

# A Cotton Tale: The United States' First Industrial Revolution (1790-1840)

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## Lesson Author

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## Standards and Benchmarks (see page 23)

## Advance Placement (AP) U.S. History Curriculum Alignment (see pages 23-24)

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## Lesson Description

It is widely accepted within the study of history that cotton played a crucial role in the United States in the eighteenth and nineteenth centuries. This lesson allows students to understand the specific causes and consequences of the dramatic increase of cotton production in southern states and its influence on the emergence of the nation's first major manufacturing industry—textile production. Students will read both primary and secondary sources detailing the growth of both northern industrialization and southern cotton expansion. Additionally, students will develop data literacy skills using FRED® (Federal Reserve Economic Data) and other statistical information to analyze the development of the two regions further. Finally, students complete the lesson by responding to an AP U.S. history exam short-answer, three-part question.

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## Grade Level

10-12

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## Economic Concepts

Factors of production  
Index  
Industrial revolution  
Interdependence  
Manufacturing  
Productivity  
Technological change

### Objectives

Students will be able to

- describe how the northern and southern economies developed from 1790-1860 with cotton as the common denominator;
- describe how economic developments in both the north and the south would play a contributing role in the onset of the U.S. Civil War;
- use FRED® to analyze primary economic data to develop a historical argument;
- examine and evaluate the validity of primary and secondary source material; and
- increase their data literacy.

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### Time Required

Approximately one 90-minute block period or two 45-minute traditional classes

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### Materials

- Online access for the class to view FRED® graphs at <https://fred.stlouisfed.org/>
- Handouts 1-5, one copy of each for each student
- Handout 5—Answer Key, one copy for the teacher

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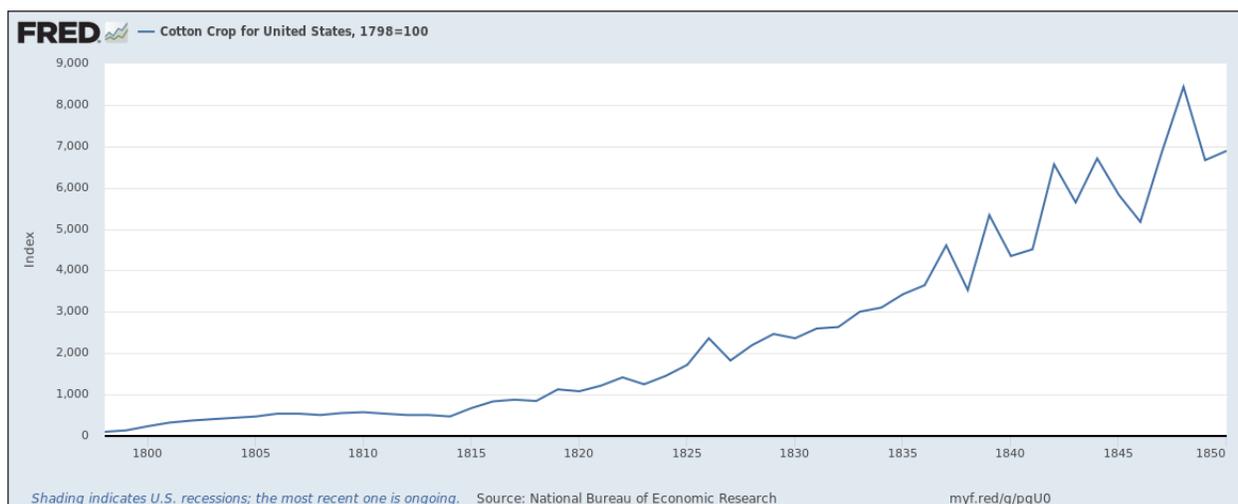
### Procedure

1. Ask students to consider industrialization in the United States. What kinds of images usually come to mind? (*Most will respond with some example of heavy machinery like steel mills or automotive assembly lines.*) Follow up by telling students that the first major **industrial revolution** in the United States was not cars or steel but cotton-based textiles. Explain that the purpose of this assignment is to analyze primary economic data and secondary sources regarding cotton production in the United States in the antebellum period and how that would transform the American economy in the first half of the nineteenth century.
2. Begin by sharing electronic copies of the lesson handouts with students. Alternatively, you can distribute a copy of each handout to each student. Explain that students will use *Handout 5: "A Cotton Tale" Student Answer Sheet* to record their answers throughout the lesson. Have students read *Handout 1: Excerpts from Empire of Cotton: A Global History by Sven Beckert*. Discuss the answers as a class before continuing. Refer to the Handout 5—Answer Key during class discussion.
3. Remind students that in 1794, Eli Whitney, a northerner working in the south for money to attend Yale to become a lawyer, invented a machine that separates cotton seeds from the useable lint. This cotton "gin" (an abbreviation for engine) removed a long-standing bottleneck

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in the cotton production process that had been, before Whitney, only done by manual labor. **Productivity**, which is measured as the output of a worker over time, skyrocketed. Whereas a single laborer took an entire day to separate one pound of lint from seeds, the gin could produce 55 pounds in the same time. This invention revolutionized the cotton industry in the United States and caused a massive expansion in the acres of cotton planted and a redistribution of slave labor from processing the plants to tending to them in the fields and moving the finished product to market.

