

THE UNIVERSITY OF THE STATE OF NEW YORK
THE NEW YORK STATE EDUCATION DEPARTMENT

Commencement-Level Learning Experience

Robert Fulton: Technological Innovation and Change

NYSED LEARNING STANDARDS

Social Studies Standard 1: History of the United States and New York KI 2, PI 2; KI 3, PI 2 & 4; KI 4, PI 1–4

Social Studies Standard 2: World History KI 2, PI 3 + 5, & 5; KI 3, PI 1 & 2; KI 4, PI 1–4

Social Studies Standard 3: Geography KI 1, PI 6

Social Studies Standard 4: Economics KI 1, PI 3

Social Studies Standard 5: Civics, Citizenship, and Government KI 2, PI 5

English Language Arts Standard 1: Language for Information and Understanding Reading PI 3

English Language Arts Standard 1: Language for Information and Understanding Writing PI 2

English Language Arts Standard 1: Language for Information and Understanding Listening PI 3

English Language Arts Standard 1: Language for Information and Understanding Speaking PI 1–3, 5

English Language Arts Standard 3: Language for Critical Analysis and Evaluation Reading PI 3, 5

English Language Arts Standard 3: Language for Critical Analysis and Evaluation Writing PI 1–3

English Language Arts Standard 3: Language for Critical Analysis and Evaluation Listening PI 1, 3

English Language Arts Standard 3: Language for Critical Analysis and Evaluation Speaking PI 1–3

English Language Arts Standard 4: Language for Social Interaction Reading PI 1

English Language Arts Standard 4: Language for Social Interaction Writing PI 1

English Language Arts Standard 4: Language for Social Interaction Listening PI 3–4

English Language Arts Standard 4: Language for Social Interaction Speaking 2

Technology Standard 5: History and Evolution of Technology KI 5, PI 1

Technology Standard 5: Impacts of Technology KI 6, PI 1

The Arts Standard 3: Respond Critically to a Variety of Works in the Artist Visual Arts PI 1–4

The Arts Standard 4: Understanding the Cultural Dimensions and Contributions of the Arts Visual Arts PI 1–3

SOCIAL STUDIES CORE CURRICULUM

Global History and Geography

Unit 5 – An Age of Revolution (1750–1914)

- G. Economic and Social Revolutions

United States History and Government

Unit 2 – Constitutional Foundations for the United States Democratic Republic

- F. Implementing the New Constitutional Principles
 - *2. Development of unwritten constitutional government under Washington, Adams, and Jefferson: cabinet, political parties, judicial review, executive and Congressional interpretation, lobbying: the Marshall Court (*Gibbons v. Ogden*, 1824)

SKILLS

Thinking Skills – Drawing inferences and making conclusions; comparing and contrasting ideas

Research and Writing Skills – Synthesizing information

Interpersonal and Group Relation Skills – Participating in group planning and discussion

Sequencing and Chronology Skills – Sequencing major events on a timeline

Graph and Image Analysis Skills – Decoding and analyzing images (graphs, cartoons, paintings, photographs)

CONCEPTS

**Change
Government
Economic Systems
Movement of People and Goods**

**Needs and Wants
Places and Regions
Power
Science and Technology**

MODULE CONTEXT

Prior to the invention of the steamboat, waterborne navigation relied primarily on wind power and efficient sail design. With the onset of the transportation revolution, steam became the major source of power. Commercial steam boating on the Hudson River began with Robert Fulton's successful run from New York to Albany on August 14, 1807. Robert Livingston, Jr., was Robert Fulton's partner in the steamboat business. The United States Supreme Court case *Gibbons v. Ogden* (1824) addressed issues that arose from this partnership. The Court held that the power to regulate interstate navigation was granted to Congress by the commerce clause of the Constitution.

Editor's Note: Robert Fulton's steamboat was registered as the *North River Steam Boat*, but it was generally known as the *Clermont*.

