Teacher Directions: Water Quality Monitoring

GRADE 6/7: Two 60 to 90 -minute classroom sessions for Research and Essay Writing. Students may take additional time if needed. Provide on-line assessment if possible.

Task Overview

Part 1 (60 to 90 minutes): Tasked with writing an essay about the what, why and how of water quality monitoring, students will watch two videos and read an article, taking notes on these sources. They will then respond to three constructed-response questions addressing the research skills of analyzing and integrating data, evaluating sources, and using evidence to support arguments.

Part 2 (60 to 90 minutes): Using their notes and source material, students work independently to write an informational essay explaining the what, why, and how of water quality monitoring.

Scorable Products: Responses to the constructed-response questions and the essay will be scored.

Suggested Pre-task Activity: Ask students to think about why we might need to monitor the quality of our water. Can they think of specific concerns related to water quality? (lead poisoning and bacteria for example) What do they already know about monitoring the quality of our water? Share that in this task, they will learn about what, why and how of water quality monitoring.

Directions for Administration:

Part 1 (60 to 90 minutes)

- Students are given the text and videos to learn about water quality monitoring.
- Initiate the testing session. Use online testing if possible.
- Provide approximately 60 to 90 minutes to complete Part 1.
- Provide additional time as needed. The SBAC assessments are untimed.
- Make sure students put their names on their notes

Part 2 (60 to 90 minutes)

- Allow students to use their notes and data sheets to outline their essays.
- Review the essay rubric with the students.
- Provide 60 to 90 minutes to write essays.
- Provide additional time as needed. The SBAC assessments are untimed.

Scoring Notes: Water Quality Monitoring

Water Quality Volunteer

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

Analyze/Integrate Information Rubric (Claim 4, Target 2)	
2	• The response gives sufficient evidence of the ability to gather, analyze, and integrate information within and among multiple sources of information.
1	• The response gives limited evidence of the ability to gather, analyze, and integrate information within and among multiple sources of information.
0	• A response gets no credit if it provides no evidence of the ability to gather, analyze, and integrate information within and among multiple sources of information.

Scoring Notes:

- **Four Mile Run Stream Video: Determining how safe the water is for critters and humans by running tests. We can see what critters live in the water. With water quality monitoring, we figure out what is wrong so we can fix it.**
- **Marine Flight Program Video: Collecting different types of data like water clarity and dissolved oxygen to figure out the health of the water over time.**
- **Water Quality Monitoring Article: Water quality monitoring is looking at different types of pollution in the water like bacteria, dirt, nutrients, and chemicals. The water is tested for temperature, dissolved oxygen, pH, and turbidity.**

2 Points:

- **Explains what water quality monitoring is: Testing the water to determine how healthy or safe it is**
- **Uses specific examples of water quality monitoring from the videos and the article**
- **Cites**

sources 1 Point:

- **Explains what water quality monitoring is: Testing the water to determine how healthy or safe it is**
- **Uses specific examples from one or two of the sources**
- **May or may not cite**

sources 0 Points:

- **Inaccurate or incomplete definition**
- **Little or no references to sources**
- **Vague and confusing response**
- **Off topic**

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Sample 2 Point Responses:

Example #1: Water quality monitoring is using tests to check for healthy and unhealthy water. According to the article, it is important to monitor for oxygen in the water because "Oxygen is necessary for many aquatic species to survive." Also, you should monitor the temperature. Most aquatic animals are cold blooded and need cold water to survive. Based on Video #1, stream monitoring is looking for little critters. You can analyze the diversity. You want lots of critter types for the water to be healthy. According to video #2, if there is sufficient oxygen in the water, then more aquatic species can survive. Testing the water for things like temperature, oxygen, and diversity is what water quality monitoring is all about!

Example #2: Water quality monitoring is very important! We need to know if our water is safe to drink and for our fish to live. To check the quality of our water, we can run a lot of different tests. In video #1, the students are testing the water for the types of critters that are in it. The more types of critters, the healthier the water! In video #2, the people are using a piece of equipment called a CTD. One thing this equipment measures is temperature. Data is collected and analyzed to see how healthy the water is. In the article, there are four tests that are used to monitor the quality of the water. These include temperature, dissolved oxygen, pH, and turbidity. People use data from all of these tests to monitor the quality of the water.

Sample 1 Point Responses:

Example #1: What is water quality monitoring? Every living thing needs water to survive. According to video number 1, if we don't take care of our bodies of water, they will turn into dead zones. When you wash your car or use objects with chemicals or when sewer leaks happen, that gets into our streams or other water bodies. The water gets polluted the fish can die. We test the water to see if it is healthy for fish and for humans. (Only one source is referenced.)

