

Saugus Iron Works National Historic Site

244 Central Street, Saugus, MA 01906
781-233-0050 <http://www.nps.gov/sair>

Teaching with Historic Places Lesson Plan

Understanding Economy and Geography in a Regional Context: Essex County, 1600-1900

Sources: Saugus Iron Works
Saugus High School
Belmonte Middle School
Subject: Social Studies, Economy,
& Geography

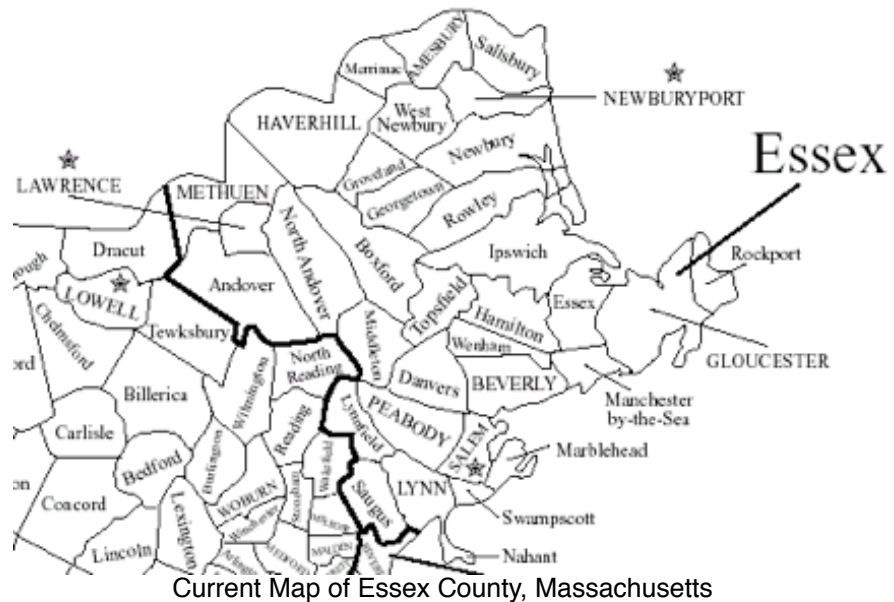
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Grade: 9-12

Introduction:

This lesson plan uses a trip to the Saugus Iron Works to demonstrate the workings and interrelations of economy and geography in the regional context of Essex County.

Objectives:

- Students will be able to demonstrate an appreciation of the historical diversity and interdependence of the regional economic growth and development of Essex County, Massachusetts (over the period of three centuries), including its historical connections to the growth of world trade. This understanding of the region's economic history will be achieved in the course of class discussion, a site visit to the Saugus Iron Works, using Hammersmith as a case study of the complex and interdependent dimensions of industrial development, and finally in a 500 word expository writing assignment utilizing the "5 Themes of Geography" to analyze 300 years of economic history in terms of the relationship between the land and people of Essex County.



- Students will be able to locate the key historical industries of Essex County, using cardinal directions and a set of regional maps. Furthermore, students will seek to interpret the geo-

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graphical relationships between each industrial setting and the place from which it evolved. The fundamental analytical question guiding each students' interpretation will be: "Why this industry in this place at this time?"

Vocabulary:

Working at the Iron Works

Bog Ore is a sedimentary iron source harvested from the bottom of shallow bogs and streams. It was the iron used here in the seventeenth century.

Gabbro is a granular igneous rock composed, mostly, of calcium and limonite. It was used as a flux in the iron making processes at Saugus in the seventeenth century.

Charcoal fueled almost every fire at this iron works. Made from the slow burning of trees, it's pure carbon and burns at a higher temperature than wood.

The **Blast Furnace** was the heart of the iron-making process. Raw materials would be filled in from the top and, after 12 hours, the molten iron and slag would be removed from the bottom.

The **Casting Shed** is located at the bottom of the blast furnace and houses gigantic bellows which supply oxygen to the fire in the furnace. From the casting shed workers would tap the furnace to remove the molten iron.

A **Pig**, or **Sow**, bar was iron that was tapped from the furnace and allowed to cool in troughs dug in the sandy floor of the casting shed.

Pig Iron was the name given to the iron that came from the blast furnace; it was very brittle and weak due to the high carbon content and random structure of the iron molecules.

Formed in the blast furnace when the flux, gabbro, pulls the impurities from the bog iron ore, **slag** was mostly considered a waste product. The slag pile remains the only original feature from the colonial iron works.