- Instruct the class to read the instructions on their student answer sheet to access, analyze, and manipulate the FRED® graph showing cotton production in the United States beginning in 1798. Caution students that when they are answering the first section, they need to be aware—and account for—the units presented in this data set. (For example, when calculating the total pounds of cotton produced in 1798, the answer is not “31,” nor is it even “31,000.” Since the units are expressed in “thousands of 500 pound bales,” the correct calculation is  $31 \times 1,000 \times 500 = 15,500,000$ .) As part of this process, students will convert the graph from thousands of pounds of cotton to an index. Explain that an **index** is a tool economists use to show overall growth changes. Numbers in an index are expressed in terms of a base year value of 100; for example, a value of 105 means the variable measured by the index has risen by 5 percent compared with the base year value. So, if an index grows to 200 over a given period, what is measured has doubled. The graph they create by this point should look like the following:



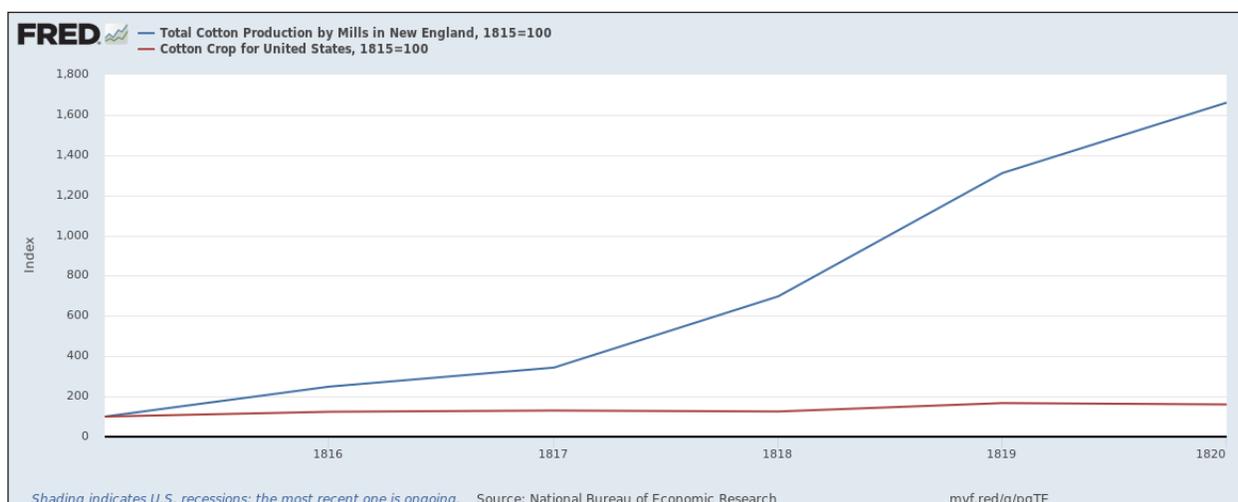
- Now ask the class what they think all the southern cotton planters in the early 1800s did with their raw cotton after harvesting. Guide the discussion from the responses to help students understand that farmers had to sell their product before it rotted to manufacturers who would turn it into durable goods. Initially, most of those manufacturers were in Manchester, England—home to the first major wave of industrialization in the 1700s. Before the American Revolution, many of the previous southern colonies would sell their product to the mother country as part of the mercantile system. After gaining independence, many in the newly formed United States began to wonder if the nation could industrialize as England had a generation earlier.

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6. Have students read *Handout 2: Excerpts from Alexander Hamilton's Report on Manufactures (1791)*. Explain to them that in 1791, Alexander Hamilton wrote a report in an attempt to convince Congress to support his economic plan, through which subsidies, tariffs, and other government interventions would help **manufacturing** growth; this, in turn, would secure the economic health and security of the new nation. (This is what historians refer to as protecting infant industries.) Have students read the passage and answer the questions on their answer sheet. Discuss responses before moving on.
7. Tell students that even though Hamilton's report was never adopted by Congress, the process of industrialization, especially in the cotton industry, was already taking shape. A quick discussion of Eli Whitney's cotton gin patent in 1794 might help students understand this concept.
8. Describe to students how, in the early 1790s, the wealthy Brown family from Providence, Rhode Island, partnered with a recent immigrant from England, Samuel Slater, to open a factory that would spin cotton lint into yarn and thread. The Browns originally amassed their fortune from shipping goods to trading slaves, but they were looking to diversify their wealth, especially considering the havoc the revolution played on trade in the 1780s. The Browns provided the capital (investment money), and Slater could replicate the technology he worked with back home in England. In 1791, the Almy and Brown cotton mill run by Samuel Slater produced the first mechanically spun yarn in the United States.
9. Have students read *Handout 3: Excerpts from "Samuel Slater & Francis Cabot Lowell: The Factory System in U.S. Cotton Manufacturing"* and answer the related questions on their student sheet.
10. Ask the students to fill in the T-chart on their answer sheet with advantages for both cotton growers and textile manufacturers as the United States began to industrialize at the start of the nineteenth century. Discuss their answers as a class. (NOTE: The items listed in the instructor's version is by no means complete.)
11. Tell the class to look up another FRED® data set in a new tab. In the search bar on the home page, students should type "total cotton production by mills." They should eventually end up at this data set: <https://fred.stlouisfed.org/series/CPNETOTAL>. Ask students to identify what information is being presented and guide them to the answer that shows cotton mill production in New England between 1815 (the year Lowell opened his first mill at Waltham) and 1860. Explain to students that the information is presented in the length of yards of cloth produced. (The width of cloth varied from mill to mill.) Instruct students to answer the questions and then discuss student answers.
12. The class will create a graph that combines both cotton mill production and cotton crop production. Have the students follow the step-by-step instructions on their student answer sheet.
13. *If using electronic copies of handouts for the lesson*, have students use the "Share Links" feature to copy/paste the image's short URL onto their student answer sheets. Check their work to make sure the graph looks like the one below:

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14. For the last questions, students may need an explanation of the differences between a correlation and a causation (causal relationship). Correlation is the relationship between two sets of data. Causation means that it can be argued that one data set directly causes a change in the other.

