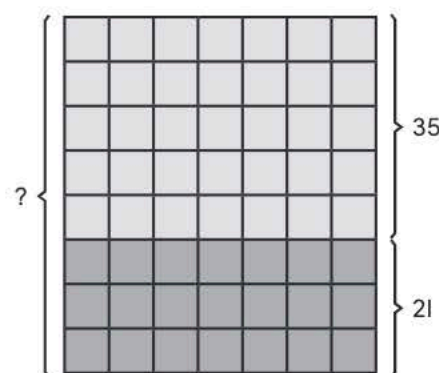
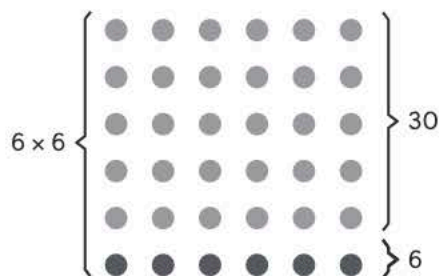


MULTIPLICATION AND DIVISION OF 6, 7, 8, AND 9

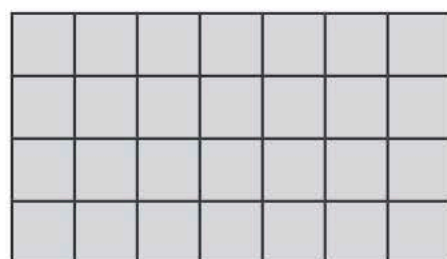
Chapter Overview

In this chapter, your student's knowledge of multiplication and division with 2, 3, 4, 5, and 10 from chapter 3 will be extended to understanding multiplication and division with 6, 7, 8, and 9. He/she will also multiply 1-digit numbers by tens and 2-digit numbers by 1-digit numbers and solve two-part and two-step word problems with all four operations. Your student will:

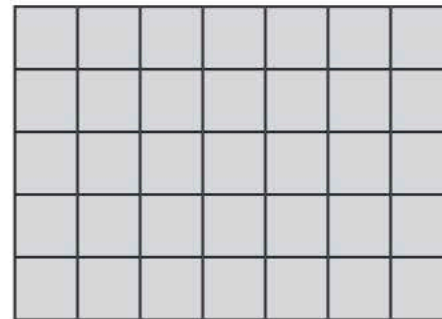
- use **arrays** and **area models** to find known facts within a fact to multiply quickly.



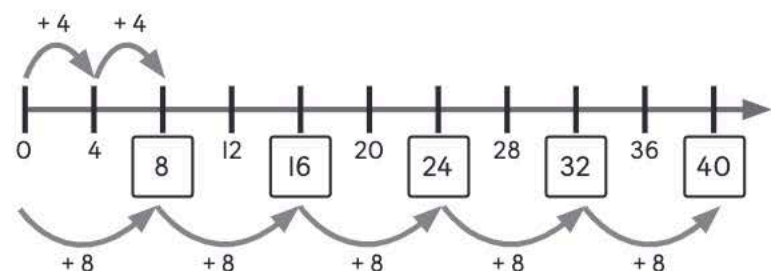
- use the **commutative property of multiplication** to manipulate models into facts that can be solved.



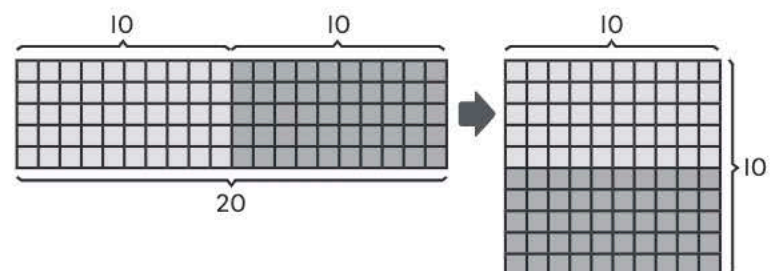
- learn to explore the **inverse relationship** among multiplication and division.



- learn to **explore patterns** when multiplying greater numbers.



- use the **associative property of multiplication** to break apart tens to multiply.



$$20 \times 5 = 10 \times 10 = 100$$

10 tens



4A Multiply and Divide by 6 (1)

Learning Objective(s)

- Practice multiplication facts for 6.
- Relate the multiplication facts for 6 with other multiplication facts for 6.
- Relate the multiplication facts for $_____ \times 6$ to the facts for $6 \times _____$.

Vocabulary

- product

Material(s)

- 1 copy of Square Grid Paper (TR05)

MULTIPLY BY 6 (Student Book, pages 185 to 190)

Lesson Opener

Task (Student Book, page 185)

Show your student the **Lesson Opener** and cover the rest of the page. Discuss the question with your student. Do not show your student how to do the task and allow him/her to explore different ways to record the multiplication equation and solve using any strategy.

