean, cold, oxygenated water.
2. Dragonfly Nymph	B. Group 1 (Sensitive): Often has two tails and no gills on abdomen.
3. Stonefly Nymph	C. Group 2 (Moderate): A predator often found in vegetation.
4. Blood Midge Larva	D. Group 2 (Moderate): An omnivore common in rocky shallows.
5. Crayfish	E. Group 3 (Tolerant): Can survive in low-oxygen mud.

1.A 2.C 3.B 4.E 5.D

(5 points)

11 Possible Page Points

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7. **Matching Water Quality Indicators**

Draw a line to match the Parameter to the Impact/Description.

Parameter	Impact/Description
1. pH	A. Indicator of road salt and mineral ions in runoff.
2. Dissolved Oxygen (DO)	B. Necessary for fish survival; drops when water gets too warm.
3. Specific Conductance	C. Measured with a Secchi Disk; affected by sediment and algae.
4. Turbidity	D. Measures the acidity or alkalinity of the reservoir
5. Phosphorus	E. The limiting nutrient that triggers cyanobacteria blooms.

1 point each

1.D 2.B 3.A 4.C 5.E (5 points)

8. **Matching Stormwater Management**

Draw a line to match the Management Term with its Function.

Management Term	Function
1. Rain Garden	A. Manages stormwater runoff by capturing, slowing, and filtering it through soil
2. Permeable Pavers	B. Pavement that allows water to soak through to the soil.
3. Constructed Wetland	C. Asphalt lot that sheds water quickly, causing flashy flows.
4. Riparian Buffer	D. Strip of trees/shrubs along the reservoir to trap sediment.
5. Impervious Surface	E. Human-made wetland designed to filter nutrients from runoff.

1 point each

1.A 2.B 3.E 4.D 5.C 10 Possible Page Points (5 points)

9. **Invasive Species:** Which of the following is considered a non-native, invasive aquatic plant frequently monitored in Massachusetts waterbodies? Circle the best answer.
A. White Water Lily
B. Cattail
C. Fanwort
D. Pickerel weed

(3 points)

10. **Wetland Function:** Which of the following is a primary service provided by wetlands in a "sponge community"? Circle the best answer.
A. Increasing the speed of runoff to prevent local puddles
B. Acting as a natural filter for sediment and pollutants
C. Increasing the salinity of nearby rivers
D. Providing a source of non-renewable energy

(3 points)

11. During a heavy storm, a wetland prevents a downstream town from flooding. Which physical process is primarily responsible for this? Circle the best answer.
A. Increasing the salinity of the water
B. Slowing water velocity and providing temporary storage
C. Converting rainwater into non-renewable energy
D. Filtering out plastic waste

(3 points)

12. **Fill in the blank.**
Which of the following watersheds would you expect to find elevated levels of coliform bacteria? _____
Watershed "A" – is densely populated, tall skyscrapers dominate the landscape, has little wildlife and domestic animals, and has many factories producing plastics and metal alloys.

Watershed "B" – is sparsely populated, farms and ranches dominate the landscape, wildlife flourishes and domesticated animals are commonplace.

(4 points)

13 Possible Page Points

13. Mark **TRUE or FALSE** for the following statements about **high nitrates levels** in a body of water. Circle your answer.

TRUE or FALSE: They might be caused by heavy use of soil fertilizers in that watershed.

TRUE or FALSE: They can contribute to high turbidity and low dissolved oxygen levels in the water.

TRUE or FALSE: They would tend to result in high biodiversity levels in the macroinvertebrates community.

TRUE or FALSE: They can result in soupy-rich blooms of algae and other aquatic plants.

TRUE or FALSE: Excessive nitrates cause fish deaths.

(5 points)

14. **Best Management Practices (BMPs)**
A local community wants to reduce the amount of stormwater that flows into their storm drains. Which of these practices helps with soaking up water on-site and is considered Low Impact Development (LID)? Circle the best answer.

A. Installing a rain garden
B. Replacing gravel with asphalt
C. Constructing a large concrete culvert
D. Increasing the slope of the land

(5 points)

15. A homeowner wants to reduce the amount of stormwater leaving their property. Which Best Management Practice (BMP) would be most effective for infiltrating water back into the soil? Circle the best answer.
A. Installing a concrete patio.
B. Installing infiltration trenches/basins
C. Paving a dirt path to prevent erosion.
D. Adding more fertilizer to the lawn to thicken the grass. (5 points)

15 Possible Page Points

16. **Fill-in-the-Blank Challenge**

Word Bank

Benthic: Living at the bottom of a lake or stream.
Best Management Practice (BMP): A method (like a rain garden) used to reduce pollution.
Bioswale: A vegetated ditch designed to slow down and filter stormwater.
Clean Water Act: The primary federal law that regulates water pollution.
Eutrophication: When too many nutrients cause algae to grow, using up all the oxygen.
Impervious: A surface that water cannot soak through (like asphalt).
Infiltration: The process of water soaking into the soil.
Macroinvertebrate: An animal without a backbone that is large enough to see (like a dragonfly nymph).
Nonpoint Source: Pollution that comes from many places rather than one pipe.
Permeable: A surface that allows water to pass through (like a "sponge").
Riparian Buffer: A strip of trees and plants along the edge of a water body.
Runoff: Water that flows over the land instead of soaking in.
Secchi Disk: A black-and-white tool used to measure water transparency.
Thermal Shock: A sudden change in water temperature that can harm fish.
Turbidity: The cloudiness or "muckiness" of the water.
Watershed: All the land that drains into a specific body of water.

