

LESSON 7

Widget Production

1. FOCUS

Student Objectives

- State advantages and disadvantages of production based on craftpersons and specialists.
- Define labor productivity as output per worker.
- Explain the effect(s) of new technology on the productivity of labor.
- Explain how productivity can be increased through specialization, training and education, investment in capital, and technology improvements.

Background

In order to produce an output of goods or services, a firm needs inputs or **factors of production**. Businesses must purchase natural, human, and capital resources. Entrepreneurship is provided by the owner or manager of the firm. These inputs can be combined in different ways to produce the firm's product.

Productivity is a measurement of output resulting from the use of an input. Today, we frequently hear about the productivity of American labor compared to the productivity of workers in other countries. How is productivity measured? The most commonly reported statistic is average product—a ratio of total output to the units of input (in this case, labor) for a specified time period.

Producers are continually interested in **increasing the productivity** of labor and other inputs. An increase in productivity results if a given amount of inputs can produce a larger output. Increased productivity also occurs when fewer inputs produce the same output. Three methods of increasing productivity are **specialization** and **division of labor**, **investment in capital resources**, and **investment in human capital** (education and training).

Concepts

Craftpersons, specialists, factors of production, productivity, increasing productivity, opportunity cost, division of labor, specialization, investment

2. PREPARE

Activity 10: Widget Production Table	Marking pens
Used paper (8 ½" - 11")	Boxes of paper clips
Rulers	Triple-hole paper punch
Pencils	Large supply of small rewards
Single-hole paper punches	

1. Duplicate a copy of Activity 10 for each student and make a transparency of it.
2. Assemble approximately 100 sheets of used 8 ½" x 11" paper, one ruler, one pencil, one single-hole paper punch, one marking pen, and a box of paper clips for each group of four to five students.
3. Assemble inexpensive items (such as stickers) that can be used as rewards in Activity 10.

3. TEACH

Introduction

Initiate a discussion about why people are served food more quickly in a fast-food restaurant than in other restaurants. Help students focus on the different methods of production.

Activities

1. Explain that the class will be producing something called a "widget." Use the following procedure to demonstrate widget production for the class.
 - Neatly stack two sheets of used 8 ½" by 11" paper.
 - Using the ruler and the pencil, mark three dots at 1 ½", 5 ½", and 9 ½" along the 11" side of the paper.
 - Using the single-hole punch, punch a hole at each of the three dots.
 - Slip a paper clip through the middle hole to hold the two pieces of paper together.
 - For decoration, draw a flower around each of the other two holes using the marking pen.
2. Discuss:
 - What are some ways you could organize widget production? (Students usually suggest dividing the labor and specializing.)
 - Describe another method which could be used. (The craftperson method is an alternative method in which one person performs all steps in the production process.)
 - What are the inputs (factors of production) needed to produce widgets? (paper, pencil, ruler, single-hole punch, marking pen, paper clips, workers, a place to work)
3. Divide the class in half. Assign half the class to produce as specialists while the others are craftpersons. Form work groups with four to five students in each group. Groups should decide upon names for their widget factories.
4. Explain that the **craftpersons** will produce widgets but will not divide the work. Each person must produce his or her own widgets from the first step through the last. Supplies and materials may be shared, but not labor. The **specialists**, however, will each do a part of the production process, sharing the labor and materials among the workers.
5. Distribute materials to each group: one pencil, one marking pen, one single-hole punch, one box of paper clips, one ruler, and a large supply of used paper. Other materials may not be used. Allow groups a few minutes to organize themselves.
6. Explain that groups will have two minutes to produce as many widgets as possible while maintaining high standards of quality. Warn them you will

check each widget and reject those which do not meet standards.

