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Lesson F: Water Quality - Abiotic Factors Worksheet

Part 1: Introduction

What do we know about Water Quality?

- Discuss this question: *What do we know about Water Quality?*
- Record your answers.

Water Quality Basics

- View this short video from The PBS Learning Media “Explore More” Series:
 - <https://vpm.pbslearningmedia.org/resource/e704f189-42ce-4dd3-82b4-18787100c43c/water-quality-basics/>
- Answer these questions and think about the importance of water, the availability of freshwater and local issues that may impact water quality.
 - Share 3 ways you use water.
 - How much water is available to mean everyone’s water needs? 1%, 2%, or 97%?
 - What is something in your community that may negatively impact water quality?

What do we want to know about Water Quality?

- Now consider this question: *What do we want to know about Water Quality?*
- Record your answers.

Water Quality - Watershed

- Continue thinking about water quality in your community by viewing this video:
 - <https://vpm.pbslearningmedia.org/resource/254b8ba3-02eb-40e0-8a65-f39f466e2aa7/water-quality-watershed/>
 - This video is about common water pollutants and their sources that may impact your local watersheds.
- Answer these questions and think about the importance of water, the availability of freshwater and local issues that may impact water quality.
 - In your own words, explain what a watershed is.
 - In what watershed do you live?
 - What are some of the types of pollutants and their sources that can affect water quality?
 - Consider our local watershed. What are the possible pollutants? What are the possible sources of the pollutants?
 - How can we determine what pollutants are in our bodies of water?

What have we learned about Water Quality?

- Discuss the question: *What have we learned about Water Quality?*
- Record your answers.



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Part 2: How Healthy is my Water? Data and Analysis

In this lesson, you will use a grade appropriate water quality test kit to test basic water quality factors and record your data on the worksheet.

This [presentation](#) guides you through the Water Quality Testing procedures using the Lamotte Water Test Education Kit.

As you complete the water quality test, enter your data into the [How Healthy is My Water? Data and Analysis Worksheet](#) and complete the analysis section.

Compare your results from various locations within the Chesapeake Bay Watershed using [Part 3: Up River. Down River.](#)



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How Healthy is my Water? Data and Analysis Worksheet

What is the street address where you collected your water sample?

Street address	City	State	Zip Code
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Enter the results of each of your tests:

Temperature	_____	Nitrate	_____
Dissolved Oxygen	_____	Phosphate	_____
DO Percent Saturation	_____	pH	_____
Turbidity	_____		

How healthy is my water? What do my results mean?

Rank the results of each water quality test on a 1-4 scale:

Test Factor	Result	Rank	My Test Rank
Dissolved Oxygen	91-110 Percent Saturation 71-90 Percent Saturation 51-70 Percent Saturation <50 Percent Saturation	4 (excellent) 3 (good) 2 (fair) 1 (poor)	
Turbidity	0 JTU >0 to 40 JTU >40 to 100 JTU >100 JTU	4 (excellent) 3 (good) 2 (fair) 1 (poor)	
Nitrate	5 ppm 20 ppm 40 ppm	2 (fair) 1 (poor) 1 (poor)	
Phosphate	1 ppm 2 ppm 4 ppm	4 (excellent) 3 (good) 2 (fair)	
pH	4 5 6 7 8 9 10	1 (poor) 1 (poor) 3 (good) 4 (excellent) 3 (good) 1 (poor) 1 (poor)	



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Analysis:

What do these measurements tell you about your water sample? Is it healthy? What factors could be improved?

Oysters require a saltwater environment to live, while freshwater Mussels do best with little or no salinity.

Which of these locations has the best salinity for Oysters?

Which has the best salinity of freshwater mussels?

Which of the other Abiotic Factors measured could impact Oysters? Mussels? Explain

Name a potential issue that could cause your water quality to degrade.

What is something that you or your middle school could do to help improve the water quality near your school; therefore improving the watershed?

