

Water Quality Monitoring Introduction Activity
A pre-visit lesson for “Water Quality Monitoring”

Grade: 4-12

Learning Objective: Students will understand the relationship between the Water Quality tests to be performed in class and the cause and effects of potential pollutants.

Summary: Students will read over the [“Optimal Water Quality Standards for Aquatic Ecosystems”](#) handout and then use it to answer the questions and crossword puzzle that follows.

Teaching Time: 30-40 minutes

Vocabulary: nutrients, dissolved oxygen, parts per million, turbidity, Fecal Coliform, optimal, phosphates, nitrates, pH, acidic, basic, alkaline, neutral.

Materials: “Optimal Water Quality Standards for Aquatic Ecosystems” handout,

Background Information:

Water quality is more than what meets the eye. Some properties are invisible.

Through water quality monitoring, students and volunteers learn from real-life observations and analysis, how the quality of surface and ground water is affected by our actions on the land. From that basis, water quality monitors gain an understanding of how they can protect our water resources and the many species that depend on them. In turn, many students volunteer to educate the local community on water quality issues, thereby helping to protect drinking water quality, human health and the environment.

Our in-class water quality lessons are designed to give your students much of the same technical science training that many volunteer monitors receive. To enhance the training and scientific methodology of water quality monitoring, it is important for the students to see the various handouts we use in the lessons prior to our arrival.

Here is a list of the water quality parameters we will be testing for and discussing throughout each water quality lesson.

1. Temperature
2. Dissolved Oxygen
3. Biological Oxygen Demand
4. Nutrients
 - Phosphates
 - Nitrates
5. PH
6. Turbidity
7. Fecal Coliform Bacteria

Procedures:

1. Have your students read through the [“Optimal Water Quality Standards for Aquatic Ecosystems”](#) handout.
2. Using the Optimal Water Quality Standards Handout to answer the review assignment and crossword puzzle that follow.

Water Quality Monitoring Assignment Sheet

1. Decreasing the temperature of the water tends to increase the amount of oxygen that can be dissolved in the water. True or False

2. In general, most aquatic organisms survive within a narrow range of temperatures. True or False

3. Which of the following would increase the temperature of a river?

- A. Planting trees along the banks
- B. Increasing storm water runoff into the river from parking lots and roadways
- C. Preventing erosion of the soil along the banks of the river
- D. Increasing the number of fish in the river

4. Which of the following is true concerning dissolved oxygen and fish?

- A. Fish do not use oxygen so the amount of oxygen dissolved in water does not matter.
- B. Fish remove oxygen from the atmosphere by coming to the surface and swallowing bubbles.
- C. Fish remove oxygen from the water by using their gills.
- D. The scales of fish have a vast blood supply and they remove oxygen dissolved in the water.
- E. Fish can breathe with lungs when they need to.

5. The amount of oxygen dissolved in water is measured in the units of parts per million or ppm. True or False

6. What range of pH values would you expect in an acidic solution?

- A. 0.0-6.0
- B. 8.0 - 9.0
- C. 10.0-11.0
- D. 6.5-8.5

7. Which of the following can affect the pH of a body of water?

- A) Minerals in the water
- B) Algae that live in the water
- C) Chemicals that you pour into the water
- D) All of the above (A,B, and C are correct)

8. The lowest range of dissolved oxygen levels which will support a diverse population of organisms is:

- A. 1-2 ppm
- B. 3-4 ppm
- C. 5-6 ppm
- D. 7-8 ppm
- E. 9-10 ppm

9. pH is measured on a scale that ranges from

- A. 0-6
- B. 0-7
- C. 0-14
- D. 7-14
- E. 8-14

10. If the pH of water is 7, we say the water is

- A. Natural
- B. Acidic
- C. Basic
- D. Neutral
- E. Alkaline

11. If something containing phosphates and nitrates washes into a lake or stream an algae bloom can result.

True or False

12. If a large amount of nitrates (nutrients) are present in a body of water, what color will the water usually be?

- A. Light Blue
- B. White
- C. Green
- D. Purple

13. What water quality test is used to measure how much oxygen is being used up by microorganisms in the water? This test also shows us if there is enough oxygen for fish.

- A. Temperature
- B. pH
- C. Biochemical Oxygen Demand
- D. Turbidity

14. If the total number of Fecal Coliform colonies found in a cup of lake water was 2,000 colonies per 100 milliliters (2,000FC/100ml) which of these would you not want to do with the water?

