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Lesson 6 - **Bookmark Profit**

OVERVIEW

This lesson focuses on profit (economics) and basic operations (mathematics). Working in small groups, the students act as companies and produce bookmarks. They decide which resources to purchase to produce their bookmarks. They calculate their costs of production and display their bookmarks for the class. The students then act as consumers and "buy" bookmarks. Based on their "sales," the student companies compute their profit or loss.

CONCEPTS

Economics

Costs of production
Entrepreneur
Profit and loss
Revenue

Mathematics

Addition, subtraction and multiplication of decimals
Equations
Inequalities

CONTENT STANDARDS

Economics

Standard 14

The Voluntary National Content Standards in Economics place the benchmarks for entrepreneurs, profit and losses at the 8th grade level. Many district elementary economics curricula introduce these concepts in the lower grades, so we have chosen to include them in this lesson.

- **Benchmark 3 for 8th grade:** Entrepreneurs and other sellers earn profits when buyers purchase the products they sell at prices high enough to cover the costs of production.
- **Benchmark 4 for 8th grade:** Entrepreneurs and other sellers incur losses when buyers do not purchase products they sell at prices high enough to cover the costs of production.

Mathematics

Number and Operations

- Develop and use strategies to estimate computations involving fractions and decimals in situations relevant to students' experience.

Problem Solving

- Solve problems that arise in mathematics and in other contexts.
- Apply and adapt a variety of appropriate strategies to solve problems.

Connections

- Recognize and apply mathematics in contexts outside of mathematics.

OBJECTIVES

The students will:

1. Define entrepreneurs, revenue, costs of production and profit.

2. Explain that profit is income for an entrepreneur.

3. Calculate profit and loss.

4. Explain that profit occurs when total revenue is greater than total costs of production and loss occurs when total revenue is less than total costs of production.

TIME REQUIRED

120 minutes

MATERIALS

1. Visuals 6.1 and 6.2
(**Note:** Visual 6.1 is the same as Activity 6.3.)

2. One copy of Activities 6.1, 6.5 and 6.6 for each student

3. A resource bag for each group of students that contains craft items such as paper, glue stick, scissors, lace, pipe cleaners, stickers, yarn, ribbon and fringe balls. To figure out how many groups you will have, divide the number of students in the class by four or five.

4. One copy of Activity 6.2 for each student group. Before making the copies, be sure the bookmark resource price list includes only the resources in the bags and an estimated price for each resource.

5. One copy of Activity 6.3 for each group

6. Enough copies of Activity 6.4 to provide three $1.00 bills for each student

7. One blank piece of notebook or copy paper for each group

ADDITIONAL RESOURCES

For additional curriculum connections, Web links, technology applications and suggested children's literature that will help you teach this lesson, go to
http://mathandecon.ncee.net/35/lesson6

PROCEDURE

PART 1

1. Explain that in this lesson, small groups of students will operate a bookmark business. To do this, they must know how to add, subtract and multiply decimals using money. Distribute a copy of Activity 6.1 to each student. Have the students complete the problems, showing their work. When everyone has finished, ask for volunteers to come to the board and demonstrate how they solved the problems.

   A. Suppose you have been saving your money to buy a new bicycle. The price of the bicycle is $175.50. You have saved $75.25. How much more money must you save? ***$100.25***

   B. You can walk the neighbor's dog for three days. She will pay you $3.00 a day. If you take the job, how much will you earn? ***$9.00*** If you put all of your earnings in your savings account, how much will you still need to buy the bike? ***$91.25***

   C. Your sister is selling lemonade. The price is $0.15 a cup. If she sells four cups, how much money will she have? ***$0.60***

   D. You bought candy at a store. You paid $0.15 for gooey worms, $0.20 for jelly beans and $0.07 for sour stars. What is the total you spent? ***$0.42*** If you paid with a $1.00 bill, how much change will you receive? ***$0.58***

   (**Note:** Review addition, subtraction and multiplication with money as needed. The students could also do this worksheet as homework the day before the lesson.)

2. Ask the students if they have ever sold lemonade or ice water or another product at a neighborhood stand. Explain that you will read them a story about two children who were selling lemonade. Read the following story:

   On Saturday afternoon, Jamal and Sally, two of the neighborhood children, opened a lemonade stand. Mrs. Counts, a mathematics teacher at their school, stopped to buy some lemonade. The lemonade was only $0.25 for an 8-ounce cup.

