Lesson 3 Case Study of an Innovation: Moving Assembly Line and the Industrial Workforce

Main Ideas

– Henry Ford's moving assembly line changed the nature of work for many Americans.

Key Concepts

– Craft system
– Mass production
– Moving assembly line
– Interchangeable parts
– Division of labor
– Industrial workforce
– Unskilled workers
– Skilled workers
– Scientific management
– $5 day

Digitized Artifacts from the Collections of **The Henry Ford**

Lesson 3
Case Study of an Innovation: The Moving Assembly Line and the Industrial Workforce

– Swift & Company's Meat Packing House, Chicago, Illinois, "Splitting Backbones and Final Inspection of Hogs," 1910-1915 ID# THF32081
– 1924 Ford Model T Cars on Assembly Line at Highland Park Plant, October 1923 ID# THF23577
– Women Workers Assembling Magnetos at Ford Highland Park Plant, circa 1913 ID# THF23810
– Letter to Henry Ford from the Wife of an Assembly Line Worker, 1914 ID# THF32100
– Ford Motor Company Clipping Book, Volume 2, January 6-10, 1914 (page 10 ID# THF68272) (page 11 ID# THF68273)

Materials

– Computers with access to the Internet, digital projector and screen (preferred) OR printed handouts of digitized artifacts' images and descriptions
– Sign: "How do people create society-changing innovations?"
– Scrap paper – lots
– Full roll of wrapping paper
– Empty wrapping paper tube
– Tape
– 10 feet of continuous flat surface, like desks or tables pushed together

Duration

2 class periods (45 minutes each)

Instructional Sequence

1. Engagement

Ask students what words or phrases come to mind when they think about factories and working in a factory. Write their suggestions on the board. Tell them they'll learn more about how Henry Ford changed the way goods are produced.

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2. Lecture: Henry Ford Creates the Moving Assembly Line

Share information with students about Henry Ford's development of the moving assembly line. Review and if necessary refer to the Glossary in the Teacher Guide to define unfamiliar terms. You may wish to wait to fully discuss workers' feelings about working on the assembly line or about the $5 day, as students will experience some of these emotions when they participate in the Build a Paper Airplane Activity.

After the lecture, ask your students to discuss the terms below as a class and come to a consensus on the definitions. They should refer to their notes to find context clues and should also use dictionaries. Use the accompanying digitized artifacts below to illustrate the meaning of some of these terms:

- Craft system
- Mass production
- "Disassembly" line (See image Swift & Company's Meat Packing House, Chicago, Illinois, "Splitting Backbones and Final Inspection of Hogs," 1910-1915 ID# THF32081)
- Moving assembly line (See image 1924 Ford Model T Cars on Assembly Line at Highland Park Plant, October 1923 ID# THF23577)
- Division of labor (See image Women Workers Assembling Magnetos at Ford Highland Park Plant, circa 1913 ID# THF23810)
- Interchangeable parts
- Unskilled workers
- Skilled workers
- Scientific management

3. Paper Airplane Workshop*

Students will produce paper airplanes as goods would have been produced before the innovation of the moving assembly line.

Have each one of your students seated at their desks. Give them each a few sheets of paper. They will do this part of the activity alone. Tell them they can create whatever kind of airplane they want to, making their own production decisions from start to finish. Don't tell them they have to produce a certain number or tell them how much time they have. Stop them after about five minutes. Ask them to count how many they have made. Ask a few to share their airplane designs with the class. Then allow them to test-fly their airplanes.

Clean up and put the tested airplanes in the recycling bin.

Note For additional information, see "Model T and the Assembly Line," in From the Curators – Henry Ford and Innovation.

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4. Paper Airplane Moving Assembly Line*

Ask students to predict how working on the assembly line and assembly line products will be different. Tell them that they will now get a taste of working on a moving assembly line so they'll be better able to answer that question.

Paper Airplane Assembly Line Setup

Recommendation

Setup the physical assembly line before your students come to class.

