



SUMMER LEARNING

Keep your
brain healthy
over **summer** break!




SUMMER
m *Å* **+** *π*
CHALLENGE

Getting Ready
for
4th Grade



Numbers to Ten Thousand

Essential  How can you represent numbers to ten thousand in different ways?

The Thousand Bolts factory uses boxes of 1,000 bolts to fill crates of 10,000 bolts. How many boxes of 1,000 bolts are in each crate of 10,000?

Count by thousands to find the total number of boxes of 1,000 bolts that will go into each crate. Then count the boxes.

1,000	2,000						
1	2						

So, there are _____ boxes of 1,000 bolts in each crate of 10,000.

Example Suppose the factory has no crates and must use case of 100 to fill an order for 3,200 bolts. How many cases will it pack?

There are _____ cases of 100 in 1,000.

So, there are _____ cases of 100 in 3,000.

There are _____ cases of 100 in 200.

Add the cases. $30 + 2 = \underline{\quad}$.

So, the factory will pack 32 cases of 100.



Turn and Talk What if the factory had boxes of 1,000 and bags of 10 but no cases of 100? Explain how it could pack the order for 3,200 bolts.

Name _____

Check Understanding

- 1 The Thousand Bolts factory has an order for 3,140 bolts. How can it pack the order using the fewest packages?

- 2 Suppose the bolt factory has only cases and bags. How can it pack the order for 3,140 bolts?

- 3 Suppose the bolt factory has only boxes and bags. How can it pack the order for 3,140 bolts?



Remember

- 1 box = 1,000 bolts
- 1 case = 100 bolts
- 1 bag = 10 bolts

On My Own

Complete the packing chart. Use the fewest packages possible. When there is a zero, use the next smaller size package.

	Number of Bolts Ordered	Crates (Ten Thousands)	Boxes (Thousands)	Cases (Hundreds)	Bags (Tens)	Single Bolts (Ones)
4	5,267		5			
5	2,709			7	0	
6	5,619					
7	8,416		0		1	6
8	3,967		0		0	

- 9 The Thousand Bolts factory used 9 boxes, 9 cases, and 10 bags to fill an order. How many bolts did they pack?

Compare 3- and 4-Digit Numbers

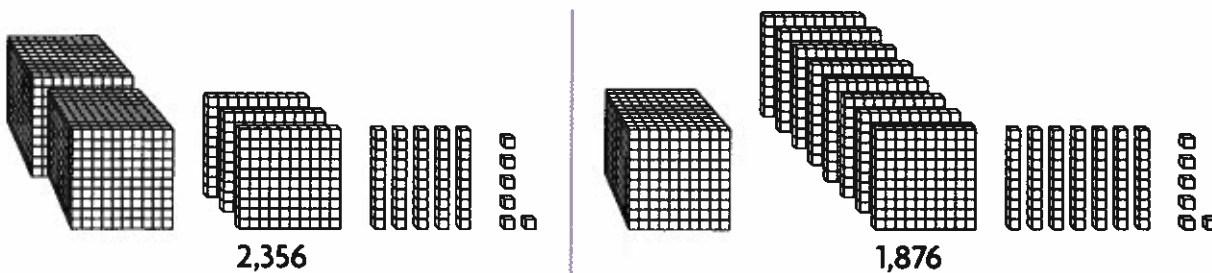
Essential ? What are some ways you can compare numbers?

Cody collected 2,365 pennies. Jasmine collected 1,876 pennies. Who collected more pennies?

You can compare numbers in different ways to find which number is greater.

One Way Use base-ten blocks.

Compare the values of the blocks in each place-value position from left to right. Keep comparing the blocks until the values are different.



2 thousands is greater than 1 thousand. So, $2,365 > 1,876$.

So, Cody collected more pennies.

Read Math

Read $<$ as *is less than*.

Read $>$ as *is greater than*.

Read $=$ as *is equal to*.

Another Way Use place value.

Compare 7,376 and 7,513.

Compare digits in the same place-value position from left to right.

THOUSANDS	HUNDREDS	TENS	ONES
7,	3	7	6
7,	5	1	3

STEP 1 Compare the thousands. The digits are the same.

STEP 2 Compare the hundreds. $3 < 5$

So, $7,376 < 7,513$.



Turn and Talk Explain how you know that 568 is less than 4,786.

Name _____

Check Understanding

- 1 Compare 2,351 and 3,018. Which number has more thousands? Which number is greater?
-

Compare the numbers. Write $<$, $>$, or $=$ in the \bigcirc .

2 835 \bigcirc 853

3 7,891 \bigcirc 7,891

4 809 \bigcirc 890

5 3,834 \bigcirc 3,483

On My Own

Compare the numbers. Write $<$, $>$, or $=$ in the \bigcirc .

6 219 \bigcirc 2,119

7 2,517 \bigcirc 2,715

8 5,154 \bigcirc 5,154

9 5,107 \bigcirc 5,105

10 1,837 \bigcirc 837


11 9,832 \bigcirc 9,328

- 12 Nina has a dictionary with 1,680 pages. Trey has a dictionary with 1,490 pages. Use $<$, $>$, or $=$ to compare the number of pages in the dictionaries.
-

- 13 The odometer in Ed's car shows it has been driven 8,946 miles. The odometer in Beth's car shows it has been driven 5,042 miles. Which car has been driven more miles?
-

- 14 Avery said that she is 3,652 days old. Tamika said that she is 3,377 days old. Who is younger?
-

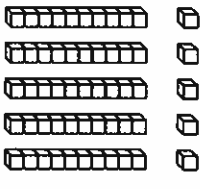
Multiply with 11 and 12

Essential  What strategies can you use to multiply with 11 and 12?

It takes Bobby 11 minutes to walk to school each morning.
How many minutes will Bobby spend walking to school
in 5 days?

Multiply. $5 \times 11 =$ 

One Way Break apart
an array.

Make 5 rows of 11. 
Use the 10s facts
and the 1s facts
to multiply with 11.

$$5 \times (10 + 1)$$

$$5 \times 10 = \underline{\quad} \quad 5 \times 1 = \underline{\quad}$$

$$5 \times 11 = \underline{\quad} + \underline{\quad}$$

$$5 \times 11 = \underline{\quad}$$

Another Way Find a pattern.

Look at the list.

$$1 \times 11 = 11$$

Notice the product has
the same factor in the
tens and ones places.

$$2 \times 11 = 22$$

$$3 \times 11 = 33$$

$$4 \times 11 = 44$$

To find 5×11 , write
the first factor in the
tens and ones places.

$$5 \times 11 = \underline{\quad}$$

$$6 \times 11 = 66$$

$$7 \times 11 = 77$$

$$8 \times 11 = 88$$

$$9 \times 11 = 99$$

$$5 \times 11 = 55$$

So, Bobby will spend _____ minutes walking to school.