Mrs. Counts thought this was very inexpensive. She asked Jamal and Sally how much profit they were earning for each cup of lemonade they sold. Jamal told Mrs. Counts that they were earning $0.25 profit. Mrs. Counts was surprised. She asked Jamal what his costs of production were. He didn't know. He turned to Sally in bewilderment. She didn't have an answer either. Mrs. Counts said that she would have to teach a special mathematics lesson the next day so Sally and Jamal would know how to compute profit.

3. Discuss the following questions:

A. If you ever sold lemonade or some other item, did you make a profit? ***Answers will vary.***

B. Do you know what Mrs. Counts meant by costs of production? ***Answers will vary but should include the cost of materials and advertising, pay for workers and rent.***

C. Why do people start businesses? ***Answers will vary and include making money, being their own boss, setting their own hours.***

4. Remind the students that today's lesson is about operating a bookmark business. In the process, they will learn about **costs of production**, **profit** and **revenue**. They will also use their math skills to compute profit or loss.

5. Explain that businesses produce and sell goods and services to earn profit. **Entrepreneurs** and other sellers earn a profit when buyers purchase the products they sell at prices high enough to cover the costs of production. The word entrepreneur comes from a French word, *entreprendre*, which means to undertake something such as starting a business.

6. Divide the class into groups of four to five students to form bookmark companies. Have the students select a name for their company and choose someone in the group to be the entrepreneur and owner.

7. Distribute a bag of resources, a blank piece of paper and a copy of Activities 6.2 and 6.3 to each group. Explain that the bag contains resources that the group should use to produce a sample bookmark. The group does not have to use all the resources in the bag. Allow the groups to look at their resources and brainstorm an idea for a bookmark.

8. Explain that Activity 6.2 is their resource price list. It shows the price the groups must pay for each resource in the bag, as well as the price they must pay for each worker and the rent they must pay for their space.

9. Refer the students to Activity 6.3 and explain that each group must record on this table the costs of producing its sample bookmark, or its unit **costs of production**. Costs of production are the costs of all resources a business uses in producing goods or services. Tell the groups that you will help them figure out their unit costs of production, and each group should choose one person to serve as a recorder.

10. Display Visual 6.1 and demonstrate how to complete the table.

• Tell the students that businesses must pay for space. Write "Rent" in the first row of Column 1 on the visual, and tell the students to write the word on Activity 6.3. Ask the students how much they must pay for space, based on their Bookmark Resources Price List. ***$0.25*** Write "$0.25" in the first row of Column 2 on the visual, and tell the group recorders to do the same on their activity. Because each group needs only one space, tell the group recorders to write "1" in the first row of Column 3 on the activity as you write "1" on the visual. Then ask the students what they should write in the first row of Column 4. ***$0.25 ($0.25 x 1)*** Write "$0.25" on the visual and tell the group recorders to do the same on the activity.

• Explain that businesses must also pay for **labor**, or all the workers in the

group except the entrepreneur. The entrepreneur will earn the profit or have the loss from the company's operations. Tell the group recorders to write "Labor" in the second row of Column 1 while you write the word on the visual. Ask the students how much they must pay each worker. ***$0.10*** Write "$0.10" on the visual in the second row of Column 2, and ask the group recorders to do the same on the activity. Tell the students to count the number of workers in their group, minus the entrepreneur, and write the number in the second row of Column 3, while you write on the visual the number of workers in one of the student groups. Ask the students what they should write in the second row of Column 4. ***The number of students in their group minus 1, the entrepreneur, x $0.10*** Tell the recorders to write their groups' labor costs on the activity while you write the labor costs for your sample group on the visual.

• Tell the groups they must pay for each resource they use from their bag. For example, if they use paper for their bookmark, they must list paper on Activity 6.3, along with the cost of paper, the number of pieces of paper they use and their total paper cost. (They do not have to pay for the blank sheet of paper you gave them.)

• Each group should calculate its unit costs of production for its sample bookmark and record the total in the last row of Column 4 on the table.

• The groups may not use any resources other than those in the bag.

11. Tell the students they will have 20 minutes to design their bookmark, calculate their unit costs, produce one sample bookmark their company can sell for $3.00 and develop a slogan that encourages others to buy their bookmark. Tell them to write their slogan on the blank piece of paper.

12. Allow time for the students to work. When they are finished, have each company display its bookmark and slogan on a table or on desks along one side of the classroom.

13. Tell the students that when they were working in their group businesses, they were producers. Now each student will have the opportunity to be a consumer. Give each student three of the $1.00 bills made from Activity 6.4. Tell the students that each bookmark costs $3.00. They will be able to "buy" the bookmark they prefer, but they may not buy their own group's bookmark.

