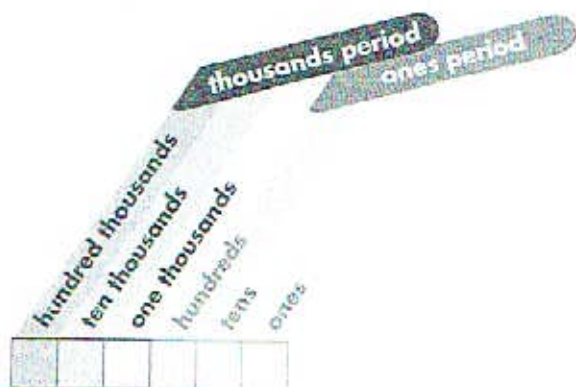


Name _____



Solve & Share

What is the relationship between the value of the first 5 and the value of the second 5 in 5,500? *Solve this problem any way you choose.*



Step Up to Grade 4

Lesson 1

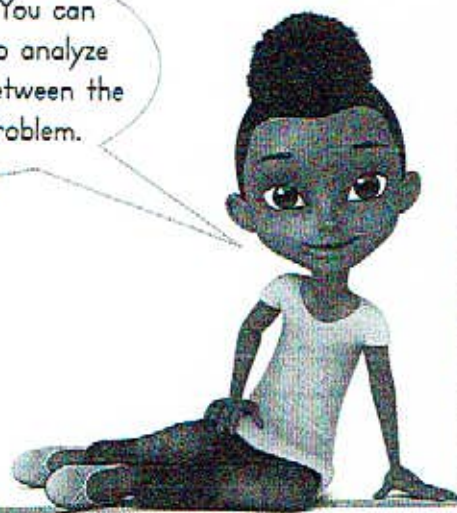
Place Value Relationships

I can ...

recognize that a digit in one place has ten times the value of the same digit in the place to its right.

© Content Standards 4.NBT.A.1, 4.NBT.A.2
Mathematical Practices MP.2, MP.3, MP.8

Use reasoning. You can use place value to analyze the relationship between the digits in the problem.



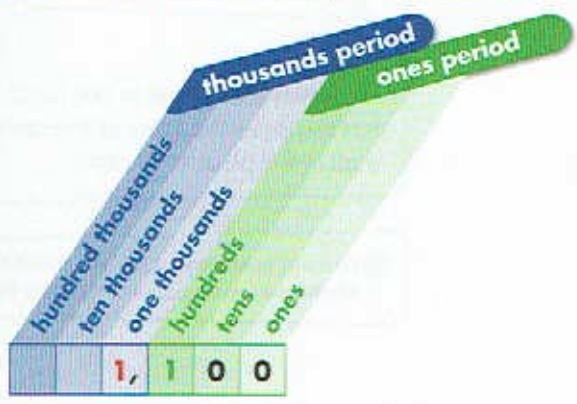
Look Back! © MP.2 Reasoning Describe two ways 5,000 and 500 are related.

Essential Question

How Are the Digits in a Multi-Digit Number Related to Each Other?

Kiana collected 1,100 bottle caps. What is the relationship between the values of the digit 1 in each place?

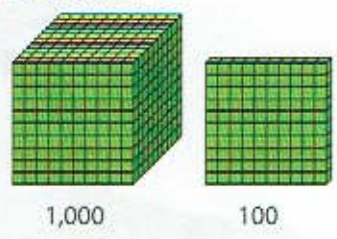
A place-value chart can help you examine the relationships between digits in a number.



B 1,100

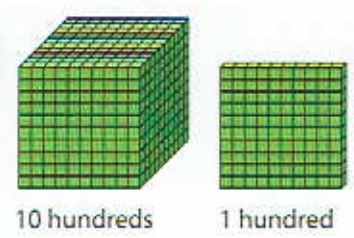
The first 1 is in the thousands place. Its value is 1,000.

The second 1 is in the hundreds place. Its value is 100.



C

How is 1,000 related to 100?

