**Physical and Human Characteristics of the Chesapeake Bay Region**

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| **Science Standards***Virginia Standards of Learning*, 2018 | 6.8 Investigate and understand that land and water have roles in watershed systems.  |
| 1. a watershed is composed on the land that drains into a body of water;
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| 1. Virginia is composed of multiple watershed systems which have specific features;
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| 1. the Chesapeake Bay is an estuary that has many important functions; and
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| 1. natural processes, human activities, and biotic and abiotic factors influence the health of a watershed system.
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| ES.1 The student will demonstrate and understanding of scientific and engineering practices by |
| 1. asking questions and defining problems
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| 1. Interpreting, analyzing, and evaluating data
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| 1. constructing and critiquing conclusions, and explanations
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| ES. Investigate and understand that resource use is complex1. use of Virginia resources has an impact on the environment and the economy
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| ES.8 Investigate and understand that freshwater resources influence and are influenced by geologic process and activities of humans |
| 1. stream processes and dynamics impact the major watershed systems in Virginia, including the Chesapeake Bay and its tributaries (sic)
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| **Learning Outcomes** | * Describe the location and size of the Chesapeake Bay.
* Explain how imagery and mapped data are alike and different.
* Predict the influence of several factors, impervious surfaces, volume of water, vegetation, and cropland, on water quality in the Bay.
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| **URL:** <https://arcg.is/1rOSTK> |
| **Engage**  |
| ***Where is the Chesapeake Bay region?*****→** Click the URL above to launch the map.**?** How many states are included in the Chesapeake Bay Watershed? **?** Which states in the watershed do not border the Chesapeake Bay?**→** With the Details button underlined, click the button, Show Contents of Map (Content).**→** Uncheck the Chesapeake Bay Watershed by State layer.**→**  Zoom in and read Map Note 1.**?** What river flows in the Chesapeake Bay here**?** Why is this river important to the Chesapeake Bay? |
| **Explore** |
| **How big is the Chesapeake Bay?****→** Use the measure tool to measure across the mouth of the river near marker 1. (*ToolTip on next page)***?** How far is it from shore to shore at this part of the Chesapeake Bay? **→** Turn off the USA Topo layer.**→** Go to the Bookmark Button and select the Mouth of the Bay bookmark.? How far is it across the mouth of the Chesapeake Bay between markers 2 and 3.? How far is the distance using the Chesapeake Bay Bridge tunnel? ? What is the water area of the Chesapeake Bay? Hint: measure tool, area. **?** How do you think the size of the Bay would affect its ability to disperse pollutants?  |

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| **Explain** |
| **How does land cover vary throughout the region?****→** Turn on the World Imagery (Clarity) layer. Use the bookmarks to zoom to each marker.**→**Toggle between the USA Topo map and the Imagery to obtain additional information. Note: the topo map is not as recent as the imagery.? What do you observe at each of the markers🞂 Natural bodies of water do not follow straight lines. ? What is the body of water near marker 3? |
| **Elaborate** |
| **How does land use affect runoff into the Bay?****→** Turn on the Chesapeake Bay Land Cover layer. Click on the layer’s name and select the legend symbol.🞂 Water cannot pass through an impervious surface such as cement and asphalt.**?** Which Marker has a high concentration of impervious surfaces?**?** How do impervious surfaces affect drainage? **?** How would barren land affect runoff into the Chesapeake Bay? **→** Click the Home button. **?** Which areas of the Chesapeake Bay watershed are primarily forested?  |
| **Evaluate** |
| **How does geographic scale affect data interpretation?****→** Turn on the Chesapeake Bay Watershed by State layer. Click on each state and examine the pop-ups.**?** Which land use is predominant in most states? Second most prominent? 🞂 Cultivated cropland has the potential for fertilizer, herbicide, pesticide, etc. runoff into the bay. **?** What is the state average of cultivated cropland for Virginia? **→** Turn on the Cultivated Land by County layer and turn off all other layers.**?** Where are the Virginia counties with a percentage of cultivated cropland higher than the state average located? **?** To what extent do the agricultural areas border the Bay? ***?*** How would the location of the cultivated areas affect plans to clean the bay?  |
| **MEASURE** | **BOOKMARKS** |
| * Click the Measure tool.
* Select distance, and then choose the unit of measurement.
* Click once to start measuring, click once to change direction, and double click to stop measuring.
 | * Click the button, Bookmarks.
* Choose a bookmark name to zoom to a specified map location and scale.
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| **EXPLORE MORE** |
| * Use the measure tool to determine latitude and longitude coordinates for the northernmost, easternmost, southernmost, and westernmost. Have students explain the criteria they used in determining those points.
* For additional latitude and longitude practice, click Modify Map, then (Add button) Search for World Latitude and Longitude Grids (ESRI) in ArcGIS Online.
* Have students compare the imagery and USA topo map layers to determine features no longer present on the landscape, e.g. Air Force base on the eastern shore.
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