14. Display Visual 6.2. Record each company name on the visual, and ask each entrepreneur to speak for his or her company and "sell" its bookmark:

• State the company name.

• Show its bookmark and present the slogan.

• Ask for a show of hands from the students who want to purchase the bookmark.

• Record this number on the visual. Ask the entrepreneur to collect $3 from each student who bought the bookmark, and place the money in front of the bookmark on the table or desk where it is displayed. (**Note:** This ensures that each student buys only one bookmark. Later, it will enable the students to count the money to verify their computation of total revenue.)

15. Distribute a copy of Activity 6.5 to each student. Explain that **total revenue** is the quantity of a product sold multiplied by the price of the product. This is the total amount the business receives for selling the product. Tell the students to work in their company groups to answer Questions 2 and 3. Refer the groups to Visual 6.2 for the number of bookmarks their company sold. Tell each group to compute its total revenue by multiplying the quantity sold by the price. Give each group the money its entrepreneur placed in front of its bookmark. Have the groups count the money to verify their calculations of total revenue.

16. Tell the groups to assume that they can produce all the bookmarks they "sold" for the same cost they calculated in Activity

6.3 for one bookmark. Tell them to record this amount in the space under "Unit Cost" in Question 4 of Activity 6.5. Then ask them to calculate their group's total costs by multiplying their unit cost by the number of bookmarks (units) they sold. When the groups have completed Questions 1 through 4 and recorded their calculation on Activity 6.5, collect the papers and record the groups' totals on Visual 6.2.

PART 2

17. Distribute Activity 6.5 to each group and review the previous activities. Remind the students that they determined the total costs and total revenue for their bookmark production. Write the symbols for greater than (>), less than (<) and equal to (=) on the board. Review the symbols with the following questions:

A. What does the symbol > mean? ***Greater than***

B. What does the symbol < mean? ***Less than***

C. What does the symbol = mean? ***Equal to***

18. Write "7 days in a week = 5 weekdays + 2 weekend days" on the board. Explain that this mathematical statement is an **equality**. In an equality, the amount on one side of the equal sign is the same as the amount on the other side of the equal sign. The statement is in balance.

19. Write "5 =" on the board. Ask the students to provide numbers on the other side of the equal sign that would make the statement balance — that is, make it an equality. ***4 + 1, 5 + 0, 3 + 2*** Ask the students for other examples of equalities. ***Answers will vary.***

20. Write "5 < 3 + 3" on the board. Explain that this statement is an **inequality**. The "pointed" end of the symbol for less than points toward the smaller value. In an inequality, the two sides of the statement are not in balance. They are not equal. In this inequality, 5 is less than 6 so the two sides do not balance.

21. Write "5 > 2 + 2" on the board, and ask a student to read the statement. ***The open end of the symbol is facing the larger value.*** Ask another student if the two sides are equal (in balance) or unequal (not in balance). ***Not in balance.*** Ask the students for other examples of inequalities. ***Answers will vary but should be unequal, thus an inequality.***

22. Use the following review questions to check the students' understanding of equal to, greater than and less than.

A. Is the number of vowels in the alphabet less than, greater than or equal to the number of consonants in the alphabet? ***Less than***

B. How would you write the statement 6 is less than 26? (6 < 26) Is this an equality or inequality? Why? ***Inequality because the two sides are not equal***

C. Is the number of players allowed on the field for a soccer team less than, greater than or equal to the number of players allowed on the court for a basketball team? ***Greater than***

D. How would you write the statement 11 is greater than 5? ***11 > 5*** Is this an equality or an inequality? Why? ***Inequality because the two sides are not equal***

E. On a checker board, is the number of red checker pieces less than, greater than or equal to the number of black checker pieces? ***Equal to***

F. How would you write the statement 12 is equal to 12? ***12 = 12*** Is this an equality or an inequality? Why? ***Equality because both sides are equal***

G. Is the number of boys in the class less than, greater than or equal to the number of girls in the class? ***Answers will vary.*** How would you write the answer to this question as a mathematical statement? ***Answers will vary.*** Is this an equality or an inequality? Why? ***Answers***

will vary.

