**5.05 Student Reading**

**Henry Ford and the Model T: A Case Study in Productivity (Part 2)**

When Henry Ford announced he was going to produce an automobile that would be affordable to the masses, he probably did not realize what a great impact his achievement would have on life in the United States. and, eventually, the world. Ford’s use of mass production strategies to manufacture the Model T revolutionized industrial manufacturing and initiated a new era in personal transportation. This three-part learning unit provides students with the story of Henry Ford and the Model T from an economics perspective. Parts 1 and 2 explore how the Ford Motor Company successfully introduced mass production strategies to the auto industry. Students learn how specialization and investments in capital (machines, people, etc.) increased productivity and allowed Ford to slash the price of his popular vehicle. Students chart a plan for the assembly line production of bookmarks, test their plan, and make recommendations for improvements. Students also explore how Henry Ford used economic incentives to address a problem created by mass production techniques—worker turnover. An optional Part 3 explains how increased productivity resulted in shifts in the supply and demand for the Model T. Students analyze how a variety of non-price determinants continue to influence the automobile market today. The unit also provides a wealth of extension activities.

**Key Concepts**

Factors of Production , Human Resources , Incentive , Production , Productive Resources ,Entrepreneur , Human Capital , Labor , Productivity , Resources , Innovation

**Process**

Students will read the background information on Henry Ford's investments in capital to improve productivity in the manufacture of the Model T. The students are provided the following text and hyperlinks.

**The Highland Park Plant**
The Ford Motor Company’s construction of the [Highland Park Plant](http://www.nps.gov/history/nr/travel/detroit/d32.htm%22%20%5Ct%20%22_blank) was an investment in [capital](http://www.econedlink.org/lessons/economic-glossary-definition.php?term=Capital" \t "pop" \o "Glossary Term: Capital). At the time it opened in 1910, the four-story factory was the largest building under one roof in the state of Michigan. It was considered the model for factory design. Large, open floors allowed for the efficient arrangement of machinery. To enhance natural lighting and ventilation, there were massive windows. About 75 percent of the wall space was glass, and there were skylights as well.

**Vertical Integration**

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| A complex surrounding the Highland Park Plant included a power plant, machine shop, and foundry. Ford was starting to bring together the various stages in the manufacture of automobiles, a strategy called vertical integration. By the 1920s, Ford had purchased a rubber plantation in Brazil, coal mines in Kentucky, acres of timberland and iron-ore mines in Michigan and Minnesota, a fleet of ships, and a railroad. These efforts to vertically integrate helped Ford make sure his company would have raw materials and parts when they were needed, guaranteeing a continuously operating assembly line. These efforts also enabled the company to profit from more of the processes involved in producing the automobile. |

Single-purpose machines and tools were created for the different steps in the manufacturing process. New power technologies such as electricity were used to run machines more efficiently than humans could run them. Electrical lighting was a key factor in making it possible to operate the factory by day and night, in three shifts.

 To facilitate the moving assembly line, an “endless chain-driven” conveyor was built to move each chassis from one workstation to another. Work slides, rollways, trolleys, elevators and other devices were also created to move cars and parts to workers so that workers could repeat their assigned tasks without having to move their feet.

Henry Ford also invested in [human capital](http://www.econedlink.org/lessons/economic-glossary-definition.php?term=Human%20Capital" \t "pop" \o "Glossary Term: Human Capital) to improve productivity. He realized that good health, education, and training all contributed to a worker's productivity. Thousands of immigrants from dozens of countries worked side by side at Highland Park. Many did not read, write, or speak English.

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| It is almost essential that a workman have a knowledge of English, from a safety standpoint as well as to thoroughly understand the requirements of his work. *Ford Factory Facts, Ford Motor Company, 1915* |

The Ford Motor Company established a [school](http://www.autolife.umd.umich.edu/Labor/L_Overview/FordEnglishSchool.htm%22%20%5Ct%20%22_blank) where workers were taught English so they could be safe and more productive on the job. A plant hospital provided health care.

What was the impact of all these changes? Production doubled in each of the first three years the Highland Park Plant operated—from 19,000 cars in 1910, to 34,500 in 1911, to a staggering 78,440 in 1912.

The $5 Work Day

  With a new factory, new machines, and new ways of organizing production, everything should have been great--but it wasn't. Spending hours and hours doing the same task over and over was unpleasant for workers. In addition, the work was dangerous. Morale was often low. Workers couldn't be counted on to show up on a regular basis. Many just quit and looked for jobs elsewhere.

Given these problems, it was difficult to keep the line running smoothly. Making matters worse, new workers required a costly break-in period that reduced productivity. Ford found himself spending $100 to train each new worker, but many of these men only stayed a month or two before quitting. Find out more about Ford's worker problem and how he solved it by reading [Henry Ford's $5-a-Day Revolution](http://corporate.ford.com/about-ford/heritage/milestones/5dollaraday/677-5-dollar-a-day%22%20%5Ct%20%22_blank).

Ford's solution? He provided an [incentive](http://www.econedlink.org/lessons/economic-glossary-definition.php?term=Incentive" \t "pop" \o "Glossary Term: Incentive) to maintain a stable and productive workforce. He boosted pay to $5 a day.