Setup

- Tape the end of the roll of wrapping paper to an empty roll of wrapping paper in a few places along the end.
- You will need ten feet of continuous flat surface; you might line up desks or tables to achieve this.
- Place the wrapping paper at one end of the surface; unwind it enough so that the empty roll-end reaches the other end of the flat surface to form the conveyor belt.
- Place a stack of scrap paper at the end with the full roll. This will be Station One on the assembly line.

Assembly line stations

Station One Take one piece from the stack of paper and place it on the conveyor belt.

Station Two Make a center vertical fold in the piece of paper.

Station Three Open the folded paper.

Station Four Fold the top right corner of the unfolded paper in to the fold line.

Station Five Fold the top left corner of the paper in to the fold line.

Station Six Fold the center to create the nose.

Station Seven Fold one side down to create one wing.

Station Eight Fold the other side down to create the other wing.

Station Nine Adjust so wings are horizontal.

Station Ten Test-fly the airplane.

Each station is a job on the assembly line. The airplane should move on the conveyor belt (wrapping paper) between stations.

Choose ten students to fill these positions. You will also need two students to run the conveyor belt, with one holding the full tube and one winding paper around the empty tube. The second student will be the belt controller, controlling the speed of the assembly line.

Students not working on the assembly line should each be assigned to closely observe one of the workers. Let the observers know that they'll be asked to comment on what their worker seems to find easy and what their worker seems to find challenging.

Review each of the jobs with the students. Explain to students how the moving assembly line will work. Once you are sure everyone understands his or her jobs, try out the moving assembly line.

Introduce the scenario that the speed of production is controlled by the speed of the conveyor belt in the moving assembly line, so that workers only have a certain amount of time to complete their step of the process. Before you begin, ask students to explain why Henry Ford would feel this is a good idea. After they answer, ask the workers to be aware of their feelings while they are working on the moving assembly line.

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4. Paper Airplane Moving Assembly Line* Continued

Explain to students how the moving assembly line will work:

The assembly line will move when the belt controller winds the paper up onto the tube. The belt controller will need to wind at a consistent speed.

After the first worker places the paper on the assembly line, his job is not done. He should continue placing papers on the assembly line so that the second station will have materials to complete the next task. Each station should continue to perform the task assigned to that station until the conveyor belt runs out.

Have a discussion about the following topics with students and write their responses on the board. Ask the workers to share how they felt during this activity. Ask the observers what they noticed that went well or was challenging. Ask the workers to describe how they felt about doing one task on the moving assembly line versus making the airplanes themselves from start to finish.

Next, try speeding up the line. Switch the conveyor belt around by moving the filled-up roll back to the start of line. Have the belt controller wind faster this time. Ask the workers: How do your feelings change? Does the work become more challenging? If so, for whom, and how? How does the quality of the product change? Update your notes on the board with these additional comments.

Let students know that in a real factory, the belt would not run out but would be moving continuously. Breaks must be scheduled so that all positions are covered; the process breaks down if just one worker is missing from his or her job on the line.

5. Impact on Workers

Tell students that workers shared many of the frustrations they felt about work on the moving assembly line. Read the Letter to Henry Ford from the Wife of an Assembly Line Worker, 1914 ID# THF32100 aloud to the students. Ask them what actions they might take in response to working on the moving assembly line.

5. The $5 Day

Explain to students that Henry Ford had difficulty retaining workers on the assembly line and so he enacted the unheard-of wage of $5 per day for unskilled or semiskilled work. Ask students to read these newspaper clippings, Ford Motor Company Clipping Book, Volume 2, January 6-10, 1914 (page 10 ID# THF68272) (page 11 ID# THF68273), which show the national and global response to Ford Motor Company's announcement. What was the reaction to the announcement?

Assessment

Have students write a piece of historical fiction that draws on their experiences today. For example, they might assume the role of a Ford Motor Company worker from 1914 and write a journal entry. Or they might draw a comic strip showing an episode from a Ford worker's day. Evaluate student work based on its ability to evoke the feelings engendered by working on a moving assembly line.

* Adapted from *The Power in Our Hands: A Curriculum on the History of Work and Workers in the United States*, by William Bigelow and Norman Diamond. New York: Monthly Review Press, 1988.