

History of Phosphate Industry in Florida

By Bill Woolwine, Winter Haven High School

I. Lesson Summary

Summary

The mining industry has played a key role in the development of world and United States history. Many different minerals have been mined and processed in the development of the industrial growth in our country. Although most people think of minerals such as gold, silver, iron ore, coal, copper, etc.; in Florida we have what is known as “Gray Gold.” Phosphate is much more valuable than gold to people since we are dependent on it to sustain life itself. In this lesson the students will research the development of the phosphate industry in Florida and how it has impacted our state. The students will study the development of the phosphate industry from a historical and economic perspective.

Objectives

Students will:

- 1.) Research the historical development of the phosphate industry in central Florida and its economic impact upon the region and state;
- 2.) Be able to answer the following questions relating to the phosphate industry:
 - a.) What is the source of phosphate and why is it so plentiful in the state of Florida?
 - b.) How did the phosphate industry develop in central Florida?
 - c.) How is phosphate mining and similar and different from the mining and processing of other types of minerals?
 - d.) How does the phosphate industry impact Florida’s economy?
 - e.) Why is this area of Florida known as “Bone Valley” and how is it related to the phosphate industry?
 - f.) What impact does Florida’s phosphate industry have on world trade?
 - g.) How does the phosphate industry impact the environment? What responsibility does the mining industry have on protecting the environment and returning the land to a useful state?
 - h.) What government regulations regulate the mining industry?
 - i.) What are the real costs of mining for phosphate in central Florida, both direct and indirect?
 - j.) What is the history of labor in the phosphate industry in central Florida? Has labor in the phosphate mines of central Florida faced the same problems of labor in other mining regions?

United States History Event or Era

This lesson can be incorporated into any study of the mining industry in the United States, agricultural development in the United States or the labor movement in the United States.

Grade Level

This lesson can be used at the middle or high school level.

Materials

“The Phosphate Story – Florida’s Hidden Treasure” video (contact Diana Youmans at IMC in Mulberry; 863/428-2613; PO Box 2000, Mulberry, 33860, or contact Scott Fields @ randall.fields@polk-fl.net or 863/680-3002); “Phosphate Feeds You” video (contact Andy Ellis at the Florida Phosphate Council in Tallahassee; 866/352-7265, or aellis@floridaphosphate.org, or contact Scott Fields @ randall.fields@polk-fl.net or 863/680-3002); photographs of Florida’s early phosphate industry from <http://fcit.usf.edu/florida/photos/industry/phosphate/phosphate.htm>; “Florida’s Phosphate Industry” handout; and research project rubric. The students should also be given access to research materials such as library materials and on-line websites. The Florida Institute of Phosphate Research (FIPR) is an excellent source of information, as are the phosphate companies in the Bartow and Mulberry area. There is also the Phosphate Museum in Mulberry, which has materials and information that may also serve students well in completing their projects.

Lesson Time

This lesson should take two or three days of classroom instruction along with time in the media center and computer lab to do research on the project. The students will need several weeks following the lesson in order to organize their information and write a research paper covering the Phosphate Industry and its development in Central Florida.

