FAMILY MATH

Compose and Decompose Units of Ten

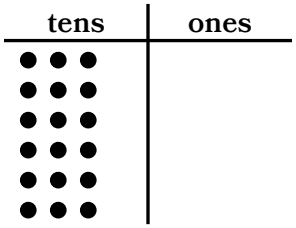
Dear Family,

Key Terms

associative property of multiplication

formula

Your student is learning to multiply and divide multiples of 10 by one-digit numbers. They see that the multiplication and division facts they learned in grade 3 can help them. To multiply, they begin with showing multiplication on a place value chart and renaming multiples of 10 in unit form. When multiples of 10 are in unit form, it is easier to think about familiar facts. Your student can multiply the familiar fact first and then multiply by 10. Grouping the factors in a multiplication expression in different ways does not change the product. Your student applies this strategy to calculating the areas of rectangles when 1 side length is a multiple of 10. To divide, students begin with showing division by using place value disks. They see that unit form and familiar facts can also help them divide multiples of 10. This topic deepens their understanding of the relationship between multiplication and division.

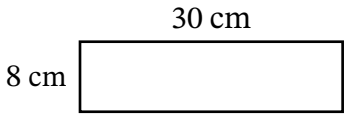


$6 \times 30 = 6 \times 3$ tens
$= 18$ tens
$= 180$

$6 \times 3 = 18$ *is a familiar multiplication fact.*

$$6 \times 30 = 6 \times (3 \times 10)$$
$$= (6 \times 3) \times 10$$
$$= 18 \times 10$$
$$= 180$$
$$6 \times (3 \times 10) = (6 \times 3) \times 10$$

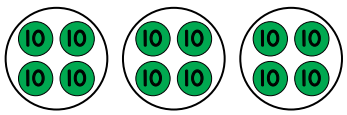
The associative property of multiplication shows how we can use familiar factors to multiply.



$A = l \times w$
$A = 30 \times 8$

The area is 240 sq cm.

The formula for the area of a rectangle is $A = l \times w$.



$120 \div 3 = 12$ tens $\div 3$
$= 4$ tens
$= 40$

$12 \div 3 = 4$ *is a familiar division fact.*

At-Home Activity

Pennies and Dimes

Use pennies and dimes to explore multiples of 10. Have your student arrange a collection of pennies in equal groups, such as 15 pennies arranged in an array of 3 rows of 5 pennies. Then build the same array as your student did but use dimes instead of pennies. Compare your arrays by using the following questions to guide the conversation. Repeat with different-size collections by taking turns building the arrays of pennies and dimes.

- "How many rows?" (3 rows of pennies) (3 rows of dimes)
- "How many cents are in each row?" (5 cents) (50 cents)
- "How many cents are there in all?" (15 cents) (150 cents)
- "What multiplication equation represents the array with the pennies?" ($3 \times 5 = 15$)
  "With the dimes?" ($3 \times 50 = 150$)
- "What division equation represents the array with the pennies?" ($15 \div 3 = 5$)
  "With the dimes?" ($150 \div 3 = 50$)

FAMILY MATH

Multiplication of Tens and Ones by One-Digit Numbers

Dear Family,

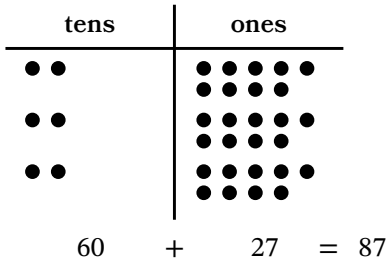
Key Terms

distributive property

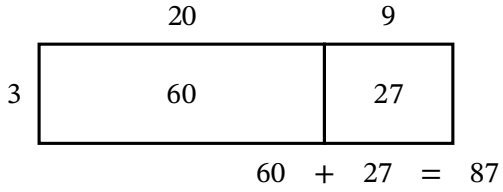
partial product

Your student is learning to multiply a two-digit number by a one-digit number. They represent the numbers by using place value disks and the area model. To multiply, they break apart, or decompose, the two-digit number into tens and ones, multiply each part by the one-digit number, and then add to find the product. They record equations alongside the representations and see that breaking apart the two-digit number makes simpler problems that are easier to multiply. This strategy is familiar from grade 3 and is referred to as the break apart and distribute strategy. Now, students learn that this strategy is called the distributive property and it is helpful for multiplying larger numbers. Students practice the distributive property as they solve word problems that include a two-digit and a one-digit factor.

