11 Connecting Time and Space
19th Century U.S. Settlement Patterns

By Chris Bunin

Guiding Question
How did the settlement and transportation patterns in early America change over time?

Project Duration
Three or four 45-minute class periods

Grade Level
Grades 6-9 (ages 11–15)

Subjects
- U.S. History
- Geography

Learning Objectives
Students will be able to:
- manipulate and interpret data layers showing spatial relationships of early 19th century settlement and land and water transportation in the United States
- describe the push and pull factors that influence human settlement
- compare and contrast transportation in the United States from 1810 to 1850
- explain the relationship between cost, distance, time, and market access to better understand the development of transportation networks.

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> ### How did the settlement and transportation patterns in early America change over time?

Activity Overview

This activity is comprised of four lessons in which students use My World GIS to visualize, analyze, and predict the relationships between early American settlement patterns and the development of transportation networks. Students compare and contrast transportation over several time periods. They conduct a cost analysis for expanding a railroad from East St. Louis to one of four possible market cities in the region.

Background

The first half of the 19th century was a period of westward migration, settlement, and transportation experimentation. The year 1850 marked a crossroads for transportation. It was a peak period for canal and steamboat transport, and railroads were being built at a furious pace. Students will be better prepared to analyze the data and make predictions if they have basic knowledge of American history and transportation including railroads, canals, and steamboats.

Connections to National Standards

NATIONAL HISTORY STANDARDS, PART II, U.S. HISTORY, GRADES 5-12

Era 4: Expansion and Reform (1801–1861)
- Standard 2: How the industrial revolution, the rapid expansion of slavery, and westward movement changed the lives of Americans and led to regional tensions.

NATIONAL GEOGRAPHY STANDARDS
- Standard 1: How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information.
- Standard 3: How to analyze the spatial organization of people, places, and environments on Earth's surface.
- Standard 9: The characteristics, distribution, and migration of human populations on Earth's surface.
- Standard 12: The process, patterns, and functions of human settlement.
- Standard 17: How to apply geography to interpret the past.

Vocabulary

westward expansion, *noun*—the movement of settlers to the western United States in the 19th century
transportation, *noun*—movement of people or goods from one place to another
canal, *noun*—artificial waterway
steamboat, *noun*—boat that uses steam as power source for engine, widely used on rivers in the 19th century
railroad, *noun*—road constructed with metal tracks on which trains travel
urban, *adjective*—having to do with city life

Additional Resources

- Clinton's Big Ditch
  http://www.eriecanal.org
- Wake Up, America
  www.pbs.org/wnet/historyofus/web04/index.html
- Stover, John F. *The Routledge Historical Atlas of the American Railroads,* Routledge Press. New York. 1999.

Data Dictionary

Additional information about each of the layers used in this project.

- LgCities1790—the 24 U.S. cities and their populations in 1790
- LgCities1810—the top 30 U.S. cities and their populations in 1810
- LgCities1830—the top 30 U.S. cities and their populations in 1830
- LgCities1850—the top 30 U.S. cities and their populations in 1850
- Canals1832—generalized canal systems for 1832
- Canals1850—generalized canal systems for 1850
- RR1830—generalized railroad lines for 1830
- RR1850—generalized railroad lines for 1830
- Major_Steamboats_1810—generalized steamboat routes for 1810
- Major_Steamboats_1830—generalized steamboat routes for 1830
- Major_Steamboats_1850—generalized steamboat routes for 1850
- National Road 1818—generalized route of the national route in 1818
- National Road 1828—generalized route of the national route in 1828
- National Road 1838—generalized route of the national route in 1838
- US Elevation—raster image that shows elevations, ESRI
- Major Rivers—major U.S. rivers, ESRI
- US States—the polygons of the 50 United States, ESRI

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19th Century U.S. Settlement Patterns

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> **How did the settlement and transportation patterns in early America change over time?**

The first half of the 19th century was a period of westward migration, settlement, and transportation experimentation. The year 1850 marked a crossroads for transportation. It was a peak for canal and steamboat transport, and railroads were being built at a furious pace. Market cities were being connected to one another by rail, which would forever impact the economic trade and industry-development patterns.

In this lesson you will use My World GIS to visualize, and analyze and predict the relationships between 19th century American settlement patterns and the development of transportation networks. You will compare and contrast transportation in the United States across several time periods. Then you will conduct a cost analysis of extending a railroad from East St. Louis to one of four possible market cities in the region.

Use your student answer sheet to record answers for each question below. Note that in some sections, questions will be posed first, and then the steps following will help you to address the question.

Lesson A: Early U.S. Settlement Patterns

In this exercise, you will:
- predict, observe, and compare the distribution of American cities from 1790-1850.
- analyze the relationship among early American cities and the evolution of transportation networks from trails to rails.

Part I: Settlement Patterns 1790

QUESTION 1

a. Which region do you think will have the most cities?

b. Which region to you think will have the fewest cities?

c. How will physical geography, including locations of mountains, streams, and oceans, influence the location of cities?

Fill in the table of predictions to answer the above questions on your student answer sheet.

1. Launch My World GIS, and choose **File > Open Project...** Navigate to the file, **Settlement Patterns.m3vz,** and select **Open Project.** You can also double-click the project name to open the project.

2. The view in the map window displays North America in a shaded relief map with the states outlined. Review the many layers available in the Layer List. A few layers, **Major Lakes, Major Rivers,** and **U.S. Elevation** are initially turned on. Adjust layers, and explore the map.

3. Practice turning the various layers on and off by clicking the "eye" icon. To make a layer active, click the layer and it will be outlined in yellow. You will need to turn layers on and off and change the active layer as you progress through the activity.

4. Turn on the **Cities 1790** layer, and make it the active layer. Scan the map of 1790 cities, and record your observations about the settlement patterns, including regional trends and geographical considerations such as proximity to waterways, coastlines and topography.

QUESTION 2.
a. What was the population of the most populated city in 1790?
b. What was the population of the 24th most populated city in 1790?
c. Which state had the most populated cities in 1790?

5. With the **Cities 1790** layer active, click the **Show Statistics for Active Layer** function. Review the data and statistics for the 24 cities represented in the layer. In answering the questions, note that the most populated city would have the "maximum" value for the population, while the least populated city (the 24th most populated,) would have the "minimum" value. The state with the most populated cities will show the "most common" value.

QUESTION 3. What were the three most populated cities in 1790, and what were their populations?

6. With the **Cities 1790** layer active, close the statistics table, and choose the **Show Table of the Active Layer** function and sort the population in descending order. Use the table to identify the top three most-populated cities in 1790, and then close the table.

QUESTION 4. What was the capital of the United States in 1790?

7. With the **Cities 1790** layer active, choose the **Open Analysis Window…** function (the globe and magnifying glass underneath the Layers List title). Choose **Select > By Value.** For these drop-down menus, select the following options:
   • **Select Records from: Cities 1790**
   • **Whose: US Capital**
   • **Matches One of the Values Checked Below: Yes**
   • **Result Name: 1790 National capital**
   The capital city should now be locatable on the map. Click the **Get Information Tool** (the "i" with an arrow) to identify the name of the city.

QUESTION 5.
a. Which city was located farthest from the national capital? How far?
b. Which two cities appear to be located farthest from the Atlantic Ocean? How far?

8. Set your unit of measurement to miles by selecting **Edit > Preferences** from the main menu. In the **Measurement Units:** drop-down menu, select **mi (mile.)** Use the **Measurement Tool** and **Get Information Tool** to identify these cities.

9. Use the **Measurement Tool** on the tool bar to determine the distances between various cities and geographical features. The Measurement Tool looks like a ruler with a compass. Click the map at your starting location and double-click to end the measurement. If you are not satisfied with your result, simply re-do it. The measurement will display at the bottom of the window as the **Segment Length** and should be noted in miles. Take several measurements to confirm the cities and distances. Once you have located the cities, use the **Get Information** tool to identify the name of the city.

With the knowledge that you have gained about the settlement patterns from 1790, think about how the patterns may change during the next two decades.

Part II: Settlement Patterns 1810

Fill in the table of predictions on your student answer sheet.

10. Keep the **Cities 1790** layer turned on, and now turn on the **Cities 1810** layer, and make it the active layer. Select the **Zoom to Active Layer** button, and scan the map of 1810 cities and record your observations about the settlement patterns, including regional trends and geographical considerations—proximity to waterways, coastlines, and topography.

QUESTION 6.

a. What was the population of the most populated city in 1810?
b. What was the population of the 30th most populated city in 1810?
c. Which state had the most populated cities in 1810?

11. With the **Cities 1810** layer active, click the **Show Statistics for Active Layer** function. Review the data and statistics for the 30 cities represented in the layer. In answering the questions, note that the most populated"city would have the "Maximum" value for the population, while the least populated city (or the 30th most populated) would have the "Minimum" value. The state with the most populated cities will show the "most common value."

QUESTION 7. What were the three most populated cities in 1810, and what were their populations?

12. With the **Cities 1810** layer active, close the statistics table, and choose the **Show Table of the Active Layer** function and sort the population in descending order. Use the table to identify the top three most-populated cities in 1810, and then close the table.

QUESTION 8. What was the capital of the United States in 1810?

13. With the **Cities 1810** layer active, choose the **Open Analysis Window…** function. Choose **Select > By Value.** For these drop-down menus, select the following options:
   • **Select Records from: Cities 1810**
   • **Whose: US Capital**
   • **Matches One of the Values Checked Below: Yes**
   • **Result Name: 1810 National Capital**
   The capital city should now be locatable on the map. Click the **Get Information** tool to identify the name of the city.

QUESTION 9.

a. Which city was located farthest from the national capital? How far?
b. Which two cities appear to be located farthest from the Atlantic Ocean? How far?