Try This! What if it took Bobby 12 minutes to walk to school?
How many minutes will he spend walking to school in 5 days?

Break apart the factor 12.

$$5 \times (10 + 2)$$

$$5 \times 10 = 50 \quad 5 \times 2 = 10$$

$$5 \times 12 = \underline{\quad} + \underline{\quad} = \underline{\quad}$$

Double a 6s fact.

Find the 6s product. $5 \times 6 = 30$

Double that product. $\underline{\quad} +$

$$\underline{\quad} = \underline{\quad}$$

So, $5 \times 12 =$ _____. Bobby will spend _____ minutes
walking to school.

Check Understanding

- 1 How can you use the 10s facts and the 2s facts to find 4×12 ?



Find the product.

- 2 $9 \times 11 =$ _____ | 3 $7 \times 12 =$ _____ | 4 _____ = 4×11

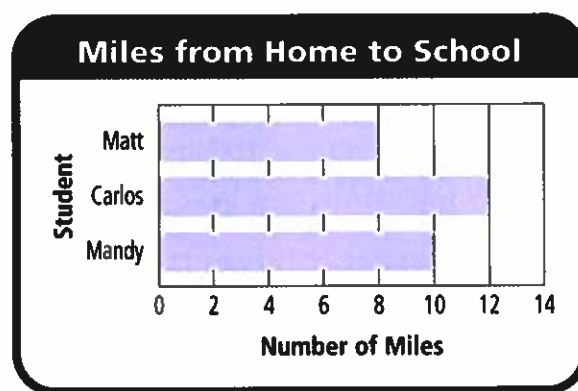
On My Own

Find the product.

- 5 _____ = 11×6 | 6 _____ = 12×2 | 7 $0 \times 11 =$ _____
 8 _____ = 6×12 | 9 $8 \times 12 =$ _____ | 10 $7 \times 11 =$ _____
 11 $12 \times 9 =$ _____ | 12 $3 \times 12 =$ _____ | 13 $1 \times 12 =$ _____

Use the graph for 14–15.

- 14 The graph shows the number of miles some students travel to school each day. How many miles will Carlos travel to school in 5 days?



- 15 Suppose that Mandy takes 9 trips to school, and Matt takes 11 trips to school. Who travels more miles? **Explain.**

Divide with 11 and 12

Essential  What strategies can you use to divide with 11 and 12?

Tara collects 60 postcards. She arranges them in 12 equal stacks. How many postcards are in each stack?

Divide. $60 \div 12 = \square$

One Way Use a multiplication table.

Since division is the inverse of multiplication, you can use a multiplication table to find a quotient.

Think of a related multiplication fact.

$$12 \times \square = 60$$

- Find the row for the factor 12.
- Look across to find the product, 60.
- Look up to find the unknown factor.
- The unknown factor is 5.

Since $12 \times 5 = 60$, then

$$60 \div 12 = \underline{\quad}$$

Another Way Use repeated subtraction.

- Start with 60.
- Subtract 12 until you reach 0.
- Count the number of times you subtract 12.

$$\begin{array}{r}
 60 \\
 - 12 \\
 \hline
 48
 \end{array}
 \begin{array}{r}
 48 \\
 - 12 \\
 \hline
 36
 \end{array}
 \begin{array}{r}
 36 \\
 - 12 \\
 \hline
 24
 \end{array}
 \begin{array}{r}
 24 \\
 - 12 \\
 \hline
 12
 \end{array}
 \begin{array}{r}
 12 \\
 - 12 \\
 \hline
 0
 \end{array}$$

You subtracted 12 five times.

$$60 \div 12 = \underline{\quad}$$

So, there are 5 postcards in each stack.

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144



Turn and Talk What other strategies can you use to divide?

Check Understanding

- 1 Use the multiplication table on page P271 to find 99×11 .

_____ Think: What is a related multiplication fact?

Find the unknown factor and quotient.

2 $11 \times \square = 66$

$\square = \underline{\hspace{2cm}}$

$66 \div 11 = \square$

$\square = \underline{\hspace{2cm}}$

3 $2 \times \square = 24$

$\square = \underline{\hspace{2cm}}$

$24 \div 2 = \square$

$\square = \underline{\hspace{2cm}}$

4 $3 \times \square = 33$

$\square = \underline{\hspace{2cm}}$

$33 \div 3 = \square$

$\square = \underline{\hspace{2cm}}$

5 $12 \times \square = 72$

$\square = \underline{\hspace{2cm}}$

$72 \div 12 = \square$

$\square = \underline{\hspace{2cm}}$

On My Own

Find the unknown factor and quotient.

6 $11 \times \square = 55$

$\square = \underline{\hspace{2cm}}$

$55 \div 11 = \square$

$\square = \underline{\hspace{2cm}}$

7 $12 \times \square = 48$

$\square = \underline{\hspace{2cm}}$

$48 \div 12 = \square$

$\square = \underline{\hspace{2cm}}$

8 $8 \times \square = 96$

$\square = \underline{\hspace{2cm}}$

$96 \div 8 = \square$

$\square = \underline{\hspace{2cm}}$

9 $8 \times \square = 88$

$\square = \underline{\hspace{2cm}}$

$88 \div 8 = \square$

$\square = \underline{\hspace{2cm}}$

Find the quotient.

10 $11 \div 11 = \underline{\hspace{2cm}}$

11 $77 \div 7 = \underline{\hspace{2cm}}$

12 $\underline{\hspace{2cm}} = 60 \div 12$

13 $\underline{\hspace{2cm}} = 22 \div 11$

14 $108 \div 9 = \underline{\hspace{2cm}}$

15 $84 \div 12 = \underline{\hspace{2cm}}$

16 $36 \div 3 = \underline{\hspace{2cm}}$

17 $\underline{\hspace{2cm}} = 96 \div 12$

18 $12 \div 12 = \underline{\hspace{2cm}}$

Compare. Write $<$, $>$, or $=$ for each \bigcirc .

19 $96 \div 8 \bigcirc 96 \div 12$

20 $77 \div 11 \bigcirc 84 \div 12$

21 $99 \div 11 \bigcirc 84 \div 7$

- 22 Justin printed 44 posters to advertise the garage sale. He gave 11 friends the same number of posters to display around the neighborhood. How many posters did Justin give each friend?
- _____

Name _____

Multiplication and Division Relationships

Essential  How can you write related multiplication and division equations for 2-digit factors?

Multiplication and division are inverse operations.

Megan has a rose garden with the same number of bushes planted in each of 4 rows. There are 48 bushes in the garden. How many bushes are in each row of Megan's garden?

One Way

Make an array.

$$48 \div 4 = \square$$

Count 48 tiles. Make 4 rows by placing 1 tile in each row.

Continue placing 1 tile in each of the 4 rows until all the tiles are used.

