

Entrepreneurship: Economics of Innovation

Lesson 7: Resources and hiring decisions for Entrepreneurs

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In this lesson students will learn about economic resources and understand how entrepreneurs make hiring decisions.

Economics

Entrepreneurs must make hiring decisions by weighing the marginal benefit of hiring a person against the marginal cost of doing so. In this lesson, students will participate in an activity where they produce wheat to demonstrate diminishing marginal productivity as more workers are added. Students will use this activity, along with additional information, to better understand how an entrepreneur determines the optimal amount of a resource (such as labor) to utilize.

Objectives:

After completing this lesson students will be able to:

- identify key economic resources (natural, human, and capital) used in entrepreneurship and explain their roles in business operations.
- analyze the relationship between marginal productivity and hiring decisions by applying economic principles to a hands-on wheat production activity.
- evaluate hiring decisions by comparing marginal revenue product (MRP) and marginal resource cost (MRC), and justify optimal hiring choices for a coffee shop based on economic reasoning.

Standards and Benchmarks

See page 13

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Concepts

Cost-benefit analysis, entrepreneurship, labor markets, resources

Time Required

60 minutes

Materials Needed

- Slide presentation: “Lesson 7: Resources and hiring decisions for Entrepreneurs”
- 10-20 8.5x11 pieces of paper (number of paper depends on the number of round you do (can use front and back side of the paper))
- 1 roll of blue painters tape
- Pencils, one per students
- White board or large presentation post-it notes to keep score and continue the conversation regarding the calculations
- 2 White board markers or regular markers to keep score
- Prize for half of the class (i.e. extra credit, small piece of candy, etc.)
- Copies of Handout 7.1: Latte Production, one per student
- One copy of Handout 7.2 Latte Production (Answers)
- Copies of Assessment 7, one per student

Preparation (If needed)

Designate two areas where you can tape up 2 pieces of 8.5x11 pieces of paper. They should be in the front of the room so everyone can see. Begin the lesson by already having 2 pieces taped up on the wall about shoulder height. Also have the white board or large post-its ready to go with the information in Visual 7.1 near each of the pieces of paper for the judge to keep track. This lesson has complete instructions with extensions for using with the entrepreneurship curriculum but you can read through the [Wheat Activity](#)² for reference.

Procedure

1. Begin the lesson by asking students the question on slide 2– how do entrepreneurs know how many people to hire? *Answers may vary but include hiring people for jobs that need to be done, or maybe you make an estimate of financial projections and hire based on that, or many students will have no idea that hiring seems like a big guessing game.*
2. Remind students that an entrepreneur uses productive resources (often referred to as economic resources or factors of production) to develop new products and start a new business. Display slide 3. Define the following terms for the students:

² FTE (2018) The Wheat Activity:
<https://fte.org/teachers/teacher-resources/lesson-plans/efilessons/the-wheat-activity/>

1. **Productive resources** are the natural, human, and capital resources available to make goods and services.
 2. **Natural Resources** are things that occur naturally in and on the earth that are used to produce goods and services
 3. **Human Resources** are the quantity and quality of human effort directed toward producing goods and services. Also known as labor.
 4. **Capital Resources** are goods that have been produced and are used to produce other goods and services. They are used over and over again in the production process. Also called capital goods and physical capital.
3. Divide the class into 2 teams and tell them they are going to compete against each other to see how much wheat you can produce. Show slide 4 and provide the rules for the activity:
1. Your goal is to produce as much wheat as possible. In real life you would plant seeds in the spring, care for the wheat throughout the spring and summer, then harvest the wheat in the fall to sell. For this activity you will write the word “wheat” as many times as you can in 30 seconds.
 2. A volunteer from each team will come up and write “wheat”. The teacher will keep track of time and call time where you will immediately stop writing (even mid-word).
 3. At the end of each round the judge will count up the total amount of wheat produced by counting the number of correctly spelled and clearly written words, “wheat”. The judge will write the number on the whiteboard filling in the table (Visual 7.1) for the entire class to see. Note that if the word is spelled incorrectly or not legible this wheat cannot be sold to produce bread so cannot be counted in the production.
 4. The winning team will receive a prize (display or tell the class what the prize is).
 5. Teams should cheer on their teammates throughout the activity.
4. Next explain that in the activity the paper is going to represent the land or natural resource used to produce wheat. Continue with the questions on slide 5:
1. Usually a farmer or farm hand is the human resource to produce wheat--what is the human resource to produce wheat in our activity? *Answer: the person writing the word wheat.*
 2. Farmers typically have tractors, combines, and many other pieces of equipment that is their capital resource to produce wheat (and other goods)--what is the capital resource in this activity? *Answer: the pencil or pen.*
5. Once you have covered the resources used for the game and clarified questions about those resources, continue with the activity. Ask for 1 volunteer from each team to keep score for the OPPOSITE team (checks and balances). Have them stand near the score keeping table (Visual 7.1)
 6. Ask each team for one volunteer to produce wheat. Either give them a pencil or have them bring up their own writing utensil. Make sure students understand the rules of the game. Begin round 1.
 7. After round 1 have the judge for each team count the number of wheat produced and keep score.