Use the **Measurement tool** and **Get Information tool** to identify these cities and the distances.

Part III: Settlement Patterns 1850

With the knowledge that you have gained about the settlement patterns from 1790 and 1810, think about how the patterns have changed and what you might expect in 1850. Where are new cities emerging? How will physical geography, including locations of mountains, streams, and oceans, influence the location of cities?

Fill in the table of predictions on your student answer sheet.

14. Keep the **Cities 1790** and **Cities 1810** layers turned on, and now turn on the **Cities 1850** layer, and make it the active layer. Select the **Zoom to Active Layer** button, and scan the map of 1850 cities, and record your observations about the settlement patterns, including regional trends and geographical considerations—proximity to waterways, coastlines and topography.

QUESTION 10.
a. What was the population of the most populated city in 1850?
b. What was the population of the 30th most populated city in 1850?
c. Which state had the most populated cities in 1850?

15. With the **Cities 1850** layer active, click the **Show Statistics for Active Layer** function. Review the data and statistics for the 30 cities represented in the layer. In answering the questions, note that the most populated city would have the "maximum" value for the population, while the least populated city (or the 30th most populated) would have the "minimum" value. The state with the most populated cities will show the "most common" value.

QUESTION 11. What were the three most populated cities in 1850 and what were their populations?

16. With the **Cities 1850** layer active, close the statistics table and choose the **Show Table of the Active Layer** function, and sort the population in descending order. Use the table to identify the top three most-populated cities in 1850, and then close the table.

QUESTION 12. What was the capital of the United States in 1850?

17. **Select > By Value.** For these drop-down menus, select the following options:
    • **Select Records from: Cities 1850**
    • **Whose: US Capital**
    • **Matches One of the Values Checked Below: Yes**
    • **Result Name: 1850 National Capital**
    The capital city should now be locatable on the map. Click the **Get Information Tool** to identify the name of the city.

QUESTION 13.
a. Which city was located farthest from the national capital? How far?
b. Which two cities appear to be located farthest from the Atlantic Ocean? How far?

18. Use the **Measurement Tool** and **Get Information Tool** to identify these cities and the distances.

    To view how the U.S. Cities and settlement patterns changed between 1790 and 1850, create two maps in the **Map Table** window to visually demonstrate this.

19. Make **Cities 1850, Major Rivers,** and **U.S Elevation** the only visible layers. In the lower-left corner of the map, choose **Map Tables > New.** Next, choose the **Top and Bottom** layout and then **Create.** Use the **Paint Can** symbol to fill the first map. **Choose Save Current Map in Table As: 1850 Map.**

20. Make **Cities 1790, Major Rivers,** and **U.S. Elevation** the only visible layers. Choose **New.** Next, choose the **Top and Bottom** layout and then **Create.** Use the Paint Can symbol to fill the first map. Choose **Save Current Map in Table As: 1790 Map.** Click **Open** to view and compare each of your new maps.

QUESTION 14. Using the answers you have completed from the lesson and your maps, create and complete a Venn diagram that compares the U.S. settlement patterns in 1790 and 1850. Find and analyze the overlapping areas, and compose a written summary of the changes.

Lesson B: Trails To Rails

In this exercise, you will:
- use GIS to analyze the relationship between new modes of transportation and the movement and settlement of people.

Part I: Moving from Rivers to Rails

1. Launch My World GIS, and choose **File > Open Project...** Navigate to the file **T2R2.m3vz,** and select **Open Project.** You can also double-click the project name to open the project.

   The view in the Map window displays North America in a shaded relief map with the states outlined. Review the many layers available in the **Layer List.**

2. Practice turning the various layers on and off by clicking the "eye" icon. To make a layer active, click the layer and it will be outlined in yellow. You will need to turn layers on and off and change the active layer as you progress through the activity.

3. Make sure the following layers are on: **U.S. Elevation, U.S. States, Major Rivers, Major Steamboat Routes 1810, Early Major Roads,** and **Top 30 Cities 1810.**

QUESTION 1. What patterns do you notice about transportation in the United States in 1810?

4. Make the **Top 30 Cities 1810** layer active and choose **Zoom to Active Layer.** Make observations about the patterns you see.

QUESTION 2.
a. How many major U.S. cities were located near steamboat routes in 1810?
b. What appears to be the best way to travel inland, away from major rivers or lakes, in 1810?

5. With the Top 30 Cities 1810 layer active, choose **Open Analysis Window > Select > By Spatial Relationship > By Distance.** For these drop-down menus, select the following options:
   - **Select Records from: Top 30 Cities 1810**
   - **That Are Less than: 15 Miles**
   - **From Records in: Major Steamboat Routes 1810**
   - **Result Name: Steamboat Cities**
   Choose **Show Table of Selection** to view the cities that fit the criteria.

Part II: Transportation 1830

QUESTION 3. Which form of transportation was likely the best for travel inland, away from major rivers or lakes, in 1830? Why?

6. Make sure the following layers are on: **U.S. Elevation, U.S. States, Major Rivers, Major Steamboat Routes 1830, Early Major Roads, Top 30 Cities 1830, Canals 1832, Railroads 1830,** and **National Road 1828.**

7. With the **Top 30 Cities 1830** layer active, choose **Open Analysis Window > Select > By Spatial Relationship > By Distance.**
For these drop-down menus, select the following options:
- **Select Records from: Top 30 Cities 1830**
- **That Are Less than: 15 Miles**
- **From Records in: Major Steamboat Routes 1830**
- **Result Name: Steamboat Cities**

Complete the operation again, using the following options:
- **Select Records from: Top 30 Cities 1830**
- **That Are Less than: 15 Miles**
- **From Records in: Canals 1832**
- **Result Name: Canal Cities**

Complete the operation again, using the following options:
- **Select Records from: Top 30 Cities 1830**
- **That Are Less than: 15 Miles**
- **From Records in: Railroads 1830**
- **Result Name: Railroad Cities**

8. For each of the three analyses, open the corresponding table of data by choosing **Show Table of Selection.** Record the following information for the year 1830:
- the number of Steamboat Cities and the state with the most Steamboat Cities
- the number of Canal Cities and the state with the most Canal Cities
- the number of Railroad Cities and the state with the most Railroad Cities.

Fill in the chart on your answer sheet with the information above. This will help you determine the answer to question 3 above.

Part III: Transportation 1850

QUESTION 4. Which form of transportation was likely the best for travel inland, away from major rivers or lakes, in 1850? Why?

9. Turn off the following layers: **Major Steamboat Routes 1830, Early Major Roads, Top 30 Cities 1830, Canals 1832, Railroads 1830,** and **National Road 1828.**

Make sure the following layers are on: **U.S. Elevation, U.S. States, Major Rivers, Major Steamboat Routes 1850, Early Major Roads, Top 30 Cities 1850, Canals 1850, Railroads 1850,** and **National Road 1838.**

10. With the **Top 30 Cities 1850** layer active, choose **Open Analysis Window > Select > By Spatial Relationship > By Distance.**
For these drop-down menus, select the following options:
- **Select Records from: Top 30 Cities 1850**
- **That Are Less than: 15 Miles**
- **From Records in: Major Steamboat Routes 1850**
- **Result Name: Steamboat Cities**

Complete the operation again, using the following options:
- **Select Records from: Top 30 Cities 1850**
- **That Are Less than: 15 Miles**
- **From Records in: Canals 1850**
- **Result Name: Canal Cities**

Complete the operation again, using the following options:
- **Select Records from: Top 30 Cities 1850**
- **That Are Less than: 15 Miles**
- **From Records in: Railroads 1850**
- **Result Name: Railroad Cities**

11. For each of the three analyses, open the corresponding table of data by choosing **Show Table of Selection.** Record the following information for the year 1850:
    - the number of Steamboat Cities and the state with the most Steamboat Cities
    - the number of Canal Cities and the state with the most Canal Cities
    - the number of Railroad Cities and the state with the most Railroad Cities.

    Fill in the chart on your answer sheet with the information above. This will help you determine the answer to question 4 above.

QUESTION 5.
a. Which major cities in 1850 did not have access to a major canal or railroad?
b. Why do you think these cities were able to thrive without access to these new forms of transportation?

12. With the Top 30 Cities 1850 layer active, choose Open Analysis Window > Select > By Spatial Relationship > By Distance. For these drop-down menus, select the following options:
    - **Select Records from: Top 30 Cities 1850**
    - **That Are More than: 15 Miles**
    - **From Records in: Railroads 1850**
    - **Result Name: No Railroad Cities**

    Click **OK.**

13. Choose **Open Analysis Window > Select > By Spatial Relationship > By Distance.** For these drop-down menus, select the following options:
    - **Select Records from: Top 30 Cities 1850 > No Railroad Cities**
    - **That Are More than: 15 Miles**
    - **From Records in: Canals 1850**
    - **Result Name: No Canals or Rails**

    Use the **Get Information Tool** or **Show Table of Selection** to identify the city or cities that met the criteria. Use this data to answer question 5 above.

Part IV: Compare transportation in 1810 and 1850

14. To view how the transportation and settlement patterns changed between 1810 and 1850, create two maps in the **Map Table** window to visually demonstrate this.

Make **Top 30 Cities 1810, Major Rivers, U.S Elevation, Major Steamboat Routes 1810,** and **Early Major Roads** the only visible layers. In the lower-left corner of the map, choose **Map Tables > New.** Next, choose the **Side-by-Side** layout and then **Create.** Use the Paint Can symbol to fill the first map. Choose **Save Current Map in Table As: 1810 Map.**

Make **Top 30 Cities 1850, Major Rivers, U.S. Elevation, Major Steamboat Routes 1850, Canals 1850, Railroads 1850** and **National Road 1838** the only visible layers. Choose **New.** Next, choose the **Side-by-Side** layout and then **Create.** Use the Paint Can symbol to fill the first map. Choose **Save Current Map in Table As: 1850 Map.** Click **Open** to view and compare each of your new maps.