H. How would you write the inequality 5 is greater than 3? ***5 > 3***

I. How would you write the inequality 5 is less than 8? ***5 < 8***

23. Remind the students that **profit** is the difference between the total revenue a business receives and the total costs it pays for resources. A business earns a profit when its total revenue is greater than its total costs. Entrepreneurs — people who take risks to develop new products or services and start new businesses — must earn a profit, or their business will eventually fail. Profit is income for entrepreneurs and is an **incentive** that encourages them to risk their money and resources. Write the following statement on the board:

Profit occurs when Total Revenue > Total Costs

Profit = Total Revenue – Total Costs

This calculated number can be positive or negative. When it is a positive number, it is called a profit.

24. Explain that when the total costs of a business are greater than its total revenue, the firm has a **loss**. When entrepreneurs start businesses, they face the risk that they will have a loss instead of earning a profit. Write the following statement on the board:

Loss occurs when Total Revenue < Total Costs

Loss = Total Revenue – Total Costs

When this calculated number is negative, it is called a loss.

25. Tell each group to answer Question 5 on Activity 6.5, and then answer Question 6 or 7 and 8, computing its profit or loss for its bookmark company.

26. Display Visual 6.2 again. Have each entrepreneur report his or her company's total revenue, total costs and profit or loss. Record the information on the visual. Discuss the following questions:

A. Which company made the most profit? Why? ***The answer will depend on the groups' results, but the reason this company made the most profit was that its costs of production were the lowest and/or many people wanted to buy its bookmark.***

B. If any companies had a loss, why do you think this occurred? ***Their costs of production were high and/or not many people wanted to buy their bookmark.***

27. Remind the groups of the statement for profit:

Profit = Total Revenue – Total Costs

Tell them to assume that the same number of people want to buy their bookmarks, but the price has changed. Ask the following questions:

A. If the price of a bookmark were $4 and your unit costs for producing bookmarks were the same as before, what would happen to your group's profit or loss? Why? ***If the group had a profit before, its profit would increase because total revenue would increase and total costs would remain the same. If the group had a loss before, its loss would be smaller or it might now make a profit.***

B. If the price of a bookmark remained $3 and your costs increased, what would happen to your group's profit or loss? Why? ***If the group had a profit before, its profit would decrease or it might now have a loss because total revenue would remain the same and total costs would increase. If the group had a loss before, it would have a greater loss now.***

C. If a business spent $4.15 to produce a bookmark and could sell the bookmark for $3.00, would the business have a profit or a loss? Why? ***A loss because costs were greater than revenue***

CLOSURE

28. Ask the groups to work on the following review questions. Each group may work on all the questions, or you may assign each group a question to answer and report to the class.

A. What is an equation? ***The amount on one side of the equal sign is the same as the amount on the other side of the equal sign. The two sides are in balance.***

B. What is an inequality? ***The two sides of the statement are not in balance and are not equal.***

C. What are total costs? ***The costs of all resources a producer uses to make a good or provide a service***

D. What is total revenue? ***The amount a business receives from the sale of its goods or services***

E. What is profit? ***Profit is total revenue minus total costs.***

F. What is an entrepreneur? ***A person who takes risks to start new businesses and develop new products or services***

G. What must a business do to earn a profit and avoid a loss? ***Keep costs low and sell the product at a price greater than its unit cost.***

H. Why must a business make careful decisions about which resources to buy? ***Resources cost money and costs affect profits.***

I. What would happen to a business if no one wanted to buy its products? ***It will have losses and eventually fail.***

J. Why is profit important to entrepreneurs? ***It determines whether the entrepreneur can continue in business, it provides the entrepreneur with a monetary reward and it serves as an incentive for entrepreneurs to accept the risks of starting and running a business.***

ASSESSMENT

Distribute a copy of Activity 6.6 to each student. Review the instructions and allow time for the students to complete their work or assign the activity as homework. Go over the answers with the students.

1. What were Jamal and Sally's total costs? Show your work. ***$3.50 + $1.00 +$0.75 + $0.75 = $6.00***

2. Write the equation for Jamal and Sally's total revenue. ***Total Revenue = Price x Quantity Sold*** What was their total revenue? ***$0.25 x 60 = $15.00***

3. Was Jamal and Sally's total revenue < or > their total costs? ***> because their total revenue of $15 was greater than their total costs of $6***

4. Who are the entrepreneurs in this activity? Why? ***Jamal and Sally, because they risk their resources and time to sell lemonade***

5. Did Jamal and Sally earn a profit or have a loss? How much was their profit or loss? ***They earned a profit of $9 because $15 – $6 = $9.***

6. If Jamal and Sally's total costs were $16.50, would they earn a profit or have a loss? How much would their profit or loss be? ***They would have a loss of $1.50 because $15 – $16.50 = – $1.50.***

VISUAL 6.1
COMPUTING UNIT COSTS OF PRODUCTION

Company Name: _____

In Column 1, list each resource you used to produce your sample bookmark.