### Assessment

15. Have students individually answer the questions on *Handout 4: AP Short-Answer Practice*. The following scoring rubric and notes are provided for reviewing student answers:

#### AP Short-Answer Questions—Rubric Guidelines (0-3 points)

**Score 3 points:** Response accomplishes all three tasks set by the question.

**Score 2 points:** Response accomplishes two of the tasks set by the question.

**Score 1 point:** Response accomplishes one of the tasks set by the question.

**Score 0 points:** Response accomplishes none of the tasks set by the question.

#### SCORING NOTES

- a. **Briefly describe ONE major difference between Jacobs's and Ashley's experiences working as young girls in the early 1800s.**

Provides ONE explanation of how Jacobs's experience in a New England textile factory and Ashley's experience working in a Texas cotton field differed. (*Answers listed below are the most common responses by students and not necessarily the only correct answers.*)

NOTE: Merely restating the question (e.g., the girls had different experiences) or noting a vague generality (e.g., life was better for Harriet) does not earn a point. Students must include an explanation with the answer.

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Harriet Jacobs	Sarah Ashley
<i>Manufacturing job producing textiles</i>	<i>Agricultural work picking cotton</i>
<i>Northern resident</i>	<i>Southern resident</i>
<i>Was paid for her work</i>	<i>Unpaid as a slave</i>
<i>Generally positive attitude about her job/employer</i>	<i>Very aware and upset at treatment by owner</i>
<i>Appears to be well cared for</i>	<i>Very harsh living/nutritional conditions</i>

**b. Briefly explain ONE specific historical event or development from the period 1790-1830 that is not explicitly mentioned in the excerpts that could be used to support Jacobs's description.**

Provides ONE specific historical item not mentioned explicitly by Jacobs that would help support her description of a New England textile mill. Examples include the following:

- *Manchester England textile mills (and treatment of workers)*
- *Many child labor laws not in existence until the 1840s*
- *The Waltham-Lowell System*
- *Slatervilles ("company towns")*
- *Textile technologies (spinning jenny, power loom, water frame) that allowed for mass manufacturing*
- *Employee dormitories/schools/cafeterias*

NOTE: Merely listing an example without providing context does not earn a point.

**c. Briefly explain ONE specific historical event or development from the period 1790-1830 that is not explicitly mentioned in the excerpts that could be used to support Ashley's description.**

Provides ONE specific historical item not mentioned explicitly by Ashley that would help support her description of a Texas cotton field. Examples include the following:

- *Abolition of the international slave trade in 1807*
- *Transferring of slave labor from tobacco to more profitable cotton*
- *Cotton gin and increased production*
- *Increased demand for the product by both American and foreign cotton manufacturers*

NOTE: Merely listing an example without providing context does not earn a point.

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### Extension

16. Optional: Extend the lesson by having a class discussion about what students believe is more important to understand when studying history: the large amounts of economic data that show fundamental changes on the macro level, or individual stories like those seen in the short-answer practice.

### Handout 1: Excerpts from *Empire of Cotton: A Global History* by Sven Beckert<sup>1</sup>

The United States was superbly suited for cotton production. The climate and soil of a wide swath of the American South met the conditions under which the cotton plant thrived, with the right amount of rain, the right patterns of rainfall and the right number of days without frost. Perceptive observers noticed the potential. In a bout of optimism, James Madison had predicted as early as 1786 that the United States would turn into a major cotton growing country, while George Washington believed that “in the increase of that new material (cotton)...must be of almost infinite consequence to the prosperity of the United States.”

What distinguished the United States from virtually every other cotton growing area in the world was planters' command of nearly unlimited supplies of land, labor and capital, and their unparalleled political power. In the Ottoman Empire and India, powerful indigenous rulers controlled the land, and deep entrenched social groups struggled over its use. In the West Indies and Brazil sugar planters competed for land labor and power. The United States, and its plentiful land, faced no such encumbrances.

With the support of southern politicians, the federal government aggressively secured new territories by acquiring land from foreign powers and from forced cessions by Native Americans. In 1803 the Louisiana Purchase nearly doubled the territory of the United States, in 1819 the US acquired Florida from Spain and in 1845 it annexed Texas. All these acquisitions contained lands superbly suited to cotton agriculture.

The insatiable demand of cotton planters dominated the politics of the new nation, not just because of their reliance on the state to secure and empty new land, but also because of their need for coerced labor. Planters in the United States, unlike elsewhere, enjoyed access to large supplies of cheap labor—what the American Cotton Planter would call “the cheapest and most available labor in the world.” The slave markets in New Orleans and elsewhere boomed as cotton did. And as significant, hundreds of thousands of slaves were available to grow cotton because tobacco production in the states of the upper south became less profitable after the American Revolution, encouraging slave owners there to sell their human property.

The reason for America's quick ascent to market dominance was simple. The United States more than any other country had elastic supplies of the three crucial ingredients that went into the production of raw cotton: labor, land and credit. As *The Economist* put it in 1861, the United States had become so successful in the world's cotton markets because the planters' “soil is marvelously fertile and costs him nothing; his labour has hitherto been abundant, unremitting and on the increase; the arrangements and mercantile organizations for cleaning and forwarding the cotton are all there.”