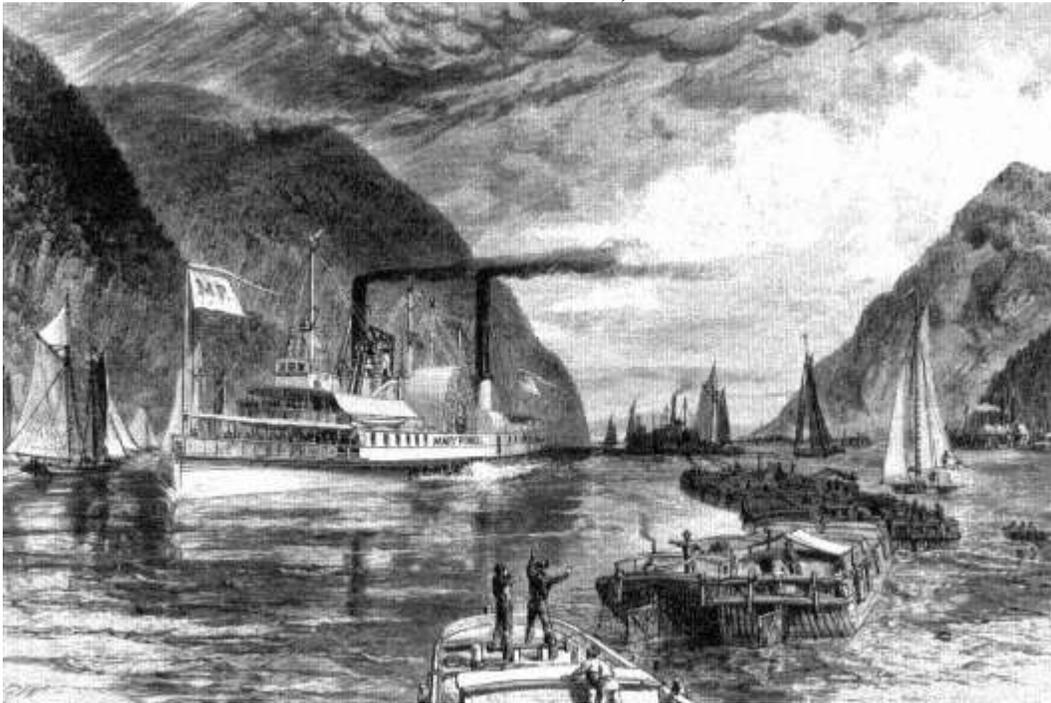
FOCUS QUESTIONS

- What impact did Robert Fulton's *Clermont* and steamship technology have on history?
- What impact did the *Clermont* have on trade and commerce?
- What impact did the *Gibbons v. Ogden* U.S. Supreme Court decision have on the economic and commercial development of the United States?

Document 1

- Students will explain that although technological effects are complex and difficult to predict accurately, humans can control the development and implementation of technology.