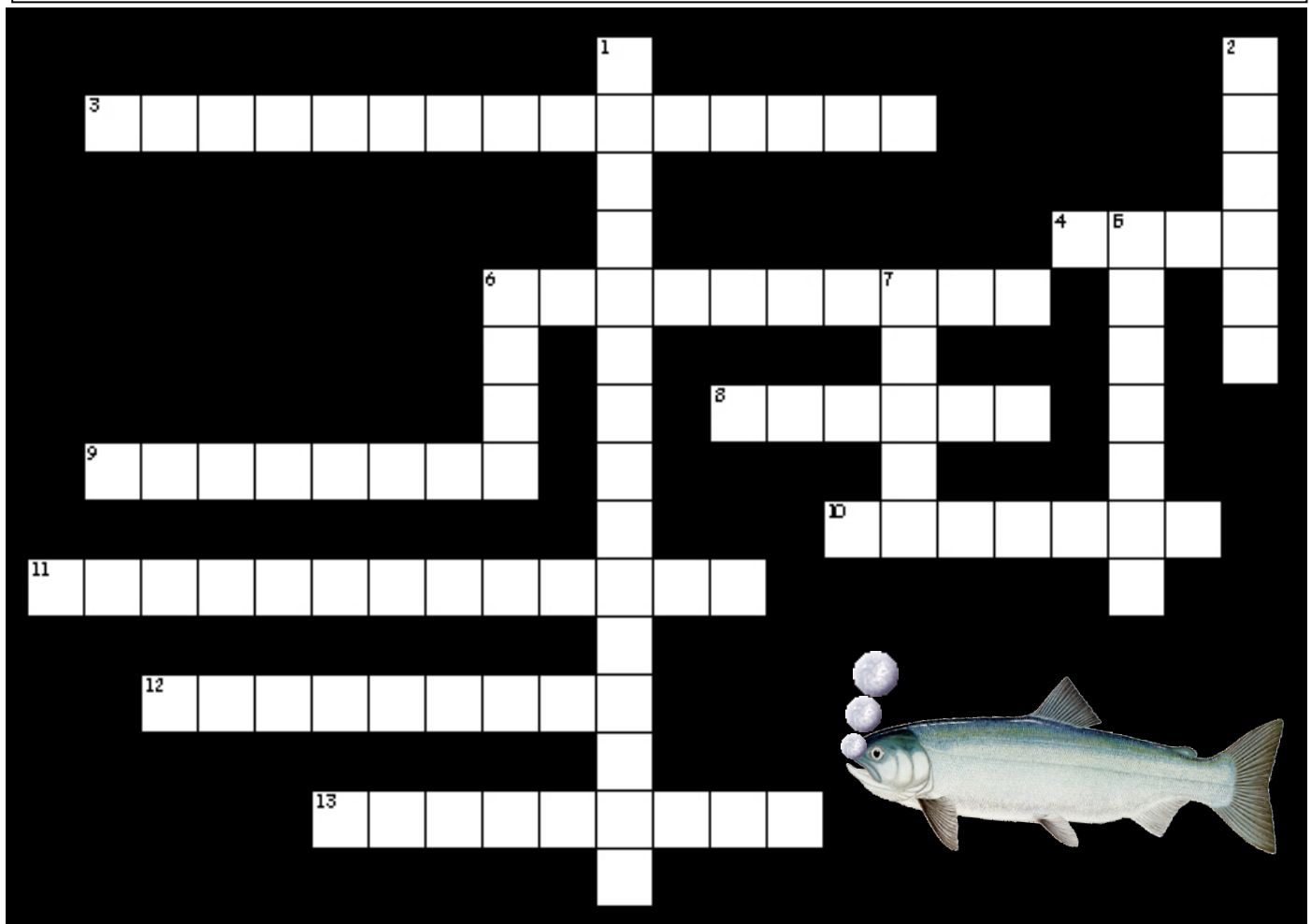
- A. Drink it
- B. Go swimming in it
- C. Have it splash on you
- D. All of the above are not safe because of all the potential disease causing bacteria in the water.

15. Which of these is a water quality problem caused from water with high turbidity?

- A. Underwater plants die because the sunlight is blocked
- B. Fine sediment like dirt and sand can clog the gills of aquatic organisms
- C. Baby salmon have trouble catching food
- D. All of these are problems caused by high turbidity

WATER QUALITY PARAMETERS

Use the Optimal Water Quality Standards Handout to complete this crossword



Across

3. One part of something in one million parts of something else.
4. Water needs to be this in order for it to hold more oxygen.
6. Surface water on roads, parking lots, sidewalks, roofs, etc., goes down this and flows to the nearest body of water.
8. Water can hold more of this when it is cold.
9. Too much sediment in the water absorbs this which will cause the water to heat up.
10. Water with a pH 7 is said to be this.
11. Bacteria found in the waste of many animals.
12. A test to determine how much sediment and silt is in the water.
13. Found in fertilizer, manure and soap.

Down

1. Water must have this in it in order for salmon and other aquatic organisms to breathe.
2. When the pH of water is too low it becomes this.
5. A word that means the best possible or most favorable conditions for an organism's survival.
6. Too much of this in the water can hurt a salmon's ability to see and breathe.
7. When water has too many nutrients, more of this will grow in it.