



Virginia's economy

from the Virginia GeoInquiries collection

VIRGINIA STUDIES

Target Audience - Virginia Studies, Grades 4, 5

Time required – 15 minutes

Activity	Examine the links between resources, industries, and transportation in Virginia.
Virginia Standards of Learning	VS.10b Describing the major products and industries important to Virginia's economy VS.10c Explaining how advances in transportation, communications, and technology have contributed to Virginia's prosperity and role in the global economy. VS.8c Describing the importance of railroads, new industries, and the growth of cities to Virginia's economic development.
Learning Outcomes	Students will be able to • Describe the location of Virginia's coal industry. • Explain how transportation supports economic development. • Explain the interdependence of trade for coal shipped through Virginia ports.

MAP URL: bit.ly/VAGeo8



Ask

Where are Virginia's coal mines?

- ? What do the map symbols mean? (*size of circles = amount of coal produced; color = mining method*)
- ? Which mining method has more large circles? (*underground*)
- ? In which region are most coal mines located? (*Appalachian Plateau*) [Hint: Click on the borders to find the name]
- Examine several of the smaller symbols for each type of mine. Read the pop-ups.
- ? Why do you think so much coal can be mined with so few workers? (*use of machinery and technology*)



Acquire

How do coal mines change the landscape?

- With the Details button underlined, select the Content button.
- Check the World Imagery and Scene layers. Uncheck all other layers.
- Select the Bookmark, Greater Wise 4 Mine. (See *Tooltip* on next page.) Pan and zoom as needed.
- ? What do you observe? (*paths and large craters in the ground*)
- Select the mining symbol (lower right) on the map, and open the pop-up. Follow the directions in the pop-up.
- ? How does the scene differ from the flat map? (*It is in 3D. You can tilt the image and zoom in closer.*)
- ? What else did you observe? (*erosion on the hill sides; terracing; rock piles; depth of mining pits*)
- Close the tab that opened for the Scene. Select the Bookmark, Dorchester Mine 4. Select the mining symbol.
- ? What do you see? (*possible answers: roads, buildings, chutes, piles of coal*)
- ? What type of mine do you think this is? (*underground*) Close the tab for the Scene.



Explore

How is coal transported?

- Over 4.1 million short tons (2,000 pounds) of coal from West Virginia, Pennsylvania, Kentucky, and Virginia move through Virginia ports. The largest coal terminals in the United States are in Hampton Roads.
- Turn on the Cargo Railroads layer. Turn off all other layers, except Coal Mines. Select the Bookmark, Virginia.
- Use the Measure tool (See *Tooltip* on the next page) to measure the straight-line distance from the easternmost coal mine near Blacksburg to Norfolk.
- ? How far is the straight-line distance? (*~243.5 miles*). Distance following the railroad tracks? (*279.5 miles*)
- ? Following the railroad tracks, how would the route differ if you were heading to Hampton? (*head north to Richmond and then south to Hampton*) [Note: Hampton is near the Newport News Coal Terminal.]

How do ports differ?

- Turn on the Virginia Ports and the World Imagery layer. Select the Bookmark, Hampton Roads. Examine the orange pop-up in the water.
- ? What is Hampton Roads? (*the world's largest natural harbor*)
- Click each of the purple pins and then "Zoom to." Pan and zoom around the port areas.
- ? What do you observe? (*railroad tracks, coal cars, ships, piles of coal, ships, loading equipment*)
- ? How are the two coal terminals alike and different? ([Hint: Switch between the World Imagery layer and the Topographic map layers.] (*both served by rail—Newport News from the north, Lamberts Point from the south; both are on shores of rivers—Newport News on the James River, Lamberts Point on the Elizabeth River; Lambert's Point has many railcars and tracks, Newport News has more pipes and piles of coal.*)



Act

Where does Virginia's coal go?

- Turn on the layer, Coal Exports from Norfolk. Click the layer's name and select "Zoom to" from More Options (the three dots.) Turn on the legend.
- ? Which continent has the most countries receiving coal shipped from Norfolk? (*Europe*)
- ? Which country receives the most coal from Virginia ports? (*Brazil*)
- ? Which country surprised you? (*answers will vary, for example Australia is the furthest away*)
- ? Examine pop-ups on several continents.
- ? Do you think coal exports from Norfolk will increase or decrease in the future? Why? (*answers will vary depending on the pop-ups chosen; likely decrease as fewer countries burn coal for electricity*)
- ? How could a change in coal exports affect Virginia's economy? (*decrease may result in fewer jobs*)

NOTE: In order to view the 3D graphics WebGL must be supported in your browser. Newer versions of the browsers may already support this feature. Be sure you are running the most recent version of Chrome. See directions for various browsers at the link below.

<https://support.biodigital.com/hc/en-us/articles/235871967-How-to-enable-3D-in-my-browser>

Students can still view aerial images without the 3D (hardware acceleration) enabled.

BOOKMARKS	MEASURE
1. Click on "Bookmarks" button. 2. Click bookmark name to zoom to a map location and scale.	1. Click the button, Measure. 2. Click the button, Distance. 3. Set the unit of measurement. 4. Click one to start measuring, click again to change direction, and double-click to stop measuring.

Next Steps

DID YOU KNOW? ArcGIS Online is a mapping platform freely available to U.S. public, private, and home schools as a part of the White House ConnectED Initiative. A school subscription provides additional security, privacy, and content features. Learn more about ArcGIS Online and how to get a school subscription at <http://connected.esri.com>.

THEN TRY THIS . . .

- Use the Change Style tool to represent the relative number of employees (short tons) for each of the Virginia coal mines included on the map.
- Use the Proximity Analysis Tool, Connect Origins to Destinations, to create distance measurements to the countries receiving coal from Virginia ports.-

Send feedback to: vageoinquiries@gmail.com

Additional materials at <https://php/radford.edu/~vga>

Learn more about Virginia's people and places in *An Atlas of Virginia*

Virginia GeoInquiries are available to the public at no cost, and were made possible with support from the Virginia Geographic Alliance and Esri.



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