In the **Forge** pig iron from the casting shed was transformed into wrought iron through a process of heating and hammering, with both manual and mechanical hammers. The Forge was a very loud and dangerous place and required great skill and strength from the workers.

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Wrought Iron is iron that has gone through a series of heating and beating so as to work out carbon and other impurities as well as align the molecules inside the iron bar.

A **Merchant Bar** was a long, thin, rectangular piece of wrought iron. The main sales item of the iron works, this iron bar was sold to a variety of people in various trades because it could be made into a wide variety of products.

The **Rolling and Slitting Mill** represents the height of 17th century technology. Here merchant bars were flattened by a set of rollers and then split into long thin strands by a pair of slitters. Ultimately the work that was done here would save a blacksmith time and effort.

The original **Blacksmith Shop** on site was small and functioned only for the maintenance of the iron works. Since a large industrial plant such as this was in constant need of iron tools, and replacement parts, this was also a very busy place to be. Skilled blacksmiths were very well paid.

The People of the Iron Works

A **Puritan** was a member of a Protestant religious group who believed in and practiced a very strict religious and moral set of rules for their life.

A **collier** was a man who knew how to make charcoal. This was a highly skilled job that was extremely important to the iron works since charcoal fueled most fires.

A man who worked in the forge processing pig iron into wrought iron was known as a **finer**. This was also a highly skilled job that required years to learn and master.

An **indenture** is a contract which binds one person to work without pay for a given period of time.

An **indentured servant** is a person who signs and is bound by an indenture to work without pay for a specified period of time especially in return for payment of travel and cost of living expenses.

Prisoners of war at the iron works were mainly Scottish men who were taken captive by the powerful British army. These men were sent across the Atlantic Ocean to work as indentured servants at the Iron Works. Most worked an indenture of seven years.

Arrowheads and other stone tools were common archaeological finds as Saugus and the surrounding area had been home to **Native Americans** for thousands of years.

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Hammersmith was the name given to the company town where many of the Iron Works employees and their families lived.

An *agent* was a man who worked on behalf of the investors in England to make sure proper business practices were being followed. John Gifford, one of the Agents, was caught stealing iron from the Iron Works.

An *investor* is a person who invests money. A group of investors, also known as the “Company of Undertakers for the Iron Works in New England,” provided the money necessary to build the iron works here.

An *owner* is someone who has a legal right of possession. Due to its colorful and interesting history, the iron works would boast several owners during the 22 years it was in business.

Living and Working at a Colonial Iron Works

Once the most abundant fish in New England waters, *cod* was a very important food source for the early colonists. Commonly it would be dried and salted, to preservation it, and then shipped to other parts of the colonies. Fish hooks were found buried here.

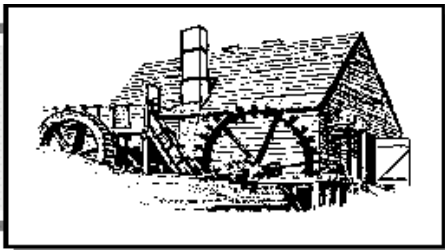
Sumptuary Laws were laws that didn’t allow people of a lower class to dress as more wealthy individuals. People of a lower class who were caught dressing like those of a higher class by wearing items such as “silver lace” or “great boots” were usually fined.

Pre-Visit Activities:

- Assign secondary readings and primary source documents for class discussion, which provide background to the economic history of Essex County and the Saugus Iron Works key industries.
- Presentation of video programs highlighting the key historical industries and related sites of Essex County (i.e. Salem, Saugus, and Lowell)
- Through teacher directed class discussion, students will formulate a set of analytical questions to guide their focus on the historical development of the key industries of Essex County.

On-Site Activities:

The teacher should contact the Saugus Iron Works and arrange a site visit for the class.



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Post-Visit Activities:

- Students will engage in class discussion in order to synthesize of the materials presented as part of this lesson plan and incorporate their understanding of the site visit.
- Students will write a 500-word exposition, which seeks to interpret critical interpretations of the significance and importance of the Iron Works within the overall context of the growth of economic industries in Essex County.
- Locate key Essex County industries on a map and provide a brief interpretive understanding of the relationship of geography and economy for each industrial setting.