8. Replace or flip each of the pieces of paper over and tape it to the wall at the same place as the first pieces of paper.
9. As each team for another volunteer so that there are 2 on each team writing “wheat” Begin round 2 and have them write “wheat” for 30 seconds. Have the judge for each team count the number of wheat produced and add it to the team’s score.
10. Continue by adding more and more students each round. Repeat the process above (volunteer, round of writing, counting the wheat, etc.) The goal is to have the students be so crowded that it’s extremely hard for them to write. I would recommend having around 8-10 students on each team writing. As you add more and more students you will likely see that there will be more “wheat” produced but that each additional worker produces less and less (diminishing marginal productivity).
11. Once you have completed all of the rounds you want to do, have the judges from each team calculate the total wheat produced in all rounds (add up the total wheat from each round). Award the winning team (including those who are seated as long as they cheered for their team) the prize.
12. Have students return to their seats. Ask students the following questions about the game on slide 6:
 1. What happened to total production of wheat throughout the rounds? *Answer: the total production likely increased each round?*
 2. What was it like producing wheat throughout the game? *Answer: it became harder and harder to produce wheat because there were so many people.*
 3. Did more people help or hurt wheat production for your team? *Answer: At first more people were helpful but at some point it became too crowded and more people made producing wheat harder.*
13. Follow this up by explaining that what they experienced was diminishing marginal productivity. Use slide 7 for this definition and to help explain the concept. Key concepts:
 1. Margin in economics means “the next one”
 2. Marginal productivity (MP) is the productivity of the next worker—how much additional wheat did the worker produce?
 - i. Calculate MP for the students using one team’s score cards and adding a column. Take the change TP from the round and divide by the change in labor. $MP = \Delta TP / \Delta L$
 3. What do you notice happening to the MP as there are more and more workers? *Answer: Total productivity increases but marginal productivity likely decreases. There might be some instances where MP increases but ultimately MP should decrease throughout the game. If MP increases you could talk about some strategy or other changes that might have happened (i.e. they were more efficient in some way which is easy to explain how that happens in the “real world” as well. We often say that TP is increasing at a decreasing rate.*
14. Give each student Handout 7.1: Latte Production which has Q_L and TP. Show slide 8 with the data. Have students work together to calculate and fill in the MP column. Give students about 2-3 minutes to work on the table. Once students are done reveal the answers by clicking through slide 8. Answer questions about calculations. Follow up by asking the following questions (continue clicking through slide 8):

1. What do you notice happening to MP? *Answer: MP increases at first and then begins to decrease.*
 2. Why would MP increase at all? *Answer: When there is one person doing an entire job it's hard to do all of the steps but when you have another person you can split up tasks like an assembly line. This happens for a while that more people make the job easier and you get more coffee produced.*
 3. Why would MP decrease? *Answer: Eventually you will start running into each other or getting in the way of other workers and so it reduces the amount of coffee each additional barista can make. There is only so much space or so many coffee machines that you will eventually have to take turns.*
15. Explain to students that it is important to understand how productivity is affected by adding more workers but it still does not seem clear how many workers an entrepreneur should hire. We need more information.
16. Ask the students why would an entrepreneur hire someone (question on slide 9)? *Answers may vary but ultimately you hire workers to produce the good or service.* Follow this up by clicking through **slide 9** and explaining that entrepreneurs should only hire someone as long as the **marginal benefit** (the added benefit of hiring a worker) is greater than the **marginal cost** (added cost of hiring a worker). Continue explaining that in economics the MB of hiring a worker is called the **marginal revenue product** (MRP) and the MC of hiring a worker is called the **marginal resource cost** (MRC).
1. Show the equation for marginal revenue product:

$$\text{MRP} = \text{MP} \times \text{Price of the good/service.}$$
17. Tell students that the price of a latte is \$5. Have students work in their groups to complete the MRP (P = \$5) column in Handout 7.1: Latte Production. Use slide 10 which has the data and click through for the answers. Reiterate to students that the MRP is a metric for how much money each worker is bringing back to the company in revenue.
18. Remind students that entrepreneurs must pay workers and that is a worker's marginal resource cost. For simplicity we are going to assume each barista makes the same amount but in practice this might not be the case—however as a business owner you will still have to compare the costs and benefits in the same way. Suppose that baristas make \$10/hour so that in an 8-hour shift they make \$80. An entrepreneur needs to compare the benefit of that employee (MRP) to the cost of that employee (MRC). Walk through the MRP column when a latte is \$5 to see how many baristas should be hired (questions 1 on Handout 7.1). Click through slide 11 which has animation for this. *Answer: 5 baristas. The 6th barista costs the company \$80 but only brings in \$75 in revenue.*
19. Explain that changes in prices of the product affects how many workers you hire. If the price of the product lowers then each worker brings less revenue to the company and the MRP lowers. The opposite is true. Display slide 12. Suppose lattes become more expensive due to the supply chain for coffee beans costing more to ship. Now each latte costs \$8. Have students work with their groups to calculate the new MRP on Handout 7.1 Latte Production. Click through slide 12 to show the answers.
20. Follow this up by asking students how many workers would you hire now? (Question 2 on Handout 7.1) *Answer: 6 because the 7th worker costs \$80 and brings in only \$16.*

21. Continue and explain that changes in the costs of workers will also change how many workers you can hire. Show slide 13; suppose workers must be paid \$18/hour. How many workers should you hire assuming the price of lattes is still \$8? (Question 3 on Handout 7.1) *Answer: each worker would cost the company \$144; hire 5 baristas because the 6th barista costs the company \$144 but only brings in \$120.*

Closure

11. Have students return to their seats. Ask students the following questions on slide 14:
- How does an entrepreneur know how many workers to hire? *Answer: they must weigh the costs and benefits of hiring each additional worker using the MRP and MRC.*
 - How does a price increase of the good or service being produced affect an entrepreneur's ability to hire workers? *Answer: when the price increases each worker becomes more valuable and their MRP increases so you can hire more workers. When the price decreases the MRP decreases and each worker loses additional revenue they bring to the company so you would need to hire fewer workers.*
 - How do wages change how many people you hire? *Answer: as wages increase each worker costs more to the company so you can hire fewer workers. As wages decreases each worker costs less so you can hire more workers.*
12. Conclude the lesson by explaining that entrepreneurs cannot just hire randomly—they must carefully analyze the revenue and costs of each worker to determine if the marginal benefit is greater than the marginal cost of hiring that person. If you do not do this you can either be leaving revenue on the table in terms of lost production or you could be losing money by over hiring and taking profits away. Entrepreneurs must be careful with hiring because this is also not simple hire and fire decisions—it's costly to hire and fire but also you are dealing with people and their livelihoods so you want to treat people carefully and ethically.

Assessment

14. Hand out Assessment 7 to each student. Students are given a fictitious college coffee shop hours sign and have to explain using economic concepts about why the hours are the way they are. You can display the image and questions on **slide 15**.

Visual 7.1

Use the following to keep track of wheat production on the white board or on a large presentation post-it note.

Round	Quantity of Labor (Q_L)	Total Production of Wheat (TP)
Round 1		
Round 2		
Round 3		
Etc.		

Handout out 7.1 Latte Production

The following information is the amount of lattes per hour a barista can make.

Q_L	TP	MP	MRP (Price = \$5)	MRP (Price = \$8)
1	30			
2	46			
3	69			
4	94			
5	117			
6	132			
7	134			

1. How many baristas will you hire for \$10/ hour for an 8-hour shift when a latte is \$5? Explain.
2. How many baristas will you hire for \$10/ hour for an 8-hour shift when a latte is \$8? Explain.
3. How many baristas will you hire for \$18/ hour for an 8-hour shift when a latte is \$8? Explain.