Use the Word Bank to **Fill in the Blank** and complete these sentences.
A large asphalt parking lot at the swimming beach is a(n) ___Impervious__ surface that creates a lot of __Runoff_ during rainstorms.
If a(n)_Bioswale or Rain Garden or BMP is built next to the boat launch, it will act like a "Living Sponge" to filter the water.
We used a(n) Secchi Disk to see if the water was clear or if it had high Turbidity.
Finding a Stonefly nymph means the water is healthy, because this creature is a(n)Macroinvertebrate that lives in the benthic zone.

A(n) Riparian Buffer of trees along the reservoir helps prevent Eutrophication by trapping nutrients like phosphorus.

(9 Points)

9 Possible Page Points

2026 Water Eco Station Team Name:

Site Specfic Questions

Use the map to answer the following questions.

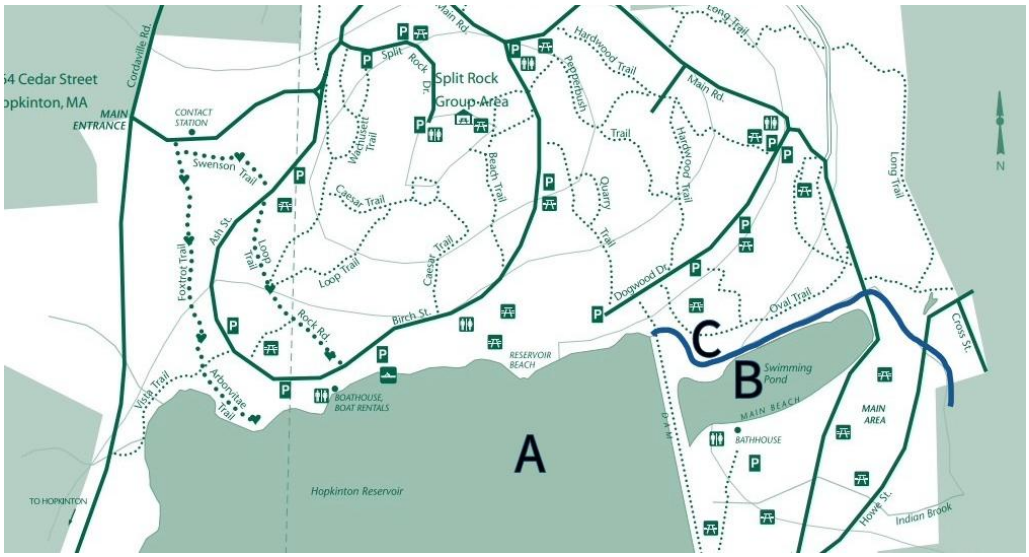
Facts:

A -Hopkinton Reservoir was once used as a drinking water supply for Boston. It is 176 acres in size and reletively deep with natural bottom. It has a maximun depth of 53 feet and an average depth of 22 feet.

B- The Swimming Pond is drained during the winter and is filled using Hokinton Reservoir Water- A. It is less than 14 feet deep and has a sandy bottom.

C- The Spillway and Stream flows from Hopkinton Reservoir to a wetland system downstream, with a natural rocky bottom.

Dogs are not permitted on the beach areas and storm drains in the parking lot DO NOT flow into the Swimming Pond-B.



17. The location where you would expect the highest levels of DO is? Circle the best answer.

A. A

B. B

C. C

(5 Points)

18. During a rain event, you would expect the turbidity to be highest at: Circle the best answer.

A. A

B. B

C. C

(5 Points)

10 Possible Page Points

19. A team is mapping "Living Sponge" opportunities near the park's paved boat ramps. Which Best Management Practice (BMP) would best reduce the velocity of runoff before it enters the water? Circle the best answer.
A. Installing more trash receptacles
B. Constructing a vegetated buffer or bioswale along the ramp edge
C. Paving the surrounding dirt trails to reduce mud
D. Increasing the slope of the parking lot for faster drainage

(5 Points)

20. Determine the clarity of the Swimming Pond- B using the turbidity tubes. Fill in the blank.
Day of -will give an acceptable range

_____

(5 Points)

21. Using the chemical pH kit provided, determine the pH of the Swimming Pond- B. Fill in the blank.
Day of -will give an acceptable range

_____

(5 Points)

22. **Short Answer**
It's a hot summer day, and you arrive at the Swimming Pond to cool off. You see a sign saying the swimming area is closed because of high bacteria levels. It hasn't rained in two days. The most likely cause of the bacteria is:
Canada Geese, waterfowl,
or give full credit if answer has to do with septic /sewer from bathhouse

(5 Points)

20 Possible Page Points