



# The Production Function Game

## Instructions

This activity is designed to give students a practical understanding of short-run production functions and the law of diminishing returns. It can easily be extended to demonstrate the relationship between production and costs, revenue and profit. It is a simple way of illustrating total, average and marginal concepts.

To make the game work successfully, it is imperative that the rules be followed strictly.

The activity consists of one or more production lines in an imaginary factory, where 'production' involves moving balls (e.g. tennis balls, ping pong balls or play balls) from one bucket to another. Alternatively it can involve moving mini stackable flowerpots used for seedlings from one table to another (you could also use the larger Lego bricks). On successful transfer, the firm generates one unit of output. Initially, the firm has some fixed factors – in this example, capital. The capital stock consists of two buckets (or two tables) for each line and a batch of balls or flowerpots.

### *Rules*

- You cannot throw the balls (or flowerpots).
- In the case of balls, they must not be dropped into the bucket. If they are, they are counted as damaged goods and do not count towards final output. If you are using flowerpots, they must be stacked.
- Any balls (or flowerpots) dropped between the buckets (or tables) also become damaged goods.
- Each production run lasts for 25 seconds. You must keep strictly to this time limit.

### *The Task*

The task for each line is to take balls out of one bucket and place them into the second bucket (or transfer pots from one table to another one at a time). At the end of each production run, the firm will add an extra unit of labour to production. The production levels will be recorded at the end of each production run. Your task is to monitor the output levels with each different combination of inputs. The results are recorded on the sheet over the page.

Each line should have a timekeeper whose role is to make sure that each production run lasts exactly 25 seconds, to count the number of balls or flowerpots transferred and to discount any dropped or thrown into the bucket / not stacked properly.

### *Discussion after the game*

- What happened to the level of output when each extra unit of labour was added? Why do you think this is?
- What combination of factors led to the maximum output? Explain why you think this was.

*Extension to include costs, revenue and profit*

The cost of the factors of production is as follows:

- Buckets or tables: £100 each
  - Balls or flowerpots: £10 each
  - Labour units: £15 each
- 1) Using this information, students should complete, for each production line, the first three columns on the right-hand side of the table: *TC*, *AC* and *MC*.
  - 2) Assuming that the firm is a price taker, the seminar/class should next assume a ‘realistic’ market price and fill in the *TR* column.
  - 3) At what output did the firm break even? At what output is profit maximised?
  - 4) Using the data in the table, draw four diagrams:
    - Total product
    - Average and marginal product
    - Total cost, total revenue and total profit
    - Average and marginal cost and revenue, showing total profit
  - 5) The class could discuss the long run by considering the effects of opening new production lines and the implications for costs and profit.

During the game				Optional, after the game				
Units of Labour	<i>TP</i>	<i>AP</i>	<i>MP</i>	<i>TC</i>	<i>AC</i>	<i>MC</i>	<i>TR</i>	Profit
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

Sources: [http://www.economicnetwork.ac.uk/showcase/hedges\\_tennis.htm](http://www.economicnetwork.ac.uk/showcase/hedges_tennis.htm)  
<http://www.bized.co.uk/educators/16-19/economics/firms/activity/dimreturns.htm>