In Column 2, write the price for each resource, using the Bookmark Resource Price List on Activity 6.2.

In Column 3, write the number of units of each resource that your company used. (For labor, write the number of students in your group, minus the entrepreneur.)

In Column 4, compute the cost of each resource by multiplying the number in Column 2 by the number in Column 3.

Add the amounts in Column 4 to find the unit costs of producing a bookmark. **Write your unit costs** (total costs of production for one bookmark) in the bottom row of Column 4.

1	2	3	4
Resource	**Resource Price per Unit**	**Number of Units Used**	**Total Resource Cost** (Column 2 x Column 3)
	Total Costs of Production for One Bookmark		

VISUAL 6.2
BOOKMARKS BY THE NUMBERS

1	2	3	4	5
Bookmark Company Name	**Quantity of Bookmarks Sold**	**Total Revenue**	**Total Cost**	**Profit / Loss**

ACTIVITY 6.1
MONEY MATTERS REVIEW

Directions: Calculate the answers to these questions. Show your work.

A. Suppose you have been saving your money to buy a new bicycle. The price of the bicycle is $175.50. You have saved $75.25. How much more money must you save?

B. You can walk the neighbor's dog for three days. She will pay you $3.00 a day. If you take the job, how much money will you earn? If you put all of your earnings in your savings account, how much will you still need to buy the bike?

C. Your sister is selling lemonade. The price is $0.15 a cup. If she sells four cups, how much money will she have?

D. You bought candy at a store. You paid $0.15 for gooey worms, $0.20 for jelly beans and $0.07 for sour stars. What is the total you spent? If you paid with a $1.00 bill, how much change will you receive?

ACTIVITY 6.2
BOOKMARK RESOURCE PRICE LIST

Resource	**Price**
Space (rent)	$0.25
Worker (wage)	$0.10

ACTIVITY 6.3
COMPUTING UNIT COSTS OF PRODUCTION

Company Name: _____

In Column 1, list each resource you used to produce your sample bookmark.

In Column 2, write the price for each resource, using the Bookmark Resource Price List on Activity 6.2.

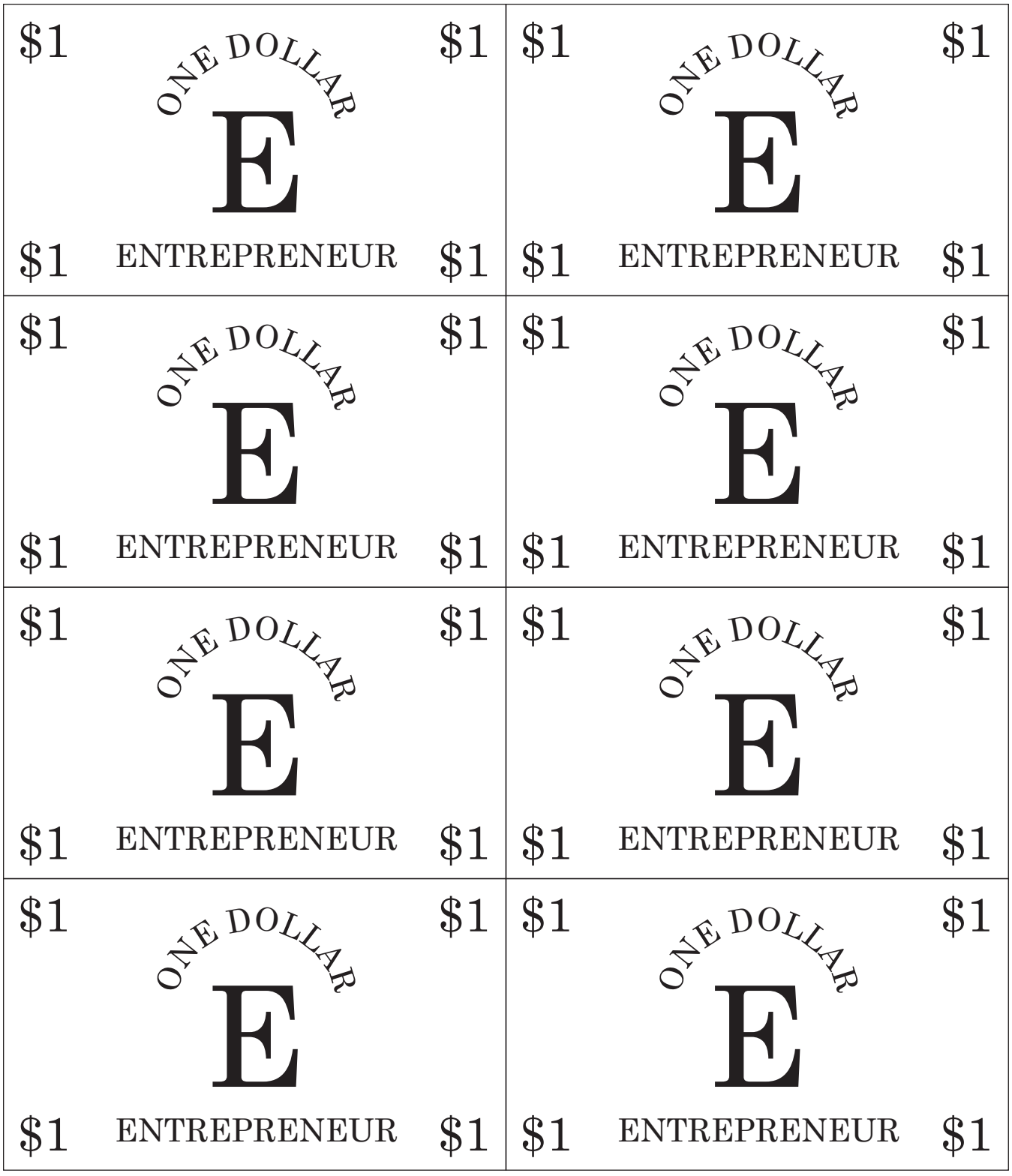
In Column 3, write the number of units of each resource that your company used. (For labor, write the number of students in your group, minus the entrepreneur.)