Refer your student to **Learn** and **Learn Together** in the Student Book for reflection after your student has explored the concepts. Use questions to build understanding and direct instruction to refine understanding.

Lesson Development

Learn (Student Book, page 185)

Invite your student to use counting objects to represent the 3 cartons of 6 eggs each. Remind your student to record his/her thinking using a multiplication equation and solve with any strategy. Have your student look at the 3 groups of 6 eggs and 6 groups of 3 eggs in the Student Book. You may wish to ask these questions:

- **How do the two sets of eggs differ?** One shows 3 cartons of 6 eggs. The other shows the cartons split into 6 cartons of 3 eggs. **How are the equations similar?** They both have 3 and 6 as factors. **Why might you want to solve 6×3 instead of 3×6 ?** You only have to count 6 three times, it would take longer to add all of those 3s.

Record each multiplication situation and remind your student to consider how they are similar.

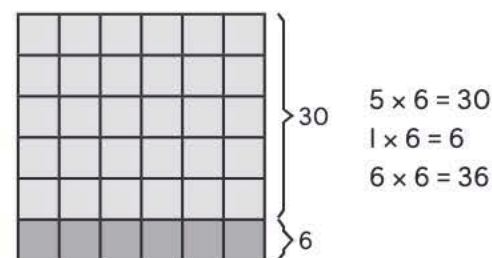
Focus Question

- **How can I multiply by 6 in multiple ways?**

Invite your student to ponder this question as you go through the lesson. Revisit this question when you reach the end of the lesson to check his/her understanding.

Teaching Tip

Make sure your student understands multiplication by asking him/her to model each representation with a drawn rectangle on Square Grid Paper (TR05). Then, encourage him/her to use different color pencils to show the known parts of the area model with a multiplication fact. Then, record the product and add.



- **How does the model match your understanding? Can you use the same grid paper to make other multiplication equations using different color pencils? How many such equations can be made?**

For Additional Support

Use sticky notes and counting objects to help your student first organize the information given in the problem and determine which operation he/she needs to use to solve the problem.

More Resources

- Refer to **Do More at Home** below and **Reteach 3, Exercise 4A (3)** if your student needs additional support.
- When your student is ready, have him/her work on **Additional Practice 3A, Exercise 4A (3)**.
- To provide your student with a challenge, have him/her work on **Extension 3, Exercise 4A (3)**.
- You may also assign **Mastery and Beyond 3A, Chapter 4, Practice I** to provide further support and development to sustain learning.

Do More at Home


Point out real-life problems that include multiplication and division whenever possible. For example, invite your student to construct word problems involving multiplication and division by observing events in his/her home such as “if my brother, my mother, and my father each have 6 cookies, then what is the total number of cookies they all have?” Challenge your student to think about what operation is happening and why. If possible, encourage him/her to represent it with a bar model to prove the operation.

Learn Together (Student Book, pages 224 and 225)


Encourage your student to solve the four problems in **Learn Together**. Remind him/her that a bar model can be a great tool to represent the word problem. If needed, provide counting objects to model the problem.

Note that in Question 2, your student will solve a two-step problem. Point out that the steps are not broken down in this lesson and that your student will have to determine which information to use for each step.

Through questioning, lead your student to determine each operation in **Learn Together**. As you go through the problems with your student, you may wish to ask the following questions:

 **How did you decide whether you were multiplying or dividing?** *To find out "How many in all" in a question, I use multiplication. If the total number is known, and the question is to find out "how many in each group," we use division. How does a model help you decide whether you are multiplying or dividing? It can show the total known or unknown. It can show the equal groups and model the operation.*


After your student has explored the concepts in the **Lesson Opener**, **Learn**, and **Learn Together**, you may wish to ask these questions to encourage further reflection:

 **How do the models match your understanding? How are they different? What changes would you make to your work?**

You may wish to have your student summarize his/her learning in a math journal. Have your student reflect on what components all bar models have. Encourage your student to think about how they are the same and how they are different.

- **QUESTION 1** builds your student's understanding of dividing to find the number of groups.
- **QUESTION 2** requires your student to solve a 2-part problem.
- **QUESTION 3** builds your student's understanding of dividing to find the number of groups.
- **QUESTION 4** builds your student's understanding of dividing to find the number in each group.

Lesson Debrief

- Conclude the lesson and facilitate your student's reflection by asking him/her to answer the **Focus Question** and share his/her thinking.
- Extend the discussion by posing the following questions.
 -  **How can bar models be used to solve multiplication and division problems?** *They can show the equal parts and the whole to help me determine which operation to use. How are multiplication and division related?* *We can write multiplication and division sentences from the same picture. We can write a division fact that matches the given multiplication, and vice versa.*


Learn Together Answers

(Student Book, pages 224 and 225)

1. 3; 3; 3
2. 5; 2; 5; 2
3. 80; \div ; 8; 10; 10
4. 72; \div ; 8; 9; 9

Digging Deeper

Your student has learned that he/she can multiply to check the answer of a division word problem and that rounding can be used to check the answer to a multiplication word problem.