Example #2: Water quality monitoring is about doing different things to test the water. In the two videos, they stated different things they did like use a C.T.D. in video 2. In video 1, they used buckets, brushes, and microscopes. (References two of the three sources; lacks specific examples of the tests that are used to monitor water quality.)

Sample 0 Point Responses:

Example #1: Everything in the world needs water. If we don't have clean water, nothing can live. So water quality is very important. (Off topic response)

Example #2: Water quality monitoring is the test we do to make sure water is clean so that water animals can live. Fish are cold blooded and every living thing on earth needs water to survive. (Incomplete definition-no tests are described. No reference to sources)

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2. **Which of the three sources, the 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)***

Use Evidence Rubric (Claim 4, Target 3)	
2	• The response gives sufficient evidence of the ability to evaluate the credibility, completeness, relevancy, and/or accuracy of the information and sources.
1	• The response gives limited evidence of the ability to evaluate the credibility, completeness, relevancy, and/or accuracy of the information and sources.
0	• A response gets no credit if it provides no evidence of the ability evaluate the credibility, completeness, relevancy, and/or accuracy of the information and sources.

Scoring Notes:

- **Puget Sound Video:** Local video so we can relate to the problems and be motivated to look for solutions. Narrator is from Shelton, WA and loves the water. She wants to protect it from pollution and water quality monitoring is a way to do this. The video focuses on data collection and analysis. Data is collected from all over the Puget Sound.
- **Virginia Video:** Shows students testing the water at Four Mile Stream. Students can relate to other students and see firsthand how to monitor the water. Also, this video has a politician explaining how important it is for future generations to have clean water. His message is: Students can make a difference!
- **Article**: There is a lot more information in the article, and the article tells us more about the importance of water quality monitoring. The article says that "Monitoring the quality of the surface water will help to protect our waterways from pollution." Farmers, the government, and all of us can help. The article gives us details about pollutants such as dirt and bacteria. We need to monitor for these pollutants.

2 Points:

- **Selects one of the three sources as best in helping students to understand the importance of water quality monitoring**
- **Provides at least one specific reason for the source selected**
- **References the other two sources in comparison**
- **Cites sources**

1 Point:

- **Selects one of the three sources as best**
- **Provides a specific reason for the sources selected**
- **Fails to reference the other sources in comparison**
- **Fails to cite sources**

Scoring Notes: Water Quality Monitoring

0 Points:

- **Fails to select one source as best or selects a source with no clear rationale**
- **Vague and confusing response**
- **Off topic**

Sample 2-point Responses:

Example #1: I think that the Virginia video is the best source for a student to learn about water quality monitoring and its importance. First, this video teaches you that water quality monitoring saves the animals in the water, so they don't die. In the Virginia video it says that we should try not to pollute or litter or use certain chemicals and I think that this is important to know. Next, the Virginia video tells us that we need healthy water for future generations and neither of the other two sources talks as much about this need. Lastly, the Virginia video stresses that it is our job to undo the damage that has been done to our waters. The congressman in the video emphasizes that we must "stop pollution and fix what is wrong." The Virginia video focuses on the importance of water quality monitoring while the Puget Sound video and the article focus more on how we monitor water quality.

Example #2: I think that the informational article would be the best to help students to understand the importance of water quality monitoring for many reasons. My first reason is that there is more detail in the article. The article talks about what pollutes our water and about the tests we can do. It is easier to understand than the Puget Sound Video and has more information about how to monitor water quality than the Virginia video. Also, the article gives a lot more detail about how the water becomes polluted. It mentions dirt, bacteria, nutrients and chemicals. The other two sources don't talk as much about pollutants. Finally, the article talks a lot about the importance of clean water. Farmers need the water to grow crops; people need water to drink - 60% of our bodies are water! In conclusion, what the article says would help a student to know about the importance of water quality monitoring.

Example #3: The informational article would be the most help to students in understanding the importance of water quality monitoring for many reasons. The Puget Sound video shows the water from the air but does not talk about it enough. The article has much more detail. For example, the article tells us what the pollutants are and gives us ideas about how to keep the water healthy. The Virginia video has a lot of information but in my opinion, it is not enough information. The article would help a student to understand how to measure bacteria in the water, so we can have clean water to drink. The article also describes the tests we can use to monitor the water quality. For all these reasons, I think the informational article is the best choice.

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Sample 1-point responses:

Example #1: I think the Puget Sound video is the best choice. It has the most we can recognize. It shows the Puget Sound and talks about pollution. It shows how to test the water. It tells us to keep the water clean. We live in the Puget Sound. (Identifies one of the sources as best and provides a reason. Does not reference the other two sources in comparison.)