Highlands of the Hudson River
Thomas Chambers, 1874



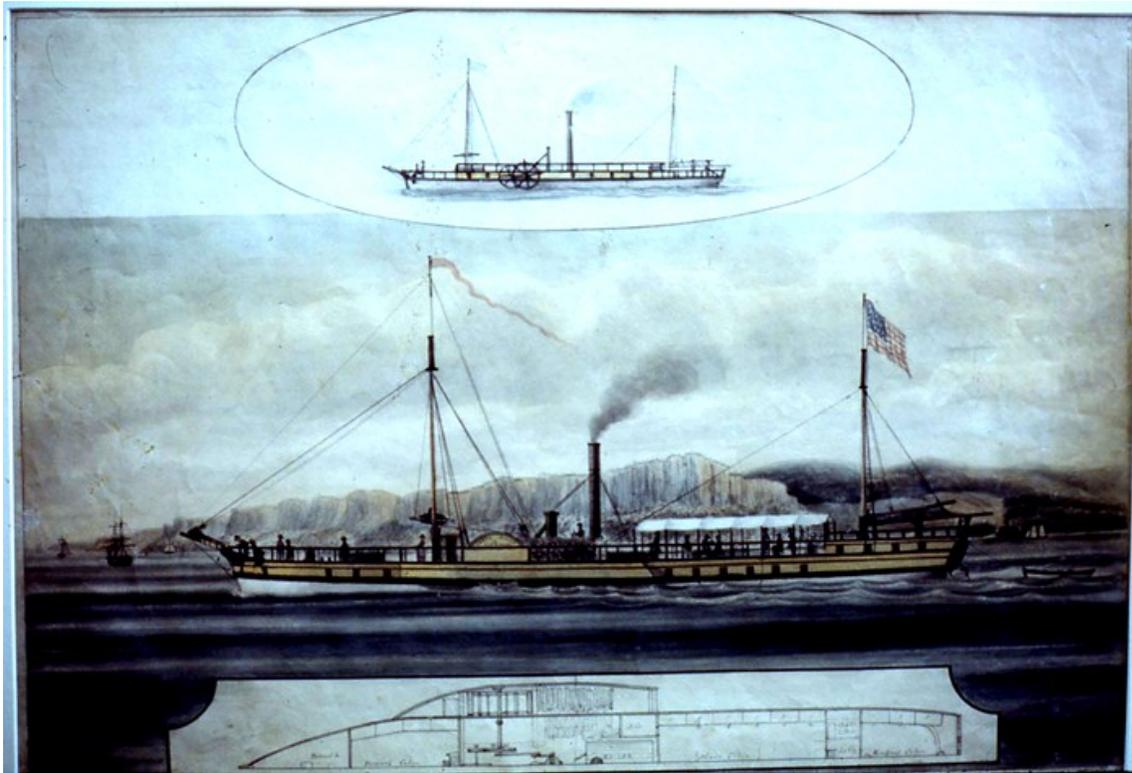
Source: New York Historical Society

- Identify two different transportation technologies that are portrayed in this painting.
- State one advantage and one disadvantage of each technology portrayed in Chambers' painting.

Document 2

- Students will explain how technological change affects people, places, and regions.

Clermont: Three-Part Study
Richard Varick De Witt, 1858



Source: Albany Institute of History & Art

- What technology powered the *Clermont*?
- How was this technology an improvement over sail technology?

Document 3

- Students will analyze historical narratives about key events in New York State and United States history to identify the facts and evaluate the author's perspective.

New York, August 20

TO THE EDITOR OF THE AMERICAN CITIZEN

Sir,

I arrived this afternoon at 4 o'clock, in the steam boat, from Albany. As the success of my experiment gives me great hope that each such boats may be rendered of much importance to my country, to prevent erroneous opinions, and to give some satisfaction to the fiends of useful improvements, you will have the goodness to publish the following statement of facts:

I left New York on Monday at 1 o'clock, and arrived at Clermont, the seat of Chancellor Livingston, at 1 o'clock on Tuesday, time 24 hours, distance 110 miles; on Wednesday I departed from the Chancellor's at 9 in the morning, and arrived at Albany at 5 in the afternoon, distance; 40 miles, time 8 hours; the sum of this is 150 miles in 32 hours, equal near 5 miles an hour.

On Thursday, at 9 o'clock in the morning, I left Albany, and arrived at the Chancellor's at 6 in the evening; I started from thence at 7, and arrived at New -York on Friday at 4 in the afternoon; time 30 hours, space run through 150 miles, equal 5 miles an hour. Throughout the whole way my going and returning the wind was ahead; no advantage could be drawn from my sails—the whole has, therefore, been performed by the power of the steam engine.

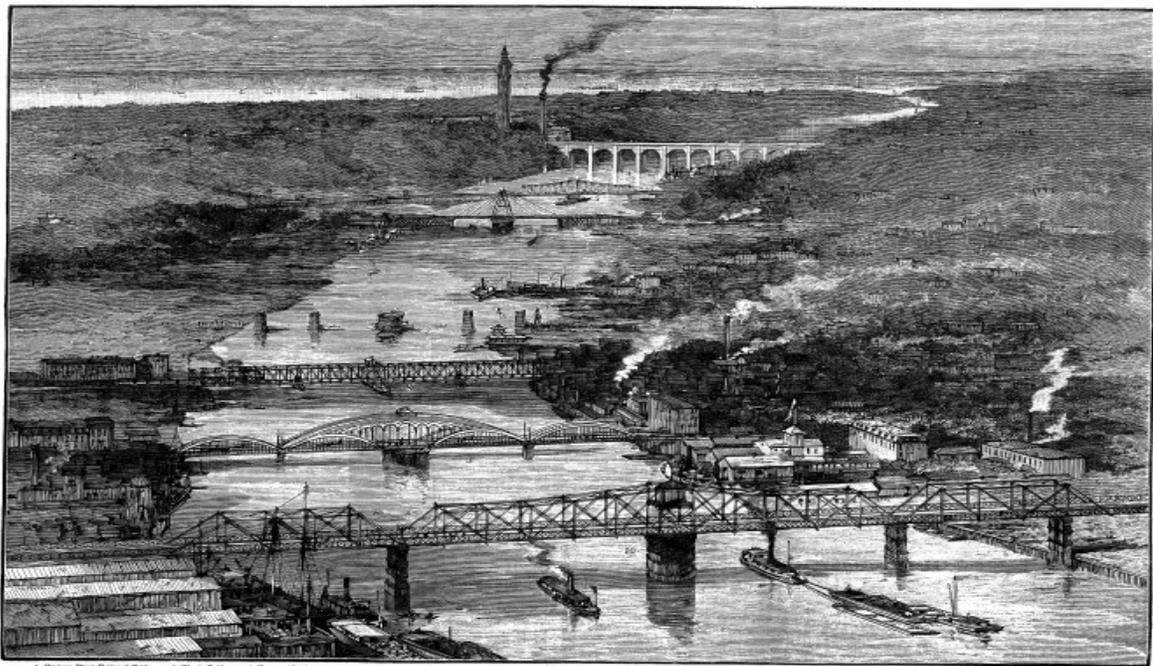
*Letter to the Editor of the American Citizen
Source: New York State Library*

- What speed did Fulton travel at on the maiden voyage of the *Clermont*?
- Why did the *Clermont* also have sails?
- How were steamboats an improvement over sail technology?