QUESTION 6. Using the answers you have completed from the lesson and your maps, create and complete a Venn diagram that compares the U.S. transportation patterns in 1810 and 1850. Find and analyze the overlapping areas, and compose a written summary of the changes.

Lesson C: Buffalo, New York—Trails to Rails Case Study

In this exercise, you will:
• use GIS to analyze the new modes of transportation connecting Buffalo, NY to New York City.
This activity demonstrates on a regional scale the impact of steamboats, canals, and railroads on the state of New York.

1. Launch My World GIS and, choose **File > Open Project...** Navigate to the file **T2R Case Study.m3vz,** and select **Open Project.** You can also double-click the project name to open the project.

   The view in the Map window displays North America in a shaded relief map. Review the many layers available in the Layer List.

2. Practice turning the various layers on and off by clicking the "eye" icon. To make a layer active, click the layer and it will be outlined in yellow. You will need to turn layers on and off and change the active layer as you progress through the activity.

Part I: Transportation Time and Distance

3. Make sure the following layers are visible: **U.S. Elevation, U.S. States, Major Rivers, Early Roads, Major Steamboat Routes 1810, State of New York Cities 1810, New York State,** and **Buffalo, NY**.

QUESTION 1.
a. What patterns do you notice about transportation in 1810?
b. How far is it from Buffalo to the closest major city following a major transportation route? What is the city?
c. How long would it take to travel from Buffalo to the nearest city by available means of transport?

4. Use the **Zoom In Tool** to examine the location of cities in New York state and the major transportation routes connecting them.

5. Use the **Measurement Tool** and **Get Information Tool** to determine which major city in New York State is closest to Buffalo. Follow a major transportation route and record the travel distance.

   Note: for purposes of calculating travel time, use the following constants for speed of travel in 1810:

Trail (early major roads)	2 miles per hour (commercial); 8 miles per hour (passenger)
Steamboat	5 miles per hour
Canal	2 miles per hour (commercial); 4 miles per hour (passenger)
Railroads	20 miles per hour

6. Using the speeds given above, calculate how many hours it would take to travel from Buffalo to the closest city along the major transportation route. If the option exists for both commercial and passenger travel, calculate both options.

QUESTION 2.

a. How far is it from Buffalo to New York City following a major transportation route?

b. How long would it take to travel from Buffalo to New York City for both commercial and passenger traffic in 1810?

7. Use the **Zoom In Tool** to locate Buffalo and New York City; make sure you can easily see the different transportation routes. Use the **Measurement Tool** to determine the length of the trip from Buffalo to New York City. Follow a major transportation route and record the travel distance.

8. Using the speed constants and the distance you have measured, calculate how many hours it would take to travel from Buffalo to New York City along the major transportation route for both commercial and passenger traffic.

QUESTION 3.

a. What patterns do you notice about transportation in 1830?

b. How far is it from Buffalo to the closest major city following a major transportation route? What is the city?

c. How long would it take to travel from Buffalo to the nearest city by available means of transport?

9. Turn off the **Early Roads** layer and make sure the following layers are turned on: **Canals 1832, Railroads 1830, State of New York Cities 1830, Major Steamboat Routes 1830,** and **New York State** are visible. Make the **New York State** layer active. Click **Zoom to Active Layer.**

10. Use the **Zoom In Tool** to examine the location of cities in New York State
and the major transportation routes connecting them in 1830.

11. Use the **Measurement Tool** and **Get Information Tool** to determine which major city in New York State is closest to Buffalo. Follow a major transportation route and record the travel distance.

Note: for purposes of calculating travel time, use the following constants for speed of travel in 1830:

Trail (early major roads)	2 miles per hour (commercial); 8 miles per hour (passenger)
Steamboat	10 miles per hour
Canal	2 miles per hour (commercial); 4 miles per hour (passenger)
Railroads	20 miles per hour

12. Using the velocity constants, calculate how many hours it would take to travel from Buffalo to the closest city along the major transportation route. If the option exists for both commercial and passenger travel, calculate both options.

QUESTION 4.

a. How far is it from Buffalo to New York City following a major transportation route?

b. How long would it take to travel from Buffalo to New York City for both commercial and passenger traffic in 1830?

13. Use the **Zoom In Tool** to locate Buffalo and New York City; make sure you can easily see the different transportation routes. Use the **Measurement Tool** to determine how far the trip is from Buffalo to New York City. Follow a major transportation route and record the travel distance.

14. Using the velocity constants and the distance you have measured, calculate how many hours it would take to travel from Buffalo to New York City along the major transportation route for both commercial and passenger traffic.

QUESTION 5.

a. What patterns do you notice about transportation in 1850?

b. How far is it from Buffalo to the closest major city following a major transportation route? What is the city?

c. How long would it take to travel from Buffalo to the nearest city by available means of transport?

15. Turn off the **Early Roads, Canals 1832, Railroads 1830, Major Steamboat Routes 1830,** and **State of New York Cities 1830** layers, and make sure the following layers are turned on: **Canals 1850, Railroads 1850, State of New York Cities 1850, Major Steamboat Routes 1850,** and **New York State** are visible. Make the **New York State** layer active, and click **Zoom to Active Layer.**

16. Use the **Zoom In Tool** to examine the location of cities in New York State and the major transportation routes connecting them in 1850.

17. Use the **Measurement Tool** and **Get Information Tool** to determine which major city in New York State is closest to Buffalo. Follow a major transportation route and record the travel distance.
    Note: for purposes of calculating travel time, use the following constants for speed of travel in 1850:

Trail (early major roads)	2 miles per hour (commercial); 8 miles per hour (passenger)
Steamboat	10 miles per hour
Canal	2 miles per hour (commercial); 4 miles per hour (passenger)
Railroads	20 miles per hour

18. Using the speeds given above, calculate how many hours it would take to travel from Buffalo to the closest city along the major transportation route. If the option exists for both commercial and passenger travel, calculate both options.

QUESTION 6.

a. How far is it from Buffalo to New York City following a major transportation route?

b. How long would it take to travel from Buffalo to New York City for both commercial and passenger traffic in 1850?

19. Use the **Zoom In Tool** to locate Buffalo and New York City; make sure you can easily see the different transportation routes. Use the **Measurement Tool** to determine how far the trip is from Buffalo to New York City. Follow a major transportation route and record the travel distance.

20. Using the velocity constants and the distance you have measured, calculate how many hours it would take to travel from Buffalo to New York City along the major transportation route for both commercial and passenger traffic.

QUESTION 7.

a. What effects did the transportation revolution of the early 19th century have on human settlement and transportation networks in New York State?

b. What changes in New York did you find most surprising?

21. Using the answers you have completed from the lesson and your maps, create and complete a Venn diagram that compares the transportation patterns for New York State in 1810, 1830 and 1850. Find and analyze the overlapping areas, and compose a written summary of the changes.

Lesson D: Who Gets The Rail? Connecting East St. Louis

In this exercise, you will:
- propose where the first railroad to connect East St. Louis to eastern urban markets will be located.
- determine the optimal routes based on cost, distance, and market access.

INTRODUCTION

As you learned in Lesson B: Rails to Trails, St. Louis was the only top 30 U.S. city that did not have direct access to a railroad or a canal. People in East St. Louis, the town located on the eastern side of the Mississippi River, knew that if they could build a railroad to connect to Eastern markets they could become the port of choice for steamboats traveling up and down the Mississippi River, and it would help St. Louis grow and prosper.

In this lesson, you will assume the role of a St. Louis investor who is looking to build a railroad that will connect East St. Louis to another top 30 city. You have a budget of 15 million dollars and believe that in order for your railroad to be successful it must connect with another top 30 city directly or by way of another existing railroad. The construction cost for a railroad in that vicinity during the time period was $37,000/mile.

Part I: Select Possible Cities

QUESTION 1. How many miles of rail can you build within the constraints of your budget?

1. Launch My World GIS, and choose **File > Open Project...** Navigate to the file **WGTR.m3vz,** and select **Open Project.** You can also double-click the project name to open the project.

   The view in the Map window displays North America in a shaded relief map. Review the many layers available in the Layer List.

2. Practice turning the various layers on and off by clicking the "eye" icon. To make a layer active, click the layer and it will be outlined in yellow. You will need to turn layers on and off and change the active layer as you progress through the activity.

3. Make sure the following layers are on: **Market Cities, U.S. Elevation, U.S. States, Major Rivers, National Road 1838, Major Steamboat Routes 1850, Canals 1850,** and **Railroads 1850.**

4. Due to cost constraints, all top 30 cities are not candidates to become the destination for a railroad that will connect to St. Louis, "The Gateway to the West." Using a calculator, calculate the maximum number of miles of rails ($37,000/ mile) you can build with a budget of $15 million and record your answer.

QUESTION 2. Which of the top 30 cities are potential destinations, given your budget?

5. Make **Market Cities** the active layer. Click **Open Analysis Window.** Choose **Select > By Value.** For these drop-down menus, select the following options:
   - **Select Cities from: Market Cities**
   - **Whose: City**
   - **Is: St. Louis**
   - **Result Name: St. Louis**
   Click **OK.** Notice that St. Louis has been selected and is highlighted in red.

Note: Make sure the **Selections—highlight Mode:** is "hide unselected" so that St. Louis is the only city visible when you turn on the St. Louis selection.

