

Lesson Plan:

The Carborundum Company

Subject Areas: Social Studies
Science

Grade Level: 8-11

New York State Learning Standards

New York State Social Studies Learning Standards

Standard 1

History of the United States and New York

Students will:

- Use a variety of intellectual skills to demonstrate their understanding of major ideas, eras, themes, developments, and turning points in the history of the United States and New York.
 - Distinguish between near and distant past and interpret simple timelines,
 - Investigate key turning points in New York State and United States history and explain why these events or developments are significant.
 - Gather and organize information about the important achievements and contributions of individuals and groups living in New York State and the United States,
 - Prepare essays and oral reports about the important social, political, economic, scientific, technological, and cultural developments, issues, and events from New York State and United States history, and
 - Analyze historical narratives about key events in New York State and United States history to identify the facts and evaluate the authors' perspectives

Standard 4

Economics

Students will:

- Use a variety of intellectual skills to demonstrate their understanding of how the United States and other societies develop economic systems and

associated institutions to allocate scarce resources, how major decision-making units function in the U.S. and other national economies, and how an economy solves the scarcity problem through market and nonmarket mechanisms.

- Explain how societies and nations attempt to satisfy their basic needs and wants by utilizing scarce capital, natural, and human resources,
- Define basic economic concepts such as scarcity, supply and demand, markets, opportunity costs, resources, productivity, economic growth, and systems, and
- Understand how people in the United States and throughout the world are both producers and consumers of goods and services

New York State Science Learning Standards

Standard 1: Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seeks answers, and develop solutions.

Standard 2: Students will access, generate, process, and transfer information using appropriate technologies.

Standard 4: Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

The Carborundum Company

The Carborundum Company was located at the intersection of Buffalo Avenue and Portage Road. In 1891, Edward Goodrich Acheson, a young scientist and inventor in Monongahela City, Pennsylvania, tried to create artificial diamonds by using electricity. His experiments produced, as a byproduct, small crystals that could cut, and diamonds. Acheson assumed that the new crystals were formed from a combination of carbon and corundum, natural aluminum oxide. He, therefore, called his product Carborundum. A year later, a chemical analysis of the crystals revealed that the crystals were actually silicon carbide, the world's first artificially produced mineral. Acheson's first sale of his new product was to a New York diamond cutter. He sold the product for, \$60.00 which netted him per karat.

In September 1891, Acheson formed the Carborundum Company with \$150,000 raised by a group of Monongahela investors each paid \$100 for each of 1,500 shares.

In 1893, the Carborundum Company secured a \$7,000 contract with George Westinghouse, who had been hired to light the Columbian Exposition Building in Chicago, for 60,000 of the company's new grinding wheels. With this money, Acheson bought the company's first dynamo. He soon that he needed a cheaper and more plentiful source of electric power. When a hydroelectric dam was constructed at Niagara Falls, Acheson, therefore, proposed moving the company closer to source of abundant power. Because his board of directors objected move to t, Acheson formed a new board. He then contracted with the Niagara Power Company for 1,000 horsepower. For financing, Acheson turned to Andrew Mellon. The Mellon family retained 20 percent ownership in the company throughout the twentieth century.

The new Carborundum plant opened in Niagara Falls in October 1895. Because of rapidly increasing industrialization, the Carborundum Company faced a huge demand for its silicon carbide product. It built its first 1,000-horsepower furnaces. By using intense heat over a 24-hour cycle, a mixture of sand, salt, sawdust, and coke formed chunks of silicon carbide. The resulting crystal chunks were then crushed and applied to grinding wheels and other abrasive tools.

The bricks used to build the furnaces, however, could the intense heat. The Carborundum Company recognized the heat-resistant qualities of silicon carbide. It, therefore, patented the mineral for use as a refractory material in 1898. In 1899, the Carborundum Company's first international subsidiary opened across the Niagara River in Niagara Falls in Canada.

Silicon's abrasive and refractory qualities contributed to the development of modern industry. As a result, Carborundum expanded quickly. It introduced a new abrasive, fused aluminum oxide, under the name Aloxite in 1905. Simultaneously, the Carborundum Company developed a process for producing fused silicon metal. It opened the Deutsche Carborundum Werke near Düsseldorf, Germany in 1906. By 1913, Carborundum was producing 15 million pounds of silicon carbide each year, and its Niagara Falls plant had grown to 13 acres using 13,000 horsepower. Its products were important to the development of many industries, including bicycle makers, the railroads, and the growing automobile and aviation industries. In 1913 a new subsidiary, The Carborundum Company Ltd., was formed in Manchester, England.

The Carborundum Company has its main office at the western end of Portage Road. It was the second company to contract with the Niagara Falls Power Company for electricity. The Carborundum Company was founded by Edward G. Acheson. Acheson heated clay and carbon in an iron bowl by passing a current between it and an arc light carbon. As a result, he produced a few hard, sharp crystals which he realized were silicon carbide. Acheson understood that silicon carbide could be used as an abrasive. He teamed the word "carbon" with the word "Corundum" to form "Carborundum", the trade name for his new product. In 1893, he obtained a patent on the new material.



Resources:

The Carborundum Company, The First 100 Years, 1891-1991. A Commemorative History.
Carborundum Company, 1991.

The Carborundum Company: Company Profile, Information, Business Description, History, Background Information on Carborundum Company at
<http://www.referenceforbusiness.com/history2/89/Carborundum-Company.html#ixzz2e802izQK>