

Lesson



Inventors: Dreaming Up New Ideas

OVERVIEW

Students will read and discuss the historical book, *A Head Full of Notions*, about Robert Fulton. They will differentiate between inventors and entrepreneurs, describe the incentives that motivate them, and explore the important contributions they make to society's standard of living.

ECONOMICS CONCEPTS

Inventors, entrepreneurs, producers, consumers, risk, profit, productivity, increasing productivity

HISTORY CONTENT STANDARDS

Standard 8B: Understand changes in transportation and their effects. Identify and describe the people who have made significant contributions in the field of transportation.

ECONOMICS CONTENT STANDARDS

Standard 4: Role of Incentives

- **Benchmark 1 for 4th grade:** Rewards are positive incentives that make people better off.
- **Benchmark 3 for 4th grade:** Both positive and negative incentives affect people's choices and behavior.

Standard 9: Role of Competition

- **Benchmark 1 for 4th grade:** Competition takes place when there are many buyers and sellers of similar products.
- **Benchmark 2 for 4th grade:** Competition among sellers results in lower costs and prices, higher product quality, and better customer service.

Standard 14: Profit and the Entrepreneur

- **Benchmark 1 for 4th grade:** Entrepreneurs are individuals who are willing to take risks, to develop new products, and start new businesses. They recognize opportunities, like working for themselves, and accept challenges.
- **Benchmark 2 for 4th grade:** An invention is a new product. Innovation is the introduction of an invention into a use that has economic value.
- **Benchmark 3 for 4th grade:** Entrepreneurs often are innovative. They attempt to solve problems by developing and marketing new or improved products.

- **Benchmark 2 for 8th grade:** Entrepreneurs accept the risks in organizing resources to produce goods and services because they hope to earn profits.
- **Benchmark 3 for 8th grade:** Entrepreneurs and other sellers earn profits when buyers purchase the product they sell at prices high enough to cover the costs of production.
- **Benchmark 4 for 8th grade:** Entrepreneurs and other sellers incur losses when buyers do not purchase the products they sell at prices high enough to cover costs of production.

Standard 15: Growth

- **Benchmark 1 for 4th grade:** When workers learn and practice new skills they are improving their human capital.
- **Benchmark 2 for 4th grade:** Workers can improve their productivity by improving their human capital.
- **Benchmark 3 for 4th grade:** Workers can improve their productivity by using physical capital such as tools and machinery.
- **Benchmark 4 for 8th grade:** Increases in productivity result from advances in technology and other sources.

OBJECTIVES

Students will be able to:

- Differentiate between invention and entrepreneurship.
- Explain that an inventor develops a new good or service to help solve problems and increase productivity.
- Explain that an entrepreneur risks resources (natural, human, capital) and money to bring a new or improved product or service to market.
- Explain that profit is the reward to the successful entrepreneur.
- Describe the benefits society gets from inventors and entrepreneurs.
- Explain Fulton's incentive to bring the steamboat to market and the effect of canals and the steamboat on life in America.

MATERIALS

- Book: *A Head Full of Notions*, By Andy Russell Bowen (ISBN: 1575050269)

- Activity Sheet 7A: *What's the Incentive to Be an Entrepreneur?* (transparency)
- Activity Sheet 7B: *Entrepreneur: Dog Walking Business* (transparency)
- Activity Sheet 7C: *A Head Full of New Ideas!* (one copy per group)

PROCEDURE

1. Introduction: Why Invent?

- a. On the day before the lesson, ask students to talk to the adults in their families or neighborhoods, and make a list of products or services that have become available in the lifetimes of these adults. In the lesson, make a long list in class of the reported items. (*One would expect items like VCRs, CD players, the internet, cell phones, copy machines, and post-it notes to be on the list.*)
- b. Write the following questions on the chalkboard and brainstorm possible answers with students. (Accept all student input.)
 - What is an invention?
 - What is an inventor?
 - How do inventors help consumers?
 - What is an entrepreneur?
 - How do entrepreneurs help consumers?

2. Have You Ever Had a Lemonade Stand? Did You Earn a Profit?

- a. Ask students if any of them have ever had a lemonade stand. Ask *why* they did this? (*The likely answer is "to make some money." Tell them that this is the goal of every business from a lemonade stand to McDonald's or Sony. Explain that the money an entrepreneur gets to keep is called a profit; it is the reward to the entrepreneur.*)
- b. Ask if students know what a *profit* is. Explain that profit is money left over from the sale of a product after the entrepreneur pays all costs. Use a transparency for Activity Sheet 7A: *What's the Incentive to Be an Entrepreneur?*
 - Display only Day #1. Calculate and record total revenue [\$5.00]. After subtracting total costs, no profits were made on the first day. All that work and there was no profit for the entrepreneur. He or she will either go out of business or try to find a way to make a profit.
 - Uncover Day #2. After more careful shopping, supplies were purchased for \$4. A profit was earned! Explain that to stay in business, a profit must be earned.