Connection to Massachusetts Frameworks for History and Social Studies Concepts and Skills:

- **History and Geography – 7:** Show connections, causal and otherwise, between particular historical events and ideas and larger social, economic, and political trends and developments.
- **Economy – 14:** Explain how people or communities examine and weigh the benefits of each alternative when making a choice and that opportunity costs are those benefits that are given up once one alternative is chosen.
- **Economy – 16:** Define and use correctly gross domestic product, economic growth, recession, depression, unemployment, inflation, and deflation.
- **United States Economy – 25:** Explain the basic economic functions of the government in the economy of the United States.
- **United States Economy – 27:** Identify and describe laws and regulations adopted in the United States to promote economic competition.

Assessment Rubrics:

Written Paper: Industry of Essex County, Massachusetts using the Saugus Ironworks

CATEGORY	4	3	2	1
Mechanics	No grammatical, spelling or punctuation errors.	Almost no grammatical, spelling or punctuation errors	A few grammatical spelling, or punctuation errors.	Many grammatical, spelling, or punctuation errors.
Organization	Information is very organized with well-constructed paragraphs and subheadings.	Information is organized with well-constructed paragraphs.	Information is organized, but paragraphs are not well-constructed.	The information appears to be disorganized. 8)



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CATEGORY	4	3	2	1
Quality of Information	Information clearly relates to the main topic. It includes several supporting details and/or examples.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples.	Information clearly relates to the main topic. No details and/or examples are given.	Information has little or nothing to do with the main topic.
Amount of Information	All topics are addressed and all questions answered with at least 2 sentences about each.	All topics are addressed and most questions answered with at least 2 sentences about each.	All topics are addressed, and most questions answered with 1 sentence about each.	One or more topics were not addressed.

Map exercise: Industries of Essex County, Massachusetts

CATEGORY	4	3	2	1
Labels - Accuracy	At least 90% of the items are labeled and located correctly.	80-89% of the items are labeled and located correctly.	79-70% of the items are labeled and located correctly.	Less than 70% of the items are labeled and located correctly.
Labels & Features Neatness	90-100% of the labels/features can be read easily.	89-80% of the labels/features can be read easily.	79-70% of the labels/features can be read easily.	Less than 70% of the labels/features can be read easily.
Knowledge Gained	When shown a blank base map, the student can rapidly and accurately label at least 10 features.	When shown a blank base map, the student can rapidly and accurately label 8-9 features.	When shown a blank base map, the student can rapidly and accurately label 6-7 features.	When shown a blank base map, the student can rapidly and accurately label fewer than 6 features.
Title	Title tells the purpose/content of the map, is clearly distinguishable as the title (e.g. larger letters, underlined, etc), and is printed at the top of the map.	Title tells the purpose/content of the map and is printed at the top of the map.	Title tells the purpose/content of the map, but is not located at the top of the map.	Purpose/content of the map is not clear from the title.
Interpretive Understanding	Interprets all of the required industries in a well-written and constructed manner.	Interprets most of the required industries in a well-written and constructed manner.	Interprets some of the required industries but does not analyze them accurately.	Does not interpret the industries or makes little effort to interpret the required industries.

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Appendix:

Explanation of Partnership between the Saugus Iron Works and the Saugus Public Schools:

In recent years, the partnership between the Saugus Iron Works National Historic Site and the Saugus Public Schools has become more valuable as the benefits of reaching into the local community for resources has become more a part of the curriculum. Saugus Public Schools serve roughly 3,500 students in a suburban setting on the outskirts of Boston. Like countless others who have discounted the history in their own backyards, many of these students have overlooked the potential learning opportunity mere miles from their homes and schools. The Teaching American History Grant has helped foster a more substantial, well-rounded, and visible connection that has fostered greater learning opportunities for students of all ages and has allowed them to take fuller advantage of an incredible academic and historic resource in their backyard.

The introduction of state-wide learning objectives and mandatory standardized testing has brought about the encouragement of school staff to reach outside traditional textbooks for resources to not only encourage different learning styles, but also diversify opportunities to accomplish a variety of different objectives. The Saugus Iron Works will continue to serve as an invaluable resource to the town of Saugus and the Saugus Public Schools where various aspects of history, sociology, archaeology, architecture, environmental science, geology, physics, engineering, and preservation live.

Description of Park:

Saugus Iron Works National Historic Site is an 8.51-acre park located about 10 miles north of Boston, in Essex County, Massachusetts. It interprets the archaeological and historic sites, structures, objects, and the reconstructed historic scene associated with first successful fully-integrated iron works in the New World, 1646-1668. Today, the recreated industrial landscape and reconstructed buildings offer a well-rounded and highly sensory encounter with our early colonial history as well as an opportunity to explore, and connect with, the role of iron and this early iron-making culture in the social, economic, and technological development of the United States.