Handout out 7.2 Latte Production (Answers)

The following information is the amount of lattes baristas can make in an 8-hour shift.

Q_L	TP	MP	MRP (Price = \$5)	MRP (Price = \$8)
1	30	-	-	-
2	46	16	\$80	\$128
3	69	24	\$120	\$192
4	94	29	\$145	\$232
5	117	23	\$115	\$184
6	132	15	\$75	\$120
7	134	2	\$10	\$16

- How many baristas will you hire for \$10/ hour for an 8-hour shift when a latte is \$5? Explain.
Answer: 5 baristas. The 6th barista costs the company \$80 but only brings in \$75 in revenue.
- How many baristas will you hire for \$10/ hour for an 8-hour shift when a latte is \$8? Explain.
Answer: 6 because the 7th worker costs \$80 and brings in only \$16.
- How many baristas will you hire for \$18/ hour for an 8-hour shift when a latte is \$8? Explain.
Answer: each worker would cost the company \$144; hire 5 baristas because the 6th barista costs the company \$144 but only brings in \$120.

Assessment 7

Answer the following questions thinking about business decisions your college's coffee shop might have to consider.

1. List an example of the natural resource utilized by a coffee shop.
2. List 2-3 examples of capital resources utilized by a coffee shop.
3. A coffee shop on a college campus has the following hours.



Use economic concepts related to marginal revenue product and marginal resource costs to explain why this business has the hours that it does. Use at least 3-4 sentences to explain yourself.

4. How should the owner or manager decide about purchasing another espresso machine using the concepts of marginal revenue product and marginal resource cost? Use at least 3-4 sentences to explain yourself.

Assessment 7 Suggested Answers

Answer the following questions thinking about business decisions your college's coffee shop might have to consider.

1. List an example of the natural resource utilized by a coffee shop.
The space/land that the shop utilizes is the best example of a natural resource.
2. List 2-3 examples of capital resources utilized by a coffee shop.
Dish washer, coffee maker, bean roaster/grinder, computers for conducting business, Point of Sale System (POS System), etc.
3. A coffee shop on a college campus has the following hours.



Use economic concepts related to marginal revenue product and marginal resource costs to explain why this business has the hours that it does. Use at least 3-4 sentences to explain yourself.

The coffee shop is likely closed or has different hours because there are not many people utilizing the space and buying coffee at that time. Outside of the times listed there are not many customers so there is little revenue coming in but you would still have to hire/ employ the baristas. Ultimately if there's not enough customers the MRC is greater than the MRP and the business will lose money.

4. How should the owner or manager decide about purchasing another espresso machine using the concepts of marginal revenue product and marginal resource cost? Use at least 3-4 sentences to explain yourself.

The owner or manager should consider how much coffee this new machine will make and how it will contribute to the business. They would also want to consider how busy they are regularly if the current machine is not enough. YOU would use the same decisions about the MRC compared to the MRP—is the marginal benefit or additional revenue from this machine worth the marginal cost or additional cost

of the machine (be sure to consider not just the upfront costs but also costs of space, cleaning, maintenance, and opportunity costs of what could you do with that money instead, etc.).

Voluntary National Content Standards in Economics

Standard 13: Income

Income for most people is determined by the market value of the productive resources they sell. What workers earn primarily depends on the market value of what they produce.

- Benchmark Grade 12
 1. Changes in the structure of the economy, including technology, government policies, the extent of collective bargaining and discrimination, can influence personal income.
 4. Changes in the prices of productive resources affect the incomes of the owners of those productive resources and the combination of those resources used by firms.
 5. Changes in demand for specific goods and services often, in the short run, affect the incomes of the workers who make those goods and services.

Standard 14: Entrepreneurship

Entrepreneurs take on the calculated risk of starting new businesses, either by embarking on new ventures similar to existing ones or by introducing new innovations. Entrepreneurial innovation is an important source of economic growth.

- Benchmark Grade 12
 1. Entrepreneurial decisions affect job opportunities.
 2. Productivity and efficiency gains that result from innovative practices of entrepreneurs foster long term economic growth.
- Benchmark Grade 8
 2. Entrepreneurs organize resources to produce goods and services because they expect to earn profits