☆**M**STAR
INTERVENTION

L4

Lesson 4: Find the Missing Value From a Table

Lesson Objective

- Students will find missing values in a table, given a scenario that reflects multiplicative thinking.

Instructional Materials

Material	Quantity	Description
How Am I Doing? graph	1 per student	
Colored pencils	1 per student	
Index cards with 1 scenario on each	1 card per pair	Students will build a table for each scenario. Do not repeat scenarios on different cards.
Popsicle sticks with 1 student name on each	1 per student for teacher use	
Whiteboard and dry-erase marker	1 per student	
Display Masters	1 each	• Preview: Key Ideas: Find the Missing Value • Demonstrate: Cookies A–D • Demonstrate: Car Wash A–E
Handouts	1 per student	• Cumulative Review • Practice 1 • Practice 2 • Independent Practice
Answer Keys	1 each	• Cumulative Review • Practice 1 • Practice 2 • Independent Practice

Cumulative Review

Have students answer the questions on the Cumulative Review handout. Go over the answers. Correct misconceptions. Have students use a colored pencil to make corrections as needed. Collect student papers to determine who needs additional instruction.

Preview

This lesson will build on students' conceptual knowledge of building a table from a given scenario and determining whether multiplicative thinking is reflected.

Display and introduce through a brief explanation the key ideas for this lesson:

- Multiplicative thinking is present when a value is multiplied by a constant rate to get the resulting value.

- Given a scenario and table of values, a rule can be determined. This rule can be used to find any missing value in the table.

- If given the *y* value in the table, the *x* value can be determined by performing the inverse operation.

Use the Key Ideas: Find the Missing Value **DM** display master as needed.

Engage Prior/Informal Knowledge

To open the lesson, activate students' background knowledge and preskills by leading activities such as the following:

- Have students discuss the following question with a partner: How do you determine whether the data in a table represents additive or multiplicative thinking? Solicit answers from 2–3 pairs.

- Before class, create a deck of index cards with a different scenario on each. Have each pair choose 1 card and create a table on a whiteboard. Ask 2–3 partners to share their scenario and table. Possible scenarios include the following:

◇ Janet babysits to earn money on the weekends. She charges $7 for each hour that she babysits.

◇ Tony went to the grocery store. He bought 2 candy bars for $1.

If students cannot complete these activities, stop and explicitly teach the material.

Demonstrate

1. Determine the rule and find the missing values in the table.

Say: *In the previous lesson, we learned how to create a table from a given scenario, find a rule, and determine whether multiplicative or additive thinking was reflected. Today, we will use a table to find missing values for a multiplicative scenario.*

Say: *Consider this scenario. Ray is making chocolate chip cookies for his mother's birthday party. The recipe calls for 1 bag of chocolate chips per 1 dozen cookies.*

Use the Cookies A **DM** display master as needed.

Say: *Let's look at a table of values for this scenario.*

Say: *This table shows the relationship between the number of bags of chocolate chips and the total number of cookies made. Some of the values have been provided for us.*

Use the Cookies B **DM** display master as needed.

Select a popsicle stick to choose a student to answer each of the following questions. Ensure that students use the correct mathematical language in their responses.

Say: *What process can we use to get from 1 to 12? (multiply by 12) If he has 2 bags of chocolate chips, he can make 24 cookies. What process can we use to get from 2 to 24? (multiply by 12) So what process is used*

to find how many cookies can be made with any given number of bags of chocolate chips? (multiply by 12)

Use the Cookies C **DM** display master as needed.

Solicit an answer for each of the following questions. Ask the other students to give a thumbs-up if they agree with the answer or a thumbs-down if they do not agree. If not all agree, clarify the answer.

> **Say:** *Given the process that we just found, we know that if Ray had 6 bags of chocolate chips, he could make 72 cookies. With your partner, discuss the following questions:*
>
> - *How many cookies could Ray make if he had 5 bags of chocolate chips? (60)*
>
> - *How many cookies could Ray make if he had 10 bags of chocolate chips? (120)*
>
> - *What is the general rule for the number of cookies made if Ray had x bags of chocolate chips? (12x)*

Use the Cookies D **DM** display master as needed.

