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# Practice Task: Water Quality Monitoring

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## PART 1: RESEARCH

(approx. 60-90 mins.)

### Student Directions:

#### Your Assignment:

**Congratulations! Your school has been selected to participate in a water quality monitoring service project that will provide important information to area scientists who are monitoring the health of our local environment. To participate in this important work, you will need to write an informational essay explaining the What, Why and How of water monitoring. Use information from the videos and the article to write your essay.**

#### Steps You Will Follow:

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To plan and write your essay, you will do all the following:

1. Watch two videos.
2. Read an article.
3. Answer three questions about the reading and the videos.
4. Plan and write your essay.

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### Directions for Beginning:

You will have 60-90 minutes to watch the videos and read the article about water quality monitoring. Take notes because you will want to refer to your notes while answering the three research questions and writing your essay. You may refer to any of the sources as often as you like.

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### Source Information:

- Source #1:** Video: Four Mile Run Stream Water Testing--- 6:06  
<https://www.youtube.com/watch?v=nDoCHqM-1GU&feature=youtu.be>
- Source #2:** Video: Marine Flight Program: Water Quality Monitoring--- 3:34  
[https://www.youtube.com/watch?v=29gokYmTz\\_g&feature=youtu.be](https://www.youtube.com/watch?v=29gokYmTz_g&feature=youtu.be)
- Source #3:** Article: Water Quality Monitoring  
*Adapted from Southwest Florida Water Management District publication*
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# Note Taking Tool Water Quality Monitoring Task



Source	What water quality monitoring is	Why water quality monitoring is important	How we monitor water quality
<b>Video #1: Four Mile Stream Water Testing, Virginia</b>			
<b>Video #2: Marine Flight Program, Puget Sound</b>			



# Note Taking Tool Water Quality Monitoring Task



Source	What water quality monitoring is	Why water quality monitoring is important	How we monitor water quality
<b>Article: Water Quality Monitoring</b>			



# *The Importance of* **WATER QUALITY MONITORING**

Every living thing on earth needs water to survive. Human bodies are made up of more than 60 percent water! We use clean water to drink, grow crops for food, operate factories, and for swimming, surfing, fishing and sailing. Water is vitally important to every aspect of our lives. Monitoring the quality of surface water will help protect our waterways from pollution. Farmers can use the information to help better manage their land and crops. Our local, state and national governments use monitoring information to help control pollution levels. We can use this information to understand exactly how we impact our water supply and to help us understand the important role we all play in water conservation.

## **Water Quality Pollutants**

It is important to remember that you cannot tell very much about the quality of water simply by looking at it. Most pollutants are invisible to the naked eye. There are four major types of pollutants that affect water quality. Let's take a look at each type.

### **Dirt**

Rain can wash dirt into rivers and streams. The dirt can smother tiny organisms and kill fish eggs clinging to rocks on the riverbed. Dirt can also clog gills and suffocate fish. Too much dirt in a water body can block sunlight that plants use to grow and make food in a process called photosynthesis. If plants don't get sunlight to grow, not only do the plants die, but they also don't make oxygen that other organisms, such as fish, need to live. Erosion is a major contributor to the dirt that flows into our local waters.

### **Bacteria**

Not all bacteria are harmful. However, some bacteria are pathogenic, meaning they can cause disease in humans. If we find certain bacteria living in a body of water, this can indicate that the water might harbor bacteria and viruses that can make you sick. A major source of bacteria comes from pet and agriculture waste that is washed into the rivers, streams and ocean.



### **Nutrients**

This is the primary cause of water pollution. The main pollutants in this category are nitrogen and phosphorus, but there are many others. Excess nutrients cause algae to grow out of control and use all the available oxygen in water, killing off other organisms that need oxygen to live. The excessive growth can also block sunlight and cause the death of plants and other aquatic organisms. Lawn fertilizers are a major source nitrogen and phosphorus. These nutrients wash off our lawns and end up in the ocean.

### **Chemicals**

This type of pollution comes from household products like cleaning fluids, soaps, pesticides, herbicides and even medicines. These products can contain chemicals that harm sea life when washed into our waters. One major source of these chemicals comes from car washing. Using a car wash rather than washing cars at home helps to reduce chemicals from entering our waterways.



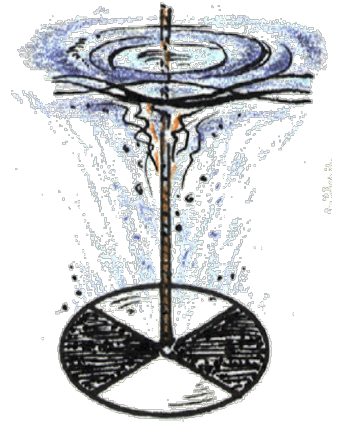
## Measuring Water Quality

Water quality can be difficult to measure. You can't tell much about the quality of water simply by looking at it; most pollutants are invisible to our eyes. And since water is such a vast network (made up of rivers, springs, creeks, streams, estuaries, wetlands, lakes, bays, etc.), water quality can be difficult to test. Each water body can contain dramatically different levels of pollution.

It's important to monitor as many streams and rivers as possible to understand water quality and to take actions to prevent further pollution.

Scientists use many different instruments to determine the quality of water, including Secchi disks (measure water clarity), probes, nets, gauges and meters. Water quality is not just measured by direct sampling. Information can also be derived from aerial and satellite photographs by observing the surrounding environment and by collecting organisms that live in the body of water.