Utilizing original and reconstructed features, visitors to the Saugus Iron Works experience a seventeenth-century, water-powered iron-making plant. Existing Seventeen-century site resources include the Iron Works House, slag pile, stone trough, and various exposed archaeological ruins, including the site of Joseph Jenks' workshop. The reconstruction is based on a major

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archaeological investigation completed in 1954 and includes a blast furnace, forge, rolling and slitting mill, pier, and warehouse. Seven working waterwheels operate the equipment demonstrating the colonial iron-making process. An extensive museum collection is housed on site allowing visitors a chance to see, and touch, many of the original excavated artifacts.

These original and reconstructed structures and settings, museum programs, as well as Ranger-led tours illustrate the critical role of iron making to seventeenth-century settlement and its legacy in shaping the early history of our nation. These resources demonstrate seventeenth-century engineering and design methods, iron-making technology and operations, local and overseas trade, and life and work in the early Massachusetts Bay Colony.

The original manufacturing site served as a training ground for skilled iron workers for what would become America's iron and steel industry. Iron making provided the infrastructure for the rise of other colonial industries. Called, "the forerunner of America's industrial giants," the site served as a center for technology, innovation and invention. Saugus Iron Works illuminates early industrial manufacturing, with its enduring social, political and environmental ramifications.

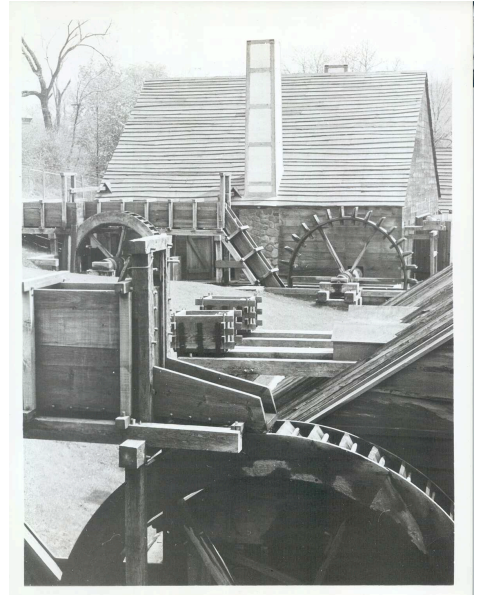


Name: _____

Saugus Iron Works

Early Industrial Marvel and Economic Resource Word Search

L L I M G N I T T I L S D N A G N I L L O R R B P
 S Z O E I E B P N E W C Y E C B O X C J N E A L I
 R U L R G P U E R A E O U J U R R Q B H W N W A G
 D I M R B R H U N O V D M X W G I O Q W R I F S I
 C U O P I B T H Y W X R C K Y M T H N B B F O T R
 R F X T T N A G O I Z N E Q S H H C M T S Q S F O
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 A C T V T A W L P Z W A S V I H O G T O E J R Q L
 S R A S Z I X W S A S O Y O T L P L A X V D P O K
 M L A E R O G O B T G B U I P E W A L N A R N O G
 D R A B R N A T I V E A M E R I C A N I L U B I U
 S R U G T T V N O R U S S B W M G X E Z E L I E Q
 Z O A O X N G X Z X K M T Y W N B C K T W R J Y P
 I I H A T S A B C W C Y C D L O G W C H J A O Q
 P P X G H Z H H A Q P V A Z J Q X T A X P F G V N
 U Z M E C M M L C I G C X K J N J A U L I F F O F
 B K D H I A B V G R C Y N M V X K X S F W N E C P
 H F E F M W T V R C E T B I N Q A A B L U P D J B
 Z N L H T I M S R E M M A H O W N E R Z T O N L N



BLACKSMITHSHOP
 BLASTFURNACE
 BOGORE
 CASTINGSBED
 COD
 COLLIER
 FINER
 FORGE
 GABBRO

HAMMERSMITH
 INDENTURE
 INDENTUREDSEVANT
 INVESTOR
 MERCHANTBAR
 NATIVEAMERICAN
 OWNER
 PIG
 PIGIRON

PROSIONERSOFWAR
 PURITAN
 ROLLINGANDSLITTINGMILL
 SLAG
 SUMPTUARYLAWS
 WROUGHTIRON