Exploring the Chesapeake Bay Watershed
Answer Key

FieldScope is an easy-to-use online Geographic Information System (GIS) interface for mapping, graphing, entering, and understanding data. Citizen scientists have collected data about water quality around the Chesapeake Bay watershed. You will explore this data by interacting with different base maps and map layers within FieldScope.

The following is a brief list of FieldScope Vocabulary introduced in the activity. See Overview and Working with Maps videos (http://chesapeake.fieldscope.org/v3/help):
- **Base Maps:** Background reference information that may include landforms, roads, landmarks, and political boundaries, onto which other thematic information is placed.
- **Map Layers:** Layers of data in geographic contexts.
- **Data Query Tool:** A feature that will help you learn more information about a particular place on a map by drawing or using a predefined shape.
- **Draw Tools:** A feature that allows you to draw custom shapes to outline a study site, change color, add labels, calculate upstream watersheds and flow paths.

Part 1. General Information about the Chesapeake Bay Watershed

Open the FieldScope map, States in the Estuary: http://chesapeake.fieldscope.org/v3/maps/295.

1. What states are included in the Chesapeake Bay watershed? Hint: You may need to zoom out to see all of the states. Delaware, Pennsylvania, Maryland, Virginia, New Jersey, West Virginia, New York, (District of Columbia)

2. On the left toolbar, click on Map Layers. Go to the State Boundaries layer and click on the icon that looks like an eye. When the eye is "off" (it turns gray), that layer is no longer visible. Now you should see the topographic base map below this layer with major cities identified. What are three major cities that are included in the Chesapeake Bay watershed?

   Possible response: Richmond, Washington D.C., Baltimore, Annapolis, Virginia Beach

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3. Zoom in on the map and move it around until you can identify three major rivers that are included in the Chesapeake Bay watershed. River lines and names are blue on this map. _____

    Possible response: James River, Potomac River, Rappahannock River, Po River

    _____

Part 2. Switching Base Maps

1. The base map you are using now is a topographic base map. Find Richmond, Virginia, on the map. What features do you observe around Richmond using a topographic base map? _____

    Rivers, big highways, county lines, cities/towns nearby. When you zoom in, you can

    determine elevation from contour lines.

2. Go to the top toolbar and click on 1. Select Base Map. Switch to a street map base map and make observations around Richmond, Virginia. Continue clicking "Next" until you return to the map. What features do you observe using this map? _____

    More highways and routes are numbered. Major cities and rivers are labeled.

    Airport and train tracks are visible.

3. Switch to a satellite with labels base map and make observations around Richmond, Virginia. What features do you observe using this map? More towns are visible. It looks more

    like a photograph of a bird's-eye view of Richmond. Homes and trees can be seen.

    Population density can be inferred from the clusters of homes and buildings right in

    the center of Richmond.

4. What makes each of these maps unique? Answers will vary. Each map emphasizes a

    different feature. The topographic map highlights terrain—contour lines are visible when

    zoomed in. The street map highlights the highway and street system. The satellite with

    labels shows a satellite image of the city.

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5. What information on each map could be helpful for learning about a watershed?

   Answers will vary. Knowing about elevation could help inform water flow-paths. The street map could tell you something about impervious surfaces—the more streets and highways in an area, the more impervious surfaces there are. And the satellite image can reveal information about population density and land use.

Part 3. Salinity Observations in the Chesapeake Bay Watershed

Open Salinity in the Estuary: http://chesapeake.fieldscope.org/v3/maps/320.

1. Looking at this map, you should see circles with numbers inside of them. Each circle represents the level of salinity for the water in that area. What are the patterns of changing salinity as you move away from the ocean and into the bay? Closer to the ocean, the salinity is higher.

   _____

2. What are the average, reported salinity levels for the following sites?

Site	Salinity Levels (ppt)
Annapolis, Maryland	9
Richmond, Virginia	0
Virginia Beach, Virginia	25

3. Based on your answers above, would you expect the vegetation and wildlife to be similar across the three sites? Why or why not? No. Vegetation and wildlife in Virginia Beach will be more tolerant of salty water.

4. What are two interesting things you now know about the Chesapeake Bay watershed (think about what you learned about the geography in addition to the observations you made about salinity)? Answers will vary: Seven states and D.C. are in the Chesapeake Bay watershed, many big cities and rivers are in the watershed, and salt water from the Atlantic Ocean mixes with freshwater in the estuary.

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Part 4. Chesapeake Bay Action Plan Connection

After exploring the Chesapeake Bay watershed through FieldScope, return to Mr. Klene's letter and the action plan he sent you. Before selecting a site to put the action plan in place, what do you need to know? What questions do you have that need to be answered before you can make a decision?

Answers will vary. Possible response:

Are there areas in the watershed with poor water quality?

How are we going to know if areas have poor water quality?

What variables can we look at in FieldScope that will tell us something about the water

quality of different areas?

Some variables that would be interesting to look at are dissolved oxygen, levels of nutrients

in the water, and land cover.

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