Example #2: The article best helps a student to understand why water quality is important for a few reasons. First, aquatic life need clean water! The text says fish can get mud in their gills which will suffocate them. If we don't have fish, the food chain will be mixed up. Next, we need water. According to the article, everything needs water. If animals drink dirty water, they will get sick and maybe die. As you can see I think keeping water clean is important. (Identifies one of the sources as best and provides specific reasons. Does not reference the other two sources in comparison.)

Sample 0-point responses:

Example #1: I like all of the sources! The videos were fun to watch. The article had a lot of good information. I learned something about what quality monitoring from each of the sources. (Fails to identify one source as best in understanding why water quality monitoring is important. Provides no details.)

Example #2: The article is the best source. I like to read. Reading is the best way to learn anything. The article was fun to read and I liked the pictures! (Off topic response.)

Scoring Notes: Water Quality Monitoring

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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)***

Use Evidence Rubric (Claim 4, Target 4)	
2	• The response gives sufficient evidence of the ability to cite evidence to support arguments and/or ideas.
1	• The response gives limited evidence of the ability to cite evidence to support arguments and/or ideas.
0	• A response gets no credit if it provides no evidence of the ability to cite evidence to support arguments and/or ideas.

Scoring Notes:

- **Puget Sound Video: The video looks at how our local region is affected by water quality. It says that we need to protect our water so that our region stays healthy. Our choices affect the health of the Puget Sound. Data collection and analysis helps us to see trends over time. Data informs the choices we make to keep the Puget Sound healthy.**
- **Virginia Video: The video shows how diversity in the types of critters in the water indicates the health of the water. We can then take action to make the water healthier. If we did not monitor the water, we would not know what is happening and how to fix it.**
- **Article: The article says that monitoring water quality will help to protect us from pollution in our waterways. "The more we monitor our water the better we will be able to recognize and prevent contamination problems."**

2 Points:

- **Defends the statement that Water Quality Monitoring is essential to the health of our local water**
- **Uses information from at least two of the three sources**
- **Cites sources**
- o

1 Point

- **Defends the statement that Water Quality Monitoring is essential to the health of our local water**
- **Uses information from only one of the sources**
- **May or may not cite sources**

0 Points:

- **Defends the statement but does not use information from any of the sources**
- **Vague and/or confusing response**
- **Off topic**

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Sample 2-point responses:

Example #1: Water quality monitoring is essential to the health of our local waters for several reasons. First, in the Virginia video, the congressman said "It is our mission to undo the damage done to our environment." This video also talks about water quality monitoring to make sure we don't have parking lot run off like oil, fuel, and grease. According to the article, we need clean water for many uses such as farming, crops, and raising animals. We also need to monitor pollution levels so that the water is safe for us to drink. Our bodies are 60% water and we need clean water to survive!

Example #2: Water quality monitoring is essential to the health of our local water. According to Video #1, the congressman said "It is your mission so your kids can have clean water to drink." Based on the article, it says "We use water to grow crops, operate factories, swimming, surfing, and sailing. Every living thing on earth needs water to survive." If living things do not get water they will very likely die or be sick. This is why water quality monitoring is essential to the health of our local waters.

Example #3: Water quality monitoring is essential to the health of our local waters. Based on the article, we humans need water to drink, grow crops, and many other things. If our water bodies are not healthy, then we can become unhealthy as well. For example, if we drink unhealthy water, we can get very sick. Next, it's not just humans that unhealthy water affects. Almost every critter that lives in our polluted water bodies is likely to suffer from it. According to video #1, the more critters that live in our water, the less polluted our water is. When we monitor water quality, we see how polluted the lakes, rivers, or other water bodies are. According to the article, the government uses our information to control pollution levels. As you can see water quality monitoring is essential!

Sample 1-point responses:

Example #1: Water quality monitoring is essential to the health of our local waters for many reasons. First, if we do water quality monitoring it saves the animals in our water. Cold-blooded animals need cold water to survive. If the water turns warmer, then these animals will die. I think these animals are part of the food chain which means other animals could also die. Next, if we monitor water quality, then we won't have to drink dirty water. We need water quality monitoring to check the waters and if they are not clean, to fix it so we won't have to drink dirty water of have the water be a dead zone. As you can see that's why water quality monitoring is important to us and to animals. (Relevant information but no reference to any of the sources.)

Example #2: Water quality monitoring is essential to the health of our local waters. Yes, that's true! Water quality monitoring is important to our local water for many reasons like making plants grow. Also, it helps animals live. We monitor and we analyze. We make sure the water is clear. We use indicators and CTD in the Puget Sound video. We check for invertebrates. We look for erosion and look at the color of the water. We try to undo damage done to lakes, streams, oceans, and rivers. We use microscopes and color indicators. Those are the many, many reasons water quality is important. (References only one source)

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Sample 0-point responses:

Example #1: Water quality monitoring is very important! We must have clean water! Don't litter or our fish and other animals will die. Also, if animals eat our junk, then they will choke. If our water is dirty, people won't be able to do fun stuff like swim. You can still swim but you will have to swim in gross junk. In conclusion, keep our water clean! (Off topic response: focus is on keeping water clean, not monitoring water quality; no reference to any of the sources.)