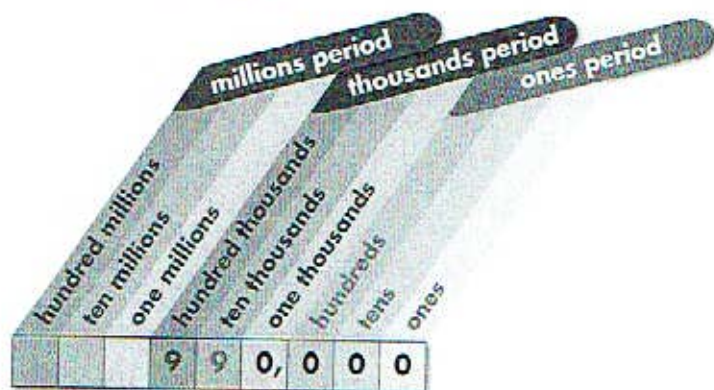


10 hundreds are equal to 1 thousand.

When two digits next to each other in a number are the same, the value of the digit on the left is always ten times as great as the digit on the right.

Convince Me! © **MP.8 Generalize** Is the value of the first 4 ten times as great as the value of the second 4 in 4,043? Explain. What can you generalize about the value of digits that are two places apart in a number?

Another Example!



The first 9 is in the hundred-thousands place. Its value is 900,000.

The second 9 is in the ten-thousands place. Its value is 90,000.

The value of the first 9 is ten times as great as the value of the second 9.

☆ Guided Practice

Do You Understand?

1. **MP.2 Reasoning** Is the value of the first 7 ten times as great as the value of the second 7 in 7,027? Explain.
2. **MP.3 Construct Arguments** Is the value of the 8 in 87,503 ten times as great as the value of the 7? Explain.

Do You Know How?

For 3 and 4, name the values of the given digits in each number. What is the relationship between the values of the given digits?

3. the 5s in 5,500
4. the 2s in 220,400

☆ Independent Practice ☆

For 5–12, name the values of the given digits in each number.

5. the 8s in 1,884
6. the 4s in 44,391
7. the 9s in 79,951
8. the 2s in 220,000
9. the 5s in 45,035
10. the 4s in 4,448
11. the 2s in 20,723
12. the 7s in 378,708

Math Practices and Problem Solving

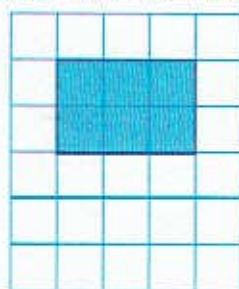
13. © **MP.3 Construct Arguments** What can you say about the 9s in 59,992?


14. © **MP.3 Critique Reasoning** Mia says in 2,222, all the digits have the same value. Is Mia correct? Explain.

15. **Number Sense** The Mississippi River flooded in 1927. In the number 1927, is the value of the 9 in the hundreds place ten times the value of the 2 in the tens place? Explain.

16. © **MP.3 Critique Reasoning** Vin says in 2,616, one 6 is 10 times as great as the other 6. Is he correct? Explain.

17. Describe 2 ways to find the area of the shaded rectangle.



 = 1 square unit

18. **Higher Order Thinking** In 881,588, how is the relationship between the first pair of 8s the same as the relationship between the second pair of 8s?

© Common Core Assessment

19. Which group of numbers shows the values of the 7s in 57,707?

- (A) 70,000; 7,000; 700
- (B) 70,000; 700; 70
- (C) 7,000; 700; 7
- (D) 700; 70; 7

20. In which number is the value of the red digit ten times as great as the value of the green digit?

- (A) 886,628
- (B) 886,628
- (C) 886,628
- (D) 886,628

Name _____



Solve & Share

Find the products for 3×4 , 3×40 , 3×400 , and $3 \times 4,000$. *Solve these problems using any strategy you choose.*

Step Up to Grade 4

Lesson 2

Mental Math:
Multiply by Multiples
of 10, 100, and 1,000

I can ...

find the products of multiples of 10, 100, and 1,000 using mental math and place-value strategies.

© Content Standard 4.NBT.B.5
Mathematical Practices MP.2, MP.4, MP.7

You can look for relationships in the products. How can finding the first product help you find the remaining products? *Show your work in the space above!*



Look Back! © MP.7 Look for Relationships What pattern do you notice in the products?