Otherwise, the entrepreneur will try another business.

- c. Ask the following questions about the activity page:
 - How much money did the entrepreneur have to spend to start the lemonade stand? (\$5)
 - Why was that a risk? (*If no one bought lemonade, the entrepreneur might have lost his or her investment. There was a risk because it was not a sure thing.*)
 - Why would an entrepreneur risk his or her money? (*The entrepreneur believes that people will buy his or her product or service and that a profit will be earned.*)

3. Increasing Productivity is Another Way to Increase Income

- a. Explain that when more work can be done in the same period of time, it is called an *increase in productivity*.
- b. Use the transparency from Activity Sheet 7B: *Entrepreneur: A Dog Walking Business* to illustrate how an increase in productivity can increase income.

4. What's the Difference Between an Inventor and an Entrepreneur?

- a. Describe what inventors and entrepreneurs do:
 - Define *inventor*: "One who produces (as something useful) for the first time through the use of the imagination or of ingenious thinking and experiment" (*According to Webster's dictionary*). Thus, an inventor designs a new product (telephone) or a new method for doing something (pasteurization).
 - Define *entrepreneur*: "Entrepreneurship is a special sort of human effort that takes on the risk of bringing labor, capital, and land together and organizing production." (*According to: www.amosweb.com*)
- b. Explain that an entrepreneur brings a new product to market. Although the entrepreneur may not invent it, he or she risks the money to gather the resources (natural resources, labor, and capital) to produce the product and bring it to market. An entrepreneur may bring an existing product or service to market in a new way. Here are some examples:
 - Steve Case did not invent the internet, but he brought it to the market in a new way with AOL.

- Ted Turner did not invent TV news, but he did bring TV news to market in a new way when he started CNN.
- Jeff Bezos did not invent selling books, but he found a new way of selling books with Amazon.com.

So, . . . inventors develop something new. Entrepreneurs bring new or improved products to market or bring them in new ways. A person can be an inventor, an entrepreneur, or both.

5. The Book: *A Head Full of New Ideas*, by Andy Russell Bowen

- Introduce the book to students. Ask students if they know anything about Robert Fulton. Either read the book to the students or have them read it. Ask students to consider, as they read the story, whether Fulton was an inventor or an entrepreneur.
 - Divide students into small groups. Distribute a copy of Activity Sheet 7C: *A Head Full of New Ideas!* to each group. Have students work in their groups to complete the activity sheet.
 - With the entire class, discuss group responses from the activity page:
 - Why couldn't Robert Fulton keep his mind on his lessons? (*He had a "head full of notions." He had lots of ideas about how things could work better.*)
 - When Robert was about 10, he devised something to improve his friend's boat. What was it? (*He built a paddle wheel for each side. The boys made the boat move by turning the cranks with their hands.*)
 - What was going on in the country at this time? (*It was 1775, the beginning of the American Revolution.*)
 - Robert lived in Lancaster, Pennsylvania. How was he affected by the war? (*There was excitement: news of battles, people coming to Lancaster when there was fighting in their own towns. There was a lot of discussion about freedom.*)
 - What trade did Robert learn, and how did he learn it? (*In 1781 he became an apprentice to a silversmith in Philadelphia.*)
 - How did he feel about working for someone? (*He wanted to work for himself. He was an entrepreneur; he started his own silversmith shop.*)
- In 1786, he took a ship to London. Why did he go? (*He hoped to work with Benjamin West, an American artist living there.*)
 - Products are usually invented for solving problems. What tool did Robert invent to help his friends who were artists? (*A tool that cut and polished marble.*)
 - What inventions did he devise for yarn and rope makers? (*He developed a machine for spinning fiber into yarn and another that would twist hemp into an especially strong rope.*)
 - Why was this invention important to the artists and people making yarn and rope? (*They were able to produce more products per day. Thus they could earn more income for their families.*)
 - Later, Fulton saw that it was very difficult for farmers to transport fertilizer to their farms South of London. What did he propose? (*A system of canals with horse-drawn barges that could move fertilizer more easily. His ideas were used in the early 1820's when a canal system was built.*)
 - What invention did he believe would help bring world peace? (*A submarine*)
 - Robert Livingston wanted Robert Fulton to work with him to invent a steamboat that could travel the river between New York and Albany. Why did Livingston want to invent the steamboat? (*He knew that whoever invented the steamboat would become wealthy and famous.*)
 - As Fulton was designing the steamboat, he developed one model that would travel 8 miles per hour and carry 50 passengers. He estimated that each trip on the river would earn \$200 profit. What is profit? (*The amount of money that is left over after all costs of the trip had been covered.*) Another model could carry 200 passengers. What would you expect to happen to profits? (*Profits could go up, or the entrepreneurs could decide to lower ticket prices.*) When Fulton built the Clermont and it sailed from New York to Albany, how many trips did they think it could make per year? (*40*) How much profit did they expect to earn per year? (*They expected to earn \$32,000 in profits, which would be equal to about \$375,000 today. That is, it would take about \$375,000 to buy the goods and*