Document 4

- Students will interpret and analyze documents and artifacts related to significant developments and events in world history.

Harper's Weekly Illustration of Bridge over the Hudson River



1. Hudson River Railroad Bridge. 2. King's Bridge. 3. Putnam Bridge. 4. High Bridge. 5. City Avenue Railroad Bridge. 6. McCown's State Bridge. 7. Madison Avenue Bridge. 8. Hudson River Railroad Bridge. 9. Harlem Bridge. 10. Schuchka's Rapid Transit and Foot Bridge as it will appear when completed.
BRIDGES OVER HUDSON RIVER.—[See Page 731.]

Source: New York State Library

- What transportation technologies are shown in this image?
- What overall impression does this image provide regarding the economy of the Hudson River Valley region?

Document 5

- Students will explain how technological change affects people, places, and regions.

Ferrying by sail laid the foundations of a fortune for Cornelius Vanderbilt, who won his title of Commodore from it, and it promised another to Robert Fulton, who obtained permission in 1811 to run two vessels built by him, equipped with steam-driven machinery of his own invention, as ferries between the Battery and the Jersey shore. A year later, he and his wealthy partner, Robert Livingston, were authorized to operate another line across the East River to Long Island.

Fulton's steam ferryboats were of the catamaran[two hulls connected by a deck above the waterline] type, with two hulls, united by a primitive bridge, or deck. They had a steering wheel between the hulls and a rudder at each end. The machinery he devised for them was placed on the deck amidships. Both ends of the boats were alike, making it possible for them to function without turning around. All that was needed to move them in the opposite direction was to reverse the machinery. This has remained a feature of New York ferryboats to the present day, although sidewheelers [ferry boats with the propelling wheel set alongside the vessel instead of at the back or front] gave way after a time to propeller-driven craft.

Weather permitting, Fulton's boats could cross from Battery to Jersey in fourteen minutes – their average time was twenty minutes – a great improvement on the forty-five minutes' average required by sailboat ferries.

Source: "New York Ferry Boats," *American Heritage*, October 1959, v. X6, pp. 30–31

- What technological changes were possible on a steamboat that made them better ferries than sailboats?
- How much more efficient were Fulton's steamboats than Vanderbilt's sailboats?

Document 6

- Students will understand the nature of scarcity and how nations of the world make choices that involve economic and social costs and benefits.

Heyday of the Floating Palace Leonard V. Huber



Source: *American Heritage*, October 1957, v. VIII6, pp. 24–25

- What two types of boats are visible in this image of the St. Louis shoreline?
- What advantage does steam have over those other kinds of boats?

Document 7

- Students will explain how economic decision making has become global as a result of an interdependent world economy.

What was the impact of the steamship on the sea world? The answer is complex. The short version is that it shrank it by more than a half, perhaps by as much as two-thirds; it eliminated dependence on the trade winds; it cut the seasons out of sailing. Only spherical trigonometry can compute its impact precisely but it can be illustrated by the practice of the East India Company, reckoned on a minimum of a year for a round voyage to Bombay; eighteen months was acceptable. A *Great Britain* [steamship] at an average speed of 9.3 knots, with three coalings stops and an allowance for headwinds, could have made three trips in eighteen months. From this kind of blunt fact developed the *Great Eastern*, the *Mauritania*, the *Queen Elizabeth*, and the half-million-ton tanker.

David Divine. "Steamship." Edward De Bono ed., *Eureka! An Illustrated History of Inventions from the Wheel to the Computer*. 1974.

Source: David Divine, "Steamship," in *Eureka! An Illustrated History of Inventions from the Wheel to the Computer*, ed. Edward De Bono. 1974.

- How did steamships "shrink the world"?
- What proof does the author provide to support his thesis?
- Why was it possible to "shrink the world" with steam, but not with sails?

Document 8

- Students will investigate key events and developments and major turning points in world history to identify the factors that brought about change, and they will discuss the long-term effects of these changes.