How Can You Multiply by Multiples of 10, 100, and 1,000?

A

Calculate 3×50 , 3×500 , and $3 \times 5,000$ using basic multiplication facts and properties of operations. Then, calculate 6×50 , 6×500 , and $6 \times 5,000$.

The Associative Property of Multiplication states that you can change the grouping of the factors and the product stays the same.



B Find 3×50 , 3×500 , and $3 \times 5,000$.

$$\begin{aligned} 3 \times 50 &= 3 \times (5 \times 10) \\ &= (3 \times 5) \times 10 \\ &= 15 \times 10 \\ &= 150 \end{aligned}$$

Shortcut rule for 3×50 :
Multiply 3×5 and write **1 zero**.
So, $3 \times 50 = 150$

Shortcut rule for 3×500 :
Multiply 3×5 and write **2 zeros**.
 $3 \times 500 = 1,500$

Shortcut rule for $3 \times 5,000$:
Multiply 3×5 and write **3 zeros**.
 $3 \times 5,000 = 15,000$

C Find 6×50 , 6×500 , and $6 \times 5,000$.

Apply the shortcut rules:

$$\begin{aligned} 6 \times 5 &= 30 \\ 6 \times 50 &= 300 \\ 6 \times 500 &= 3,000 \\ 6 \times 5,000 &= 30,000 \end{aligned}$$

When the product of a basic fact ends in zero, the product will have an extra zero. The extra zero is part of the basic fact that you use.

Convince Me! **MP.2 Reasoning** How many zeros will be in the product of 5×200 ? Explain.

Another Example!

Use place value to calculate 5×50 , 5×500 , and $5 \times 5,000$.


5×50 is 5 groups of 5 tens or 5×5 tens. 5×5 tens is 25 tens, or 250.

5×500 is 5 groups of 5 hundreds or 5×5 hundreds. 5×5 hundreds is 25 hundreds, or 2,500.

$5 \times 5,000$ is 5 groups of 5 thousands or 5×5 thousands. 5×5 thousands is 25 thousands, or 25,000.

☆ Guided Practice

Do You Understand?

1.  **MP.7 Look for Relationships**
 Show how you can use the basic fact $4 \times 5 = 20$ to determine the product of 4×500 .
2. Bob said $5 \times 800 = 400$. Explain his error.

Do You Know How?

For 3–5, use strategies you learned to help multiply.

3. $7 \times 3 =$ _____
 $7 \times 30 =$ _____
 $7 \times 300 =$ _____
 $7 \times 3,000 =$ _____
4. 6×60
5. 6×300

☆ Independent Practice ☆

Leveled Practice For 6–11, find each product.

- | | | |
|--------------------------|--------------------------|--------------------------|
| 6. $9 \times 40 =$ _____ | 7. $2 \times 90 =$ _____ | 8. $7 \times 80 =$ _____ |
| $9 \times 400 =$ _____ | $2 \times 900 =$ _____ | $7 \times 800 =$ _____ |
| $9 \times 4,000 =$ _____ | $2 \times 9,000 =$ _____ | $7 \times 8,000 =$ _____ |

9. $3 \times 3,000$

10. 800×6

11. 2×70

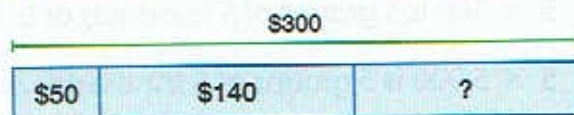
You can use place-value strategies to calculate each product.



Math Practices and Problem Solving

12. **Math and Science** The Amazon River is about 5 times the length of the Rhine River. If the Rhine River is about 800 miles long, about many miles long is the Amazon River? Write and solve an equation.

13. **MP.4 Model with Math** Sophia, Emma, and Jacob are trying to raise \$300 for a local shelter. Sophia raised \$50. Emma raised \$140. How much money does Jacob need to raise in order to reach their goal?



For 14 and 15, use the table at the right.