Place Value Chart



Area Model



Equation

$$\begin{aligned} 3 \times 29 &= 3 \times (20 + 9) \\ &= (3 \times 20) + (3 \times 9) \\ &= 60 + 27 \\ &= 87 \end{aligned}$$

3×29 can be represented with models, such as a place value chart, an area model, or an equation. In each representation, 29 is broken into tens and ones: 2 tens and 9 ones. Each part is multiplied by 3. The partial products, 60 and 27, are added together to equal the product of 3×29.

At-Home Activity

Break It Apart

Create a hands-on place value chart with your child by using small objects such as colored cereal loops or small blocks. Draw 2 columns on a piece of paper and label the columns as *tens* and *ones*. You can also use a tabletop, making a divider to separate the tens and ones columns with masking tape. Give your child a one-digit by two-digit multiplication problem, such as 2×23, and have them represent the problem and find the product by using the small objects. For an equation such as 2×23, your student should put 2 cereal pieces in the tens place and 3 cereal pieces in the ones place to show 23. To show that they are multiplying by 2, they need to

duplicate those cereal pieces so that they have 2 groups of 2 tens 3 ones. Along the way, ask the following questions to guide their thinking.

- "How can you show 23 on the place value chart? How can you show 2 times 23?"
- "How many tens are there? How many ones are there? What is 2 times 23?"

FAMILY MATH

Division of Tens and Ones by One-Digit Numbers

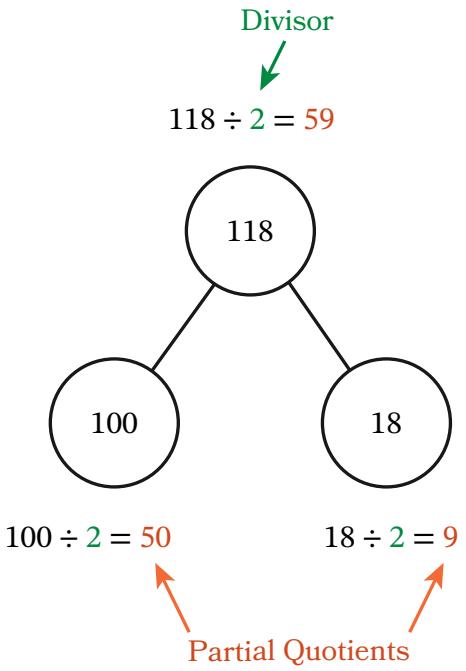
Dear Family,

Your student is learning to divide with larger numbers. To divide, they break apart, or decompose, the total into tens and ones. They divide each part and then add to find the quotient. Breaking the total into 2 smaller parts makes simpler problems that are easier to divide, allowing them to use their division facts from grade 3. They represent their thinking by using several familiar models including number bonds, area models, and place value charts. The place value chart is a flexible model because it can be used to represent all four operations: addition, subtraction, multiplication and division. The models that your student uses now will support a strong understanding of the division standard algorithm.