services today that could have been bought for \$32,000 in 1807.)

15. Who were the people who were not happy about the invention of the steamboat? *(Competitors, people already operating barges, who might have been put out of business by a faster mode of transportation or they might have had to lower their prices in order to stay in business.)*
16. Why did the Mississippi River represent both a big challenge and a big opportunity? *(It was a larger river with stronger currents and snags that might overturn a riverboat. But there was a big opportunity for commerce between New Orleans and cities along the Mississippi and Ohio Rivers.)*

6. Optional: A Writing Assignment

Instruct students: Select a product you really enjoy. Pretend that you know the names of the inventor and entrepreneur. Write a thank you letter to the inventor who devised it and to the entrepreneur who brought it to market. Tell them why it improves your life. *(Time permitting, students might do research to find out who brought their selected products to market.)*

7. Closure: Inventor or Entrepreneur?

Return to the questions that were put on the chalkboard earlier and discuss. Ask students:

- Was Robert Fulton an inventor or entrepreneur? *(both)*
- In what ways was he an inventor? *(He observed problems around him and used his creative ideas to devise products and methods to solve the problems.)*
- What were some of the things he invented? *Paddle wheel boat; a tool to polish marble, a machine to spin fiber into yarn, steamboat*
- Why did he do this? *(He probably wanted to help people with their problems.)*
- In what ways was he an entrepreneur? *(He was able to borrow the money to actually bring his steamboat invention to market.)*

- Why did he do this? What was his incentive? *(He wanted to make money. Profit, the amount of money that an entrepreneur gets to keep after all expenses are paid, is an incentive that encourages entrepreneurs to take the risks involved in bringing a product to market.)*
- Did you notice any increases in productivity as a result of his inventions? *(The yarn spinning machine helped workers increase productivity, and they were interested in a boat that carried more passengers.)*
- How did society benefit from Fulton's inventions and entrepreneurship? *(His inventions helped to solve some of the problems of the day and for years to come, and these inventions led to other inventions to continue the benefits. His entrepreneurship gave him income and it gave consumers in his time an opportunity to use his inventions.)*

EXTENSION:

- a. For an online lesson with links to a number of websites with information about a number of entrepreneurs and inventors, go to: <http://www.econedlink.org>.
- Choose "lessons" and then find the lesson entitled: "U.S. History: Inventors & Entrepreneurs"
- b. To help students learn more about inventors, have them read the following:
- *Alexander Graham Bell: An Inventive Life*, by E. MacLeod (ISBN: 1550744585)
 - *The Story of Thomas Alva Edison*, by M. Cousins (ISBN: 0394848837)
 - *Benjamin Franklin's Adventures With Electricity*, by B. Birch (ISBN: 0812097904)
- c. Here are some online resources. This is a booklet of activities on thinking up ideas: <http://www.uspto.gov/web/offices/ac/ahrpa/opa/projxl/invthink/invthink.htm> and this website is the patent office and it has a spot for kids: www.uspto.gov

What's the Incentive to Be an Entrepreneur?

Lemonade Stand

Day #1

20 cups sold at 25¢ each = _____ total revenue

Cost of production

(lemons, sugar, ice, cups) - \$5.00 total cost

Profit = _____

(money left for the entrepreneur)

Will this entrepreneur want to stay in business?

Day #2

20 cups sold at 25¢ each = _____ total revenue

Cost of production

after more careful shopping

(lemons, sugar, ice, cups) - \$4.00 total cost

Profit = _____

(money left for the entrepreneur)

Entrepreneurs must earn a profit, or it won't be worth their while to stay in business.

Activity Sheet 7B:
Entrepreneur: A Dog Walking Business

**I'll Walk Your Dog for 1 Hour
Price: \$2**

How might this entrepreneur earn more income per hour?

Suppose two dogs can be walked together.

How much money might the entrepreneur earn per hour? _____

Supposed three dogs can be walked together.

How much money might the entrepreneur earn per hour? _____

**When more work can be done in the same period of time, it is called an *increase in productivity*.
An increase in productivity can increase income.**

Activity Sheet 7C:
A Head Full of New Ideas!