14. There are 7 boys and 2 adults in Ethan's scout troop. How much did the troop pay for tickets to the amusement park?
15. **Higher Order Thinking** Mason visited Happyland with her dad and a friend. They bought tickets for Plan C. How much money did they save on the two children's tickets for Plan C instead of buying separate tickets for Plan A and Plan B?

DATA	Happyland Ticket Prices		
	Plans	Adult	Child
	Plan A Waterpark	\$50	\$40
	Plan B Amusement Park	\$40	\$30
	Plan C Combined A + B	\$80	\$60

Common Core Assessment

16. Isabella says 7×900 is greater than $9 \times 7,000$. Noah says 7×900 is less than $9 \times 7,000$.

Part A

Without calculating the answer, explain how to use place-value strategies or the Associative Property to find which is greater.

Part B

Without calculating the answer, explain how to use relationships or basic facts to find which is less.

Name _____



Solve & Share

The principal of a school needs to order supplies for 20 new classrooms. Each classroom needs the following items: 20 desks, 30 chairs, and 40 pencils. How many of each item does the principal need to order? *Solve these problems using any strategy you choose.*

You can use structure. What basic facts can you use to help solve these problems? How are they related? *Show your work in the space below!*



Step Up to Grade 4

Lesson 3

Mental Math: Multiply Multiples of 10

I can ...

use place-value strategies or patterns to multiply by multiples of 10.

© Content Standards 4.NBT.B.5, 4.OA.A.3
Mathematical Practices MP.2, MP.7

Look Back! © MP.7 **Look for Relationships** Look at the factors and products. What patterns do you notice?

How Can You Multiply by Multiples of 10?

A

The number of visitors of each age group for the Sunny Day Amusement Park are shown below. How many adults under 65 visit the park in 20 days? How many children visit the park in 30 days? How many adults 65 and over visit the park in 50 days?

You can use a pattern to multiply by a multiple of 10.



B Adults under 65 in 20 days

Find $20 \times 60 = a$.

To multiply 20×60 , use a pattern.

$$\begin{aligned} 2 \times 6 &= 12 \\ 20 \times 6 &= 120 \\ 20 \times 60 &= 1,200 \end{aligned}$$

$a = 1,200$

1,200 adults under 65 visit the park in 20 days.

C Children in 30 days

Find $30 \times 80 = c$.

The number of zeros in the product is the total number of zeros in both factors.

$$\begin{array}{ccccccc} 30 & \times & 80 & = & 2,400 \\ \uparrow & & \uparrow & & \uparrow \uparrow \\ 1 \text{ zero} & & 1 \text{ zero} & & 2 \text{ zeros} \end{array}$$

$c = 2,400$

2,400 children visit the park in 30 days.

D Adults 65 and over in 50 days

Find $50 \times 40 = a$.

If the product of a basic fact ends in zero, include that zero in the count.

$$\begin{aligned} 5 \times 4 &= 20 \\ 50 \times 40 &= 2,000 \end{aligned}$$

$a = 2,000$

2,000 adults 65 and over visit the park in 50 days.

Convince Me! © **MP.7 Look for Relationships** Write the missing numbers for each of the following. Explain.

_____ $\times 7 = 280$ _____ $\times 40 = 1,600$ _____ $\times 50 = 3,000$

Another Example!

Find 30×80 . The product has the same number of zeros as in both factors.

$$\begin{aligned} 30 \times 80 &= 3 \times 10 \times 8 \times 10 \\ &= (3 \times 8) \times (10 \times 10) \\ &= 24 \times 100 \\ &= 2,400 \end{aligned}$$

You can use the Commutative and Associative Properties of Multiplication to see why the patterns with zeros work!



☆ Guided Practice

Do You Understand?

1. **MP.2 Reasoning** Find 50×80 . How many zeros are in the product?
2. Fewer people go the park in September than March. There are 30 days in September. If 50 people visit the park each day in September, how many people visit for the whole month?

Do You Know How?

For 3–8, use basic facts and place-value strategies to find each product.

- | | |
|-------------------|-------------------|
| 3. 10×90 | 4. 40×10 |
| 5. 80×10 | 6. 50×90 |
| 7. 60×40 | 8. 70×70 |

☆ Independent Practice ☆

For 9–16, use basic facts and place-value strategies to find each product.

