# Unit 4 Family Support Materials

# Relating Multiplication to Division

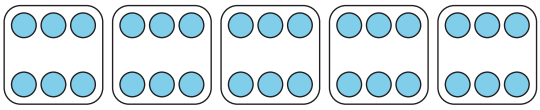
In this unit, students make sense of division and learn to multiply and divide whole numbers within 100. They also use the four operations to represent and solve two-step word problems. Students work toward these end-of-year goals:

- Fluently multiply and divide within 100.
- Know from memory all products of two one-digit numbers.

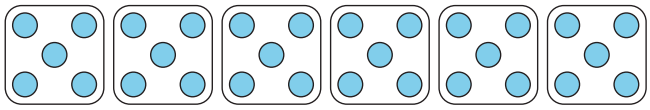
## Section A: What Is Division?

In this section, students think about division in terms of equal-size groups, just as they have done with multiplication. For instance, the expression $30 \div 5$ can represent dividing 30 objects into 5 equal groups, or dividing 30 objects into groups of 5. Students see that, in general, dividing means answering either the question "how many are in each equal group?" or the question "how many equal groups can be made?"

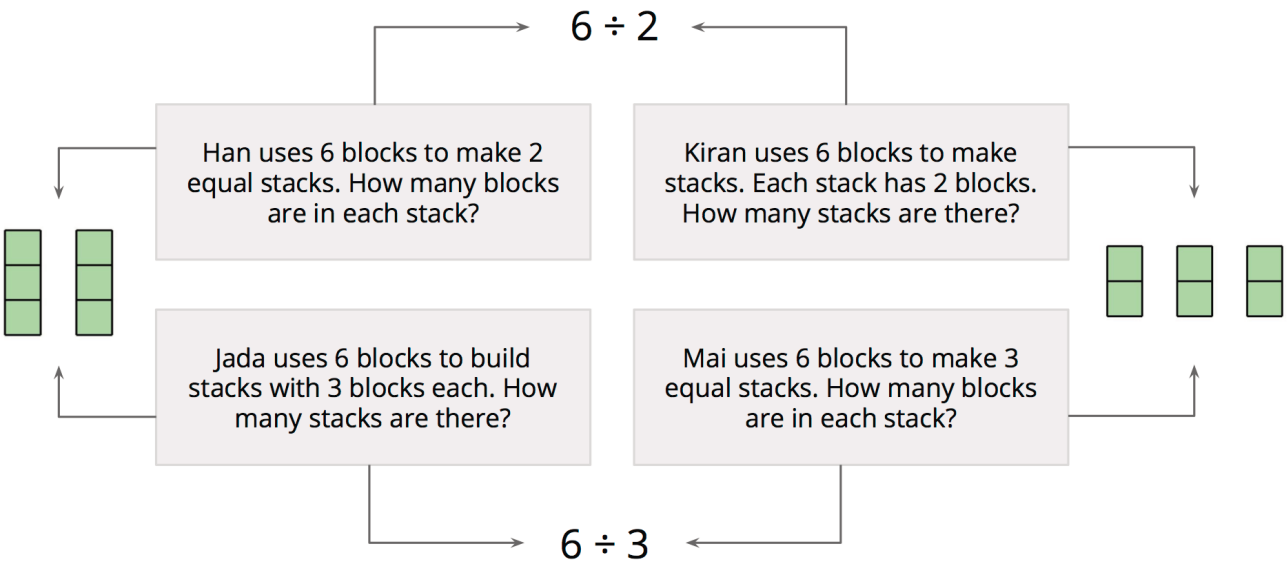
30 objects in 5 equal groups



30 objects in groups of 5



Students interpret descriptions, diagrams, and expressions that represent division situations. They see that the same diagram or expression can represent different questions. For example, the expression $6 \div 2$ can represent two different questions about 6 blocks divided into stacks of 2 or divided into 2 equal stacks, as shown in the image. The same image shows the expression $6 \div 3$ can represent two different questions about 6 blocks divided into stacks of 3 or divided into 3 equal stacks:

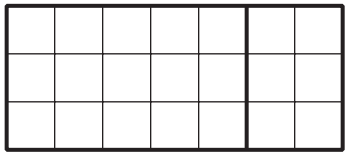



## Section B: Relating Multiplication and Division

In this section, students make connections between the result of a division and the unknown factor in a multiplication equation.

For example, the value of $30 \div 6$ is the unknown factor in $\_\_\_\_\_ \times 6 = 30$. This understanding helps students recognize division facts, based on the multiplication facts they know.

Students also learn to use properties of operations to multiply. For example, if they know $3 \times 7$, they also know $7 \times 3$.



Students also can decompose (or break apart) the 7 in $7 \times 3$, into 5 and 2, and then find $(5 \times 3) + (2 \times 3)$. An area diagram can show this strategy for multiplying.

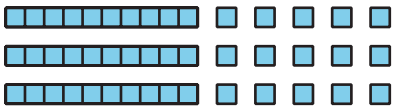
## Section C: Multiplying Greater Numbers

In this section, students use different strategies to multiply greater numbers. First, they multiply a single-digit number by a multiple of 10, relying on what

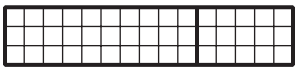
they know about place value. For instance, $2 \times 40$ means 2 groups of 4 tens, or $2 \times 4 \times 10$. Then, students multiply a single-digit number by other two-digit numbers.

They see that it is helpful to break apart the two-digit numbers by place value, into tens and ones. For example, to calculate $3 \times 15$, find $3 \times 10$ and $3 \times 5$. Students use base-ten blocks, or base-ten diagrams, and area diagrams (with and without a grid) to help them find such products.

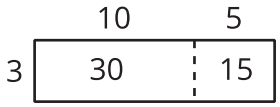
base-ten blocks or diagram



gridded area diagram



ungridded area diagram




## Section D: Dividing Greater Numbers

In this section, students divide greater numbers. They continue to use the relationship between multiplication and division and their understanding of place value to find quotients. For example, to find the value of $78 \div 3$, students may think about dividing 78 into 3 equal groups and use multiplication to find how many are in each group.

$$3 \times 10 = 30$$
$$3 \times 10 = 30$$
$$3 \times 6 = 18$$
$$10 + 10 + 6 = 26$$

$$3 \times 20 = 60$$
$$3 \times 6 = 18$$
$$20 + 6 = 26$$

## Try it at home!

Near the end of the unit, ask your third grader to find answers to these problems:

- $6 \times 16$
- $98 \div 7$

Questions that may be helpful as they work:

- How did you break up the expression to make it easier to solve?
- Can you rewrite the division problem as a multiplication problem?

Solution:

- 96
- 14

Sample response:

- For the multiplication expression, I multiplied 6 by 10, and then I multiplied 6 by 6. I added those products together to get my answer. For the division expression, I broke apart 98 into 70 and 28. I know that $70 \div 7 = 10$ (or $10 \times 7 = 70$) and that $28 \div 7 = 4$ (or $4 \times 7 = 28$). I added 10 and 4 to get my answer.
- $7 \times 14 = 98$