***Frigates, Port of Harfleur* (ca. 1852–1853)**
Oil Canvas



Source: Sterling and Francine Clark Art

Institute

- Have students analyze John Barthold Jongkind's *Frigates, Port of Harfleur* and write down their observations on the Venn diagram below.

Port of Rouen: Unloading Wood (1898)
Oil Canvas



Source: Sterling and Francine Clark Art

Institute

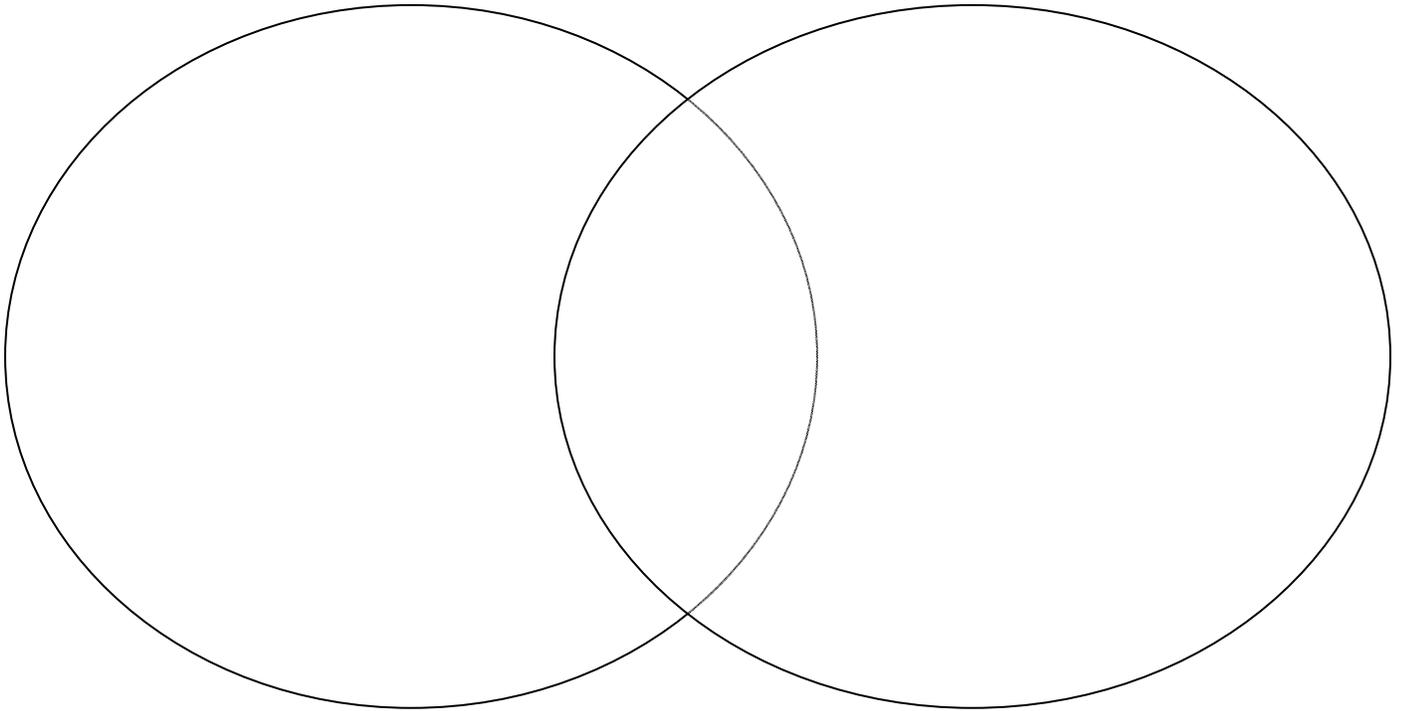
- Students will analyze Camille Pissarro's *Port of Rouen: Unloading Wood* (1898) and write down their observations on the Venn diagram below.

Frigates, Port of Harfleur (ca. 1852–1853)
(1898) Johan Barthold Jongkind – Dutch
French

Oil Canvas

Port of Rouen: Unloading Wood
Camille Pissarro –

Oil Canvas



Document 9

- Students will understand the dynamic relationship between federalism and states' rights.

