

The Law of Diminishing Returns: Space Aliens

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Materials

1. Cut several sheets of letter-sized paper into quarters. Scrap paper will work if one side of the paper is blank. You will need about 50 quarters per class.
2. Three pencils
3. A table big enough for four students. Four desks put together will work.
4. A sample drawing of a space alien. I usually draw it on the whiteboard.
5. Timer

Procedures

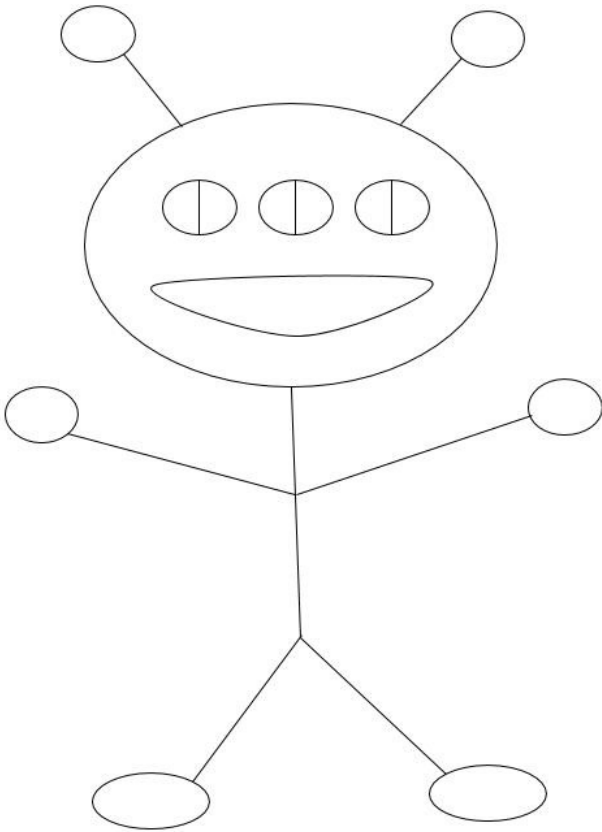
1. Set up your factory
 - a. A table for four with chairs
 - b. About 50 quarters of letter-sized paper
 - c. Three pencils
2. Draw the production schedule on the whiteboard.
3. Draw the Space Alien on the whiteboard.
4. Tell the students that they will be demonstrating the Law of Diminishing Returns in a factory simulation.
5. Review the Law of Diminishing Returns and stress that only one input will change and all other factors will remain the same (*ceteris paribus*). In this case variable will be the number of workers.
6. Have the students recreate the output schedule on the left side of their notebook entry.
7. Select the first student to work at the factory.
8. Allow them to practice by recreating the space alien you drew on the whiteboard. They should go to the table, use a pencil you provided, and place the drawing on one of the quarter sheets.
9. Check to see that the drawing is complete.
10. Time how many space aliens the student worker can draw in 30 seconds. Count and check their work.

11. Record the output on the schedule you drew on the whiteboard. Have the students do the same.
12. "Hire" another student and repeat the training.
13. Now time how many space aliens the two student workers can draw in 30 seconds. Count and check their work.
14. Record the data again.
15. Keep adding workers and recording their output until the you have reached negative returns. This usually happens within eight students.
16. Keep an eye out for students who try to bring their own pencils and chairs to the factory. That is not allowed (*ceteris paribus*).
17. Make sure to throw away and not count any products of grossly poor quality, especially after the fourth student.
18. Your schedule should show increasing returns, diminishing returns, and negative returns.
19. When it does send the students back to their assigned seats.
20. Graph the data from the schedule. Output should be on the vertical axis and the number of workers on the horizontal axis.
21. The students graph along with you.
22. Ask the class
 - a. When did the output begin to diminish?
 - b. When did the output fall or go negative?
 - c. At what point should the management have stopped hiring workers?
23. After a class discussion of these three questions, draw a vertical line at the point where returns diminished and another where negative returns begin. Label the three sections: increasing returns, diminishing returns, and negative returns. The students should do the same in their notebooks.
24. Student teams should discuss why production began to diminish and then go negative. Give the teams four minutes to talk.
25. Assessment:
 - a. FRQ: Why do diminishing returns occur? Cite from the in-class simulation. and the lecture.
 - b. MCQ: the order or stages production.

Production Schedule

Workers	Output
1	
2	
3	
4	
5	
6	
7	
8	

Space Alien



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