6. Click **Open Analysis Window.** Choose **Create Buffer Around…** For these drop-down menus, select the following options:
   • **Create Buffer of: St. Louis**
   • **Create Buffer:** ＿＿ **Miles around St. Louis (enter the maximum mileage you calculated in Question 1.)**
   Click **Dissolve All Buffers.** Name your **Result Name:** with **St. Louis Buffer.** Click **OK.**

7. Notice that a buffer has been created around St. Louis. This is the maximum distance your railroad will be able to travel in any direction given your budget of $15 million. Move the **St. Louis Buffer** layer so that it is positioned below **Market Cities** and **Railroads 1850.** Move the **U.S. States** layer so that it is positioned above the buffer layer.

QUESTION 3. Which of the existing railroads lie within the buffer zone and could be considered possibilities for connecting to St. Louis?

8. Click **Open Analysis Window…** Choose **Select > By Spatial Relationship > By Containment.** For these drop-down menus, select the following options:
   • **Select Records From: Railroads 1850**
   • **Which: Are at Least Partly Contained By**
   • **Records in: St. Louis Buffer**
   • **Result Name: Possible Railroads**
   Click **OK.**

9. Study the map closely to observe that only the railroads with the possibility of connecting have been selected and are now viewable on the map.

   Note: Make sure the **Selections—highlight Mode:** is "hide unselected" so that Possible Railroads are the only ones visible when you turn the selection on.

QUESTION 4. How many cities are located near one of the "Possible Railroads"? Which cities would be possible for St. Louis to connect to?

10. Click **Open Analysis Window…** Choose **Select > By Spatial Relationship > By Distance.** For these drop-down menus, select the following options:
    • **Select Records From: Market Cities**
    • **That are: Less Than 10 miles**
    • **From Records in: Possible Railroads**
    • **Result Name: Possible Market Cities**
    Click **OK.**

Note: Make sure the **Selections—highlight Mode:** is "hide unselected" so that Possible Market Cities are the only ones visible when you turn the selection on. You may also need to change the appearance of the symbols for your Possible Market Cities to better view them on your map. With the Market Cities layer active, select **Edit Appearance of Active Layer** to change the size and/or color of your Possible Market Cities symbols.

11. There should now be four cities visible on your map as **Possible Market Cities.** With the Market Cities layer active, and the Possible Market Cities selection checked, click Show Table of Selection. Record the names of the four cities that are finalists to receive a railroad from St. Louis.

QUESTION 5. What is the transportation time in 1850 from St. Louis to the four possible cities?

12. Use the **Measurement Tool,** a calculator, and the speed table from earlier in the activity to calculate the transportation time to each of the four cities.

Part II: Conduct your Analysis
QUESTION 6.
a. Of the four possible market cities, which will provide the most access to other U.S. city markets?
b. What other cities will potentially connect with your chosen market city?

Note: You will need to complete the following instructions for each of the four potential market cities. Here, the example will use Chicago while illustrating each step.

13. Make Market Cities the active layer active and make sure that All (highlighting off) is checked.
    Click **Open Analysis Window…** Choose **Select > By Value.** For these drop-down menus, select the following options:
    - **Select Records From: Market Cities**
    - **Whose: CHIMKT**
    - **Matches One Of The Values Checked Below: Definite**
    - **Result Name: Definite Chicago Market**
    Click **OK.**

14. You have just identified those cities that experts believe will become part of your trade network if the railroad goes to Chicago. Complete the instructions again to identify cities that will potentially connect with St. Louis if you build a railroad.

    Click Open **Analysis Window…** Choose **Select > By Value.** For these drop-down menus, select the following options:
    - **Select Records From: Market Cities**
    - **Whose: CHIMKT**
    - **Matches One Of The Values Checked Below: Possible**
    - **Result Name: Possible Chicago Market**
    Click **OK.**

15. Make sure the **Market Cities** layer is active, and **Definite Chicago Market** is selected. Click **Show Statistics for Selection.** Use the statistics to identify how many cities **(Number of Values)** would definitely become part of the St. Louis trade network if the railroad went to Chicago. Identify the total population that would be considered **(the Sum)** in this scenario. To check your work, click **Show Table Of Selection,** and review the data in a different format.

16. Next, make sure the **Market Cities** layer is active, and **Possible Chicago Market** is selected. Repeat the process of looking at the statistics and table data to acquire the information for the number of cities and population for the potential market.

17. Now you should have all the data pertaining to Chicago and its definite and potential markets for St. Louis, should the railroad be built. Repeat the procedure for the remaining three cities: Detroit (DETMKT), Louisville (LOUMKT), and Cincinnati (CINMKT).

You have now analyzed the variables to generate a general understanding of the definite and potential urban markets for each city to which you could choose to connect St. Louis.

QUESTION 7.
a. How much time will it save to travel from St. Louis to each of the finalist cities if the railroad is built?
b. Choose a major East Coast port (or your choice of New York City, Philadelphia, or Baltimore,) and determine how long it will take to travel there by rail. How much time is saved?

18. Click the **Measurement Tool** and determine the travel distances for each route (St. Louis to each of the four final cities and St. Louis to your selected East Coast city). Using your measured distances, a calculator and the speed tables for 1850, determine the transportation times for each route.

Part III: Prepare your Presentation
QUESTION 8. Which city would you propose to become the first city to connect to St. Louis by railroad?

Using My World, you have now:
• Identified potential railroads to connect to St. Louis
• Identified potential cities to connect to St. Louis
• Conducted a general analysis of potential and definite city markets
• Calculated a distance/time savings analysis

19. Using all the data you have collected, and the map you have created, prepare a final recommendation as to which city you would propose to become the first city to connect to St. Louis by railroad. Be prepared to defend your decision.

QUESTION 9. Was a railroad actually built during this time period connecting St. Louis to the city of your findings?

20. Go the Library of Congress's American Memory website and look at a United States Railroad map of 1860. From the American Memory site, go to the **Maps** collections, and then to **Railroad Maps.** By this time (1860,) was there a railroad connecting St. Louis to the city that you recommended?

Name _____   Date_____

Connecting Time and Space

Lesson A: Early U.S. Settlement Patterns

Part I: Settlement Patterns 1790

1a. Which region do you think will have the most cities?

1b. Which region to you think will have the least cities?

1c. How will physical geography, including locations of mountains, streams, and oceans, influence the location of cities?

	Predictions	Observed Patterns	Possible Explanations	Questions?
1790				

2a. What is the population for the most populated city in 1790? _____

2b. What was the population for the 24th most populated city in 1790? _____

2c. Which state was home to the most populated cities in 1790? _____

3. What are the 3 most populated cities in 1790, and what were their populations?

Rank	City	Population
1		
2		
3		

4. What was the capital of the United States in 1790? _____

5a. Which city was located farthest from the national capital? How far was it from the capital?

_____

Name _____   Date_____

Connecting Time and Space

5b. Which two cities appear to be located farthest from the Atlantic Ocean? How far are they from

the Atlantic Ocean? _____

_____

Part II: Settlement Patterns 1810

	Predictions	Observed Patterns	Possible Explanations	Questions?
1810				

6a. What was the population for the most populated city in 1810? _____

6b. What was the population for the 30th most populated city in 1810? _____

6c. Which state was home to the most populated cities in 1810? _____

7. What were the three most populated cities in 1810, and what were their populations?

Rank	City	Population
1		
2		
3		

8. What was the capital of the United States in 1810? _____

9a. Which city was located farthest from the national capital? How far was it from the capital?

_____

Name _____   Date_____

Connecting Time and Space

9b. Which two cities appear to be located farthest from the Atlantic Ocean? How far are they from

the Atlantic Ocean?   _____

_____

Part III: Settlement Patterns 1850

	Predictions	Observed Patterns	Possible Explanations	Questions?
1850				

10a. What was the population for the most populated city in 1850? _____

10b. What was the population for the 30th most populated city in 1850? _____

10c. Which state was home to the most populated cities in 1850? _____

11. What were the three most populated cities in 1850, and what were their populations?

Rank	City	Population
1		
2		
3		

12. What was the capital of the United States in 1850? _____

13a. Which city was located farthest from the national capital? How far was it from the capital?

_____

13b. Which two cities appear to be located farthest from the Atlantic Ocean? How far are they from

the Atlantic Ocean?   _____

_____

Name _____   Date_____

Connecting Time and Space

14. Using the answers you have completed from the lesson and your maps, create and complete a Venn diagram that compares the U.S. settlement patterns in 1790 and 1850. Find and analyze the overlapping areas, and compose a written summary of the changes.