II. Lesson Procedures

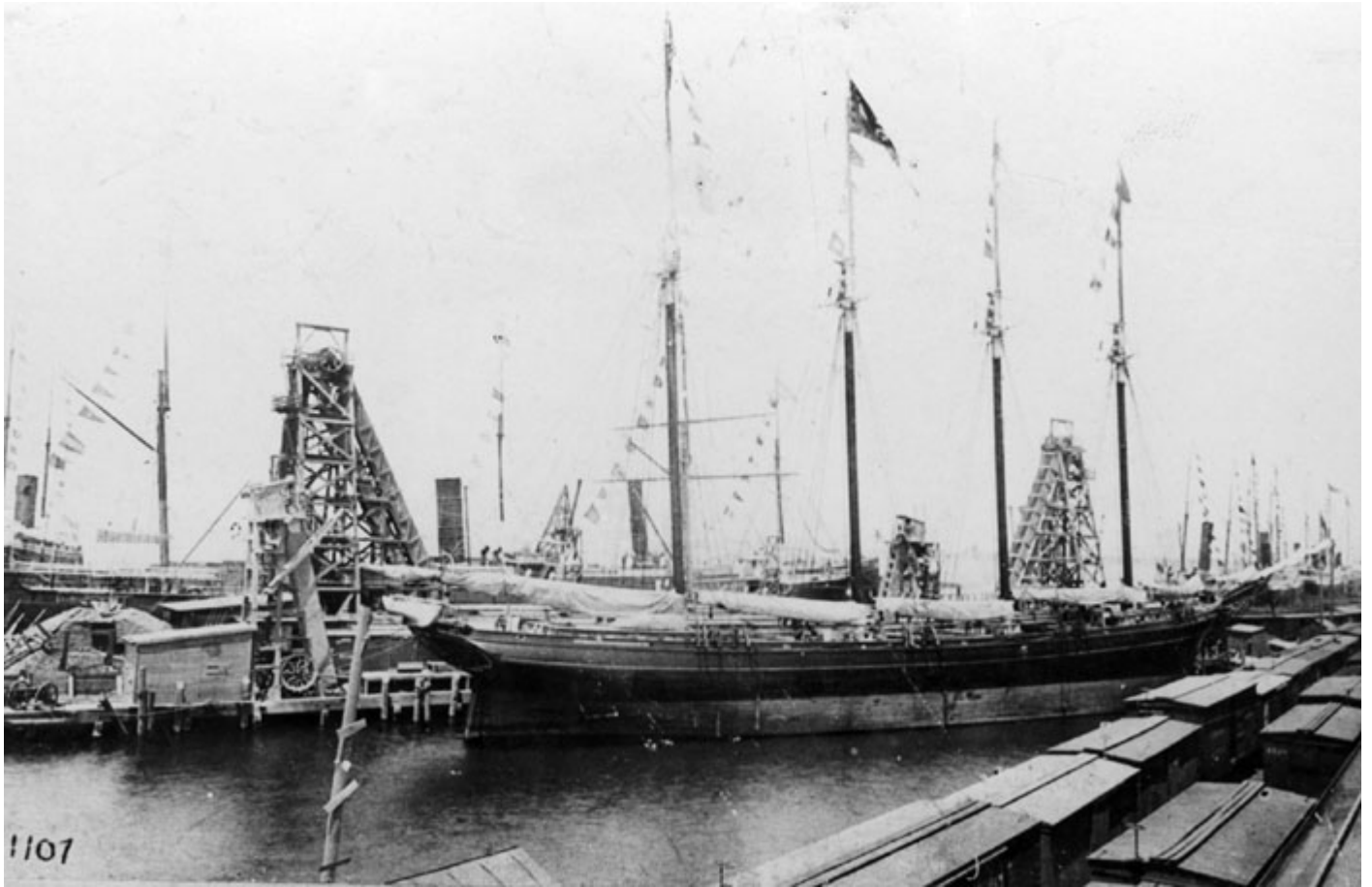
Procedures

- 1.) A great deal of information can be gathered from FIPR (Florida Institute of Phosphate Research) in Bartow. The phosphate museum in Mulberry is another important source of information for gaining material for this project. In addition it is important to discuss the significance of phosphate in our lives and what it is used for. A partial list of questions introducing the subject could include the following:
 - a. **What is phosphate?**
 - b. **What is a mineral?**
 - c. **Where does phosphate come from?**
 - d. **What are some of the uses for phosphate?**
 - e. **How important is it for our good health and the production of crops?**
 - f. **Do we have phosphate in Florida? If so where? How do we get the mineral?**
 - g. **How do you use phosphate in your lifestyle?**
 - h. **Why should we know something about this industry in Polk County?**
 - i. **Do you know anyone that works in the industry?**
- 2.) **Preview (option #1):** The lesson can be introduced by showing a video on the phosphate industry and the mining for the phosphate rock in Florida. The following videos could be used to introduce the subject: “The Phosphate Story – Florida’s Hidden Treasure,” available from IMC; or “Phosphate Feeds You” from the Florida Phosphate Council. **Preview (option #2):** Print and copy the three photographs and corresponding questions found in the “Activities” section. Then, pass them out to the students and lead a short discussion on what is pictured in each photo. Afterwards, pass out to each student a copy of “Florida’s Phosphate Industry,” which is included in the “Activities” section.
- 3.) When initiating the lesson and having students prepare for their research project, introduce the following key words and instruct students to understand the meaning and relevance of these terms in the course of doing research: **geology, phosphate, beneficiation, contouring, mining, native vegetation, mineral deposit, moonscape, species, dragline, matrix, phosphogypsum, habitat, processing, reclamation, hydrology, supply, demand, scarcity, markets, resources, resource base, taxes, fees, Bone Valley.**
- 4.) Assign the research project. Explain that each student will do research that will apply to the following areas:
 - a. What is the source of phosphate? Why has the industry had such a prominent role in the history and economy of Florida? How has the industry affected other major industries in the state?
 - b. How did the industry develop in Central Florida and what has the impact been on our economy and environment? In what ways do government regulations impact the industry?
 - c. What is the total cost of mining? This would include any clean-up cost, environmental fees, reclamation costs, taxes, as well as the actual cost of mining and extraction of the phosphate rock. What are some of the ways that the industry both benefits and hurts the local environment?
 - d. What role is played by the Central Florida phosphate industry on the world economy? Who are some of its major competitors? What are some of the assets and liabilities that the industry has in this competition?
 - e. How has technology affected this industry?
 - f. What does the future look like for this industry in central Florida?

