



POWELL CENTER FOR
ECONOMIC LITERACY

Lesson Plan

WRITTEN BY John Doggett

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Do Many Hands Make Light Work

Time Required

Two class periods

Economic Concepts

Diminishing Returns – *the marginal product of an input will decline as the quantity of the input increases.*

Factors of Production – *the inputs used to produce goods and services, usually labor, land and capital.*

Marginal Product – *the increased output that results from an additional unit of input.*

Productivity – *the relationship between the output of goods or services and the input of resources.*

Specialization – *the act of devoting all of most of one's resources to the production of a single good or service, sometimes referred to as the division of labor.*

Total Product – *the total output of goods or services an entity produces.*

Overview

Economic growth, efficiency, a nation's standard of living, and the availability of goods and services are linked to productivity. Students often perceive the production process, where inputs are combined and transformed into output, as an abstract process. But the basic decisions that underlie production—how much to produce, how to produce the item, and what combination of inputs to use—often cannot be conveyed adequately by a text. The purpose of this lesson is to engage students in a participatory exercise that illustrates the relationships between differing production techniques and the number of goods that can be produced.

Objectives

- Students illustrate the following economic principles: productivity, specialization, marginal product, total product, factor mix, and diminishing returns.
- Students show how output varies as one input varies while other inputs remain



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Lesson Plan

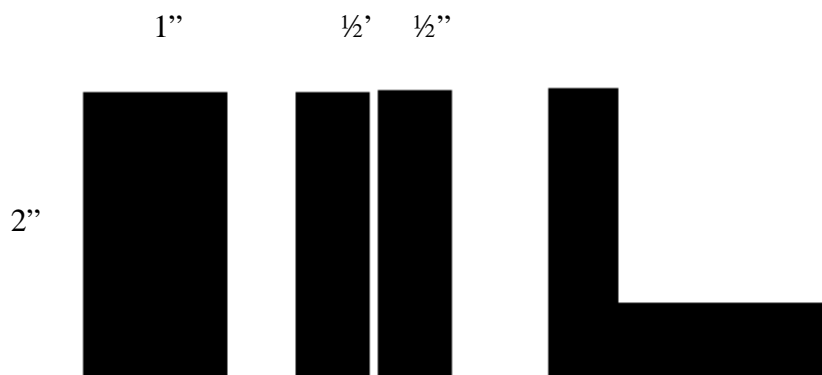
- fixed.
- Students demonstrate how the division of labor and specialization can influence output in the production process.
 - Students see distinctions between fixed and variable inputs.
 - Students see how the constraint of fixed inputs affects the production process.
 - Students see how different combinations of factors affect levels of inputs.
 - Students see how the law of diminishing returns operates.

Materials and Handouts

- 2 rulers
- 2 pencils
- 2 rolls of clear adhesive tape
- 10 pairs of scissors
- white paper (8.5" x 11")
- colored paper (8.5" x 11")

Teaching Activity

The task is to create two objects: a sign with a white background (dimensions of 4" x 5") and an "L" measuring 2" high x 2" long x 1/2" wide cut from colored paper). The "L" should be affixed to the middle of the white sign by two pieces of tape. The illustration below shows an efficient way to cut the colored paper. should not be shown to the students prior to the activity because the method used to make the final product is to be determined by the students.



Lay 2 halves across
each other as shown.



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Lesson Plan

Cut Paper 2" x 1" Cut in half

Divide the class into two groups. Each group should be equipped with fixed inputs of a ruler, pencil, roll of tape, 10 pieces of white paper, and 8 pieces of colored paper. One member of each group should be designated as recorder, another as timekeeper, and a third should be responsible for quality control. In the first production round, each group will choose one member to assemble as many complete signs as possible within two minutes. Only fully completed signs that meet specifications will be counted. Record the total number of signs produced during this time period.

In the second production round, each group will again have the same amount of fixed inputs, but now a second worker should be added to the production team. Record the total number of signs produced in two minutes. Conduct three more production rounds, each time adding [another worker](#) to the process. Each group should then construct tables and graphs to illustrate [changes in total product and marginal product](#) associated with the additional workers. (*See Table 1 for a suggested way of handling the graphing task.*) Regions of increasing, diminishing, and negative marginal returns should be noted. Ensuing class discussions might assess the various strategies for deploying workers and the relationship between repetition of tasks and productivity/job satisfaction.

In the next phase of this exercise, each group will have the same fixed inputs as above, along with five workers. During the first two-minute production round, each group will be given a [pair of scissors](#). Record the total number of completed signs produced. Conduct four more production rounds, adding another pair of scissors after each two-minute interval. Each group should again construct tables and graphs to illustrate changes in total product and marginal product associated with additional capital (scissors). Regions of increasing, diminishing, and negative marginal returns should be noted. (*See Table 2 for a suggested way of handling the graphing task.*)

This exercise can be varied in a number of ways to affect productivity levels. Incentives (a high grade) can be offered to the group with the highest output. Penalties can be assessed for wasting paper or tape. The amount of paper available in the production process can be increased or decreased. Some of the fixed inputs can be rendered [temporarily unusable](#) during a production round



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ECONOMIC LITERACY

Lesson Plan

(e.g., a broken pencil).

As an extension of this exercise, prices for labor and capital—and a selling price for a completed sign—can be given. This information will allow students to determine the marginal revenue product, marginal costs, and variable costs at different levels of production; it also will allow them to [make decisions](#) about the optimum combination of scissors and workers to employ.

Keystone Economics

The following list illustrates some of the Keystone Economics principles contained in this lesson.

Principle #6 – Do what you do best; trade for the rest

- Specialization is a subset of this principle. If the students do not choose to specialize when adding more workers, it is unlikely they will improve productivity, but the teacher may prefer to let them make their own choices. By concentrating on a specific task and developing a skill in performing it, a specialized worker can increase the total output of signs. This enables the group to have more opportunities to trade the signs produced for other desired goods. [Back](#)

Principle #7 – Most choices are made at the margin.

- All other things being held constant, a rational person would make production decisions based on the resources used to make each additional sign. [Back](#)

Principle #8 - The quality and availability of resources determine our living standard.

- The first group of production rounds indicates what can happen when workers, a human resource, acquire a specialized skill (total output should increase). [Back](#)
- The second phase introduces scissors, a capital resource, to the production process. Again, by improving the resources available, total output should increase. [Back](#)
- If some of the resources become unusable, students will be able to observe a decrease in output. [Back](#)