1790   **1850**

Summary: _____

_____

_____

_____

_____
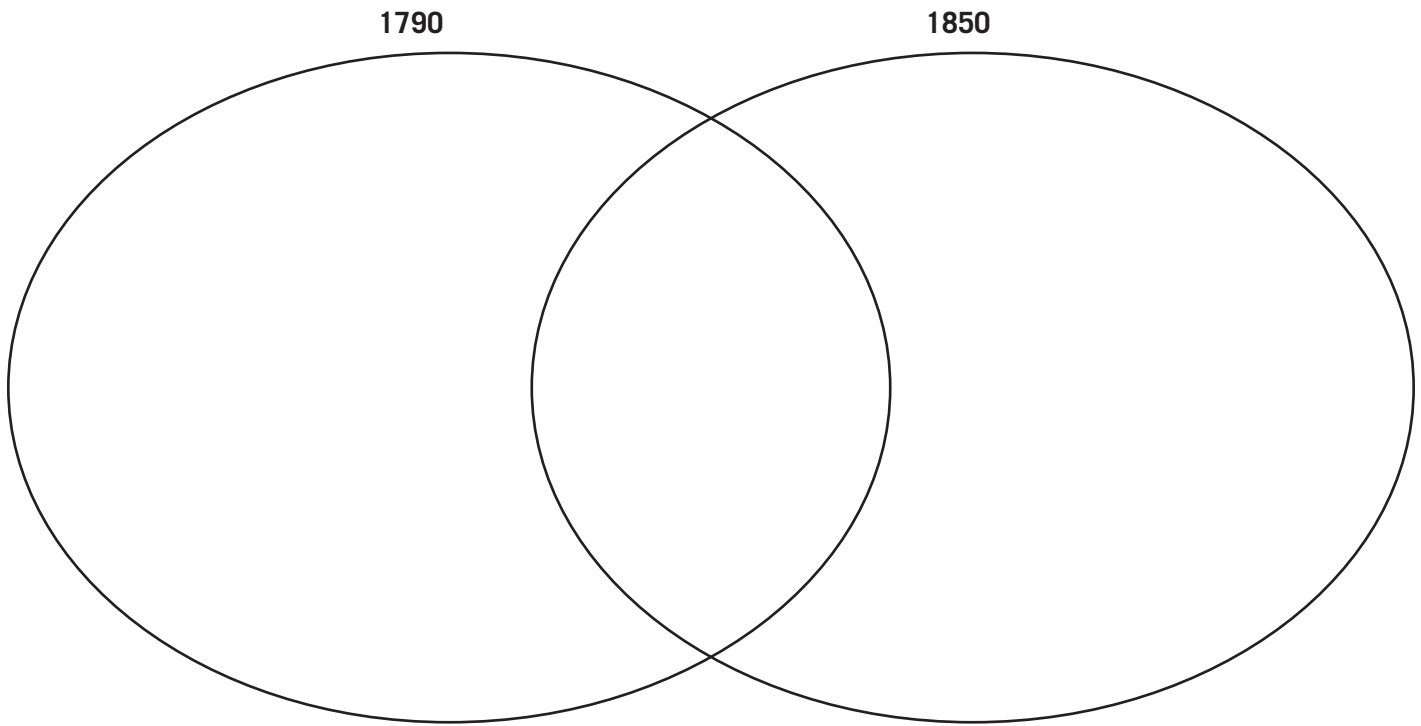
Name _____   Date_____

Connecting Time and Space

Lesson B: Trails To Rails

Part I. Moving from Rivers to Rails

1. What patterns do you notice about transportation in the United States in 1810? _____

_____

_____

2a. How many major U.S. cities were located near steamboat routes in 1810? _____

_____

2b. What appears to be the best way to travel "inland" (away from major rivers or lakes) in 1810?

_____

Part II: Transportation 1830

YEAR	Number of Steamboat Cities	State with most Steamboat Cities	Number of Canal Cities	State with most Canal Cities	Number of Railroad Cities	State with Most Railroad Cities
1830						

3. Which form of transportation was likely the best for travel inland, away from major rivers or lakes, in 1830? Why? _____

_____

_____

Part III: Transportation 1850

YEAR	Number of Steamboat Cities	State with most Steamboat Cities	Number of Canal Cities	State with most Canal Cities	Number of Railroad Cities	State with Most Railroad Cities
1850						

Name _____   Date_____

Connecting Time and Space

4. Which form of transportation appears to be the best for travel inland, away from major rivers or lakes, in 1850? Why? _____

_____

_____

_____

_____

5a. Which major cities in 1850 did not have access to a major canal or railroad in 1850?

_____

5b. Why do you think these cities were able to thrive without access to these new forms of transportation? _____

_____

Part IV: Compare transportation in 1810 and 1850

6. Using the answers you have completed from the lesson and your maps, create and complete a Venn diagram that compares the U.S. transportation patterns in 1810 and 1850. Find and analyze the overlapping areas, and compose a written summary of the changes.

1810   **1850**

Name _____   Date_____

Connecting Time and Space

Summary: _____

_____

_____

_____

_____

Name _____   Date_____

Connecting Time and Space

Lesson C: Buffalo, New York—Trails to Rails Case Study

Part I: Transportation Time and Distance

1a. What patterns do you notice about transportation in 1810? (b) How far is it from Buffalo to the closest major city following a major transportation route? What is the city? (c) How long would it take to travel from Buffalo to the nearest city by available means of transport?

Instructions: Use the tables below to help you calculate distance and travel time from city to city.

DATE: 1810   FROM: Buffalo, NY   TO: Schenectady, NY (Nearest City)

Mode	Distance	Velocity	Travel Time
Trail		2 miles/hr (Commercial) 8 miles/hr (Passenger)	
Steamboat		5 miles/hour	
Canal		2 miles/hr (Commercial) 4 miles/hr (Passenger)	
Railroad		20 miles/hr	
TOTAL		Commercial Passenger	

Name _____   Date_____

Connecting Time and Space

DATE: 1810   FROM: Buffalo, NY   TO: New York City

Mode	Distance	Velocity	Travel Time
Trail		2 miles/hr (Commercial) 8 miles/hr (Passenger)	
Steamboat		5 miles/hour	
Canal		2 miles/hr (Commercial) 4 miles/hr (Passenger)	
Railroad		20 miles/hr	
TOTAL		Commercial Passenger	

DATE: 1830   FROM: Buffalo, NY   TO: Rochester, NY (nearest city)

Mode	Distance	Velocity	Travel Time
Trail		2 miles/hr (Commercial) 8 miles/hr (Passenger)	
Steamboat		10 miles/hour	
Canal		2 miles/hr (Commercial) 4 miles/hr (Passenger)	
Railroad		20 miles/hr	
Fastest Time		Commercial Passenger	

Name _____   Date_____

Connecting Time and Space

DATE: 1830   FROM: Buffalo, NY   TO: New York City

Mode	Distance	Velocity	Travel Time
Trail		2 miles/hr (Commercial) 8 miles/hr (Passenger)	
Steamboat		10 miles/hour	
Canal		2 miles/hr (Commercial) 4 miles/hr (Passenger)	
Railroad		20 miles/hr	
Fastest Time		Commercial Passenger	

DATE: 1850   FROM: Buffalo, NY   TO: Rochester, NY (nearest city)

Mode	Distance	Velocity	Travel Time
Trail		2 miles/hr (Commercial) 8 miles/hr (Passenger)	
Steamboat		10 miles/hour	
Canal		2 miles/hr (Commercial) 4 miles/hr (Passenger)	
Railroad		20 miles/hr	
Fastest Time		Commercial Passenger	

Name _____   Date_____

Connecting Time and Space

DATE: 1850   FROM: Buffalo, NY   TO: New York City

Mode	Distance	Velocity	Travel Time
Trail		2 miles/hr (Commercial) 8 miles/hr (Passenger)	
Steamboat		15 miles/hour	
Canal		2 miles/hr (Commercial) 4 miles/hr (Passenger)	
Railroad		20 miles/hr	
Fastest Time		Commercial Passenger	

Answers to the questions below will be derived from the measurements and calculations shown in the tables above.

2a. How far is it from Buffalo to New York City following a major transportation route?

_____

2b. How long would it take to travel from Buffalo to New York City via trail and steamboat for both

commercial and passenger traffic in 1810? _____

3a. What patterns do you notice about transportation in 1830? _____

_____

3b. How far is it from Buffalo to the closest major city following a major transportation route? What is

the city? _____

3c. How long would it take to travel from Buffalo to the nearest city by available means of transport?

_____

4a. How far is it from Buffalo to New York City following a major transportation route?

_____

Name _____   Date_____

Connecting Time and Space

4b. How long would it take to travel from Buffalo to New York City via canal for both commercial and passenger traffic in 1830? _____

5a. What patterns do you notice about transportation in 1850? _____

_____

5b. How far is it from Buffalo to the closest major city following a major transportation route? What is the city? _____

5c. How long would it take to travel from Buffalo to the nearest city by available means of transport?

_____

6a. How far is it from Buffalo to New York City following a major transportation route?

_____

6b. How long would it take to travel from Buffalo to New York City via canal for both commercial and passenger traffic in 1850? _____

7a. What effects did the transportation revolution of the early 19th century have on human settlement and transportation networks in New York State? _____

_____

7b. What changes in New York did you find most surprising? _____

_____

Name _____   Date_____

Connecting Time and Space

Trails to Rails: The Case of Buffalo, NY

Population	Trails Y/N	Steam Y/N	Canal Y/N	Rail Y/N	Nearest Major NY City	Travel Time to Nearest NY City	Passenger Time to NYC	Commercial Time to NYC
1810								
1830								
1850								