Example #2 Water quality is important because the health of the water. I think that it is a good thing because we do the right thing for several reasons. According to the video, it said that you can find animals and you can protect them from going anywhere. The earth needs water because it helps you stay alive and to keep water safe. (Vague and confusing response.)

Informative / Explanatory Writing Rubric (Grades 6-11)
Scoring Version

Score	4	3	2	1
Statement of Purpose/Focus	**The response is fully sustained and consistently and purposefully focused:** • consistent or main idea of a topic is clearly communicated, and the focus is strongly maintained for the purpose, audience, and task	**The response is adequately sustained and generally focused:** • controlling or main idea of the topic is clear, and the focus is mostly maintained for the purpose, audience, and task	**The response is somewhat sustained and may have a minor drift in focus:** • controlling or main idea of a topic may be somewhat unclear, and the focus may be insufficiently sustained for the purpose, audience, and task	**The response may be related to the topic but may provide little or no focus:** • controlling or main idea of the topic may be somewhat confusing or ambiguous; response may be too brief or the focus may drift from the purpose, audience, and task
Organization	**The response has a clear and effective organizational structure creating unity and completeness:** • consistent use of a variety of transitional strategies to clarify the relationships between and among ideas • effective introduction and conclusion • logical progression of ideas from beginning to end; strong connections between and among ideas, with some syntactic variety	**The response has an evident organizational structure and a sense of completeness, though there may be minor flaws and some ideas may be loosely connected:** • adequate use of transitional strategies with some variety to clarify the relationships between and among ideas • adequate introduction and conclusion • adequate progression of ideas from beginning to end; adequate connections between and among ideas	**The response has an inconsistent organizational structure, and flaws are evident:** • inconsistent use of transitional strategies with little variety • introduction and conclusion, if present, may be weak • uneven progression of ideas from beginning to end; and/or formulaic; inconsistent or unclear connections between and among ideas	**The response has little or no discernible organizational structure:** • few or no transitional strategies are evident • introduction and conclusion, if present, may be missing • frequent extraneous ideas may be evident; ideas may be randomly ordered or have an unclear progression
Elaboration of Evidence	**The response provides thorough and convincing support/evidence for the controlling idea and supporting idea(s) that includes the effective use of sources, facts, and details.** • comprehensive evidence from sources is integrated; references are relevant and specific • effective use of a variety of elaborative techniques*	**The response provides adequate support/evidence for the controlling idea and supporting idea(s) that includes the use of sources, facts, and details:** • adequate evidence from sources is integrated; some references may be general • adequate use of some elaborative techniques*	**The response provides uneven, cursory support/evidence for the controlling idea and supporting idea(s) that includes uneven or limited use of sources, facts, and details:** • some evidence from sources is weakly integrated, imprecise, or repetitive; references may be vague • weak or uneven use of elaborative techniques*; development may consist primarily of source summary	**The response provides minimal support/evidence for the controlling idea and supporting idea(s) that includes little or no use of sources, facts, and details:** • evidence from the source material is minimal or irrelevant; references may be absent or incorrectly used • minimal, if any, use of elaborative techniques*
Language	**The response clearly and effectively elaborates ideas, using precise language:** • vocabulary is clearly appropriate for the audience and purpose • effective, appropriate style enhances content	**The response adequately elaborates ideas, employing a mix of precise with more general language**: • vocabulary is generally appropriate for the audience and purpose • generally appropriate style is evident	**The response elaborates ideas unevenly, using simplistic language:** • vocabulary is uneven or somewhat ineffective for the audience and purpose • inconsistent or weak attempt to create appropriate style	**The response is vague, lacks clarity, or is confusing:** • vocabulary is limited or ineffective for the audience and purpose • little or no evidence of appropriate style

Score	2	1	0
Conventions	**The response demonstrates a command of conventions:** • adequate use of correct sentence formation, punctuation, capitalization, grammar usage, and spelling	**The response demonstrates partial command of conventions:** • limited use of correct sentence formation, punctuation, capitalization, grammar usage, and spelling	**The response demonstrates little or no command of conventions:** • infrequent use of correct sentence formation, punctuation, capitalization, grammar usage, and spelling

NS	**Unintelligible, in a language other than English, off-topic, insufficient evidence (incomplete) or copied text. (Off-purpose writing will still receive a score in Conventions.)**

*Elaborative techniques may include the use of personal experiences that support the controlling idea.