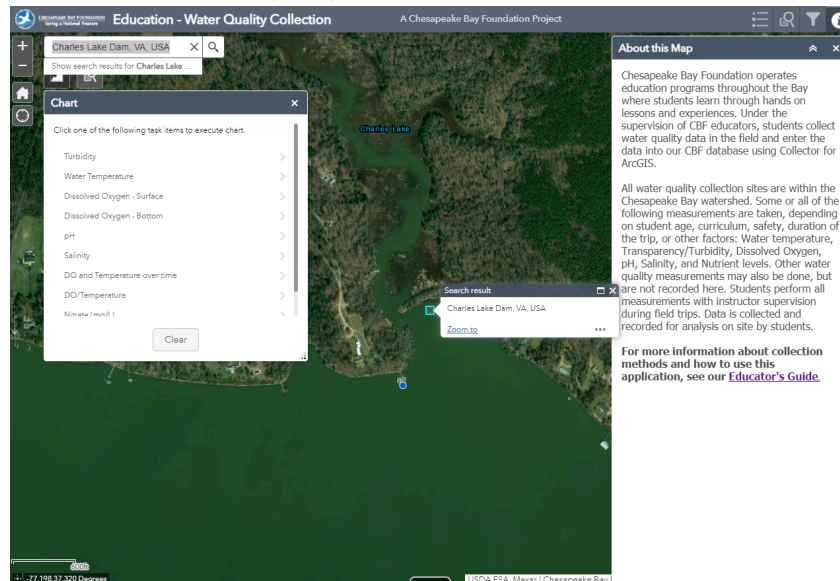


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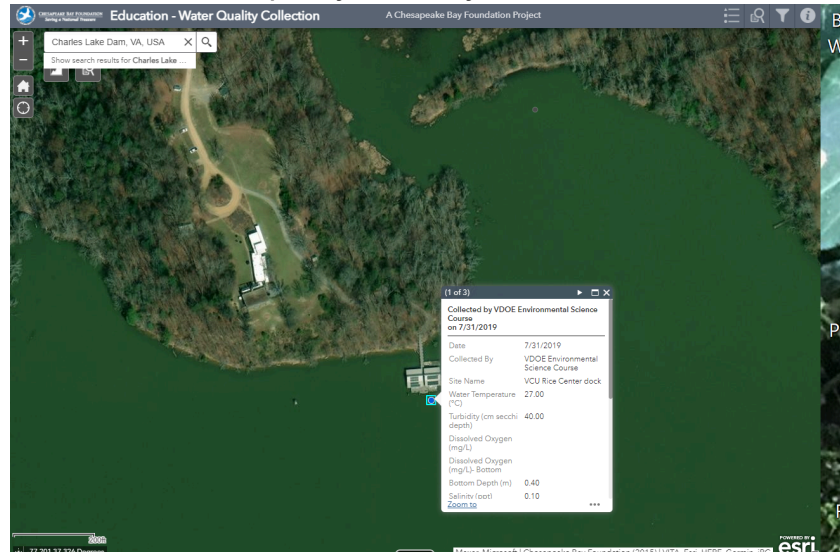
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Part 3: Up River, Down River

1. Use the Chesapeake Bay Foundation Water Quality Database to compare water quality from several locations along the river.
 - a. [Part 3: Up River, Down River Data and Analysis Worksheet](#)
 - b. <https://cbforg.maps.arcgis.com/apps/webappviewer/index.html?id=c5b79fd4c0ae431d83b58ffabd3df913>
 - c. Enter “Charles Lake Dam, VA, USA” in the search bar and search



- d. Locate the blue dot just below the Charles Lake Dam. This marks the location of a water quality testing site at the **VCU Rice Rivers Center Dock**. Record the water quality data in your worksheet