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<sup>1</sup> Beckert, Sven. *Empire of Cotton: A Global History*. New York: Vintage Books, 2015, pp. 100, 105, 108-9, 243.

**Handout 2: Excerpts from Alexander Hamilton's Report on Manufactures (1791)<sup>2</sup>**

There is something in the texture of this material, which adapts it in a peculiar degree to the application of Machines. The signal Utility of the mill for spinning of cotton, not long since invented in England, has been noticed in another place; but there are other machines scarcely inferior in utility which, in the different manufactories of this article are employed either exclusively, or with more than ordinary effect. This very important circumstance recommends the fabricks of cotton, in a more particular manner, to a country in which a defect of hands constitutes the greatest obstacle to success.

Manufactories of cotton goods, not long since established at Beverly, in Massachusetts, and at Providence in the state of Rhode Island and conducted with a perseverance corresponding with the patriotic motives which began them, seem to have overcome the first obstacles to success; producing corduroys, velverets, fustians, jeans, and other similar articles of a quality, which will bear a comparison with the like articles brought from Manchester. The one at Providence has the merit of being the first in introducing [into the United States] the celebrated cotton mill.

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<sup>2</sup> "Alexander Hamilton's Final Version of the Report on the Subject of Manufactures, [5 December 1791]," *Founders Online*, National Archives, last modified June 13, 2018; <http://founders.archives.gov/documents/Hamilton/01-10-02-0001-0007>. [Original source: *The Papers of Alexander Hamilton*, Vol. 10, December 1791–January 1792, ed. Harold C. Syrett. New York: Columbia University Press, 1966, pp. 230-340.]

### Handout 3: Excerpts from “Samuel Slater & Francis Cabot Lowell: The Factory System in U.S. Cotton Manufacturing”<sup>3</sup>

Samuel Slater was born in 1768 to a fairly prosperous yeoman farmer in Belper, a Derbyshire township less than 20 miles from the Nottingham site where Richard Arkwright would launch the world’s first spinning mill a year later. Slater did indeed work for Arkwright and Strutt for seven years as an apprentice, and the time would prove pivotal in developing his business acumen and technical skills. Slater was receptive to the idea of applying his knowledge in America, and in early September 1789 he left his hometown for what was supposed to be a short trip to London. Two weeks later, he wrote to his mother that “I am going to America,” shortly before beginning a two-month voyage to the United States. On the advice of friends, Slater dressed down as a “farm laborer” to avoid detection by customs officials looking for skilled textile engineers seeking to emigrate.

Slater quickly understood that reaping the full benefits of the water-frame technology would require a change in where yarn spinning happened, not just how. Seeking to replicate the model of dedicated manufacturing facilities that Slater had experienced in Nottingham, they found a promising site adjacent to the Blackstone River a few miles from central Providence. After damming the river, constructing a waterwheel, and building the two-story factory facility, the mill opened in 1793.

From almost the start of Slater’s endeavor, the model was dependent on children to serve as a nimble and compliant labor force. As Slater’s success grew over the next decade, so did his engagement in the lives of his workers. By 1803 he recognized that it would be difficult to recruit the required labor force by targeting children alone and decided to bring entire families into his mill system. To do this, he created a mill village—aptly named “Slatersville”—that offered the basics of a typical New England town, including housing for workers and a general store. Over the coming years, this “Rhode Island System” of company-owned towns would be replicated across the northeastern United States.

Although Slater’s mill in Pawtucket grew to such a size that it dwarfed other manufacturing operations in the region, the factory was far from isolated or even self-sufficient. Rather, Slater’s operating model depended on a critical step in the value chain—weaving of yarn into cloth—being “outsourced” to a network of local suppliers. Absent a water-powered loom, Slater’s yarn had to be “woven by hand in households.” There is evidence that the industrialist chose to site his factories based at least in part on the proximity to farmers’ homes with underutilized labor that could be applied to weaving.

Two decades later a visit to England by Francis Cabot Lowell would likewise prove important. A Harvard College graduate and scion of a wealthy Boston merchant family, Lowell used business connections to gain access to Britain’s large-scale mills. He returned to Boston shortly before the War of 1812 with enough trade secrets, process flows, and proprietary machine drawings to launch an entirely new model for cotton manufacturing. This new approach, dubbed the “Waltham-Lowell” system, was quite different from the Slater system in terms of technology, organizational structure, and capital sources. At a fundamental level, the Waltham-Lowell system was based on a technology that was a radical change from previous models. The process of transforming raw cotton into finished

cloth had several steps, with the spinning of yarn and the weaving of cloth being chief among them. The Slater model used water-powered machinery only for the spinning portion; weaving was completed by hand through the work of laborers at a network of small off-site facilities. The British designs Lowell recreated in Boston included the blueprints for a power loom that could leverage water power to mechanize weaving as well as spinning. This meant that spinning and weaving could now be conducted under the same roof, potentially improving labor productivity, increasing economies of scale, lowering transportation costs, and fostering greater consistency of output. Lowell realized that with the greater scale facilitated by the new technology, he did not have to locate mills in places with strong labor markets. Instead, he could build very large mills in places with the best water power and bring labor to new residential communities adjoining the mills. By 1860 over 62,000 women, particularly single young women from Massachusetts and New Hampshire, were working at textile mills across New England. Having witnessed deplorable working conditions in large textile mills during his time in England and Scotland, Lowell aimed to provide quality housing and higher wages.