Canals   **Railroads**
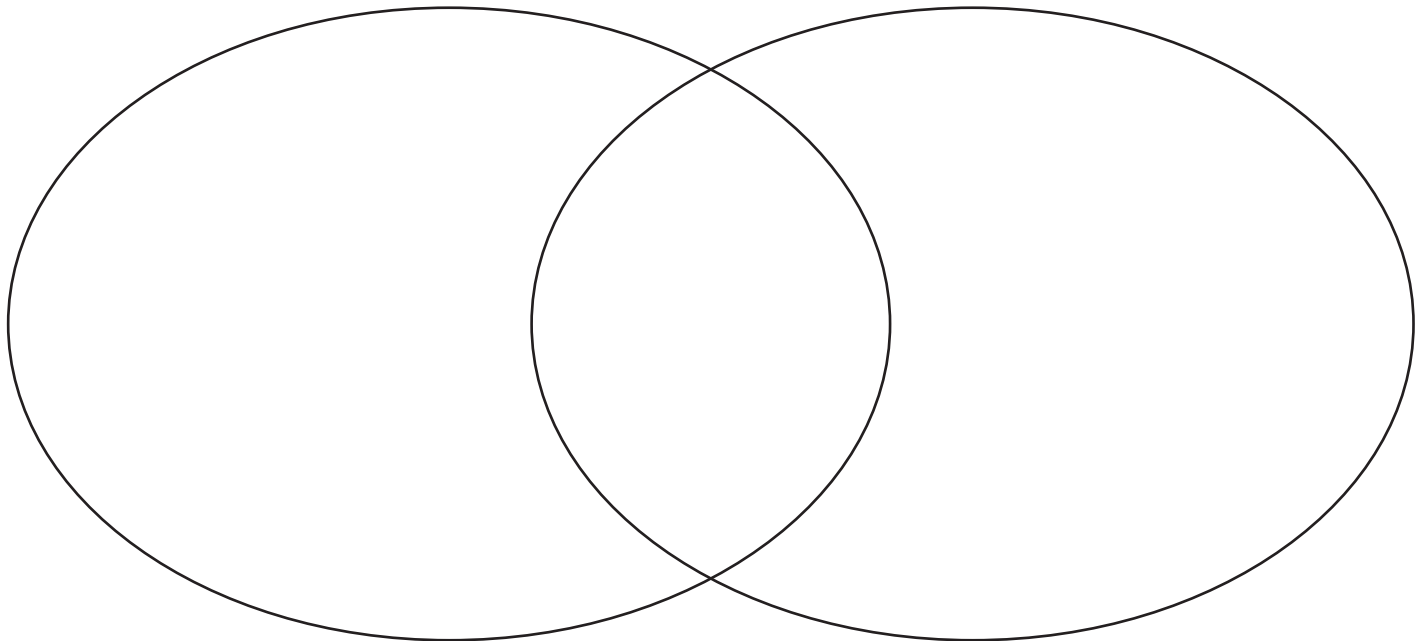
Summary: _____

_____

_____

_____

_____

Name _____   Date_____

Connecting Time and Space

Lesson D: Who Gets The Rail? Connecting East St. Louis

1. How many miles of rail can you build within the constraints of your budget? _____

Who Gets the Rail?				
Finalists				
Current travel distance to St. Louis?				
Current travel time to St. Louis				
Number of Definite Market Cities				
Sum of all Definite Market Population				
Number of Possible Market Cities				
Sum of all Possible Market Population				
Railroad distance from St. Louis				
Railroad travel time				
Distance Savings				
Time Savings				

Name _____   Date_____

Connecting Time and Space

*Cincinnati was the first city to receive a rail line directly connecting with St. Louis. However, by 1860 each of these cities were some how connected to St. Louis via rail.

See table (above) for answers to the following questions. Answers will vary.

2. Which of the top 30 cities are potential destinations, given your budget? _____

_____

3. Which of the existing railroads lie within the buffer zone and could be considered possibilities for

connecting to St. Louis? _____

_____

4. How many cities are located near one of the "Possible Railroads?" Which cities would be possible

for St. Louis to connect to? _____

_____

5. What is the transportation time in 1850 from St. Louis to the four possible cities?

_____

_____

Part II: Conduct your Analysis

6a. Of the four possible market cities, which will provide the most access to other U.S. city markets?

_____

6b. What other cities will potentially connect with your chosen market city? _____

_____

7a. How much time will it save to travel from St. Louis to each of the finalist cities if the railroad

were built? _____

_____

7b. Choose a major East Coast port (or your choice of New York City, Philadelphia, or Baltimore,) and

determine how long it will take to travel there by rail. How much time is saved?

_____

Name _____   Date_____

Connecting Time and Space

Part III: Prepare your Presentation

See table (above) for answers to the following questions. Answers will vary.

8. Which city would you propose to become the first city to connect to St. Louis by railroad?

_____

9. Was a railroad actually built during this time period connecting St. Louis to the city of your

findings? _____

Name _____   Date_____

Connecting Time and Space

Lesson A: Early U.S. Settlement Patterns

Part I: Settlement Patterns 1790

1a. Which region do you think will have the most cities?

1b. Which region to you think will have the least cities?

1c. How will physical geography, including locations of mountains, streams, and oceans, influence the location of cities?

	Predictions	Observed Patterns	Possible Explanations	Questions?
1790	Answers will vary.	More cities in the north, along the coast, and along major/navigable waterways. No cities west of the Appalachian Mountains.	Industry in north, topography, transportation	Answers will vary.

2a. What is the population for the most populated city in 1790? __33,131__

2b. What was the population for the 24th most populated city in 1790? __2,584__

2c. Which state was home to the most populated cities in 1790? __MA (Massachusetts)__

3. What are the three most populated cities in 1790, and what were their populations?

Rank	City	Population
1	New York	33,131
2	Philadelphia	28,522
3	Baltimore	18,320

4. What was the capital of the United States in 1790? __New York, NY__

5a. Which city was located farthest from the national capital? How far was it from the capital?
Charleston, SC; Approximately 640 miles

Name _____   Date_____

Connecting Time and Space

5b. Which two cities appear to be located farthest from the Atlantic Ocean? How far are they from the Atlantic Ocean? <u>Answers may vary. Obvious choices, are Albany, NY (~118 miles),</u>
<u>Hudson, NY (~88 Miles), Richmond, VA (~70 Miles), Petersburg, VA (~60 Miles)</u>

Part II: Settlement Patterns 1810

	Predictions	Observed Patterns	Possible Explanations	Questions?
1810	Answers will vary.	A few cities west of the Appalachian Mountains. New Orleans becomes a US City. North still has more cities than the South. No major city west of Mississipi River.	Westward expansion (Louisiana Purchase), transportation improvements.	Answers will vary.

6a. What was the population for the most populated city in 1810? <u>96,373</u>

6b. What was the population for the 30th most populated city in 1810? <u>4,948</u>

6c. Which state was home to the most populated cities in 1810? <u>Massachusetts (MA)</u>

7. What were the three most populated cities in 1810, and what were their populations?

Rank	City	Population
1	New York	96,373
2	Philadelphia	53,722
3	Baltimore	46,555

8. What was the capital of the United States in 1810? <u>Washington, DC</u>

9a. Which city was located farthest from the national capital? How far was it from the capital?
<u>New Orleans, LA (~960 Miles)</u>

Name _____   Date_____

Connecting Time and Space

9b. Which two cities appear to be located farthest from the Atlantic Ocean? How far are they from

the Atlantic Ocean?   Answers will vary, but may include New Orleans (Distance Varies), Albany,

NY (~118 miles), Hudson, NY (~88 Miles), Richmond, VA (~70 Miles), Petersburg, VA (~60 Miles)

Part III. Settlement Patterns 1850

	Predictions	Observed Patterns	Possible Explanations	Questions?
1850	Answers will vary.	More cities in the west along the Mississippi River, Great Lakes, and Erie Canal. No major city west of the Mississippi River.	Cities are located along major rivers and are connected by canals and railroads.	Answers will vary.

10a. What was the population for the most populated city in 1850? __515,547_____

10b. What was the population for the 30th most populated city in 1850? __21,019_____

10c. Which state was home to the most populated cities in 1850? __New York (NY)_____

11. What were the three most populated cities in 1850, and what were their populations?

| Rank	City	Population
1	New York	515,547
2	Baltimore	169,054
3	Boston	136,881

12. What was the capital of the United States in 1850? __Washington, DC_____

13a. Which city was located farthest from the national capital? How far was it from the capital?

St. Louis (~760 Miles), Chicago, (~680 miles)

13b. Which two cities appear to be located farthest from the Atlantic Ocean? How far are they from

the Atlantic Ocean?   Answers will vary but may include New Orleans, St. Louis, Chicago,

Detroit, Louisville, and Cincinnati

Name _____   Date_____

Connecting Time and Space

14. Using the answers you have completed from the lesson and your maps, create and complete a Venn diagram that compares the U.S. settlement patterns in 1790 and 1850. Find and analyze the overlapping areas and compose a written summary of the changes.