Draw the array you made.



There are _____ tiles in each row.

$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

So, there are _____ bushes in each row of Megan's garden.

Another Way

Write related equations.

$$48 \div 4 = \square$$

Think: 4 times what number equals 48?

$$4 \times \underline{\hspace{2cm}} = 48$$

You can check your answer using repeated addition.

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Write related equations.

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = 48$$

$$48 \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$



Turn and Talk How can you tell if two equations are related?

Name _____

Check Understanding

- 1 Complete the related equations for this array.

$3 \times 11 = 33$

$33 \div 3 = 11$



Complete the related multiplication and division equations.

2 $1 \times 11 = \underline{\quad}$

$\underline{\quad} \times 1 = 11$

$11 \div 1 = \underline{\quad}$

$\underline{\quad} \div 11 = 1$

3 $5 \times \underline{\quad} = 60$

$12 \times 5 = \underline{\quad}$

$\underline{\quad} \div 5 = 12$

$60 \div \underline{\quad} = 5$

4 $\underline{\quad} \times 11 = 77$

$\underline{\quad} \times 7 = 77$

$77 \div \underline{\quad} = 11$

$\underline{\quad} \div 11 = 7$

On My Own

Complete the related multiplication and division equations.

5 $\underline{\quad} \times 12 = 84$

$\underline{\quad} \times 7 = 84$

$\underline{\quad} \div 7 = 12$

$84 \div \underline{\quad} = 7$

6 $6 \times \underline{\quad} = 66$

$11 \times \underline{\quad} = 66$

$66 \div 6 = \underline{\quad}$

$66 \div 11 = \underline{\quad}$

7 $12 \times 8 = \underline{\quad}$

$8 \times \underline{\quad} = 96$

$96 \div \underline{\quad} = 8$


$96 \div 8 = \underline{\quad}$

- 8 Megan cut 108 roses to make flower arrangements. She made 9 equal arrangements. How many roses were in each arrangement?

- 9 Megan put 22 roses in a vase. She cut the same number of roses from each of 11 different bushes. How many roses did she cut from each bush?

Name _____

Use Multiplication Patterns

Essential  How can you multiply with 10, 100, and 1,000?

Mrs. Goldman ordered 4 boxes of yo-yos for her toy store. Each box had 100 yo-yos. How many yo-yos did Mrs. Goldman order?

Use a basic fact and a pattern to multiply.

Factors	Products	
4×1	$= 4$	Think: Use the basic fact $4 \times 1 = 4$. Look for a pattern of zeros.
4×10	$= 40$	
4×100	$= 400$	

So, Mrs. Goldman ordered 400 yo-yos.

Try This! Use a basic fact and a pattern to find the products.

A. $1 \times 3 = 3$

$10 \times 3 = \underline{\quad}$

B. $5 \times 1 = 5$

$5 \times 10 = 50$

$5 \times 100 = \underline{\quad}$

$5 \times 1,000 = \underline{\quad}$



Turn and Talk When multiplying $9 \times 1,000$, how many zeros will be in the product? **Explain.**

Name _____

Check Understanding

1 Explain how to use a basic fact and a pattern to find 6×100 .

Use a basic fact and a pattern to find the products.

2 $7 \times 10 =$ _____

$7 \times 100 =$ _____

$7 \times 1,000 =$ _____

3 $10 \times 5 =$ _____

$100 \times 5 =$ _____

$1,000 \times 5 =$ _____

4 $3 \times 10 =$ _____

$3 \times 100 =$ _____

$3 \times 1,000 =$ _____

On My Own

Use a basic fact and a pattern to find the products.

5 $2 \times 10 =$ _____

$2 \times 100 =$ _____

$2 \times 1,000 =$ _____

6 $10 \times 8 =$ _____

$100 \times 8 =$ _____

$1,000 \times 8 =$ _____

7 $9 \times 10 =$ _____

$9 \times 100 =$ _____

$9 \times 1,000 =$ _____

Find the product.

8 $10 \times 8 =$ _____

9 $6 \times 100 =$ _____

10 _____ $= 4 \times 100$

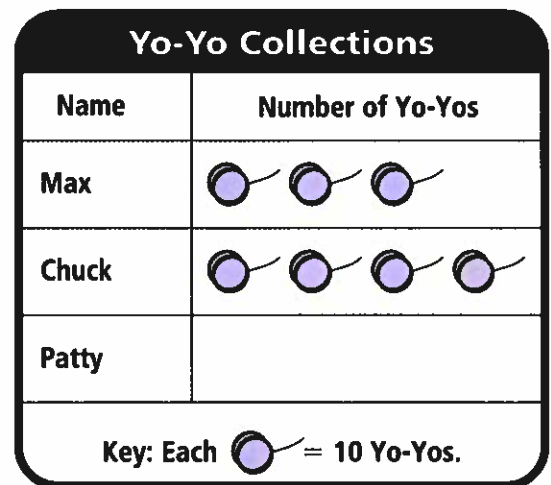
11 $1,000 \times 4 =$ _____

12 _____ $= 1,000 \times 3$

13 $9 \times 100 =$ _____

Use the picture graph.

14 Patty has 20 fewer yo-yos in her collection than Chuck. Draw yo-yos in the picture graph. to show the number of yo-yos in Patty's collection. Explain your answer.



Name _____

Use Models to Multiply Tens and Ones

Essential  How can you use base-ten blocks and area models to model multiplication with a 2-digit factor?

Three groups of 14 students toured the state capitol in Columbus, Ohio.
How many students toured the capitol in all?

Multiply. $3 \times 14 =$

One Way

STEP 1

Model 3×14 with base-ten blocks.



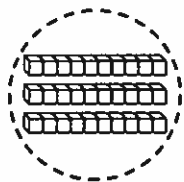
3 rows of 10



3 rows of 4

STEP 2

Multiply the tens and ones. Record each product.



$$3 \times 10 = \underline{\quad} \quad 3 \times 4 = \underline{\quad}$$

STEP 3

Add the products.

$$30 + 12 = 42$$

$$3 \times 14 = 42$$

So, 42 students toured the capitol.

Another Way

STEP 1

Model 3×14 with an area model.



3 rows of 10

3 rows of 4

STEP 2

Multiply the tens.

$$3 \times 10 = \underline{\quad}$$

Multiply the ones.

$$3 \times 4 = \underline{\quad}$$

STEP 3

Add the products.

$$30 + 12 = 42$$

$$3 \times 14 = 42$$



Turn and Talk How are the two ways to find a product alike?

Check Understanding

- 1 One way to model 18 is 1 ten 8 ones. How can knowing this help you find 4×18 ?