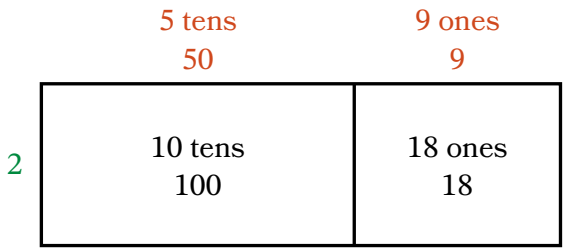
Key Terms

divisor

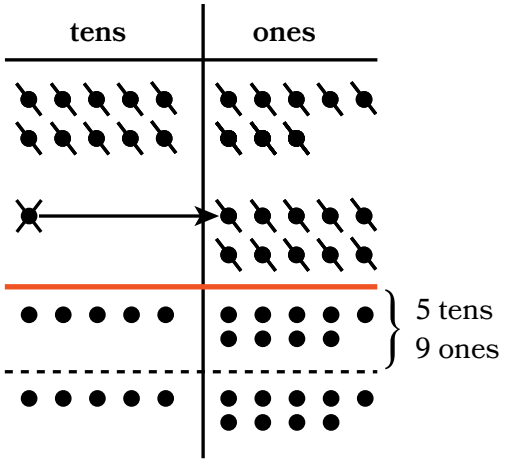
partial quotient



Breaking apart 118 into 100 and 18 is helpful because 100 and 18 are both easily divisible by 2.



In an area model, 118 is broken into tens and ones. 1 side length is labeled with the divisor, 2. Each part is divided, and the partial quotients are written along the top side length.



In a place value chart, 118 *is broken into* 11 *tens and* 8 *ones. Each part is divided into* 2 *equal groups.* 1 *ten must be broken into* 10 *ones to make the* 2 *equal groups.*

At-Home Activity

Fair Sharing with 84

With your student, gather 84 small objects such as 84 beads, cereal pieces, crackers, fruit snacks, or toy bricks. Ask your student to share the 84 objects between the 2 of you so that you each have the same amount. Give your student time to work. Then ask them to write a division equation to represent the situation: $84 \div 2 = 42$. Encourage your student to use one of the strategies learned in class. Ask your student to explain where 84, 2, and 42 are shown in the collection of objects.

Repeat this process with 84 objects shared among the following numbers of people.

- 3 people and write $84 \div 3 = 28$.
- 4 people and write $84 \div 4 = 21$.
- 6 people and write $84 \div 6 = 14$.

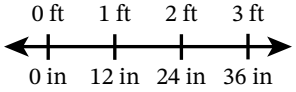
Then consider asking your student to explain why the quotient gets smaller when the divisor gets bigger.

FAMILY MATH

Problem Solving with Measurement

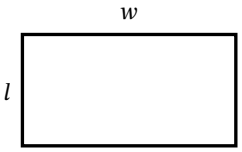
Dear Family,

Your student is learning to convert customary length measurements of yards, feet, and inches. They convert length measurements from larger units to smaller units. They learn there is a multiplicative relationship between units, such as 1 foot is 12 times as long as 1 inch. Your student applies these conversions to solve word problems involving area and perimeter. They use their experience with finding the perimeters of rectangles in grade 3 to identify formulas for perimeter. In these problems, your student solves for the perimeter, the area, or the unknown side lengths of rectangles.



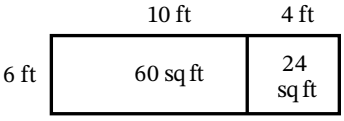
Feet	Inches
1	12
2	24
3	36

Students represent conversions by drawing a number line and a table.



$P = l + w + l + w$
$P = 2l + 2w$
$P = 2 \times (l + w)$

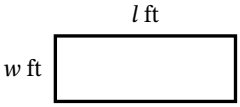
Students identify different formulas for finding the perimeters of rectangles.



$6 \times l = 84$
$l = 14$ feet
The length of the trailer is 14 feet.

In problems where the area and the length of 1 side are known, students may represent the area with an area model. They determine the length of the unknown side by using division.

Area = 44 square feet
Perimeter = 30 feet



$2 \times (l + w) = 30$
$30 \div 2 = 15$
$15 = 11 + 4$
$11 \times 4 = 44$

In some cases, students may know the area and the perimeter, and they then determine the dimensions of the rectangle.

At-Home Activities

Perimeter and Area with Mixed Units

Ask your student to identify a large rectangular object in your home, such as a door, window, rug, or part of a tile floor. Work together to measure the length and the width of the object in feet and inches. Help your student calculate the perimeter of the object. Then calculate the area. Talk together about how perimeter is measured in units, such as feet or inches, while area is measured in square units, such as square feet or square inches.