The combination of innovative technology, novel organizational design, and creative financing proved extremely successful, and by 1828 five large-scale mills existed in Waltham and Chelmsford, named to honor Lowell posthumously in 1826. By 1840 Lowell had developed into the second-largest city in the state.

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<sup>3</sup> Nicholas, Tom and Guilford, Matthew. “Samuel Slater & Francis Cabot Lowell: The Factory System in U.S. Cotton Manufacturing.” Harvard Business School Case 814-065, January 2014. (Revised July 2016.)

### Handout 4: AP Short-Answer Practice

Directions: Read the two excerpts below and answer the following three-part question.

I worked first in the spinning room as a “doffer.” The doffers were the very youngest girls, whose work was to doff, or take off, the full bobbins and replace them with empty ones.

I can see myself now, racing down the alley, between the spinning-frames, carrying in front of me a bobbin-box bigger than I was. These mites had to be very swift in their movements, so as not to keep the spinning-frames stopped long, and they worked only about fifteen minutes in every hour. We were paid two dollars a week...

The working-hours of all the girls extended from five o'clock in the morning until seven in the evening, with one-half hour for breakfast and for dinner. Even the doffers were forced to be on duty nearly fourteen hours a day, and this was the greatest hardship in the lives of these children. For it was not until 1842 that the hours of labor for children under twelve years of age were limited to ten per day; but the “ten-hour law” itself was not passed until long after some of these little doffers were old enough to appear before the legislative committee on the subject, and plead, by their presence, for a reduction of the hours of labor.<sup>4</sup>

—*Harriet Jacobs, Lowell factory employee, 1898*

I used to have to pick cotton and sometime I pick 300 pound and tote it a mile to the cotton house. Some pick 300 to 800 pound cotton and have to tote the bag the whole mile to the gin. If they didn't do the work get whip til they have blisters on them. I never got whipped, 'cause I always got my 300 pounds. Us have to go early to do that when the horn goes early before daylight.

Us never got enough to eat so us keep stealing stuff. They give us a peck of meal to last a week or two, three pound of bacon in chunk. Us never have flour or sugar, just cornmeal and the meat and potatoes. [We] had a big box under the fireplace where they kept all the big and chickens we stole down in salt.<sup>5</sup>

—*Interview with former slave Sarah Ashley of Goodrich, Texas*

### Question

- Briefly describe ONE major difference between Jacobs's and Ashley's experiences working as young girls in the early 1800s.
- Briefly explain ONE specific historical event or development from the period 1790-1840 that is not explicitly mentioned in the excerpts that could be used to support Jacobs's description.
- Briefly explain ONE specific historical event or development from the period 1790-1840 that is not explicitly mentioned in the excerpts that could be used to support Ashley's description.

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<sup>4</sup> Jacobs, Harriet. *Loom & Spindle: or Life Among the Early Mill Girls*. New York: TY Crowell & Company, 1898, pp. 30-1. Available at <https://archive.org/details/loomspindleorlif00robi>.

<sup>5</sup> Federal Writers' Project: Slave Narrative Project, Vol. 16, Texas, Part 1, Adams-Duhon. 1936. Manuscript/Mixed Material. <https://www.loc.gov/item/mesn161/>.

**Handout 5: "A Cotton Tale" Student Answer Sheet (page 1 of 6)**

Name: \_\_\_\_\_

Hour: \_\_\_\_\_

1. Read Handout 1 and answer the following questions:
  - a. How was North America's climate advantageous for cotton production?
  
  
  
  
  
  
  
  
  
  
  - b. Politically and geographically, what advantages did the United States possess over other cotton-producing nations in the late 1700s and early 1800s?
  
  
  
  
  
  
  
  
  
  
  - c. In terms of labor, how did the United States compare with the rest of the world in the cotton market?
  
2. Go to the FRED® website: <https://fred.stlouisfed.org/>.
  
3. In the search bar type "cotton crop."
  
4. Click on the data set "Cotton Crop for United States." (HINT: Make sure you select the set that is measured in thousands of 500-pound pales [gross weight], annual, not seasonally adjusted.)
  
5. Adjust the timeline by using the date range featured to the left of the orange "EDIT GRAPH" button to show the period 1798-01-01 to 1850-01-01.
  
6. Calculate how many POUNDS of cotton the United States produced in the following years. (NOTE: Be sure to consider the units in this graph when making your calculations.)
  - a. 1798
  
  - b. 1812
  
  - c. 1817
  
  - d. 1826
  
  - e. 1837

**Handout 5: "A Cotton Tale" Student Answer Sheet (page 2 of 6)**

7. Now convert the graph from its original units to an index with "1798-01-01" (January 1, 1798) as the start date as follows:
  - Click the "EDIT GRAPH" button in the top-right corner.
  - From the "Units" dropdown menu, select the last option, "Index (Scale value to 100 for chosen date)." Note that FRED® automatically sets the index to begin on January 1, 1798.
  - To close the panel, click the "X" in the top-right corner of the panel.
8. Answer the following questions based on the graph you just created:
  - a. How long did it take before the cotton crop in the United States doubled?
  - b. How long before it increased by a factor of 5?
  - c. In what year did cotton production increase by a factor of 10?
  - d. By what factor did the cotton crop grow in 1826?
  - e. In what year did cotton production double from its 1826 figure?
9. Read Handout 2 and answer the following questions:
  - a. Why would Hamilton focus on cotton as a point of emphasis in his report?
  - b. Where does Hamilton cite that the manufacturing of cotton has had success?
  - c. Why does Hamilton believe that the industrialization of cotton manufacturing in the United States would be beneficial for the entire country?
  - d. What example that already existed in cotton manufacturing did Hamilton use to make his case for further support of industrialization in the United States?