1790   **1850**

Summary: _____

_____

_____

_____

_____
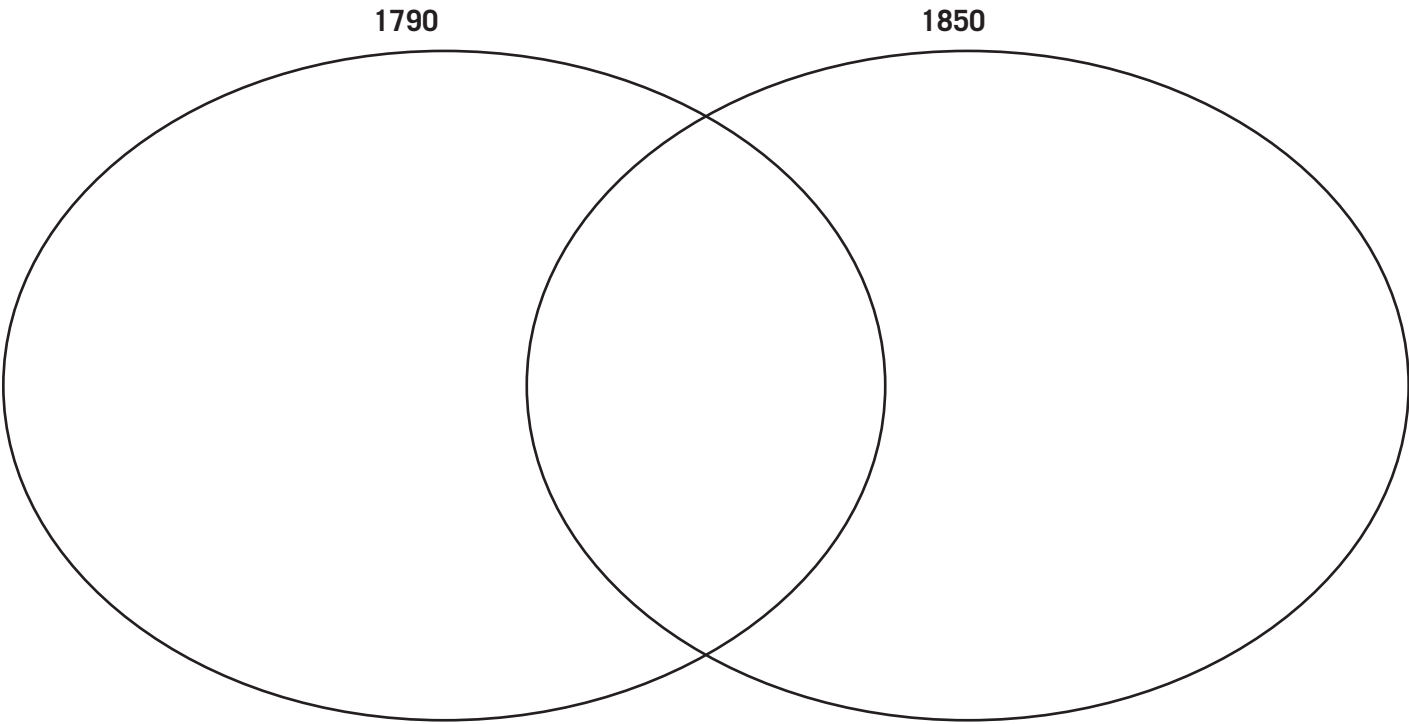
Name _____   Date_____

Connecting Time and Space

Lesson B: Trails To Rails

Part I: Moving from Rivers to Rails

1. What patterns do you notice about transportation in the United States in 1810? <u>Most cities were</u>
<u>connected by roads (unimproved.) The only commercial steamboat was in New York along the</u>
<u>Hudson River.</u>

2a. How many major U.S. cities were located near steamboat routes in 1810? <u>Three: New York,</u>
<u>Albany, and Schenectady.</u>

2b. What appears to be the best way to travel "inland" (away from major rivers or lakes) in 1810?
<u>In 1810 the best way to travel inland was by way of roads.</u>

Part II: Transportation 1830

YEAR	Number of Steamboat Cities	State with most Steamboat Cities	Number of Canal Cities	State with most Canal Cities	Number of Railroad Cities	State with Most Railroad Cities
1830	11	New York	24	New York	6	Pennsylvania

3. Which form of transportation was likely the best for travel inland, away from major rivers or lakes, in
1830? Why? <u>Canals appear to be the best form of transportation inland. Of the major cities, 24 were</u>
<u>located near a canal. The years 1810–1830 were a boom period for canal building. Many cities along early</u>
<u>roads now had a canal that connected them to western cities that were not even major cities in 1810.</u>

Part III: Transportation 1850

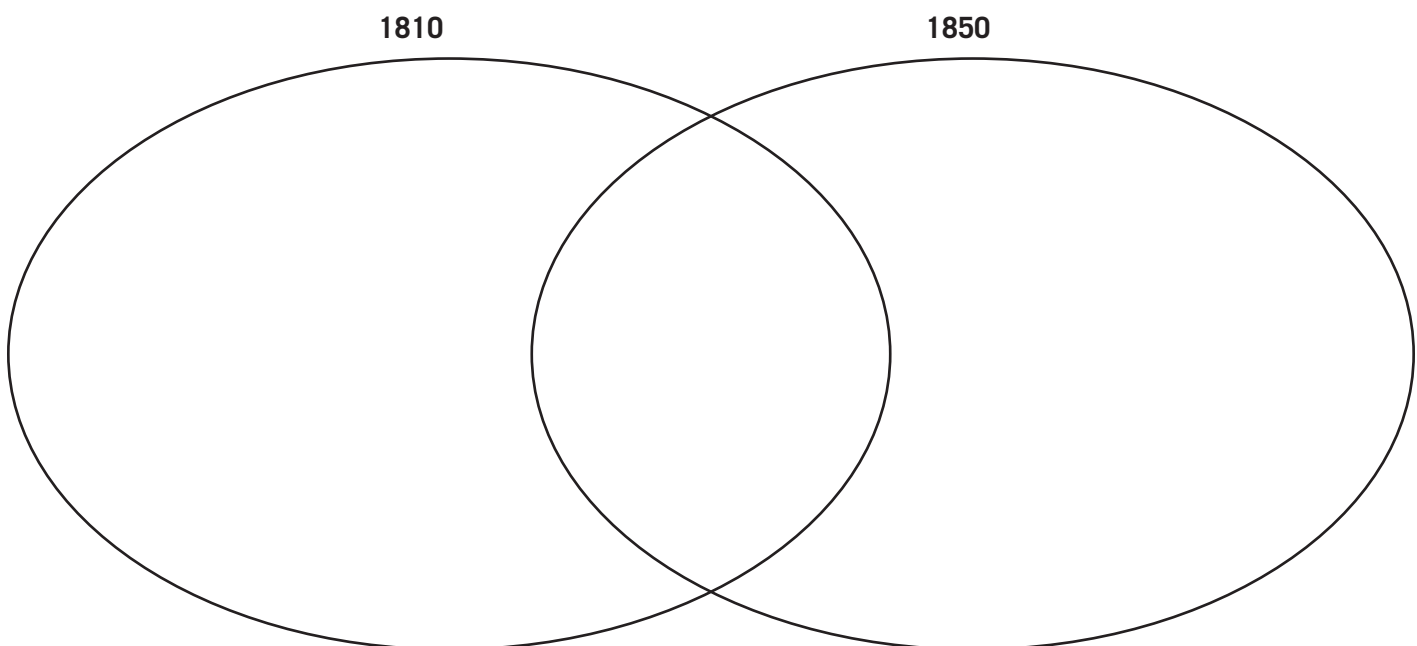| YEAR	Number of Steamboat Cities	State with most Steamboat Cities	Number of Canal Cities	State with most Canal Cities	Number of Railroad Cities	State with Most Railroad Cities
1850	16	New York	24	New York	27	New York

Name _____   Date_____

Connecting Time and Space

4. Which form of transportation appears to be the best for travel inland, away from major rivers or lakes, in 1850? Why? Students could make an argument for either canals or railroads. However, they should notice that the number of cities with access to steamboats has increased by five and the number of cities located with access to a railroad has increased from 6 to 27. This means that 90 percent of our major cities were connected by rail in less than 20 years. The statistics alone demonstrate that railroads were growing faster than canals. In fact, canal building was slowing.

5a. Which major cities in 1850 did not have access to a major canal or railroad in 1850?

 St. Louis, MO

5b. Why do you think these cities were able to thrive without access to these new forms of transportation? Answers will vary.

_____

Part IV: Compare transportation in 1810 and 1850

6. Using the answers you have completed from the lesson and your maps, create and complete a Venn diagram that compares the U.S. transportation patterns in 1810 and 1850. Find and analyze the overlapping areas and compose a written summary of the changes.

1810   **1850**

Name _____   Date_____

Connecting Time and Space

Summary: _____

_____

_____

_____

_____

Name _____   Date_____

Connecting Time and Space

Lesson C: Buffalo, New York - Trails to Rails Case Study

Part I: Transportation Time and Distance

1a. What patterns do you notice about transportation in 1810? (b) How far is it from Buffalo to the closest major city following a major transportation route? What is the city? (c) How long would it take to travel from Buffalo to the nearest city by available means of transport?

Instructions: Use the tables below to help you calculate distance and travel time from city to city

DATE: 1810   FROM: Buffalo, NY   TO: Schenectady, NY (Nearest City)

Mode	Distance	Velocity	Travel Time
Trail	256	2 miles/hr (Commercial) 8 miles/hr (Passenger)	128 hours 32 hours
Steamboat	X route was not possible, mode didn't exist	5 miles/hour	X
Canal	X route was not possible, mode didn't exist	2 miles/hr (Commercial) 4 miles/hr (Passenger)	X X
Railroad	X route was not possible, mode didn't exist	20 miles/hr	X
TOTAL		Commercial Passenger	128 32

Name _____   Date_____

Connecting Time and Space

DATE: 1810   FROM: Buffalo, NY   TO: New York City

Mode	Distance	Velocity	Travel Time
Trail	267	2 miles/hr (Commercial) 8 miles/hr (Passenger)	133–135 hours 33–35 hours
Steamboat	150	5 miles/hour	29–30 hours
Canal	X route was not possible, mode didn't exist	2 miles/hr (Commercial) 4 miles/hr (Passenger)	X X
Railroad	X route was not possible, mode didn't exist	20 miles/hr	X
TOTAL		Commercial Passenger	~175 hours ~60–65 hours

DATE: 1830   FROM: Buffalo, NY   TO: Rochester, NY (nearest city)

Mode	Distance	Velocity	Travel Time
Trail	X route was not possible, mode didn't exist	2 miles/hr (Commercial) 8 miles/hr (Passenger)	X X
Steamboat	~110 miles	10 miles/hour	11 hours
Canal	~80 miles	2 miles/hr (Commercial) 4 miles/hr (Passenger)	40 hours 20 hours
Railroad	X route was not possible, mode didn't exist	20 miles/hr	X
Fastest Time		Commercial Passenger	11 hours 10 hours

Name _____   Date_____

Connecting Time and Space

DATE: 1830   FROM: Buffalo, NY   TO: New York City

Mode	Distance	Velocity	Travel Time
Trail	X route was not possible, mode didn't exist	2 miles/hr (Commercial) 8 miles/hr (Passenger)	X
Steamboat	150	10 miles/hour	~15 hours
Canal	290	2 miles/hr (Commercial) 4 miles/hr (Passenger)	145 hours ~36 hours
Railroad	X route was not possible, mode didn't exist	20 miles/hr	X
Fastest Time		Commercial Passenger	145 hours ~36 hours

DATE: 1850   FROM: Buffalo, NY   TO: Rochester, NY (nearest city)

Mode	Distance	Velocity	Travel Time
Trail	X route was not possible, mode didn't exist	2 miles/hr (Commercial) 8 miles/hr (Passenger)	X X
Steamboat	110	10 miles/hour	~11 hours
Canal	~80	2 miles/hr (Commercial) 4 miles/hr (Passenger)	40 hours ~10 hours
Railroad	74	20 miles/hr	3-4 hours
Fastest Time		Commercial Passenger	3-4 hours 3-4 hours

Name _____   Date_____

Connecting Time and Space

DATE: 1850   FROM: Buffalo, NY   TO: New York City

Mode	Distance	Velocity	Travel Time
Trail	X route was not possible, mode didn't exist	2 miles/hr (Commercial) 8 miles/hr (Passenger)	X X
Steamboat	150	15 miles/hour	10 hours
Canal	290	2 miles/hr (Commercial) 4 miles/hr (Passenger)	145 hours ~36 hours
Railroad	300	20 miles/hr	15 hours
Fastest Time		Commercial Passenger	145 hours ~36 hours

Answers to the questions below will be derived from the measurements and calculations shown in the tables above.