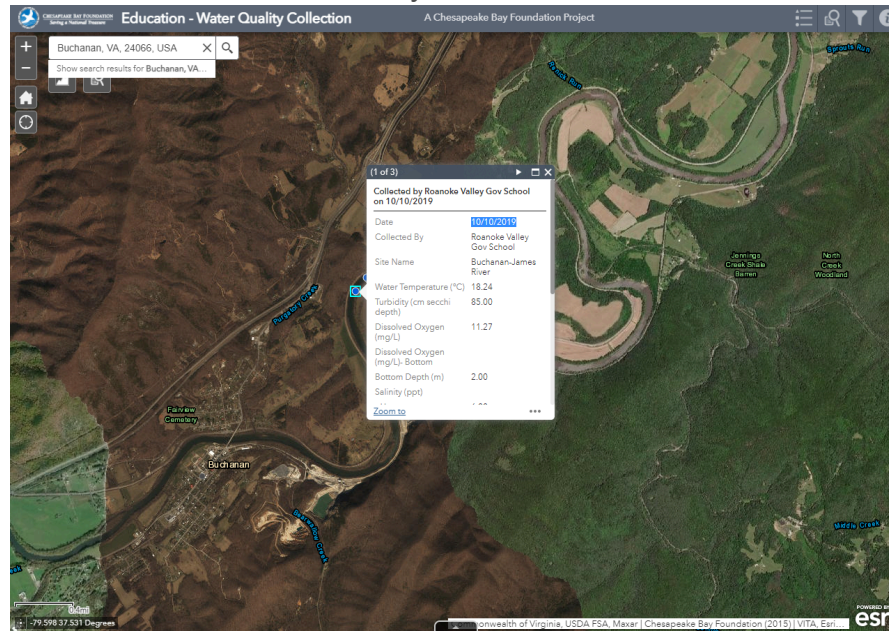




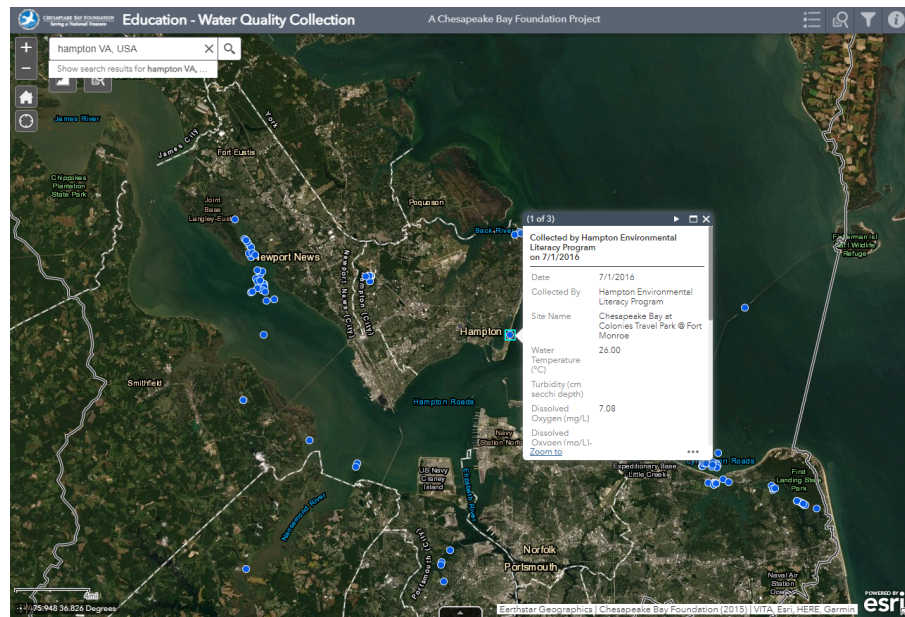
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- e. Now search for “Buchanan, VA, 24066, USA”. This will take you to the Upper James River. Zoom in until you see several blue dots indicating test sites northeast of Buchanan. Choose the site that was tested on 10/10/2019 and record the data on your worksheet.



- f. Search for “Hampton VA, USA” and click on the blue dot just east of Hampton. Record the data on your worksheet.





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2. Choose one additional location along the James River and enter the data on your worksheet.

Part 3: Up River, Down River Data and Analysis Worksheet

Data	Site #1	Site #2	Site #3	Site #4
Date the Sample was Collected	7/31/2019	10/10/2019	7/1/2016	
Site Name	VCU Rice Rivers Center Dock	Buchanan-James River	Chesapeake Bay at Colonies Travel Park @ Fort Monroe	
Water Temperature (°Celsius)				
Turbidity (cm Secchi Disk depth)				
Dissolved Oxygen (surface)				
Salinity (ppt)				
pH				
Nitrate (mg/L)				
Phosphate (mg/L)				

3. Analysis:

Notice the **Salinity** of each location.

Why do you think that this factor is different between the locations?

Notice the **Turbidity** of each location.

Why do you think that this factor is different between the locations?

Notice the **Nitrate and Phosphate** levels of each location.

Why do you think that these factors are different between the locations?

Do you think that the time of year that the samples were taken may have affected the **Nitrate** and **Phosphate** levels? Why or Why not?