Ford's $5 day sent shockwaves through the auto industry. Many businesspeople including stockholders in the Ford Motor Company regarded the pay increase as crazy. Many thought the company would soon go out of business. But Ford believed that retaining more skilled, satisfied employees would increase productivity and lower production costs. He was right! Turnover and absenteeism disappeared almost overnight. In addition Ford greatly increased the size of his plants by adding new and additional equipment to further raise the productivity of his workforce.

* In 1914, 13,000 workers at Ford made 260,720 cars. By comparison, in the rest of the industry, it took 66,350 workers to make 286,770 cars.
* Between 1914 and 1916, Ford's profits doubled, going from $30 million to $60 million.

Ford was producing cars at a record-breaking rate. In the early days of Model T production, completing one vehicle required 12 hours. By 1914, vehicles rolled out of the Highland Park Plant at the rate of one every 93 minutes. In 1920, a Ford was turned out every minute, and one out of every two automobiles in the world was a Model T. At one point, the pace picked up to one Ford being manufactured every 24 seconds!

**Henry Ford and the Model T: A Case Study in Productivity (Part 3)**

When Henry Ford announced he was going to produce an automobile that would be affordable to the masses, it is doubtful even he realized the far reaching impact such an achievement would have on life in the U.S. and eventually, the world. Ford’s use of mass production strategies to manufacture the Model T revolutionized industrial manufacturing and initiated a new era in personal transportation. This 3-part learning unit provides students with the story of Henry Ford and the Model T from an economics perspective. Parts 1 and 2 explore how the Ford Motor Company successfully introduced mass production strategies to the auto industry. Students learn how specialization and investments in capital (machines, people, etc.) increased productivity and allowed Ford to slash the price of his popular vehicle. Students chart a plan for the assembly line production of bookmarks, test their plan and make recommendations for improvements. Students also explore how Henry Ford used economic incentives to address a problem created by mass production techniques—worker turnover. An optional Part 3 explains how increased productivity resulted in shifts in the supply and demand for the Model T. Students analyze how a variety of non-price determinants continue to influence the automobile market today. A wealth of extension activities is provided if additional time is available.

**Key Concepts**

Demand , Economic Growth , Entrepreneurship , Equilibrium Price , Markets , Price , Quantity Demanded , Quantity Supplied , Supply , Determinants of Demand , Determinants of Supply ,Productivity , Profit

**Students Will**

* Describe how Henry Ford’s innovative use of large-scale production in the auto industry and explain its impact on workers, consumers, and producers.
* Analyze shifts in the market supply and demand for motor vehicles caused by nonprice determinants.
* Summarize the story of Henry Ford and the Model T from an economic perspective.

**Introduction**

Henry Ford changed the auto industry forever. To remain competitive, other automakers had to adopt his innovations in mass production. In Part 3, of this set of lessons, the students will analyze his efforts to increase auto productivity in the auto industry and learn how his innovations affected market supply and demand.

**Resources**

* Interactive Activity:  This interactive quiz tests students' understanding of this productivity lesson.
[Click Here](http://www.econedlink.org/interactives/multiple-choice/index.php?lid=692&gid=1)

**Process**

Students will work at computers individually learning how Henry Ford’s efforts to improve productivity caused changes in the market for automobiles. The students should observe that non-price determinants caused shifts in both supply and demand. By reference to hypothetical current events, the students are asked to predict the impact of various non-price determinants on the auto market today.

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| **Model T Prices and Production \*** |
| **Price** | **Production** |
| $950 | 19,173 |
| 850 | 9,450 |
| 780 | 35,451 |
| 690 | 68,228 |
| 600 | 151,693 |
| 550 | 180,279 |
| 490 | 185,278 |
| \* Nominal Prices |

Students will plot the information on this chart to better visualize how price affects production.

In October 1908, the first Model T Fords were sold for $950. As Henry Ford found new ways to reduce production costs, he passed the savings on to consumers as lower prices. By 1912, the car was selling for $575. It was the first time that a new car had sold for less than the average wage of U.S. workers. The price of the Model T would continue to drop during its 19 years in production, at one point dipping as low as $280. With each price cut, more and more consumers could afford to buy the cars.

This reduction in price meant that Ford's profit margins (on each Model T) decreased but its revenues increased. How was that possible? In 1909 the profit on a car was $220. By 1914, the margin had dropped to $99. But sales were exploding. While profit margins on individual cars were smaller, the added sales volume increased total profits. During this period, the company’s net income rose from $3 million to $25 million. Its U.S. market share rose from 9.4 percent in 1908 to a remarkable 48 percent in 1914.

**The Changing Market for Automobiles**

Henry Ford permanently changed the auto industry. To remain competitive, other automakers had to adopt his innovations in mass production.



Increased productivity made it possible for automakers to increase the number of automobiles they were willing and able to sell at different prices. The supply curve in the auto market shifted right.



Up to this point, the lesson has focused primarily on mass production, but mass consumption was just as important to Henry Ford. His $5 day forced other employers in the auto industry and other industries to follow his lead to attract and keep workers. As a result, wages for many U.S. workers increased.

The increase in wages increased consumer demand for automobiles. The demand curve shifted right as more consumers were willing and able to buy cars.

Fast forward to the automobile market today. Supply and demand for motor vehicles continues to shift. Read the following newspaper headlines and decide whether each event will have an impact on the market supply or demand for cars. If there is a change, specify whether it will be an increase or decrease.

**Conclusion**

Many people believe that Henry Ford invented the automobile. Others credit him with creating the assembly line. In fact, he did neither.