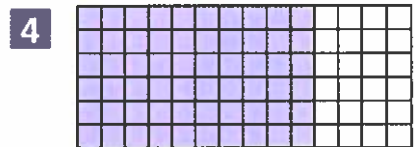
Find the product. Show your multiplication and addition.



$$3 \times 16 = \square$$



$$5 \times 13 = \square$$



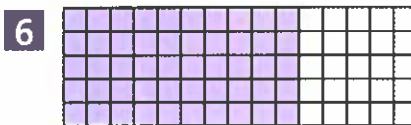
$$6 \times 14 = \square$$

On My Own

Find the product. Show your multiplication and addition.



$$4 \times 13 = \square$$



$$5 \times 15 = \square$$



$$3 \times 17 = \square$$

- 8 Randy rakes yards for \$5 an hour. How much money does he earn if he works for 12 hours? _____

Model Division with Remainders

Essential  How can you use counters to model division with remainders?

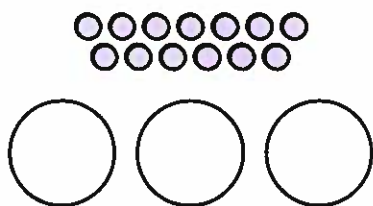
Madison has 13 seeds. She wants to put the same number of seeds in each of 3 pots. How many seeds can Madison put into each pot? How many seeds are left over?

Activity Materials

counters

Use counters to find $13 \div 3$.

STEP 1 Use 13 counters. Draw 3 circles for the 3 pots.



STEP 2 Place one counter in each group until there are not enough to put 1 more in each of the groups.



There are _____ counters in each circle.

There is _____ counter left over.

$13 \div 3$ is 4 with 1 left over.

The quotient is 4.

The remainder is 1.

So, Madison can put 4 seeds in each pot. There is 1 seed left over.

After dividing a group of objects into equal groups as large as possible, there may be some left over. The amount left over is called the **remainder**.

Try This! What if Madison wants to put 4 seeds in each pot. How many pots will Madison need? How many seeds will be left over?



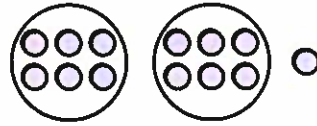
Turn and Talk Explain why you cannot have a remainder of 3 when you divide by 3.

Name _____

Check Understanding

- 1 Divide 13 counters into 2 equal groups.

There are _____ counters in each group,
and _____ counter left over.



Complete.

- 2 April divided 17 counters into 4 equal groups.

There are _____ counters in each
group and _____ counter left over.

- 3 Divide 20 counters into groups
of 6.

There are _____ groups and
_____ counters left over.

On My Own Complete.

- 4 Divide 14 pencils into 3 equal
groups.

There are _____ pencils in each
group and _____ pencils left over.

- 5 Divide 60 pieces of chalk into
groups of 8.

There are _____ groups and
_____ pieces of chalk left over.

Find the total number of objects.

- 6 There are 2 shoes in each of
6 groups and 1 shoe left over.

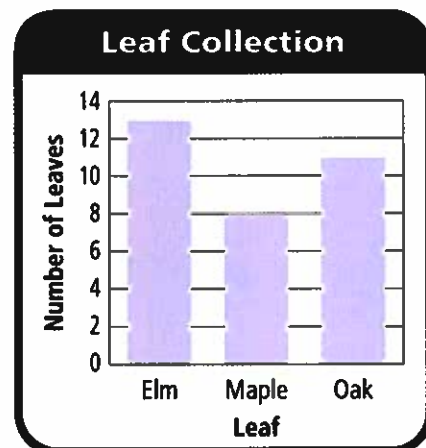
There are _____ shoes in all.

- 7 There are 4 apples in each of
3 groups and 2 apples left over.

There are _____ apples in all.

Use the bar graph for 8.

- 8 If Hector divides the oak leaves evenly
into 4 display boxes, how many leaves
will be in each box? How many leaves
will be left over?



Use Models to Divide Tens and Ones

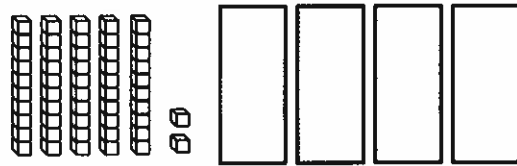
Essential  How can you model division with a 2-digit quotient?

Emma baked 52 muffins. She wants to put an equal number of muffins on each of 4 trays. How many muffins can she put on each tray?

Find $52 \div 4$.

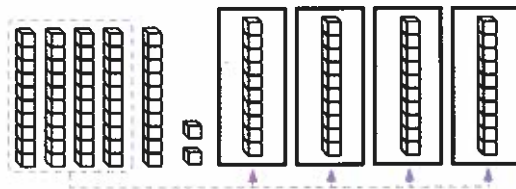
STEP 1

Use base-ten blocks to model the problem. Draw 4 rectangles to represent the 4 equal groups.



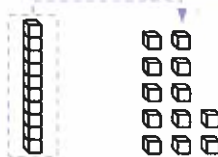
STEP 2

Share the tens. Place 1 ten in each group until there are not enough tens to put 1 more ten in each group.



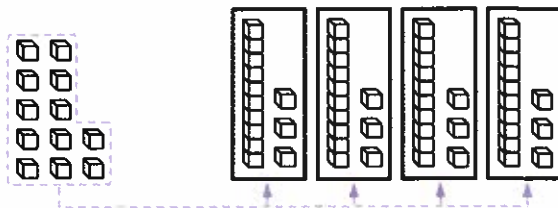
STEP 3

Regroup the remaining ten as ones. There are now 12 ones.



STEP 4

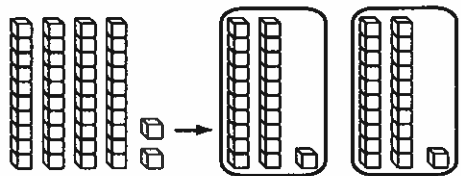
Share the ones. Place 1 one in each group until there are not enough ones to put 1 more one in each group.



So, Emma can put _____ muffins on each tray.



Turn and Talk How you can check your answer.

Check Understanding**1** Find $42 \div 2$.

- How many equal groups are there? _____
- How many tens go in each group? _____
- How many ones go in each group? _____
- The quotient is _____.

Use base-ten blocks and your MathBoard to divide.

2 $65 \div 5 =$ _____

3 $90 \div 3 =$ _____

4 $88 \div 4 =$ _____

On My Own

Use base-ten blocks and your MathBoard to divide.

5 $72 \div 2 =$ _____

6 $69 \div 3 =$ _____

7 $96 \div 6 =$ _____

8 Roger has 84 trading cards. He wants to put an equal number in each of 3 boxes. How many cards will he put into each box?

9 Riley has 78 postcards. She wants to put 6 on each poster board. How many poster boards will she need?

Name _____

Model Tenths and Hundredths

Essential  How can you model and write fractions in tenths and hundredths?