 **What suggestions can you give someone when rounding to estimate?**
Possible solutions: Choose one number to round. Choose the number that is closest to 10.

Reflect and Connect

- Allow time for your student to reflect on what he/she has learned and ask questions about what he/she may be unsure of.
- Encourage him/her to share anything that was confusing or difficult, and how thinking about it differently and perseverance helped the process of learning.
- Ask your student to answer a reflection question or draw a picture to show his/her reflection. You may offer these prompts:
 - 🗣️ **How did you multiply today? Why are you able to break apart numbers to multiply? Why might you choose to break apart numbers when multiplying by tens?**

What to look for:

- an example of multiplying by tens
- an understanding of using the associative property to reorganize the factors to multiply
- an understanding of how using place value and the associative property to multiply mentally

Practice On Your Own (Student Book, pages 241 and 242)

- **QUESTION 1** assesses your student's ability to use place-value concept to multiply by tens.
- **QUESTION 2** assesses your student's ability to multiply by tens and solve problems involving missing tens in equations.

Think!

- **QUESTION 3** assesses your student's ability to identify the pattern in the table to find the missing numbers. You may wish to ask the following questions:
 - 🗣️ **What do you notice about the columns in the table? Numbers in "a" and numbers in "b" are multiplied to get "c." How can you use place value to determine what number multiplied by 6 will give you 300? Think of it as $6 \times 10 \times \underline{\hspace{1cm}} = 300$.**
- **QUESTION 4** assesses your student's ability to see "20 times" as multiplying by 2 and then 10. Explain that this is called an input/output machine. Numbers go in, an action is performed, and then a number comes out. You may wish to ask the following questions:
 - 🗣️ **What action is the machine doing? multiplying numbers by 2 and then by 10 What does it mean to be a "20 times" machine? It multiplies numbers by 20. Where do you see numbers being multiplied by 20 in the machine? $\times 2$ and $\times 10 = \times 20$**

Practice On Your Own Answers

(Student Book, pages 241 and 242)

1. (a) 12; 120
(b) 12; 120
2. (a) 180
(b) 240
(c) 20
(d) 30
(e) 7

Think! Answer

3.

| a | b | c |
|---|----|-----|
| 2 | 40 | 80 |
| 7 | 30 | 210 |
| 6 | 50 | 300 |
| 5 | 50 | 250 |

4. 5; 60; 60; 5

Rubric (Student Book, page 260)

Use the scoring guide to help you give feedback on your student’s work. Use the comments section to provide information about what was done well and what could be improved. Write words of encouragement to let your student know what he/she has done well.

| Scoring Rubric | | |
|----------------|---|----------|
| | Description | Point(s) |
| 1 | Your student: <ul style="list-style-type: none">draws an array for 36.gives the correct answer. (36) | 1 1 |
| 2 | Your student: <ul style="list-style-type: none">gives the correct answer. (25)explains correctly that since each side can fit at most 5 pies, the greatest number of pies packed is 25. | 1 1 |
| 3 | Your student: <ul style="list-style-type: none">correctly draws one possible arrangement for a box with pies of different sizes.correctly draws another possible arrangement for a box with pies of different sizes. | 1 1 |
| 4 | Your student: <ul style="list-style-type: none">draws an array for 6.explains correctly the reason for the chosen dimensions of the box. | 1 1 |
| Total | | 8 |

Teaching Tip

You may wish to note that at Grade 3, your student’s model should simply show a firm understanding of multiplication and division facts of 6, 7, 8, and 9. Encourage your student to think about real-world problems with multiplication and division involving these numbers. Challenge your student to look around and tell word problems from the world around him/her.

Use this table as a guide to help you relate your student’s scores to his/her performance levels.

| Level | Score |
|---|---------|
|  | 7-8 |
|  | 2.5-6.5 |
|  | 0-2 |

Day 19 of 24



Project Work (Student Book, Chapter 3, page 174)

- Your student is given an opportunity to make connections between time and mathematics as they explore the base-60 (sexagesimal) numeral system used on clocks.
- At the end of **Chapter 4**, your student should be able to complete **Part 2**.
- Part 2** requires your student to apply his/her knowledge of multiplication facts of 6, 7, 8, and 9 to create his/her own time systems.
- Prompt your student if there are any other time systems that could be created using the facts learned in this chapter. Add these findings to the previous systems and ask your student to consider which one he/she prefers. Invite your student to explain his/her favorite system that will be used in the next part of the task.