**Handout 5: "A Cotton Tale" Student Answer Sheet (page 4 of 6)**

11. Brainstorm what advantages both southern cotton growers and northern textile manufacturers would have in the 1790s and early 1800s that would benefit them and the rest of the country. Share your answers with the class.

<b>Southern cotton growers</b>	<b>Northern textile manufacturers</b>

12. Now we'll look at how cotton production affected the north and its impact on pre-Civil War industrialization. Open a new tab and go to FRED®'s homepage. In the main search bar, type "Total Cotton Production by Mills" and select the data set that shows mill production in New England from 1815-1860. Consider cotton textile production in New England between 1815 (the year Lowell opened the Boston Manufacturing Company) and 1860.
- a. How many yards of cotton textiles were produced in 1815?
  - b. How many yards of cotton textiles were produced in 1824, the first year the Lowell, Massachusetts, factory was operational?
  - c. How many yards of cotton textiles were produced in 1837?
  - d. How many yards of cotton textiles were produced in 1859?
13. Just like before with cotton production, we need to convert this data set to an index. (Follow the instructions from Step 7 if you forgot how to convert.) Answer the following questions:
- a. How long did it take before textile manufacturing in the United States doubled?
  - b. In what year did textile production increase by a factor of 10?
  - c. How long did it take for textile manufacturing to increase by a factor of 100?

**Handout 5: "A Cotton Tale" Student Answer Sheet (page 5 of 6)**

14. Adjust the index value to start on January 1, 1845. To do this, click the orange "EDIT GRAPH" button and under the feature "Select a date that will equal 100 for your custom index," adjust the year from 1815 to 1845. How long did it take for textile manufacturing to double from this date?
  
15. Go back and reset the index to its original 1815 starting year.
  
16. We will now compare textile production in the north to cotton production in the south. To make the comparison as accurate as possible, we will continue to use the index feature. To add another data set to the current graph, follow the directions below:
  - a. Click the orange "EDIT GRAPH" button.
  - b. Select the "Add Line" tab.
  - c. In the search bar, type "cotton crop" and select from the dropdown menu "Cotton Crop for the United States, Thousands of Five Hundred Pound Bales (Gross Weight), Annual, Not Seasonally Adjusted from 1798-1955."
  - d. Click add data series.
  - e. Click the X to return to your graph.
  - f. Adjust the timeline to show the date range from 1815-01-01 to 1820-01-01.
  
17. *If you are using an electronic version of this answer sheet, use the "Share Links" feature to copy/paste an image's short URL into the box below:*

18. Answer the following questions based on the graph you just created:
  - a. Describe the overall trend in the rate of growth between southern cotton crop production and New England textile production.

**Handout 5: "A Cotton Tale" Student Answer Sheet (page 6 of 6)**

19. Expand the end date of the timeline from 1820-01-01 to 1860-01-01.
- a. Has that trend previously seen between 1815 and 1820 continued? If so, how?
  
  - b. From the information presented in this graph, did the north or south benefit more from textile manufacturing/cotton crop production? Why?
  
  - c. What implications might this economic trend have in leading to the Civil War?
  
  - d. What is a correlation (if any) between the two data sets?
  
  - e. Do you think there is a causation (causal relationship) between the two data sets?

**Handout 5: "A Cotton Tale" Student Answer Sheet—Answer Key (page 1 of 6)**

1. Read Handout 1 and answer the following questions:
  - a. How was North America's climate advantageous for cotton production? (*Temperature, rainfall, and soil, especially in the southern colonies/states, allowed the plants to thrive.*)
  - b. Politically and geographically, what advantages did the United States possess over other cotton-producing nations in the late 1700s and early 1800s? (*Aside from Native Americans, cotton planters did not have to compete with indigenous peoples or other groups for land use. Cotton growers were able to expand westward with limited resistance from other developments. Finally, the U.S. government in the early 1800s backed an expansionist policy acquiring favorable cotton-growing lands in the American south and Gulf Coast region.*)
  - c. In terms of labor, how did the United States compare with the rest of the world in the cotton market? (*The U.S. used slave labor at the time.*)
2. Go to the FRED® website: <https://fred.stlouisfed.org/>.
3. In the search bar type "cotton crop."
4. Click on the data set "Cotton Crop for United States." (HINT: Make sure you select the set that is measured in thousands of 500-pound pales [gross weight], annual, not seasonally adjusted.)
5. Adjust the timeline by using the date range featured to the left of the orange "EDIT GRAPH" button to show the period 1798-01-01 to 1850-01-01.
6. Calculate how many POUNDS of cotton the United States produced in the following years. (NOTE: Be sure to consider the units in this graph when making your calculations.)
  - a. 1798 (*15.5 million pounds*)
  - b. 1812 (*78.5 million pounds...just over what the Gateway Arch weighs*)
  - c. 1817 (*136 million pounds*)
  - d. 1826 (*366 million pounds*)
  - e. 1837 (*714 million pounds...just under what the Empire State Building weighs*)

**Handout 5: "A Cotton Tale" Student Answer Sheet—Answer Key (page 2 of 6)**

7. Now convert the graph from its original units to an index with "1798-01-01" (January 1, 1798) as the start date as follows:
  - Click the "EDIT GRAPH" button in the top-right corner.
  - From the "Units" dropdown menu, select the last option, "Index (Scale value to 100 for chosen date)." Note that FRED® automatically sets the index to begin on January 1, 1798.
  - To close the panel, click the "X" in the top-right corner of the panel.
  