You can use models to represent fractions in tenths and hundredths.

Example

A

STEP 1

This model has 10 equal parts. Each part is one **tenth**. Shade three parts out of ten equal parts.



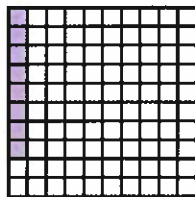
STEP 2

Write the fraction.
Think: Three tenths are shaded.

B

STEP 1

This model has 100 equal parts. Each part is one **hundredth**. Shade eight of one hundred equal parts.

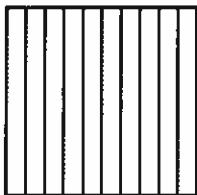


STEP 2

Write the fraction.
Think: Eight hundredths are shaded.

Try This!

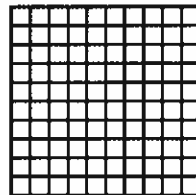
Shade the model to show nine of the ten equal parts.



Read: _____

Write: _____

Shade the model to show sixty-five of the hundred equal parts.



Read: _____

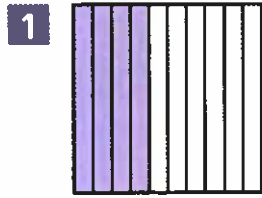
Write: _____



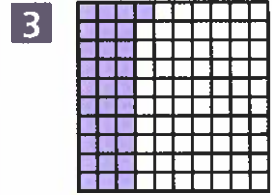
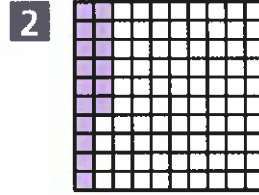
Turn and Talk Which number in a fraction represents the number of parts being counted, and which represents the number of equal parts in the whole?

Check Understanding

Write the fraction that names the shaded part.



Think: How many equal parts are shaded?

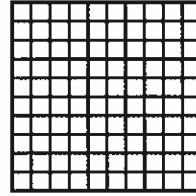


Shade to model the fraction. Then write the fraction in numbers.

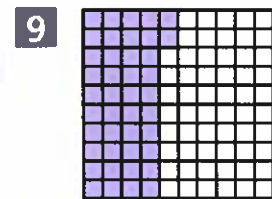
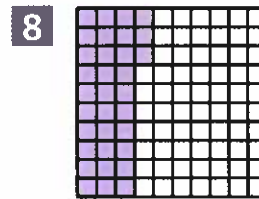
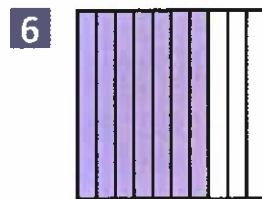
4 three tenths



5 twenty-three hundredths

**On My Own**

Write the fraction that names the shaded part.



10 Each player shot a basketball 10 times. Eric made 4 baskets. Write a fraction to represent the part of Eric's shots that were baskets.

11 Nina asked 100 students if they have a pet. Of the students, $\frac{19}{100}$ have a cat. How many students have a cat?

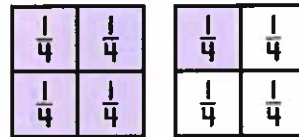
Fractions Greater Than One

Essential  When might you use a fraction greater than 1 or a mixed number?

Troy uses $\frac{1}{4}$ of a box of clay to make one model of a car. How many boxes of clay does he use to make 5 model cars?

Make a model.

- Draw squares divided into fourths to show the boxes of clay. Shade $\frac{1}{4}$ for the amount of clay Troy uses for each of the 5 model cars.



- Count the number of shaded parts.
There are _____ shaded parts.

- Write the fraction.

shaded parts

parts in the whole

Think: $\frac{4}{4} = 1$

One whole and one fourth are shaded.

Write: $1\frac{1}{4}$

Read Math

Read $1\frac{1}{4}$ as *one and one fourth*.

The number $\frac{5}{4}$ is a fraction greater than 1. A fraction greater than 1 can be written as a **mixed number**. A mixed number has a whole number and a fraction.

So, Troy uses $\frac{5}{4}$ or $1\frac{1}{4}$ boxes of clay to make 5 model cars.



Turn and Talk Why are $\frac{5}{4}$ and $1\frac{1}{4}$ equal?

Check Understanding

- 1 Each fraction circle is 1 whole. Write a mixed number for the parts that are shaded.

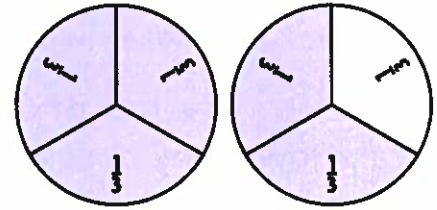
There are _____ parts shaded.

There are _____ equal parts in the whole.

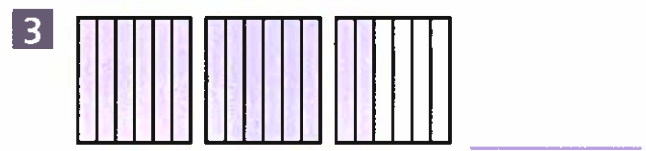
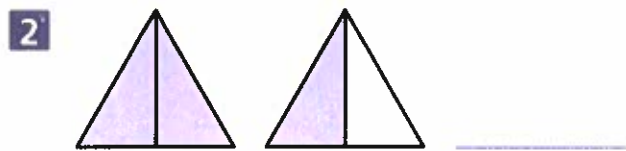
Fraction: shaded parts
 parts in a whole

There is _____ whole shaded and _____ thirds shaded.

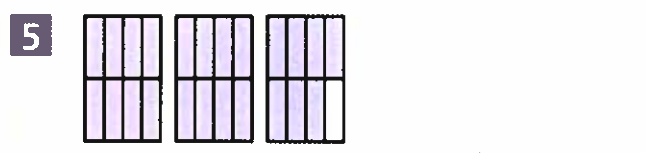
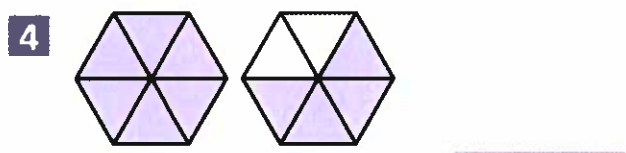
The mixed number is _____.



Each shape is 1 whole. Write a mixed number for the parts that are shaded.

**On My Own**

Each shape is 1 whole. Write a mixed number for the parts that are shaded.



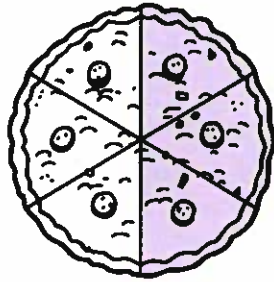
- 6 Luis played $\frac{6}{4}$ games of soccer this season. How can you write the number of games Luis played as a mixed number?
- _____

- 7 Marci used $\frac{7}{3}$ packages of juice drinks. How can you write the number of packages of juice drinks Marci used as a mixed number?
- _____

Equivalent Fractions

Essential  How can you use models to find equivalent fractions?