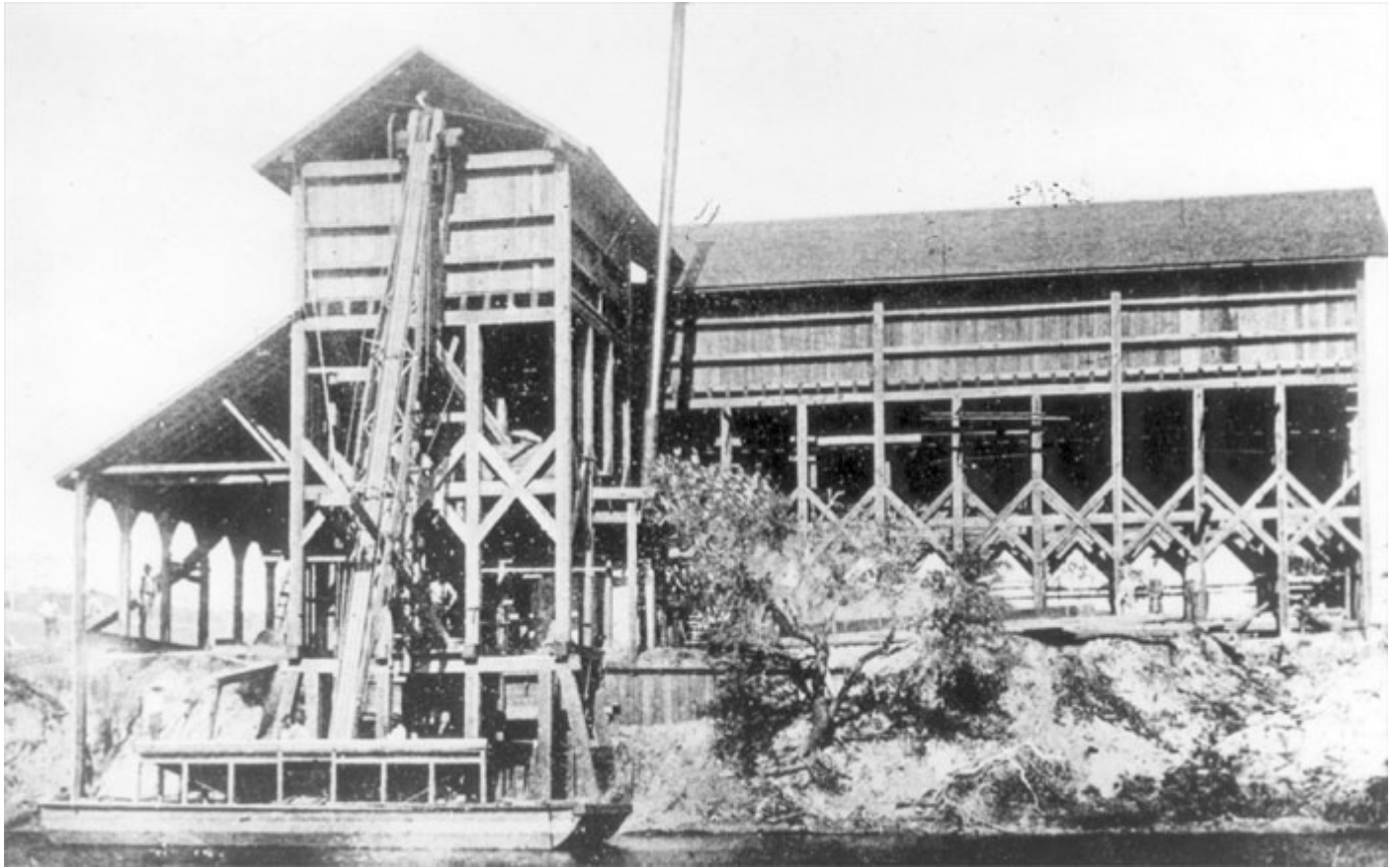
III. Activities



Picture G-7-1: Workers mining rock at the Bone Valley mining facility in Charlotte. " Prior to the 1900s phosphate mining was done by hand." (Photo courtesy of the Special Collections Department, University of South Florida- <http://fcit.usf.edu/florida/photos/industry/phospate/0870.htm>)



Picture G-7-2: A photograph of ships next to the original phosphate elevators at Port Tampa (Photo courtesy of the Special Collections Department, University of South Florida- <http://fcit.usf.edu/florida/photos/industry/phospate/0596.htm>)



Picture G-7-3: A photograph of the Peace River Phosphate Industry in Charlotte, showing an “elevator, drying works, and shipping bin of an early mining facility located along the Peace River. The Peace River Phosphate Co. first mined phosphate in the early 1890s.” (Photo courtesy of the Special Collections Department, University of South Florida-<http://fcit.usf.edu/florida/photos/industry/phospate/0869.htm>)

Florida's Phosphate Industry

Phosphate rock is the largest mineral industry in Florida, accounting for about 50% of the state's produced minerals value. Florida ranks first in the nation in the production of phosphate rock, and produces about 30% of the world total. A production increase of as much as 20% has been forecasted by the year 2000, which is interesting because the U.S. Bureau of Mines has predicted a steady decline in the state's phosphate-rock production during the twenty-first century, as well as termination of mining around the year 2010. Reorganization and consolidation seem to have brought a new vitality to the industry.