- | | | | |
|--------------------|--------------------|--------------------|--------------------|
| 9. 10×50 | 10. 40×20 | 11. 70×30 | 12. 20×90 |
| 13. 40×80 | 14. 30×60 | 15. 30×20 | 16. 90×80 |

For 17–22, find the missing factor.

- | | | |
|--|--|--|
| 17. $10 \times \underline{\hspace{2cm}} = 100$ | 18. $\underline{\hspace{2cm}} \times 20 = 1,400$ | 19. $\underline{\hspace{2cm}} \times 70 = 3,500$ |
| 20. $30 \times \underline{\hspace{2cm}} = 1,500$ | 21. $\underline{\hspace{2cm}} \times 80 = 5,600$ | 22. $50 \times \underline{\hspace{2cm}} = 3,000$ |

Math Practices and Problem Solving

23. **MP.2 Reasoning** The product of two factors is 3,200. If one of the factors is 40, what is the other factor? Explain.

24. **Algebra** There are 30 players on each high school football team. Explain how you can find the total number of players if there are 10 teams. Write and solve an equation.

25. Alan leaves the water running while brushing his teeth. He uses 2 gallons of water. He then uses 10 gallons of water to wash clothes. How many more quarts of water did Alan use while washing his clothes than brushing his teeth?



There are 4 quarts
in 1 gallon.

26. **MP.7 Look for Relationships** Emily walked 60 minutes each day for 80 days. Show how you can use basic facts to find how many minutes Emily walked.

27. **Higher Order Thinking** Explain why the product of 50 and 20 has three zeros when 50 and 20 each have one zero.

Common Core Assessment

28. Mr. Cantor travels 20 weeks a year for work. He is home the other 32 weeks. There are 7 days in 1 week. Which of the following expressions can Mr. Cantor use to mentally find the number of days he is home?

- (A) $(7 \times 2) + (3 \times 10)$
- (B) 7×100
- (C) $(7 \times 30) + (7 \times 10)$
- (D) $(7 \times 30) + (7 \times 2)$

29. Mrs. Cantor travels 22 weeks a year for work. She is home the other 30 weeks. There are 7 days in a week. Which of the following basic facts can Mrs. Cantor use to help find the number of days she is home?

- (A) 2×7
- (B) 3×7
- (C) $22 + 7$
- (D) $30 + 7$

Name _____



Solve & Share

There are 10 teams in a baseball league. Each team has 25 players. How many players are in the league? *Solve this problem using any strategy you choose.*

Step Up to Grade 4

Lesson 4

Use Models to Multiply 2-Digit Numbers by Multiples of 10

I can ...

use models and properties of operations to help multiply.

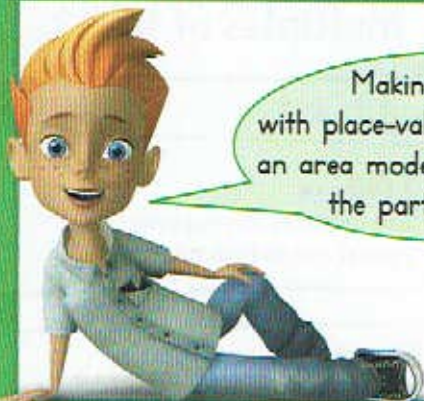
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Mathematical Practices MP.1, MP.2, MP.4, MP.5



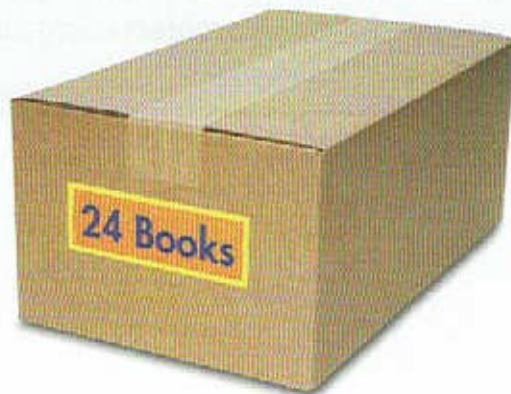
You can use appropriate tools. Place-value blocks or grid paper can help you visualize the problem. *Show your work in the space above!*

Look Back! © MP.2 Reasoning How do the digits in a number being multiplied by 10 compare to the digits in the product? Explain.