2a. How far is it from Buffalo to New York City following a major transportation route?

It is 256 miles to Schenectady NY, the nearest city on a major route.

2b. How long would it take to travel from Buffalo to New York City via trail and steamboat for both commercial and passenger traffic in 1810? Commercial ~175 Hours; Passenger ~60–65 Hours

3a. What patterns do you notice about transportation in 1830? More options are available. Canals have arrived.

3b. How far is it from Buffalo to the closest major city following a major transportation route? What is the city? The city is Rochester, NY and it is 110 miles away by steamboat.

3c. How long would it take to travel from Buffalo to the nearest city by available means of transport?

The city is Rochester, NY, and it is 10-11 hours away.

4a. How far is it from Buffalo to New York City following a major transportation route?

The shortest distance is by steamboat. It is 150 miles.

Name _____   Date_____

Connecting Time and Space

4b. How long would it take to travel from Buffalo to New York City via canal for both commercial and passenger traffic in 1830? Commercial—145 hours, Passenger—36 hours

5a. What patterns do you notice about transportation in 1850? There are more options. Railroads have arrived.

5b. How far is it from Buffalo to the closest major city following a major transportation route? What is the city? Rochester is 74 miles away.

5c. How long would it take to travel from Buffalo to the nearest city by available means of transport?
By railroad, it would take 3-4 hours

6a. How far is it from Buffalo to New York City following a major transportation route?
It is 300 miles by railroad from Buffalo to NYC

6b. How long would it take to travel from Buffalo to New York City via canal for both commercial and passenger traffic in 1850? 25 hours

7a. What effects did the transportation revolution of the early 19th century have on human settlement and transportation networks in New York State? The railroads were much faster than anything else.

7b. What changes in New York did you find most surprising? Answers will vary. Students may find it surprising how quickly the railroads came into existence.

Name _____   Date_____
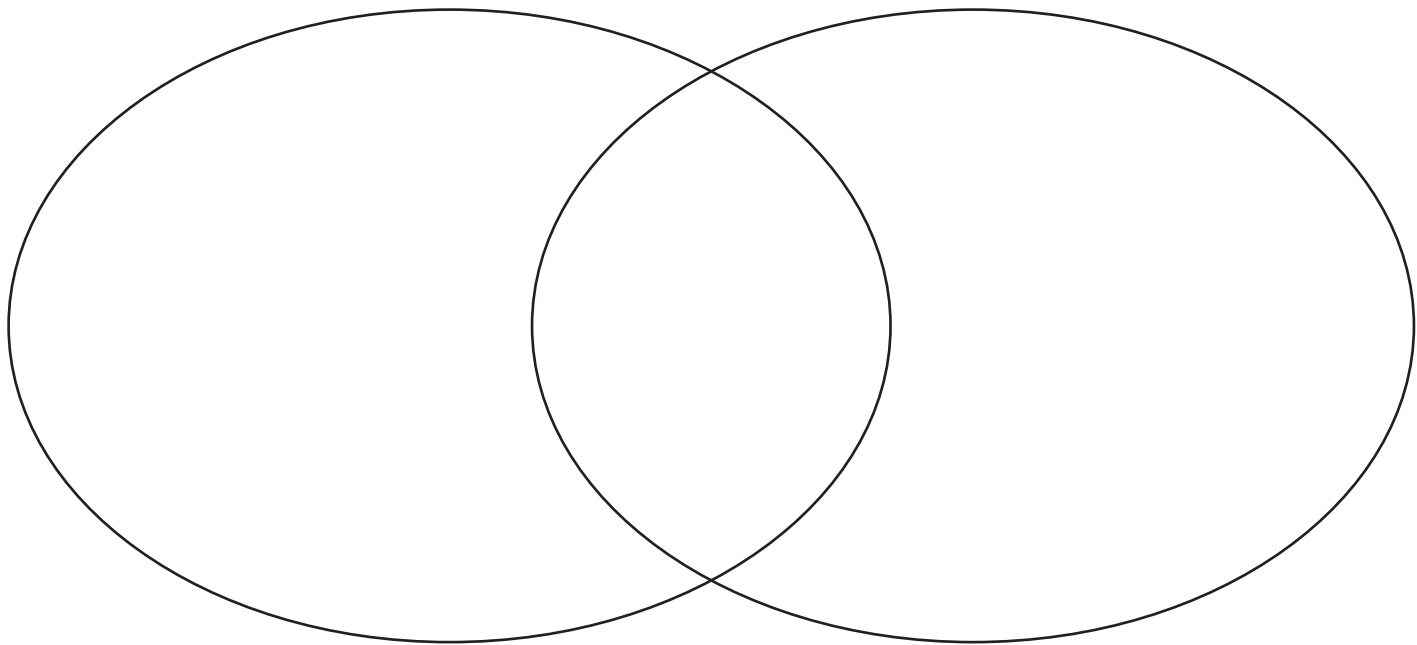
Connecting Time and Space

Trails to Rails: The Case of Buffalo, NY

Population	Trails Y/N	Steam Y/N	Canal Y/N	Rail Y/N	Nearest Major NY City	Travel Time to Nearest NY City	Passenger Time to NYC	Commercial Time to NYC
1810	Y	N	N	N	Schenectady	32 hours	60-65 hours	175 hours
1830	Y	Y	Y	N	Rochester	10 hours	36 hours	145 hours
1850	Y	Y	Y	Y	Rochester	3–4 hours	25 hours	25 hours

Canals   **Railroads**

Summary: _____

_____

_____

_____

_____

Name _____   Date_____

Connecting Time and Space

Lesson D: Who Gets The Rail? Connecting East St. Louis

1. How many miles of rail can you build within the constraints of your budget? __405 miles__

Who Gets the Rail?				
Finalists	CHICAGO	DETROIT	LOUISVILLE	CINCINNATI
Current travel distance to St. Louis?	Answers will vary depending on methods chosen. The goal is to show the challenges to reach these cities	Answers will vary depending on methods chosen. The goal is to show the challenges to reach these cities	406	535
Current travel time to St. Louis	Answers will vary depending on methods chosen. The goal is to show the challenges to reach these cities.	Answers will vary depending on methods chosen. The goal is to show the challenges to reach these cities.	By Steamboat, 27 Hours	By Steamboat, 35
Number of Definite Market Cities	10	10	9	9
Sum of all Definite Market Population	874630	874630	507643	507643
Number of Possible Market Cities	3	4	13	12
Sum of all Possible Market Population	106757	222192	1122579	1092616
Railroad distance from St. Louis	320 (may vary depending on route) Goal is for students to realize how much easier it is to build a railroad across land and the potential time savings. If following the Mississippi River, distance would be ~325 miles	380 (may vary depending on route) Goal is for students to realize how much easier it is to build a railroad across land and the potential time savings. If following the Mississippi River, distance would be ~380 miles, but note that going this way essentially means you think the rail should connect to Chicago first, then go around Lake Michigan.	Will vary, but going directly across land it would be ~ 250 miles.	Will vary, but going directly across land it would be ~ 310 miles.
Railroad travel time	16 – 17 hours	19 hours	12 –13 hours	15 – 16 hours
Distance Savings	Will vary	Will vary	150-160 miles	225
Time Savings	Will Vary, but rail will be substantially shorter.	Will Vary, but rail will be substantially shorter.	14-15 hours	~ 20 hours

Name _____   Date_____

Connecting Time and Space

*Cincinnati was the first city to receive a rail line directly connecting with St. Louis. However, by 1860 each of these cities were some how connected to St. Louis via rail.

See table (above) for answers to the following questions. Answers will vary.

2. Which of the top 30 cities are potential destinations, given your budget? _____

_____

3. Which of the existing railroads lie within the buffer zone and could be considered possibilities for

connecting to St. Louis? _____

_____

4. How many cities are located near one of the "Possible Railroads?" Which cities would be possible

for St. Louis to connect to? _____

_____

5. What is the transportation time in 1850 from St. Louis to the four possible cities?

_____

_____

Part II: Conduct your Analysis

6a. Of the four possible market cities, which will provide the most access to other U.S. city markets?

_____

6b. What other cities will potentially connect with your chosen market city? _____

_____

7a. How much time will it save to travel from St. Louis to each of the finalist cities if the railroad was

built? _____

_____

7b. Choose a major East Coast port (or your choice of New York City, Philadelphia, or Baltimore,) and determine how long it will take to travel there by rail. How much time is saved?

_____

Name _____   Date_____

Connecting Time and Space

Part III: Prepare your Presentation

See table (above) for answers to the following questions. *Answers will vary.*

8. Which city would you propose to become the first city to connect to St. Louis by railroad?

_____

9. Was a railroad actually built during this time period connecting St. Louis to the city of your

findings? _____