7. Stop at the end of two minutes. Tell students to discard all partially completed widgets. Inspect each widget, discarding those which are not properly produced. Ask groups to count their acceptable widgets.
8. Distribute a copy of Activity 10 to each student. Using the transparency, complete columns 1-4 for round 1 for each group. Explain that column 5 indicates labor **productivity**. Define this as the number of widgets per worker and calculate it by dividing output (column 4) by input (column 3).
9. Discuss:
 - Which group had the most productive workers?
 - Which method seemed to be most productive? (Compare the figures in column 5).
 - What are some advantages and disadvantages of the specialist method of production? (Advantages include speed and expertise gained from learning only one step of the process, higher productivity, and not needing to retool or wait to use inputs. Disadvantages include boredom from doing the same job all day and the problem of absent workers when other workers do not have the same skills.)
 - What are some advantages and disadvantages of the craftperson method of production? (Advantages include the satisfaction of producing a product from beginning to end and variety during the work day. Disadvantages include the time and effort required to learn and perfect all the skills needed for production, lower productivity, and the need to stop and retool.)
10. Explain that you would like to pay everyone who produced widgets, but you are uncertain how to divide the pay. Ask for suggestions from the class. If students do not suggest payment according to output, tell them you have decided on this method. Distribute small rewards to groups, giving each group a reward for every widget the group produced. Warn students not to “consume” their pay yet.
11. Discuss ways to increase productivity. Some responses might include having everyone become specialists and giving groups more materials. Tell students they will have another round in which to try to improve their productivity, but they may not change their basic method of production or use more materials (except paper). They may try to smooth out other problems or shuffle jobs around.
12. Replenish supplies of paper, if necessary, then begin another two-minute round.
13. After this round, repeat the procedure of discarding incomplete widgets and inspecting for quality. Complete the table for round 2. Pay workers with rewards again and discuss changes in productivity.
14. Announce that you would like everyone to increase productivity even more and that a new invention, a triple-hole punch, will help groups become more productive. By omitting the measuring and marking step, demonstrate how to produce a widget using the new technology.
15. Continue by explaining that unfortunately there is only one triple-hole punch. Ask for suggestions for ways to allocate or distribute this scarce resource. Suggestions might include giving it to the least productive or most productive group. If no one suggests selling the punch, tell the class this is the method you will use. Auction off the punch to the highest bidder in return for the rewards you distributed earlier.
16. Begin another two-minute round in which everyone again produces widgets. Repeat the same procedures of discarding, inspecting, and counting. Complete the table for round 3. Pay the workers with rewards again.

Although you would expect specialists to be more productive, sometimes this does not happen due to lack of cooperation among assembly line workers, lack of skills, or unfamiliarity with procedures.

Some very interesting things may happen here. The groups who do not get the triple-hole punch may suggest buying the extra single-hole punch, pencil, and ruler with their rewards. If such buying and selling occurs, discuss how it affects productivity.

A decline in productivity might occur with the group using the triple-hole punch due to a lack of experience and skills.

17. Discuss:

- What are some reasons the groups without the triple-hole punch increased their productivity anyway? (additional experience, new method of organizing the workers, and more capital, if another group purchased extra capital from triple-hole punch group)
- What effect did the triple-hole punch have on productivity? (It probably increased it.)
- How did the triple-hole punch affect the workers who had previously measured and marked? (Those workers would no longer be needed and would need to be retrained for new jobs.)
- What do you think would happen to productivity if the workers were inadequately trained in using new machines (capital)? (Productivity would probably decline.)
- How could the productivity of these workers be increased? (through training and education)
- What are some things a producer should consider when deciding whether to buy (invest in) capital, such as the triple-hole punch? (the cost of the capital, risk involved in borrowing money to pay for it, and the cost of training workers are important considerations)
- If a producer decides to invest in capital, what is the opportunity cost of this decision? (The opportunity cost includes what the producer would have done with the money if the capital had not been purchased.)

18. Allow students to consume their rewards, but direct them first to decide how the rewards should be allocated among the members of the group.

19. To conclude, review the objectives of the lesson.

4. CONNECT

Community Connection. Take a field trip to a factory, office, or restaurant and observe methods used to increase productivity. Instruct students to ask questions and take notes on training and education, specialization and division of labor, and investment in capital.

Community Connection. Encourage students to identify a problem in their school or community and to stage a productivity experiment to help solve the problem.

Language Arts. Instruct students to design and build a prototype of a labor-saving device. Students should prepare a demonstration speech describing how the device increases productivity.

Newspaper Connection. Find an article about a business in the newspaper. Read the article and circle all words that relate to productivity.

ACTIVITY 10

Widget Production Table

1. Group Name	2. Method of Production	3. Input or Workers	4. Output or Widgets			5. Productivity (Widgets per Worker)		
			Round 1	Round 2	Round 3	Round 1	Round 2	Round 3