The History: Phosphate mining began in Florida in 1879 in Miocene sediments near Hawthorne, just east of Gainesville. Commercial exploration began in the early 1880s when companies began to mine phosphatic pebbles from the Peace River near Fort Meade, in Polk County. As time passed, technology and economics allowed the miners to move from the river-pebble to the land-pebble and hard-rock (replaced limestone) phosphates, and then to mining the finer-grained "phosphate matrix" (the admixture of clay, quartz sand, dolomite, and phosphate that occurs over a wide area of west-central Florida including southeastern Hillsborough County and southwestern Polk County). The hard rock district was located in parts of Alachua, Citrus, Dixie, Gilchrist, Hernando, Lafayette, Levy, Marion, Sumter, and Taylor counties. In the 1960s, hard-rock mining ceased for a variety of technical and economic reasons. At the same time, mining began in the northern phosphate district, located mainly in Hamilton and Columbia counties. Starting in the late 1970s, the central Florida phosphate companies began moving their mining operations into the "southern extension," located in parts of De Soto, Hardee, and Manatee counties.

The Process: The classic central Florida phosphate district consists of phosphate deposits that are highly reworked and weathered marine and estuarine sediments along the southern and eastern flanks of the Ocala Arch. The main ore zone belongs to the Peace River Formation and Bone Valley Member of the Hawthorne Group, and it is believed to have been deposited in a warm, shallow sea in a near shore environment.

Phosphate mining in Florida is relatively simple. After land preparation, large draglines are used to remove the overburden. The same draglines then mine the ore and drop it in a pit, where the ore is slurried by hydraulic monitors and pumped to the mineral-processing plant.