Compare the perimeters and areas of different objects that you measured together. Ask the following questions to guide their thinking.

- "Which objects have larger perimeters? Which objects have larger areas?"
- "Do any objects have the same perimeter but different areas?"
- "Do any objects have the same area but different perimeters?"
- "Why might we need to know the perimeter or area of any of the objects you measured?"

Yards, Feet, or Inches?

Look for opportunities where you may need to measure the length of an object. Discuss with your student whether it makes sense to measure the object by using yards, feet, or inches. Often, objects may be measured in inches but measuring in feet can be more efficient. Sometimes, objects may require combined units, such as feet and inches. These observations and discussions strengthen your student's understanding of the relative size of each measurement unit.

FAMILY MATH

Factors and Multiples

Dear Family,

Your student is learning to identify factors and multiples of numbers up to 100. They use the relationship between multiplication and division to find factors of numbers. Numbers with exactly 2 factors are called prime numbers. Numbers with more than 2 factors are called composite numbers. They learn that a number is divisible, or can be divided without a remainder, by each of its factors. Your student learns to find multiples of any number by using skip-counting or multiplication. Students use factors and multiples to find an unknown term in a pattern or sequence.

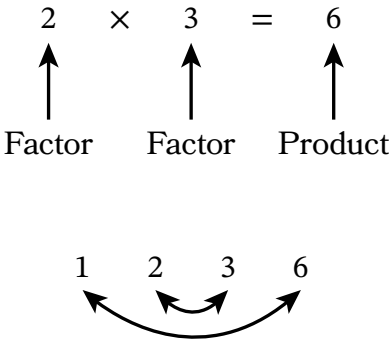
Key Terms

composite number

divisible

prime number

term



6 is a composite number because it has more than 2 factors.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiples of 9 are identified when skip-counting by 3 on a hundreds chart. Some numbers are multiples of both 3 and 9.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

The circled numbers are prime numbers. A prime number has only 2 factors, 1 and itself. A composite number has more than 2 factors. The number 1 is neither prime nor composite.

9, 18, 27, 36, 45

Every other term is divisible by 6.

$9 \times 2 = 18$
$3 \times 3 \times 2 = 18$
$3 \times 6 = 18$

$9 \times 4 = 36$
$3 \times 3 \times 2 \times 2 = 36$
$6 \times 6 = 36$

The sequence shows the first five terms when listing multiples of 9. Every other term is also divisible by 6. If the pattern continues, will the 7th term be divisible by 6? How do you know?

At-Home Activities

Factor Pairs Memory Game

Help your student list the factors of 90, which are 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45, and 90. Gather 12 small pieces of paper or index cards. Write 1 factor on each piece of paper until you have written all 12 factors. Mix up the 12 pieces of paper and arrange them in an array, facedown. Take turns with your student to turn over 1 piece of paper and try to find its factor pair. For example, if you turn over the number 3, try to find the number 30 because $3 \times 30 = 90$. When either you or your student finds a matching factor pair, leave both pieces of paper faceup. If you do not find a matching factor pair, then turn both pieces of paper facedown. Then have the next player begin the process again. Once all the factor pairs have been found, consider repeating the activity with the factors of 48, which are 1, 2, 3, 4, 6, 8, 12, 16, 24, and 48. Also try the activity with the factors of 84, which are 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, and 84.

Sorting by Prime or Composite

Gather the cards or papers that you and your student prepared for the Factor Pairs Memory Game. Ask your student to sort each number into piles that show whether the number is prime, composite, or neither. If your student is not sure whether a number is prime or composite, ask the following questions to guide their thinking.

- "Can the number be divided by a number other than 1 or itself without a remainder?"
- "If you draw the number as the area of a rectangle can it only be drawn 1 way, such as a 1 by 7 rectangle? Or can you draw more than 1 possible rectangle such as a 2 by 6, a 3 by 4, and a 1 by 12 to represent the number?