

First in Industrialization?

LESSON CREATED BY

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SUGGESTED GRADE LEVELS

9-12

SUGGESTED TIME FRAME

2-3 class periods, or
1-2 blocks

Lesson Description/Purpose

This lesson draws a connection between the innovative steps that George Washington took as “first farmer” and the wave of changes that comprise the American Industrial Revolution. In this lesson, students will explore information from text, video, and drawing sources. Students will make interdisciplinary connections between history and science / engineering.

Objectives

- Students will interpret visual evidence to make inferences about the mechanical operation of the Evans mill system
- Students will consult primary and tertiary sources to discover how Washington’s gristmill operates
- Students will compose vivid descriptive writing in response to visual and auditory stimuli

Related Standards

- Reading and Writing Literacy in History/Social Studies
- Integrate and Evaluate Content in Diverse Formats.
- Writing Standards
- Time, Continuity, and Change
- Science, Technology, and Society

Materials

- Projection technology
- Computer lab access or a class set of Internet-capable devices
- Copy of “Overview of the Gristmill” Questions for each student

Background Information

One of George Washington’s jobs as president was to review and sign patent applications. One of the very first patents Washington signed was for Oliver Evans’ improvements to a gristmill. After seeing the system in action a few years after signing Evans’ patent, Washington decided to purchase a license for the Evans system and have it installed on his estate. The Evans system was fully automated and greatly reduced the need for unskilled labor at the mill. It also gave millers the capability to grind grain much finer than a traditional mill could. This extra-fine flour could fetch far higher prices and thus increased the profitability of the mill. Washington’s decision to pursue this advancement in agricultural technology is an example of his forward-looking relationship with innovation, putting him on the forefront of the Industrial Revolution in America.

Procedures

ANTICIPATORY SET

Show students plate 9 from Oliver Evans’ *The Young Mill-Wright and Millers Guide* (included as ImageSource handout in Student Materials)

- Have students use their imaginations to consider what might be going on in this diagram. Ask them to write a paragraph or two explaining what could be happening in this picture.

- Have several students share their answers with the class. You may even consider awarding prizes to the students who develop the most imaginative or most accurate explanations of the diagram.

GRISTMILL IN MOTION

To show students how the process shown in the diagram actually works, play the following short video of Mount Vernon's master miller, Steve Bashore, demonstrating Washington's gristmill (which uses the Evans system) in action:

<http://www.mountvernon.org/video/watch/washingtons-gristmill-at-mount-vernon>

- Ask students the following question, and have several share their responses with the class:

How does the video improve your understanding of the diagram?

Seeing the mill in action helped George Washington understand it better, too. He had first encountered this gristmill when he, as president, signed Oliver Evans' patent for his mill improvements. Later, Washington saw a mill using Evans' system in action. This first-hand experience convinced Washington to use the Evans system on his estate, Mount Vernon.

GEORGE WASHINGTON'S GRISTMILL

- Distribute one copy of the "Overview of the Gristmill" Questions to each student.
- Ask students to read the "Overview of the Gristmill" article from Mount Vernon's Digital Encyclopedia and answer the "Overview of the Gristmill" Questions:
<http://www.mountvernon.org/digital-encyclopedia/article/overview-of-the-gristmill/>
- Have students share their answers to these questions.

DESCRIPTIVE WRITING

- Show students another video of the gristmill in action:
<http://www.mountvernon.org/video/watch/the-working-gristmill>
- After watching the video, students will respond to the following prompt and share with the class:

Pretend you are standing in Washington's gristmill. Combine what you know from your reading, the pictures, and the videos to write a narrative describing how the grain and flour move through the mill. Use colorful adjectives and adverbs to create a vivid description of the mill's operation. Try to include as many senses as you can!

FINAL WRITTEN RESPONSE

- Ask students to respond in writing to the following question:

How did Washington's installation of the Evans system in his gristmill demonstrate his early adoption of the principles of the Industrial Revolution?
- Give students 7-10 minutes to develop the first draft of their answers.
- Put students into groups of four. Students should sit in a circle with the other students in their group.
- Ask each student to pass his written response to the student to his right. Each student should read the response she is currently holding and prepare to provide feedback about the content of the writing.
- Give students a few minutes to share their feedback with their group members and revise their own writing to implement content suggestions as appropriate.
- Now ask each student to pass his written responses to the student to his left. Each student should read the response she is currently holding for any spelling, grammar, or usage errors. Give students a few minutes to consult with their group members, then edit their responses as appropriate.
- Finally, have each student exchange papers with the student sitting across from him. Each student should read and score the response she is currently holding using the following rubric:

COMPONENT	POINTS
Answers the question clearly	3
Supports argument with specific details and examples	5
Appropriate spelling, grammar, and usage	2
TOTAL	10

Assessments

FORMATIVE: anticipatory paragraph, “Overview of the Gristmill” questions, descriptive writing

SUMMATIVE: final written response

Accommodations

EXCEPTIONAL EDUCATION STUDENTS: Before having students compose the final written response, discuss the prompt as a class. As a class, brainstorm key principles of the Industrial Revolution. Then gather evidence that Washington’s installation of the Evans system in his gristmill demonstrates his adoption of these principles. Finally, have students compose their written responses independently.

ENGLISH-LANGUAGE LEARNERS: The vocabulary of the mill is quite specific and obscure. Have students reference the “Gristmill Glossary of Terms” reference guide during the course of this lesson:

<http://www.mountvernon.org/the-estate-gardens/gristmill/gristmill-glossary-of-terms/>

GIFTED STUDENTS: Washington, of course, was a slave owner. Have students research the impact of mechanization and automation on the institution of slavery.

Suggestion for Extension

Have students work in groups to create miniature models of Washington’s gristmill.

Gristmill Answer Key

1. When did George Washington first get into the milling business?

1770

2. When did he upgrade his mill with the Evans system?

1791

3. How does the Evans system reduce the amount of labor required for milling?

It is fully automated. People aren't needed to move the grain and flour around the mill because the system moves them mechanically instead.

4. How did Washington first hear about the Evans system?

As president, Washington signed Oliver Evans' patent application for mill improvements in 1790.

5. How was Washington able to see the Evans system in action before he installed it himself?

When he was president, Washington went to thank Joseph Tatnall, a miller in Delaware who had helped feed the Continental Army at Valley Forge during the Revolutionary War. Tatnall had the Evans system installed in his mill by the time of this presidential visit.

6. What benefits did Washington hope to gain in upgrading his mill with the Evans system?

He would be able to mill a higher quality and quantity of flour, which he could sell for higher profits.

7. Using critical thinking, describe how installing the Evans system could have been risky for Washington.

Answers will vary but may include: The system was in use in very few places. It could have problems that the users had not discovered yet. It could potentially make his mill slower, less profitable, or otherwise worse.

8. Study at the diagram. How did the Evans system turn grain into flour?

The grain was pulled up to the roof, then fell down into storage bins. From there it was transferred onto a rolling screen before being ground to flour by the mill stones. The whole thing was powered by a water wheel.

9. What was the result of Washington's installation of the Evans system in his mill?

His mill was, indeed, more profitable thanks to his installation of the Evans system.

10. Why did Oliver Evans publish *The Young Mill-Wright & Millers Guide*?

He hoped it would make more people aware of his mill system and help those who bought a license to his patent install their milling systems.