The Economic Importance: Of the mined rock, 90% is used to make fertilizer. Another 5% is used in livestock-feed supplements (primarily for chickens and cattle). The balance is used in food products, chemicals, and ceramics. Rail and trucks move both products and rock to ports in Tampa, Manatee, and Jacksonville for marketing in domestic and international sectors. Florida's exports may be sold directly or bartered for raw materials such as nitrogen, sulfur, and potash, which are used in fertilizer production. This low-cost, readily available, domestic source of fertilizer is a key factor in the ability of the United States to produce surplus food for internal and international use at reasonable prices.

The phosphate industry has more than \$10 billion in capital invested in Florida, and new construction, expansion, and replacements of plants and equipment run into hundreds of millions of dollars per year. About 8000 people are directly employed by the phosphate companies, with an annual payroll of more than \$300 million. It is estimated that an additional 50,000 jobs are created in supporting industries.

PHOSPHATE INDUSTRY RESEARCH PROJECT

*Please refer to the following rubric for directions on developing and writing your research project.

- 1.) **ESSAY:** Typed and a minimum of five pages;
- 2.) **MUST** use a **minimum** of **5 resources**;
- 3.) A **BIBLIOGRAPHY** or **Works Cited** page **MUST** be included;
- 4.) The essay should include the following information:
 - A history of the phosphate industry in Polk County and Central Florida.
 - What everyday products depend on phosphate or a phosphate product?
 - How does the future of the industry look in Central Florida?
 - What is the impact of the industry on the economy of Polk County?
 - What government regulations govern the mining industry, and how do they affect the cost of doing business?
 - What must the industry do to reclaim the land that it mines?
 - Discuss each of the following topics and how they have affected the phosphate industry recently:
 - Piney Point
 - Coronet Industries
- 5.) In order to receive an “A”, your paper must be typed and each question must be addressed and relevant to your essay. In order to receive a “B” the paper must be typed and each question must be addressed in your essay. In order to receive a “C” each question must addressed in your essay.

REMEMBER: There will be a grade deduction if project is turned in late!!!!!!!!!!!!!!

IV. Assessment

The research paper could act as an effective assessment tool for this lesson. In addition, the following questions that students should encounter during their research could also act as an effective assessment.

- 1.) What is the source of phosphate and why is it so plentiful in the state of Florida?
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- 4.) How does the phosphate industry impact Florida's economy?
- 5.) Why is this area of Florida known as "Bone Valley" and how is it related to the phosphate industry?
- 6.) What impact does Florida's phosphate industry have on world trade?
- 7.) How does the phosphate industry impact the environment? What responsibility does the mining industry have on protecting the environment and returning the land to a useful state?
- 8.) What government regulations must the mining industry take into account?
- 9.) What are the real costs of mining for phosphate in central Florida, both direct and indirect?
- 10.) What is the history of labor in the phosphate industry in central Florida? Has labor in the phosphate mines of central Florida faced the same problems of labor in other mining regions?

V. Resources

Florida Phosphate - <http://www.flaphos.org/>

Florida Institute of Phosphate Research - <http://www.fipr.state.fl.us/index.html>

Florida Phosphate Council - <http://www.fas.usda.gov/itp/wto/florida/racjheal.html>

Mulberry Phosphate Museum - <http://www.ohwy.com/fl/m/mulphomu.htm>

Tampa Bay Soundings - <http://www.baysoundings.com/sum02/behind.html>

Harvard University Press/The Florida Phosphate Industry - <http://www.hup.harvard.edu/catalog/BLAFLO.html>

Florida Phosphate Mining Crisis - http://www.whoseflorida.com/misc_pages/phosphate_mining_crisis.htm

Phosphate and You - <http://www.flaphos.org/you.htm>

History of Mulberry - <http://www.mulberrychamber.org/history.asp>

Phosphate Industry Photos - <http://fcit.usf.edu/florida/photos/industry/phospate/phospate.htm>

Catholic Encyclopedia - <http://www.newadvent.org/cathen/06115b.htm>

History of Phosphate - http://www.imcglobal.com/general/education_corner/phosphates/history.htm