Max's Moving Company has boxes for packing books. If each box holds 24 books, how many books would fit into 20 boxes?



Making an array with place-value blocks or using an area model helps to visualize the partial products.



B Use place-value blocks to make an array.

Find $20 \times 24 = b$.



400

80

$$\begin{array}{r} 400 \\ + 80 \\ \hline 480 \end{array}$$

Partial Products

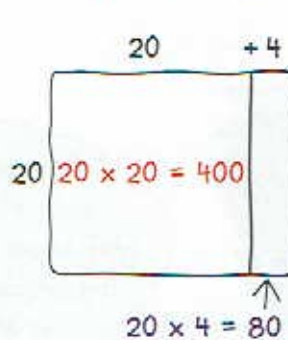
$$20 \times 24 = 480$$

$$b = 480$$

480 books will fit into 20 boxes.

C Draw an area model.

Find $20 \times 24 = b$.



$$\begin{array}{r} 400 \\ + 80 \\ \hline 480 \end{array}$$

Partial Products

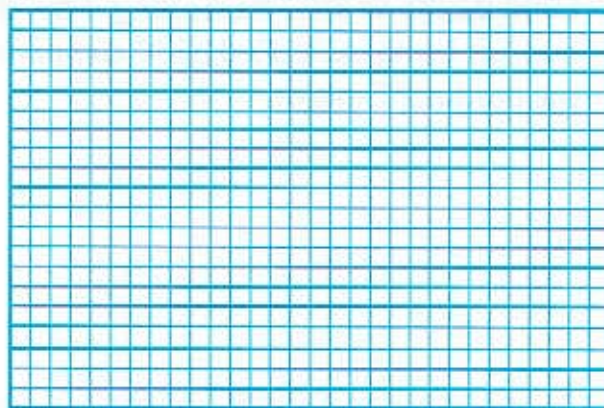
$$20 \times 24 = 480$$

$$b = 480$$

480 books will fit into 20 boxes.

Convince Me! © MP.4 Model with Math

Use the grid to show an array for 20×27 . What is the product?



Name _____

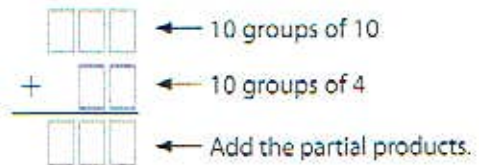
★ Guided Practice

Do You Understand?

1. **MP.4 Model with Math** Draw an area model to show 20×22 . Then find the product.

Do You Know How?

2. The place-value block array shows 10×14 . Find the product.



★ Independent Practice

For 3–12, use place-value blocks, area models, or arrays to find each product.

3. 10×25



4. 10×12



You can use a sheet of grid paper to draw arrays or area models.

5. 20×31

6. 20×46

7. 30×25

8. 40×34

9. 10×63

10. 50×16

11. 70×21

12. 80×46

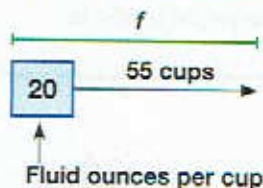
☆ Math Practices and Problem Solving ☆

13. **Algebra** In the last 3 months of the year, an electronics store sold 908 cell phones. How many cell phones did the store sell in December? Write and solve an equation.

Cell Phone Sales	
Month	Number Sold
October	319
November	257

14. The store sold 34 power cords. Each power cord sells for \$30. What was the total cost of the cords?

15. **MP.4 Model with Math** During a basketball game, 55 cups of lemonade were sold. Each cup holds 20 fluid ounces. How many total fluid ounces of lemonade were sold?



16. **Higher Order Thinking** There are 58 third graders at a school. Each third grader writes 4 book reports. Show how to use the Distributive Property to find the number of book reports written.

© Common Core Assessment

17. William sold 17 magazine subscriptions for \$40 each. Abigail sold 28 subscriptions for \$30 each. Use arrays or area models to explain who raised more money.

Representations can help you write a complete explanation.

