Curriculum Support Maps for the Study of Indiana Coal

By Walt Gray

**Targeted Age:** High School/Middle School  
**Activity Structure:** Individual Assignment or Group Project  
**Indiana Standards and Objectives:** E.S. 3.9, 5.2, 5.3, 6.4; ICP 8.1, 8.2  
**Material Requirements:** A computer with Internet access; printing or e-mail capability (optional).

**Introduction**

In this activity, teachers or students will use IndianaMap to create geographic information systems (GIS) maps to demonstrate the distribution of coal mines within the state of Indiana. Step-by-step directions and tutorial videos will provide students with the necessary resources to create the final product. A list of questions is provided in each section to judge student comprehension of the data presented to them. It is expected that students have studied the process of coal formation, especially the different types of coal, before attempting this activity.

**What products does the instructor want the students to create and in what format?**

IndianaMap provides students the ability to create a map, bookmarks to maps, hyperlinks, and to print the maps they have created. As the instructor, you will need to determine functions you would like students to use during the lesson, based on the technological issues in your classroom and the outcomes you desire.
General Class Discussion

Coal is a combustible sedimentary rock and a valuable economic resource. During the Pennsylvanian Period (318 to 299 million years ago), poorly decayed plant materials were deposited in swamps in the central to eastern regions of the United States. Over time, these deposits eventually formed peat. As the peat was buried by additional sediments, the overlying weight caused the dewatering of the peat while compressing the deposits into thinner beds. Continued increases in both heat and pressure over millions of years produced the coals currently found in southwestern Indiana.

Coals are classified in one of four general categories or “ranks”: lignite, subbituminous, bituminous, and anthracite. Indiana coals are bituminous and composed of 55 to 79 percent carbon with an average heat value of 12,000 Btus per pound.

Indiana currently ranks as the seventh-largest coal-producing state in the nation and has an estimated 57 billion tons of unmined coal, of which nearly 17 billion tons is recoverable. These reserves could last another 585 years at the current rate of production. This valuable, nonrenewable energy resource is used to provide electricity to citizens across the state of Indiana.

After mining operations have ceased, companies are required to reclaim the mined land under provisions of the Surface Mining Control and Reclamation Act (SMCRA) of 1977.

Essential Questions to Be Addressed

Describe the process of coal formation.

What geological time period is known for major coal deposits?

What rank of coal is mined in Indiana?

Coal mines, both abandoned and current operations, are located in which region of Indiana? Why are these mines limited to this region?

Explain why most underground coal mines are generally found west-southwest of surface mines.
Closure

Students, using the GIS map they created, should recognize that all operational and abandoned coal mines in Indiana are located within the southwestern region of the state. The region represents the area of Indiana containing Pennsylvanian-age rocks, which are known for major coal deposits. Using the layers displaying depths of the Danville and Springfield coal units, students should have recognized that the units dip to the south-southwest and thus occur at a greater depth along the Indiana-Illinois state border compared to more eastern locations. Hence, surface mines are established where coal deposits are shallow, and underground mines are dug where the coal deposits are deeper.

Extension or Enrichment Ideas

Have students research the economic benefits coal provides to the state and its citizens.

Compare and contrast potential environmental issues surrounding underground and surface coal mining.

Explain the importance of mapping the location of abandoned coal mines.

What is subsidence and how is it related to underground coal mines?

Explain the Surface Mining Control and Reclamation Act (SMCRA) of 1977 and demonstrate how reclaimed lands can benefit the community.

Other IGS products supporting the study of coal topics:

Coal of Indiana (2010), Item #: Poster 12

Coal Mining History of the United States with Emphasis on Indiana (2003), Item #: MI 37

Coal Supply and Demand in Indiana (2009), Item #: OFS 09-05

Coal in Indiana, http://igs.indiana.edu/coal/index.cfm