In Column 4, compute the cost of each resource by multiplying the number in Column 2 by the number in Column 3.

Add the amounts in Column 4 to find the unit costs of producing a bookmark. **Write your unit costs** (total costs of production for one bookmark) in the bottom row of Column 4.

1	2	3	4
Resource	**Resource Price per Unit**	**Number of Units Used**	**Total Resource Cost** (Column 2 x Column 3)
	Total Costs of Production for One Bookmark		

ACTIVITY 6.4
DOLLARS FOR BOOKMARKS



ACTIVITY 6.5
COMPUTING BOOKMARK PROFITS

Company Name:	Entrepreneur:

1. The selling price of your company's bookmark is	**$3.00**

2. How many bookmarks did you sell?	

3. Use this equation to determine your company's total revenue:

Selling Price	**x**	**Quantity Sold**	**=**	**Total Revenue**
	x		**=**	

4. Use this equation to determine your company's total cost:

Unit Cost	**x**	**Quantity Produced**	**=**	**Total Cost**
	x		**=**	

5. Is your company's total revenue > (greater than) its total cost
or is your company's total revenue < (less than) its total cost?

6. If your company's total revenue was greater than its total cost,
use this equation to determine your company's profit:

Profit	**=**	**Total Revenue**	**–**	**Total Cost**
	=		–	

7. If your total cost was greater than your total revenue,
use this equation to determine your company's loss.

Loss	**=**	**Total Revenue**	**–**	**Total Cost**
	=		–	

8. Did your company's entrepreneur earn income (profit)?

ACTIVITY 6.6
ASSESSMENT: LUSCIOUS LEMONADE

Directions: Read the paragraph below. Help Jamal and Sally use this information to figure out whether their lemonade business earned a profit or had a loss. Show your work. (Use the back if you need more room.)

Mrs. Counts talked with Jamal and Sally about their lemonade stand. She learned that they sold 60 cups of lemonade at $0.25 each. She also learned that Jamal's mother charged them for the resources they used to make the lemonade:

- $3.50 for lemonade mix
- $1.00 to rent the table for the lemonade stand
- $0.75 for cups
- $0.75 to rent the pitcher, spoon and measuring cup

1. What were Jamal and Sally's total costs? Show your work.

2. Write the equation for Jamal and Sally's total revenue. What was their total revenue?

3. Was Jamal and Sally's total revenue < or > their total costs?

4. Who are the entrepreneurs in this activity? Why?

5. Did Jamal and Sally earn a profit or have a loss? How much was their profit or loss?

6. If Jamal and Sally's total costs were $16.50, would they earn a profit or have a loss? How much would their profit or loss be?