1. Why couldn't Robert Fulton keep his mind on his lessons?

2. When Robert was about 10, he devised something to improve his friend's boat. What was it?

3. What was going on in the country at this time?

4. Robert lived in Lancaster, Pennsylvania. How was he affected by the war?

5. What trade did Robert learn, and how did he learn it?

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7. In 1786, he took a ship to London. Why did he go?

8. Products are usually invented for solving problems. What tool did Robert invent to help his friends who were artists?

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10. Why was this invention important to the artists and people making yarn and rope?

Activity Sheet 7C: *A Head Full of New Ideas!* (con't)

11. Later, Fulton saw that it was very difficult for farmers to transport fertilizer to their farms South of London. What did he propose?

12. What invention did he believe would help bring world peace?

13. Robert Livingston wanted Robert Fulton to work with him to invent a steamboat that could travel the river between New York and Albany. Why did Livingston want to invent the steamboat?

14. As Fulton was designing the steamboat, he developed one model that would travel 8 miles per hour and carry 50 passengers. He estimated that each trip on the river would earn \$200 profit.
 - What is profit?

 - Another model could carry 200 passengers. What would you expect to happen to profits?

 - When Fulton built the Clermont and it sailed from New York to Albany, how many trips did they think it could make per year?

 - How much profit did they expect to earn per year?

15. Who were the people who were not happy about the invention of the steamboat?

16. Why did the Mississippi River represent both a big challenge and a big opportunity?



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many of which are based on children's literature, all related to U.S. history in this time period. Topics include: Indian economies, the resources of the Pilgrims, the Virginia Company as an investment, the role of trade, comparison of the New England, Middle, and Southern colonies, colonial money, as study of the economic opportunities of women, slaves, artisans, farmers, and large landowners in colonial times. Many of the lessons are based on children's literature, including books by popular writers such as Jean Fritz and Don Hall. All lessons include handouts and activities such as games, simulations or songs. (123 pages) Grades 4-8.

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This book contain 16 hands-on lessons that are activities, games, and simulations, many of which are based on children's literature, all related to U.S. history in this time period. Topics include: exploring the economic relationship between the colonies and England; looking at the trade-offs made in writing the Constitution; exploring the role of Eli Whitney's invention in the spread of cotton plantations across the South; study of the demand for cotton created by the manufacturing North; the Gettysburg Address and a cost-benefit analysis of the Civil War; decision-making of those who chose to be pioneers; and the movement from an agricultural society to an urban society. Many of the lessons are based on children's literature including book by such popular writers as Jean Fritz, Deborah Hopkinson, and Peter and Connie Roop. All lessons include reproducible handouts as well as games, simulations or songs. (139 pages) Grades 4-8.

Spotting Economics: From Africa to Ice Cream – Through 15 engaging lessons, students will learn to notice economics in action in their everyday lives. They begin by learning to "spot" the economics in popular children's literature by authors such as: Harriet Ziefert, Russell Hoban, Judith Viorst, Robert McClosky, Anne Rockwell, Gail Gibbons, Pat Brisson and Tomie dePaola. Each lesson starts off using an "Economics Spotter List" to find the economic concepts in a story--about subjects from Africa to ice cream. The concepts are then reinforced through activities, games and songs. Five bonus "mini-lessons" are included to show how to the use the "Economics Spotter List" with other books. (107 pages) Grades K-5.

Adventures in the Stock Market – In twelve exciting lessons students in elementary and middle school learn about the stock market. Each lesson opens with a list of basic concepts and national standards in economics and personal finance, followed by several hands-on activities. Lessons also include closure questions, assessment activities, and an extension section with reinforcement activities such as references to relevant children's literature, puzzles, and even songs to familiar tunes with words that describe the concepts. Pre- and Post-Tests are included in the appendix, along with a glossary. These lessons will help students learn more about the importance of saving and investing for their futures, as well as the role of business and the stock market in the economy. As they learn, they will practice skills in math, research, and decision-making. And as a bonus, these activities add lots of excitement to the classroom. (148 pages) Grades 3-7.

Puppet Economics – Using this resource, teachers can guide students as they create their own original puppet show and experience basic economic concepts. They start with decision-making as they choose the plot and characters. They experience production and scarce resources as they create puppets. Specialization and interdependence come into action when students organize for production. They build their own human capital when they rehearse and present the show. Finally they learn about the critical role of consumers, as they market their show. In addition to step-by-step teacher's instructions, the guide includes 30 lessons, activity sheets, supply lists, ideas for making puppets, puppetry tips, and sample puppet plays. (129 pages) Grades K-8.

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