Bart brought an apple pie to the picnic. He cut the pie into 6 equal pieces and 3 pieces were eaten.



- What fraction names the amount of the pie that was eaten? _____
- What fraction names the amount of the pie that was left over? _____

Bart divided each of the leftover pieces into 2 equal pieces. Draw a dashed line on each piece to show how Bart divided it.

After you divide each sixth-size piece into 2 equal pieces, there will be 12 pieces in the whole pie. The pieces are called twelfths.

- What fraction names the total number of pieces Bart has left? _____

$\frac{3}{6}$ and $\frac{6}{12}$ are equivalent since they both name the same amount of the pie.



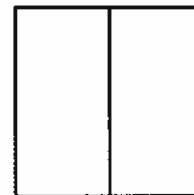
Turn and Talk How do the size of the parts compare in the equivalent fractions? How do the number of parts compare?

Check Understanding

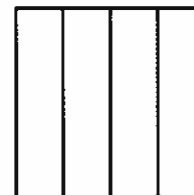
Use models to find the equivalent fraction.

1 $\frac{1}{2} = \frac{\square}{4}$

This model shows a whole divided into 2 equal parts.
Shade the model to show the fraction $\frac{1}{2}$.



This model shows a whole divided into 4 equal parts.
Shade the model to show a fraction equivalent to $\frac{1}{2}$.

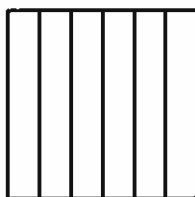
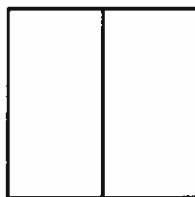


So, $\frac{\square}{2} = \frac{\square}{4}$.

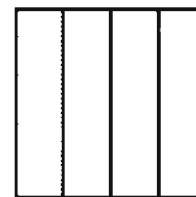
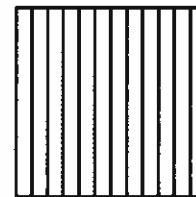
On My Own

Use models to find the equivalent fraction.

2 $\frac{1}{2} = \frac{\square}{6}$



3 $\frac{9}{12} = \frac{\square}{4}$



4 A loaf of bread has 12 slices.
Micky ate $\frac{1}{4}$ of the loaf. Write the
fraction of the loaf Micky ate in
twelfths.

5 Sandra used $\frac{1}{4}$ of a meter of
string to make a bracelet. Write
the fraction of a meter of string
Sandra used in eighths.


Name _____

Equivalent Fractions on a Multiplication Table

Essential  How can you generate equivalent fractions using a multiplication table?

CONNECT You can use a model to show the equivalent fractions $\frac{1}{2}$, $\frac{2}{4}$, and $\frac{3}{6}$.

Think: The same amount is shaded in the models; the second model and third model have more parts shaded.


 $\frac{1}{2} = \frac{2}{4} = \frac{3}{6}$

You can use a multiplication table for other equivalent fractions for $\frac{1}{2}$.

Activity What are some equivalent fractions for $\frac{1}{2}$?

Materials ■ multiplication table

- Shade the row for the numerator of the fraction $\frac{1}{2}$. The numerator is 1.
- Shade the row for the denominator of the fraction $\frac{1}{2}$. The denominator is 2.
- Look across the rows for numerator 1 and denominator 2.

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30

Write the products with the numerator 1 as a factor. Then write the products with the denominator 2 as a factor. The first three are done for you.

numerator \longrightarrow $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{\square}{8}$
 denominator \longrightarrow

- What do you notice about the products from the column for 1 to the column for 2?
The numerator and denominator both increase by a factor of ____.
- What do you notice about the products from the column for 1 to the column for 3?
The numerator and denominator both increase by a factor of ____.

So, $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$, and $\frac{6}{12}$ are some equivalent fractions for $\frac{1}{2}$.



Turn and Talk Why is the arrangement of factors and products in a multiplication table helpful in finding equivalent fractions?

Check Understanding

Use a multiplication table to find equivalent fractions.

1 Write 3 equivalent fractions for $\frac{1}{3}$.

×	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30

- Shade the row for the numerator of the fraction $\frac{1}{3}$. The numerator is _____.
- Shade the row for the denominator of the fraction $\frac{1}{3}$. The denominator is _____.
- Look across the rows for numerator 1 and denominator 3.

Write the products with the numerator 1 as a factor. Then write the products with the denominator 3 as a factor.

$$\begin{array}{l} \text{numerator} \longrightarrow \\ \text{denominator} \longrightarrow \end{array} \frac{1}{3} = \frac{\square}{6} = \frac{\square}{\square} = \frac{\square}{\square}.$$

$$\text{So, } \frac{1}{3} = \frac{\square}{\square} = \frac{\square}{\square} = \frac{\square}{\square}$$

List 3 equivalent fractions.

2 $\frac{1}{6}$

3 $\frac{1}{4}$

On My Own

Use a multiplication table to find three equivalent fractions.


4 $\frac{2}{5}$

5 $\frac{3}{10}$

6 On Jan's soccer team, $\frac{1}{5}$ of the players are on the field. What are three equivalent fractions that name the part of the team on the field?
_____**7** Chen used $\frac{3}{4}$ of a carton of milk. What are three equivalent fractions that name the part of the carton of milk that Chen used?

Name _____

Same Size, Same Shape

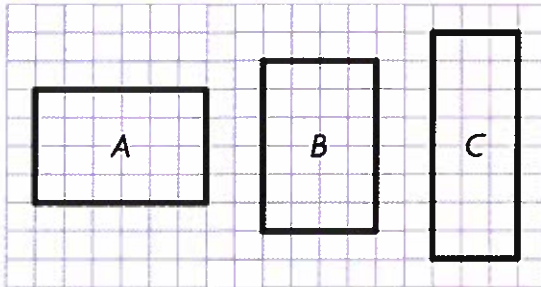
Essential  How can you identify shapes that have the same size and are shaped the same?

You can tell if two shapes have the same size and are shaped the same by comparing the matching parts of the shapes.

Activity Compare size and shape.

Materials ■ grid paper ■ scissors ■ ruler

STEP 1 Trace Shape A on grid paper. Cut out Shape A.



STEP 2 Move Shape A in any way to compare it to Shape B.

- Do the shapes match exactly? _____

Shape A and Shape B _____ the same size and _____ shaped the same.

STEP 3 Move Shape A in any way to compare it to Shape C.

- Do the shapes match exactly? _____

Shape A and Shape C _____ shaped the same.

Try This!