> **Say:** *Therefore, the equation y = 12x could be used to find the total number of cookies made, given the number of bags of chocolate chips used. We can use this equation, or rule, to find any missing value in the table. If we needed to know how many cookies 100 bags of chocolate chips would make, we could use our rule. How many cookies would 100 bags of chocolate chips make? (12 times 100, or 1,200)*

2. Determine the rule and find the missing values in the table.

> **Say:** *Let's try another scenario: Mandy washes cars in her*

1 TEACHER NOTE
If students see the pattern in the y values of adding 12, discuss why this pattern will not hold true if x values are missing from the table.

neighborhood for 9 dollars per car. Last weekend, she washed 5 cars and earned 45 dollars.

Use the Car Wash A **DM** display master as needed.

> **Say:** *Let's take a look at a table of values for this scenario.*

> **Say:** *This table shows the relationship between the number of cars Mandy washes and the total amount of money she earns. We know that from washing 1 car, Mandy earns 9 dollars. From washing 2 cars, Mandy earns 18 dollars. Last weekend, Mandy washed 5 cars and earned 45 dollars.*

Use the Car Wash B **DM** display master as needed.

> **Say:** *What do I multiply the number of cars washed by to get the total amount of money Mandy earned? (9)*

Use the Car Wash C **DM** display master as needed.

Solicit an answer for each of the following questions. Ask the other students to give a thumbs-up if they agree with the answer or a thumbs-down if they do not agree. If not all agree, clarify the answer.

> **Say:** *Given the process we just found, we know that if Mandy washed 5 cars, she made 45 dollars. With your partner, discuss the following questions:*
>
> - *How much money would Mandy make if she washed 3 cars? (27 dollars)*
>
> - *How much would she make if she washed 4 cars? (36 dollars)*
>
> - *If Mandy washed 10 cars, how much would she make? (90 dollars)*
>
> - *What is the general rule for the amount of money Mandy would make if she washed x number of cars? (9x)*

Say: *Therefore, the equation y = 9x could be used to find the total amount of money Mandy made, given the number of cars she washed. We can use this equation, or rule, to find any missing value in the table.*

Use the Car Wash D **DM** display master as needed.

Say: *Look at this table. Imagine Mandy made 63 dollars. How many cars did she wash? The general rule for this scenario is the number of cars washed times 9 equals the amount of money Mandy made. If I know the amount of money Mandy made, I can find the number of cars she washed by using the inverse operation, division. To find how many cars were washed for 63 dollars, I divide 63 by 9 to get 7.*

Say: *If Mandy made 99 dollars, how many cars did she wash? (11) Why? (99 divided by 9 equals 11)*

Use the Car Wash E **DM** display master as needed.

Practice

For each practice activity, provide detailed feedback to students, highlighting what was done correctly and what needs improvement. Provide opportunities for students to correct their errors. Collect student work to review and monitor student progress.

Activity 1: Help students complete the activity on the Practice 1 handout. Have students check their table with a partner and discuss reasoning. Select a few students to verbalize their reasoning and each step in the process. Ensure that students use the correct mathematical language in their explanations.

Activity 2: Have students work in pairs to complete the activity on the Practice 2 handout. Have students verbalize their reasoning and each step in the process to their partners. Ensure that students use the correct mathematical language in their explanations.

Circulate to monitor student progress.

Independent Practice

1. Have students work independently to complete the activity on the Independent Practice handout.

2. Go over the answers (students self-check and correct, using a colored pencil).

3. Have students record the number correct in the box and complete their How Am I Doing? graph.

4. Collect the papers to review and monitor student progress.

Closure

Review the key ideas. Have students provide examples from the lesson.

Have students discuss their answer to the following questions:

- How many sets of values (completed rows) do you need to determine the rule in the table?

- Why would you want to create a rule for a scenario? Give an example in which such a rule would be useful.

Clear up any misconceptions. Students who struggle to identify missing values in a table need additional instruction.