8. Answer the following questions based on the graph you just created:
  - a. How long did it take before the cotton crop in the United States doubled? (*Two years; in 1800*)
  
  - b. How long before it increased by a factor of 5? (*Eight years; in 1806*)
  
  - c. In what year did cotton production increase by a factor of 10? (*1819*)
  
  - d. By what factor did the cotton crop grow in 1826? (*By a factor of 23*)
  
  - e. In what year did cotton production double from its 1826 figure? (*1839*)
  
9. Read Handout 2 and answer the following questions:
  - a. Why would Hamilton focus on cotton as a point of emphasis in his report? (*Answers will vary, but many students will cite that cotton was already a large part of the U.S. economy, especially in the south at this point.*)
  
  - b. Where does Hamilton cite that the manufacturing of cotton has had success? (*Hamilton points to the industrial revolution in England that began with cotton textiles.*)
  
  - c. Why does Hamilton believe that the industrialization of cotton manufacturing in the United States would be beneficial for the entire country? (*He argues that the United States' small population does not have enough labor ["a defect of hands"] to handle a growing economy.*)
  
  - d. What example that already existed in cotton manufacturing did Hamilton use to make his case for further support of industrialization in the United States? (*He describes cotton mills already open in Rhode Island and Massachusetts as an example of what can be done in the future on a much bigger scale.*)

**Handout 5: "A Cotton Tale" Student Answer Sheet—Answer Key (page 3 of 6)**

10. Read Handout 3, a secondary source on the history of cotton manufacturing in the United States by Tom Nicholas and Matthew Guilford, and answer the following questions:
- How did Slater acquire his knowledge of British industrial cotton machinery? (*He apprenticed at Richard Arkwright's mill for seven years in his hometown.*)
  - Why did Slater initially hire children to work in his Rhode Island mill? (*They were easily controlled and could work the machines efficiently.*)
  - How did that labor change in his mill over time? (*He began to hire families to work and live in his mill town system.*)
  - How did Lowell acquire the technology needed to build his factory? (*He stole trade secrets and blueprints while traveling in England before the War of 1812.*)
  - How was Lowell's factory different from Slater's? (*Lowell combined multiple steps of a process all under one roof instead of just one portion of the process.*)
  - What benefits did the new Lowell factory system create? (*Increases in productivity and production scaling; consistency in the product; lowering of transportation costs*)
  - In both Slater's and Lowell's textile factories, what readily available energy source powered these mills? (*Water; specifically, a water frame perfected by Richard Arkwright that used a wheel to turn the spindles and move the looms*)
  - What kind of labor force did Lowell rely upon? (*Usually single young women from New England*)

**Handout 5: "A Cotton Tale" Student Answer Sheet—Answer Key (page 4 of 6)**

11. Brainstorm what advantages both southern cotton growers and northern textile manufacturers would have in the 1790s and early 1800s that would benefit them and the rest of the country. Share your answers with the class.

<b>Southern cotton growers</b>	<b>Northern textile manufacturers</b>
<i>No tariffs</i>	<i>No tariffs</i>
<i>Shorter (cheaper) transportation costs</i>	<i>Cheap raw material cost</i>
<i>Less risk of foreign intervention/economic pressures</i>	<i>Emerging domestic market to sell products</i>
	<i>Sense of patriotism in American-made products</i>

12. Now we'll look at how cotton production affected the north and its impact on pre-Civil War industrialization. Open a new tab and go to FRED®'s homepage. In the main search bar, type "Total Cotton Production by Mills" and select the data set that shows mill production in New England from 1815-1860. Consider cotton textile production in New England between 1815 (the year Lowell opened the Boston Manufacturing Company) and 1860.
- a. How many yards of cotton textiles were produced in 1815? (*76,000 yards, or approximately 43 miles of fabric*)
  - b. How many yards of cotton textiles were produced in 1824, the first year the Lowell, Massachusetts, factory was operational? (*2,638,000 yards, or almost 1,500 miles*)
  - c. How many yards of cotton textiles were produced in 1837? (*50,125,000 yards, or 28,480 miles [The Earth's circumference is 25,000 miles.]*)
  - d. How many yards of cotton textiles were produced in 1859? (*176,080,000, or just over 100,000 miles*)
13. Just like before with cotton production, we need to convert this data set to an index. (Follow the instructions from Step 7 if you forgot how to convert.) Answer the following questions:
- a. How long did it take before textile manufacturing in the United States doubled? (*One year*)
  - b. In what year did textile production increase by a factor of 10? (*1819*)
  - c. How long did it take for textile manufacturing to increase by a factor of 100? (*30 years, from 1815-1845*)