Since all the angles in Shapes A and B are the same, you can compare shapes by their matching sides.

The length of the shorter side of Shape A is _____ units.

The length of the shorter side of Shape B is _____ units.

The length of the longer side of Shape A is _____ units.

The length of the longer side of Shape B is _____ units.

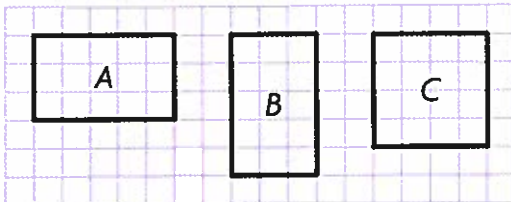
So, Shape A and Shape B have the _____ size and are shaped the _____.



Turn and Talk Explain how the size and shape of Shape A compares to the size and shape of Shape C.

Check Understanding

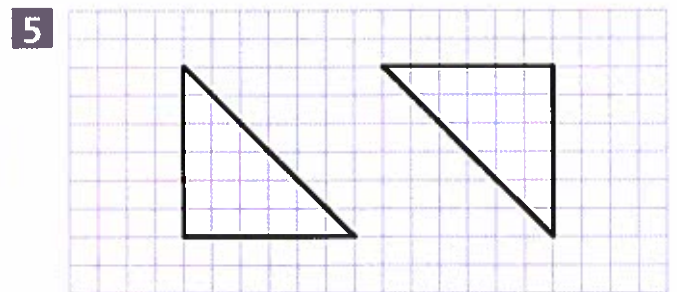
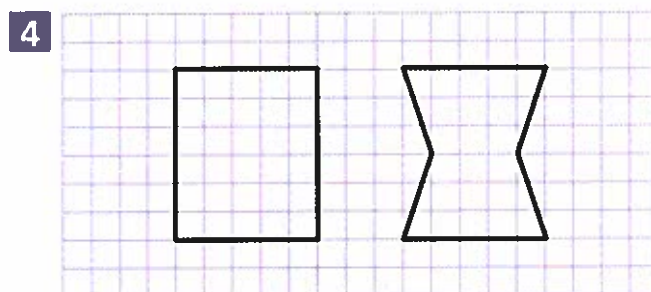
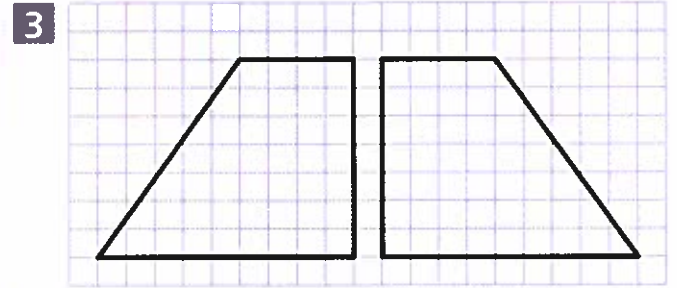
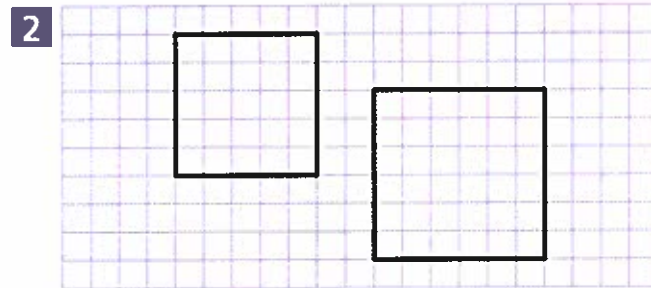
- 1 Which shape appears to have the same size and the same shape as Shape A?



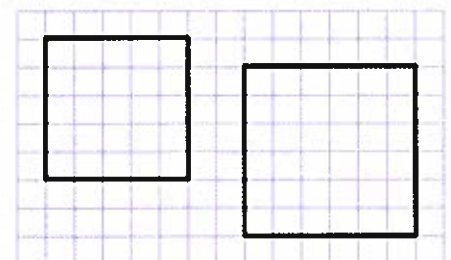
Think: If I trace Shape A and move it, which shape might it match exactly?

On my Own


Look at the first shape. Tell if it appears to have the same size and shape as the second shape. Write *yes* or *no*.



- 6 Kyra says that these shapes have the same size and same shape. Is she correct? Explain.



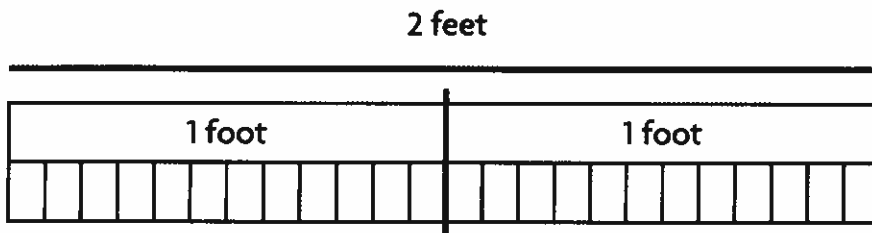
Change Customary Units of Length

Essential  How can you change feet to inches?

You can use different units to name the same length.

Erin has a shelf that is 2 feet long. How many inches long is Erin's shelf?

One Way Draw a picture.



 **Remember**
1 foot = 12 inches

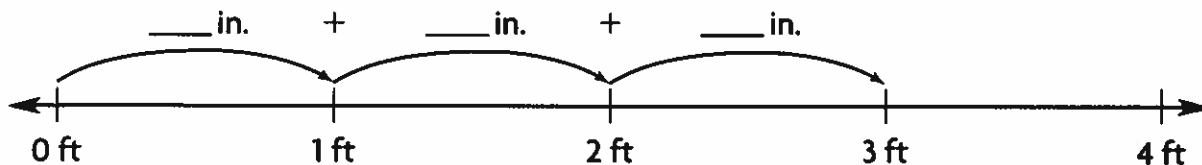
Draw one box to show each foot. Below each foot, draw 12 small boxes to show the number of inches in 1 foot. Count the total number of small boxes.

There are 24 small boxes in all. 2 feet = _____ inches.

So, Erin's shelf is _____ inches long.

Another Way Use a number line.

Erin has a table that is 3 feet long. How many inches long is her table? Draw a number line and label it in feet.



Draw a 12-inch jump for each foot. Add the lengths of the jumps to find the total number of inches.

3 feet = _____ inches.

So, Erin's table is _____ inches long.



Turn and Talk Why do you count by 12s when you rename feet as inches?

Name _____

Check Understanding

- 1 Use the number line. Rename 4 feet using inches.



4 feet = _____ inches

On My Own

Draw a picture.

- 2 Rename 7 feet using inches.



7 feet = _____ inches

- 3 Rename 6 feet using inches.



6 feet = _____ inches

- 4 Use the number line. Rename 8 feet using inches.