Although you might not have access to the resources of a scientist, there are some simple tests you can perform to get an idea of the quality of a particular water body:



secchi disk

### Temperature



The temperature of water can affect it in many ways. Some organisms prefer cool water, while some like it warm. Most aquatic organisms are cold-blooded. This means that the temperature of their bodies matches the temperature of their surroundings. Reactions that take place in their bodies, like photosynthesis and digestion, can be affected by temperature. It is also important to know that when the temperature goes up, water will hold more dissolved solids (like salt or sugar) but fewer dissolved gases (like oxygen). The opposite is true for colder water. Plants and algae that use photosynthesis prefer to live in warm water, where there is less dissolved oxygen.

Generally, bacteria tend to grow more rapidly in warm waters. Colder water contains more oxygen, which is better for animals like fish and insect larvae.

### Dissolved Oxygen (DO)

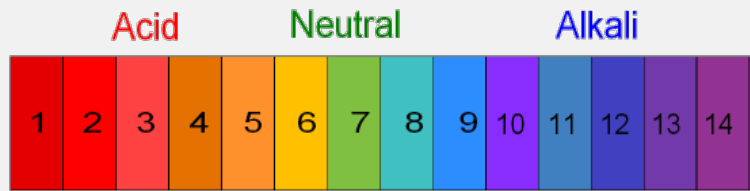
Oxygen is necessary for many aquatic species to survive. This test tells you how much oxygen is dissolved in water for fish and other organisms to breathe. Most healthy water bodies have high levels of DO. Lots of organic debris (fallen leaves, sewage leak) can cause a decrease in DO concentration. Microorganisms, in the process of decomposing the organic material, use all the oxygen in water. How does oxygen get in water in the first place? Much of the oxygen in water comes from plants during photosynthesis and also from air as wind blows across the water's surface.



## pH (acidity)

The potential of Hydrogen, also known as pH, is a measure of acidity and ranges from 0 (extremely acidic) to 14 (extremely basic) with 7 being neutral. Most water is in the range of 6.5–8.5. Let's see some examples to compare pH values. Lemon juice has a pH of 3 — this makes it an acid.

We all know how it feels to accidentally get lemon juice on a cut finger. Stronger acids have the ability to eat through solid objects if spilled. Strong bases, just like acids, can burn your skin. Let's think about why. Our bodies are made mostly of water. Water has a pH of 7. Things that are close to pH 7 work well with our bodies. The same holds true for aquatic organisms. If the water becomes too acidic or basic, it can kill them.



## Turbidity

Turbidity refers to the clarity of water, or how clear it is. This determines how much light gets into the water and how deep it goes. Excess soil erosion, dissolved solids or excess growth of microorganisms can cause turbidity. All of these can block light. Without light, plants die. Fewer plants mean less dissolved oxygen. Dead plants also increase the organic debris, which microorganisms feed on. This will further reduce the dissolved oxygen. No dissolved oxygen means other aquatic life forms cannot live in the water.



***Water quality issues influence human and environmental health, so the more we monitor our water the better we will be able to recognize and prevent contamination problems. When possible, share your data with local scientists who can use your data along with other peoples to monitor the health of our local waters.***



## Practice Task: **Water Quality Monitoring**



1. Explain what water quality monitoring is using specific examples from the videos and the article. Cite your sources. (*Claim 4, Target 2*)

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## Practice Task: Water Quality Monitoring

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2. Which of the three sources, Puget Sound video, the Virginia video, or the Informational Article, would best help a student to understand the importance of water quality monitoring? Reference information from each of the sources in your response. Cite your sources. *(Claim 4, Target 3)*

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## Practice Task: Water Quality Monitoring



3. Read this statement: *Water quality Monitoring is essential to the health of our local waters.* Use information from the sources to support this statement. Cite your sources.  
(Claim 4, Target 4)

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## Practice Task: Water Quality Monitoring



### Part 2: ESSAY

(approx. 60-90 mins)

#### Student Directions:

You will now have 60-90 minutes to review your notes and sources, plan, draft, and revise your essay. You may use your notes and refer to the sources. You may also refer to the answers you wrote to questions at the end of part 1, but you cannot change those answers. Now read your assignment and the information about how your essay will be scored, then begin your work.

#### Your assignment:

You and your classmates will participate in a school service project where you will collect water quality data and share your data with local scientists who are monitoring the health of our rivers, streams and Puget Sound. In preparation for this important work, you have been asked to write an essay where you explain what water quality monitoring is, why it is so important, and how monitoring is done. Use information from both print and video sources in your essay. Cite your sources.

### How your essay will be scored:

The people scoring your essay will be assigning scores for

- **Statement of Purpose / Focus**– how well you clearly state and maintain your controlling idea or main idea
- **Organization**– how well the ideas progress from the introduction to the conclusion using effective transitions and how well you stay on topic throughout the essay
- **Elaboration of Evidence**– how well you provide evidence from sources about your topic and elaborate with specific information
- **Language and Vocabulary**– how well you effectively express ideas using precise language that is appropriate for your audience and purpose
- **Conventions**– how well you follow the rules of usage, punctuation, capitalization, and spelling

### Now begin work on your essay.

Manage your time carefully so that you can:

- Plan your essay
- Write your essay
- Revise and edit for a final draft





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## Practice Task: **Water Quality Monitoring**

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### Planning My Essay

<b>Introduction</b>	
<b><i>What:</i> water quality monitoring is</b>	
<b><i>Why:</i> Monitoring our water is important</b>	
<b><i>How:</i> Specific tests we use to monitor the quality of the water</b>	
<b>Conclusion</b>	

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