Gibbons v. Ogden

Citation: U.S. 1 (1824)

Concepts: Interstate Commerce Federal Supremacy v. State Rights

Facts

Robert Livingston secured from the New York State Legislature an exclusive twenty-year grant to navigate the rivers and other waters of the State. The grant further provided that no one should be allowed to navigate New York waters by steam without a license from Livingston, and his partner, Robert Fulton, and any unlicensed vessel should be forfeited to them. Aaron Ogden had secured a license for steam navigation from Fulton and Livingston. Thomas Gibbons originally had been partners with Ogden but was now his rival. Gibbons was operating steamboats between New York and New Jersey under the authority of a license obtained from the United States. Ogden petitioned the New York court and obtained an injunction ordering Gibbons to stop operating his boats in New York waters.

Issue

Whether the New York statute that prohibited vessels licensed by the United States from navigating the waters of New York was unconstitutional and, therefore, void.

Opinion

Writing for the Supreme Court of the United States, Justice Marshall said that the injunction against Gibbons was invalid because the monopoly granted by the New York statute conflicted with a valid federal law. The Court used this case to put forth the position that Congress can legislate and regulate *all* matters of interstate commerce as long as there is some commercial connection with another state. While Congress regulates interstate commerce, power to regulate “completely internal” commerce (trade carried on in a state that does not affect other states) is reserved to the state.

Holding

Judgment of the New York courts was reversed.

Supreme Court Membership

Chief Justice: John Marshall

Associate Justices: Bushrod Washington, William Johnson, Thomas Todd, Gabriel Duvall, Joseph Story

Argued February 4, 1824 Decided March 2, 1824	
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- Why is *Gibbons v. Ogden* considered a landmark Supreme Court decision?
- Which constitutional principles were the basis for the *Gibbons v. Ogden* Supreme Court decision?
- What is the relationship between the *McCulloch v. Maryland* and *Gibbons v. Ogden* Supreme Court decisions?

- Students will understand the dynamic relationship between federalism and states' rights.
- Students will present reasons, examples, and details from primary and secondary sources to defend opinions and judgments.

Provide students with a list of arguments used in *Gibbons v. Ogden*:

- Preamble of the United States Constitution
- Article 1, Section 8 of the U.S. Constitution
- Article 1, Section 10 of the U.S. Constitution
- The Tenth Amendment of the U.S. Constitution
- Division of powers arguments
- *McCulloch v. Maryland* (1819) decision

Ask the class to create a graphic organizer in which each student classifies whether the argument supports:

- Gibbons's position in favor of Congress's regulation of commerce (G)
- Ogden's position in favor of New York's regulation of commerce (O)
- Both sides (B)
- Neither side (N)

Have the class create a chart based on their discussion of individual student evaluations. Post the chart in the classroom.

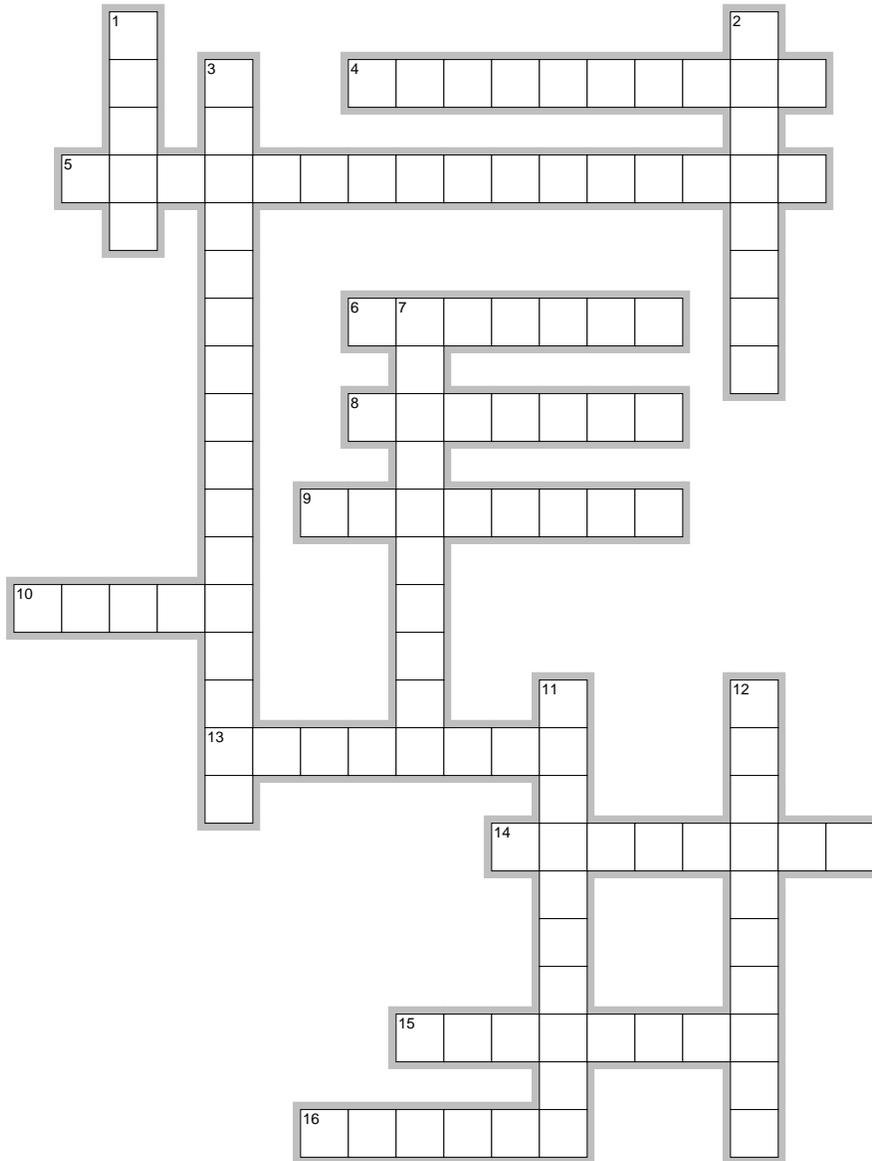
Class Debate:

- Have the class debate how well the historic Supreme Court case *Gibbons v. Ogden* reflects the intent and spirit of the Constitution in 1824 and today.

VOCABULARY

Assembly	explosions	license	steamboat
authorize	federal supremacy	mechanics	steam engine
bill of	forfeiture	misdemeanor	states' rights
complaint			
capital	injunction	monopoly	statute
civil engineer	intrastate	navigate	suit
	commerce		
commerce	interstate	partners	trade
	commerce		
Congress	innovation	petition	transportation revolution
enacted	invention	plaintiff	torpedo
enforcement	jurisdiction	propeller	vessel
engine	law	Senate	

ADDITIONAL ACTIVITIES:
Crossword Puzzle:



EclipseCrossword.com

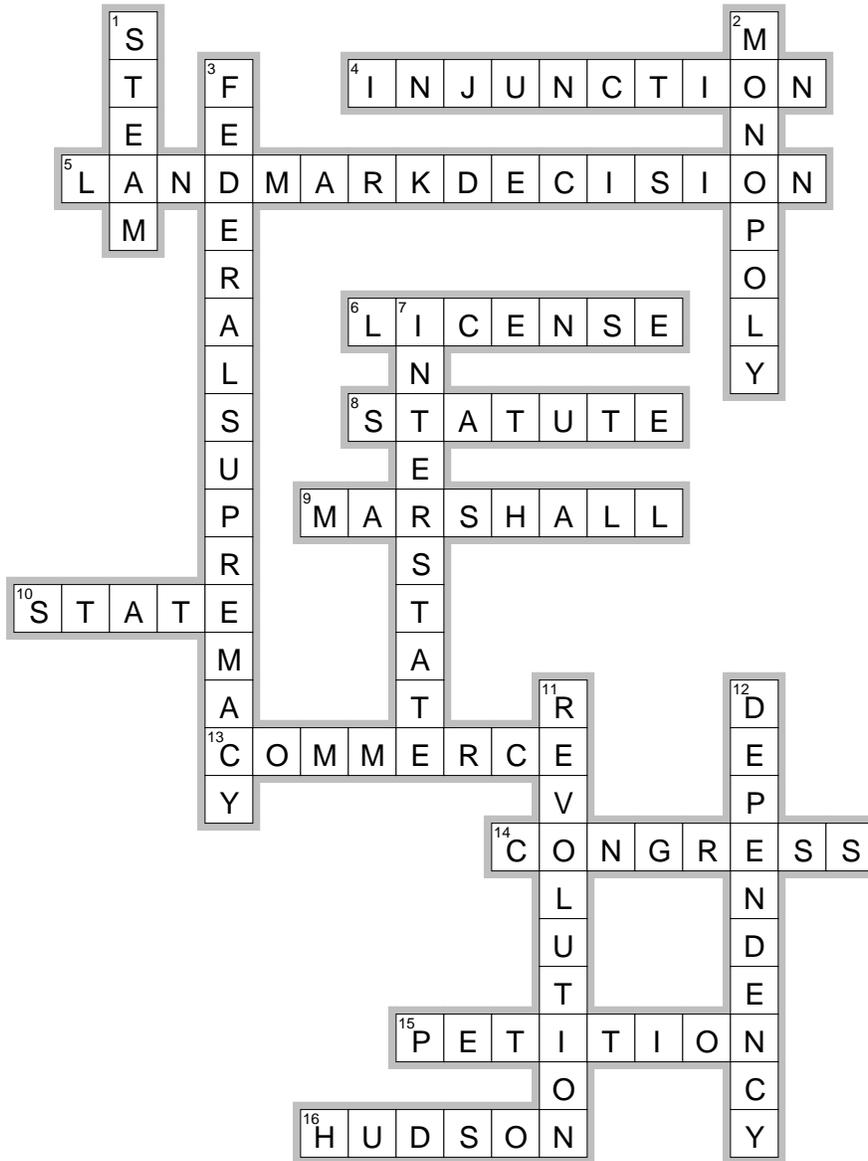
Across

4. An _____ is an order from a court either prohibiting an action or demanding an action be done.
5. A ruling by the U.S. Supreme Court is called a _____ if the decision has an extremely important outcome.
6. A _____ gives a person or a company legal permission to take an action.
8. A formal rule or a law is called a _____.
9. The Chief Justice of the U.S. Supreme Court in 1824 when the ruling was made on Gibbons v. Ogden was _____.
10. Gibbons v. Ogden is one of several landmark U.S. Supreme Court decisions that established the principle that the federal government could limit _____ rights.
13. _____ is the buying and selling of goods.
14. According to the ruling in Gibbons v. Ogden, _____ was to legislate and regulate all matters involving trade between the states.
15. A request or a plea to a court is called a _____.
16. The _____ River is where Fulton made his first successful run with a steam powered boat.

Down

1. The energy that powered the Clermont came from _____.
2. A _____ is when a person or company has exclusive control of a service or market
3. _____ is a key vocabulary term central to this learning experience and the Gibbons v Ogden decision.
7. Trade that takes place between two or more states is called _____ trade.
11. The steam boat was one of the new forms of transportation in the Transportation _____, a great change in how people traveled.
12. According to David Divine, quoted in document seven, the steam boat eliminated _____ on trade winds as it cut the seasons out of sailing.

Key:



EclipseCrossword.com

Modifications for Special Education and ELL Students:

- Students may consult with the regular education teacher regarding additional resources and support.
- During resource room period, students may work with their special education or ELL teacher to further explore sources.
- Remedial reading and ELA teachers should be aware of the assignments. They may also provide further assistance to students.
- Media center and library staff will pull additional resources and compile for students.
- Additional time may be allotted when submitting assignments.
- Assignments will be broken down into different stages to accommodate students.
- Visual assistance (flowcharts, pictures, illustrations) may also help students with the assignments.

SUGGESTED RESOURCES AND MATERIALS

Buckman, David Lear. 1909. *Old Steamboat Days on the Hudson River: Tales and Reminiscences of the Stirring Times That Followed the Introduction of Steam Navigation*. New York: Grafton Press. New York State Library

Carmer, Carl Lamson. 1939. *The Hudson*. New York: Farrar and Rinehart. New York State Library

Dangerfield, George. 1964. "The Steamboat Case," in *Quarrels That Have Shaped the Constitution*, ed. John A Garry. New York: Harper & Row, pp. 49-61. New York State.

Ford, Carin. 2004. *Robert Fulton: The Steamboat Man*. Berkeley Heights, NJ: Enslow Publishers.

Morgan, John. 1977. *Robert Fulton*. New York: Mason/Charter.

Sale, Kirkpatrick. 2001. *The Fire of His Genius: Robert Fulton and the American Dream*. New York: Simon & Schuster.

Sutcliffe, Alice Crary. 1909. *Robert Fulton and the Clermont*. New York: The Century Co.

WEBSITES

The History of Steamboats

<http://inventors.about.com/library/inventors/blsteamship.htm>

"The North River Steam Ship Clermont"

<http://www.kiac-usa.com/clermont.html>

Online Museum – A Short History of Steam Engines

<http://www.steamboats.com/museum/engineerom1.html>

Robert Fulton: His Life and Its Results by Robert H. Thurston

<http://www.iment.com/maida/familytree/henry/history/clermont/>

Robert Fulton and the Steamboat

http://www.bookrags.com/Robert_Fulton

Clermont State Historic Site

<http://www.friendsofclermont.org/>

Robert Fulton

http://www.pbs.org/wnet/historyofus/web04/features/bio/B07_2.html

Steamboat on the Hudson

<http://pbskids.org/bigapplehistory/early/topic17.html>

Maps and Industrial Revolution Images

<http://www.pbs.org/wnet/historyofus/tools/browser4b.html>