8 feet = _____ inches

- 5 Ella has a rope that is 10 feet long. How many inches long is the rope?

- 6 Jose is 5 feet tall. How many inches tall is he?

Change Metric Units of Length

Essential  How can you change meters to centimeters?

CONNECT You have learned to change feet to inches.

In this lesson, you will change meters to centimeters.

Gina needs a piece of wood that is 4 meters long to make a bench. How many centimeters of wood does Gina need?

Complete the table to show how the units are related.

STEP 1 Look for a pattern to complete the table.
Describe the relationship.

Meters	1	2	3	4	5
Centimeters	100	200	300	400	

 **Remember**

1 meter = 100 centimeters

To find the number of centimeters, add _____ centimeters for each meter.

STEP 2 Use the relationship to find the number of centimeters in 4 meters.

4 meters = _____ centimeters

So, Gina needs _____ centimeters of wood to make a bench.

Example

A. Change 6 meters to centimeters. **B. Change 8 meters to centimeters.**

Add 100 to _____ centimeters.

So, 6 meters = _____
centimeters.

Multiply 100 centimeters by _____.

So, 8 meters = _____
centimeters.



Turn and Talk What do you need to know in order to change from one unit of length to another?

Name _____

Check Understanding

- 1** How can you change 3 meters to centimeters?
Complete the table to show how the units are related.

Meters	1	2	3	4
Centimeters	100	200		400

To find the number of centimeters, add _____ centimeters for each meter.

So, 3 meters = _____ centimeters.

Find the unknown number.

2 2 meters = _____ centimeters

3 5 meters = _____ centimeters

On My Own

Complete the table.

4

Meters	3	4	5	6	7	8	9	10
Centimeters	300	400	500				900	

Find the unknown number.

5 8 meters = _____ centimeters

6 3 meters = _____ centimeters

- 7** Jorge needs 7 meters of wire for a garden fence. The wire is sold in centimeters. How many centimeters of wire does Jorge need?
- _____

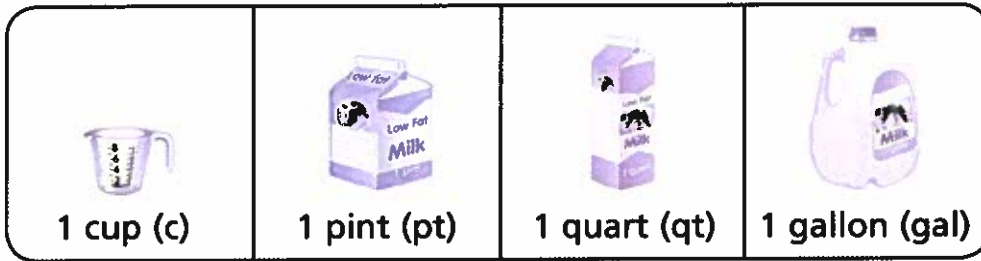
- 8** Wanda needs 9 meters of fabric to make curtains. She has 1,000 centimeters of fabric. Does Wanda have enough fabric to make the curtains? **Explain.**
- _____
- _____

Name _____

Estimate and Measure Liquid Volume

Essential  How are cups, pints, quarts, and gallons related?

You can use customary units to measure the amount of liquid a container will hold. Some customary units are **cup (c)**, **pint (pt)**, **quart (qt)**, and **gallon (gal)**.



Activity Show how cups, pints, quarts, and gallons are related.

Materials ■ cup, pint, quart, gallon containers ■ water

STEP 1 Estimate the number of cups it will take to fill the pint container. Record your estimate in the table.

STEP 2 Fill a cup and pour it into the pint container. Repeat until the pint container is full. Record the number of cups it took to fill the pint container.

STEP 3 Repeat Steps 1 and 2 for the quart and gallon containers.

Number of Cups			
	Number of Cups in a Pint	Number of Cups in a Quart	Number of Cups in a Gallon
Estimate			
Liquid Volume			



Turn and Talk Which unit would you use to measure the amount of water needed to fill an aquarium? Explain your choice.

Check Understanding

Choose the unit you would use to measure the amount of liquid the container will hold. Write *cup*, *pint*, *quart*, or *gallon*.

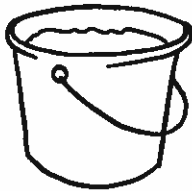
1



Think: A cup is small.

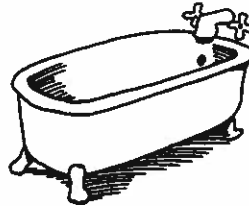
_____ cup _____

2



bucket

3



bathtub

4



glass

On My Own

Choose the unit you would use to measure the amount of liquid the container will hold. Choose the better unit of measure.

5 a dog's water bowl: 2 cups or 2 gallons

6 a juice box: 1 cup or 1 quart

7 Lila made 3 quarts of lemonade. How many cups of lemonade did she make?

8 Richard made 2 gallons of fruit punch for a party. How many 1-cup servings can he make?

Name _____

Estimate and Measure Weight

Essential  How are ounces and pounds related?

Weight is the measure of how heavy an object is. Customary units of weight include **ounce (oz)** and **pound (lb)**.



**Customary Units
of Weight**

$$1 \text{ pound} = 16 \text{ ounces}$$

1 slice of bread weighs about 1 ounce.

1 loaf of bread weighs about 1 pound.

Activity Show how ounces and pounds are related.

Materials ■ spring scale ■ classroom objects

STEP 1 Estimate the weight of the object shown in the table. Record your estimate.

STEP 2 Use a scale to measure the weight of the object to the nearest ounce or pound. Record the weight.

STEP 3 Repeat Steps 1 and 2 for each object.

 **Remember**

Include the unit when you record each estimate and measurement in your table.

Weight of Objects		
Object	Estimate	Weight
apple		
book		
pencil box		
tape dispenser		



Turn and Talk How do your estimates compare to the actual weights?

Check Understanding

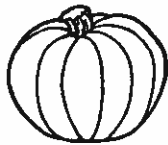
- 1 Which unit would you use to measure the weight of a grape? Write *ounce* or *pound*.

ounce

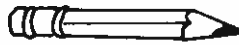
Think: A grape is a small, light object.

Choose the unit you would use to measure the weight. Write *ounce* or *pound*.

2



3



4



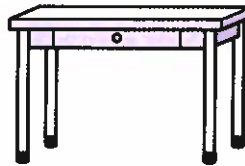
On My Own

Choose the unit you would use to measure the weight. Write *ounce* or *pound*.

5



6



7



- 8 Duane bought some oregano to use in a batch of pasta sauce. Which is a more likely weight for the oregano, 1 ounce or 1 pound?

- 9 Erin bought a bag of flour to use for baking dinner rolls. Did she buy 5 ounces of flour or 5 pounds of flour?
