

Physical and Human Characteristics of the Chesapeake Bay Region

Science Standards <i>Virginia Standards of Learning, 2018</i>	6.8 Investigate and understand that land and water have roles in watershed systems. a) a watershed is composed on the land that drains into a body of water; b) Virginia is composed of multiple watershed systems which have specific features; c) the Chesapeake Bay is an estuary that has many important functions; and d) natural processes, human activities, and biotic and abiotic factors influence the health of a watershed system.
	ES.1 The student will demonstrate and understanding of scientific and engineering practices by a) asking questions and defining problems c) Interpreting, analyzing, and evaluating data d) constructing and critiquing conclusions, and explanations ES.8 Investigate and understand that freshwater resources influence and are influenced by geologic process and activities of humans d) stream processes and dynamics impact the major watershed systems in Virginia, including the Chesapeake Bay and its tributaries (sic)
Learning Outcomes	- Describe the location and size of the Chesapeake Bay. - Explain how imagery and mapped data are alike and different. - Predict the relationship of various factors influencing water quality in the Bay.

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? (*six, plus the District of Columbia*)
- ? Which states in the watershed do not border the Chesapeake Bay? (*New York, Pennsylvania, Delaware, West Virginia*)
- With the Details button underlined, click the button, Show Contents of Map (Content).
- Uncheck the States in Chesapeake Bay Watershed layer.
- Zoom in and read Map Note 1.
- ? What river flows in the Chesapeake Bay here? (*Susquehanna*)
- ? Why is this river important to the Chesapeake Bay? (*largest source of fresh water runoff*)

Explore

How big in 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? (*~one mile*)
- Turn off the USA Topo Maps layer.
- Go to the Bookmark Button and select the Mouth of the Chesapeake Bay bookmark. (*Tooltip on next page*)
- ? How far is it across the mouth of the Chesapeake Bay? (*~13 miles*)
- ? How far is the distance using the Chesapeake Bay Bridge tunnel? (*~19.4*)
- ? What is the water area of the Chesapeake Bay? Hint: measure tool, area. (*~3769.2 sq. miles*)
- ? How do you think the size of the Bay would affects its ability to disperse pollutants? (*smaller bodies of water are less likely to disperse pollutants*)

Explain

How does land cover vary throughout the region?

- Change the Basemap to Imagery. Use bookmarks to zoom to each marker.
- ? What do you observe at each of the markers? (Marker 1: large settlement on the western bank of the river, farms along the Bay; . Marker 2: sandy shore and buildings with paved lots; Marker 3: north/south highway, open land to the south, farms to the north)
- ▶ Natural bodies of water do not follow straight lines.
- Toggle between the USA Topo map and the Imagery basemap to obtain additional information. Note: the topo map is not as recent as the imagery.
- ? What is the body of water near marker 3? (*Virginia Inside Passage*) What do you think its purpose is? (*create a shorter route and shelter ships from ocean currents*)

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 of the three areas has a high concentration of impervious surfaces? (*Marker 3, Virginia Beach*)
- ? How do impervious surfaces affect drainage? (*water cannot drain into the ground, flows into nearby streams*)
- ? How would barren land affect runoff into the Chesapeake Bay? (*vegetation can prevent erosion*)
- ? Which areas of the Chesapeake Bay watershed are primarily forested? (*interior areas, mountainous*)

Evaluate

How does a different 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? (*forests*) Second most prominent? (*cultivated cropland*)
- ▶ Cultivated cropland has the potential for fertilizer, herbicide, pesticide, etc. runoff into the bay.
- ? What is the state average of cultivated cropland for Virginia? (*20.67%*)
- Turn on the Cultivated Land by County layer and turn off the Chesapeake Bay Watershed by State layer.
- ? Where are the Virginia counties with a higher percentage of cultivated cropland than the state average located? (*in the northwestern part of the state*)
- ? To what extent do the agricultural areas border the Bay? (*none directly touch the bay*)
- ? How would the location of the cultivated areas affect plans to clean the bay? (*areas away from the bay don't readily see the effects of their actions*)

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.

EXPLORE MORE

- Use the measure tool to determine latitude and longitude coordinates for the northernmost, easternmost, southernmost, and westernmost. Have students explain what criteria they used in determining those points.
- 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.