**Handout 5: "A Cotton Tale" Student Answer Sheet (page 5 of 6)**

14. Adjust the index value to start on January 1, 1845. To do this, click the orange "EDIT GRAPH" button and under the feature "Select a date that will equal 100 for your custom index," adjust the year from 1815 to 1845. How long did it take for textile manufacturing to double from this date? (14 years, from 1845: The index does not go above 200 until 1859, at a value of 212.5.)
15. Go back and reset the index to its original 1815 starting year.
16. We will now compare textile production in the north to cotton production in the south. To make the comparison as accurate as possible, we will continue to use the index feature. To add another data set to the current graph, follow the directions below:
  - a. Click the orange "EDIT GRAPH" button.
  - b. Select the "Add Line" tab.
  - c. In the search bar, type "cotton crop" and select from the dropdown menu "Cotton Crop for the United States, Thousands of Five Hundred Pound Bales (Gross Weight), Annual, Not Seasonally Adjusted from 1798-1955."
  - d. Click add data series.
  - e. Click the X to return to your graph.
  - f. Adjust the timeline to show the date range from 1815-01-01 to 1820-01-01.
17. *If you are using an electronic version of this answer sheet, use the "Share Links" feature to copy/paste an image's short URL into the box below:*

18. Answer the following questions based on the graph you just created:
  - a. Describe the overall trend in the rate of growth between southern cotton crop production and New England textile production. (*Answers will vary, but most students should describe that while both indices are increasing, the growth in northern textile production is dramatically higher than the growth in cotton crop production.*)

**Handout 5: "A Cotton Tale" Student Answer Sheet—Answer Key (page 6 of 6)**

19. Expand the end date of the timeline from 1820-01-01 to 1860-01-01.
- a. Has that trend previously seen between 1815 and 1820 continued? If so, how? *(The trend continues and gets even wider as we move closer to the start of the Civil War.)*
  
  - b. From the information presented in this graph, did the north or south benefit more from textile manufacturing/cotton crop production? Why? *(Answers will vary, but students should interpret the data to see that the north benefited more because the rate of growth of textile manufacturing far exceeded the growth of cotton production.)*
  
  - c. What implications might this economic trend have in leading to the Civil War? *(Answers will vary, but students should conclude that this trend may suggest the north was economically growing at a faster rate than the south, which eventually would have political and social implications that would lead to the Civil War beginning in 1861.)*
  
  - d. What is a correlation (if any) between the two data sets? *(Answers will vary, but most students will describe a positive relationship because both data sets increase over time.)*
  
  - e. Do you think there is a causation (causal relationship) between the two data sets? *(Answers will vary, but many students will describe an interdependent relationship of how more raw cotton production led to cheaper prices for manufacturers, which led to more finished goods and a greater demand for the products and raw materials in the free international market. Since this trade affected both the United States and England, it also was a sign of an emerging global marketplace.)*

## Standards and Benchmarks

### College, Career, and Civic Life (C3) Framework for Social Studies State Standards

#### Dimension 2: Applying Disciplinary Concepts and Tools

##### Economics: The National Economy

D2.Eco.10.9-12. Use current data to explain the influence of changes in spending, production, and the money supply on various economic conditions.

D2.Eco.13.9-12. Explain why advancements in technology and investments in capital goods and human capital increase economic growth and standards of living.

##### History: Historical Sources & Evidence

D2.His.9.9-12. Analyze the relationship between historical sources and the secondary interpretations made from them.

##### History: Causation & Argument

D2.His.16.9-12. Integrate evidence from multiple relevant historical sources and interpretations into a reasoned argument about the past.

## Voluntary National Content Standards in Economics

### Standard 15: Economic Growth

Investment in factories, machinery, new technology, and in the health, education, and training of people stimulates economic growth and can raise future standards of living.

## AP U.S. History Curriculum Alignment

### LEARNING OBJECTIVES

- **Work, Exchange & Technology**

WXT-1.0 Explain how different labor systems developed in North America and the United States and explain their effects on workers' lives and U.S. society.

WXT-2.0 Explain how patterns of exchange, markets, and private enterprise have developed, and analyze ways that governments have responded to economic issues.

WXT-3.0. Analyze how technological innovation has affected economic development and society.

- **Migration & Settlement**

MIG-2.0 Analyze causes of internal migration and patterns of settlement in what would become the United States and explain how migration has affected American life.

- **Geography & the Environment**

GEO-1.0 Explain how geographic and environmental factors shaped the development of various communities and analyze how competition for and debates over natural resources have affected both interactions among different groups and the development of government policies.

- **America in the World**

WOR-1.0 Explain how cultural interaction, cooperation, competition, and conflict between empires, nations, and peoples have influenced political, economic, and social developments in North America

### PERIOD TIMELINE ALIGNMENT

Key Concept 4.2—Innovations in technology, agriculture, and commerce powerfully accelerated the American economy, precipitating profound changes to U.S. society and to national and regional identities.

- I. New transportation systems and technologies dramatically expanded manufacturing and agricultural production.
  - Entrepreneurs helped to create a market revolution in production and commerce, in which market relationships between producers and consumers came to prevail as the manufacture of goods became more organized
  - Innovations including textile machinery, steam engines, interchangeable parts, the telegraph and agricultural inventions increase the efficiency of production methods
- II. The changes caused by the market revolution had significant effects on U.S. society, workers' lives, and gender and family relations.
  - Increasing numbers of Americans, especially women and men working in factories, no longer relied on semi subsistence agriculture; instead they supported themselves producing goods for distant markets.
  - The growth of manufacturing drove a significant increase in prosperity and standards of living for some; this led to the emergence of a larger middle class and a small but wealthy business elite but also to a large and growing population of laboring poor.
- III. Economic development shaped settlement and trade patterns, helping to unify the nation while also encouraging the growth of different regions.
  - Increasing Southern cotton production and the related growth of Northern manufacturing, banking, and shipping industries promoted the development of national and international commercial ties.
  - Southern business leaders continued to rely on the production and export of traditional agricultural staples, contributing to the growth of a distinctive Southern regional identity.