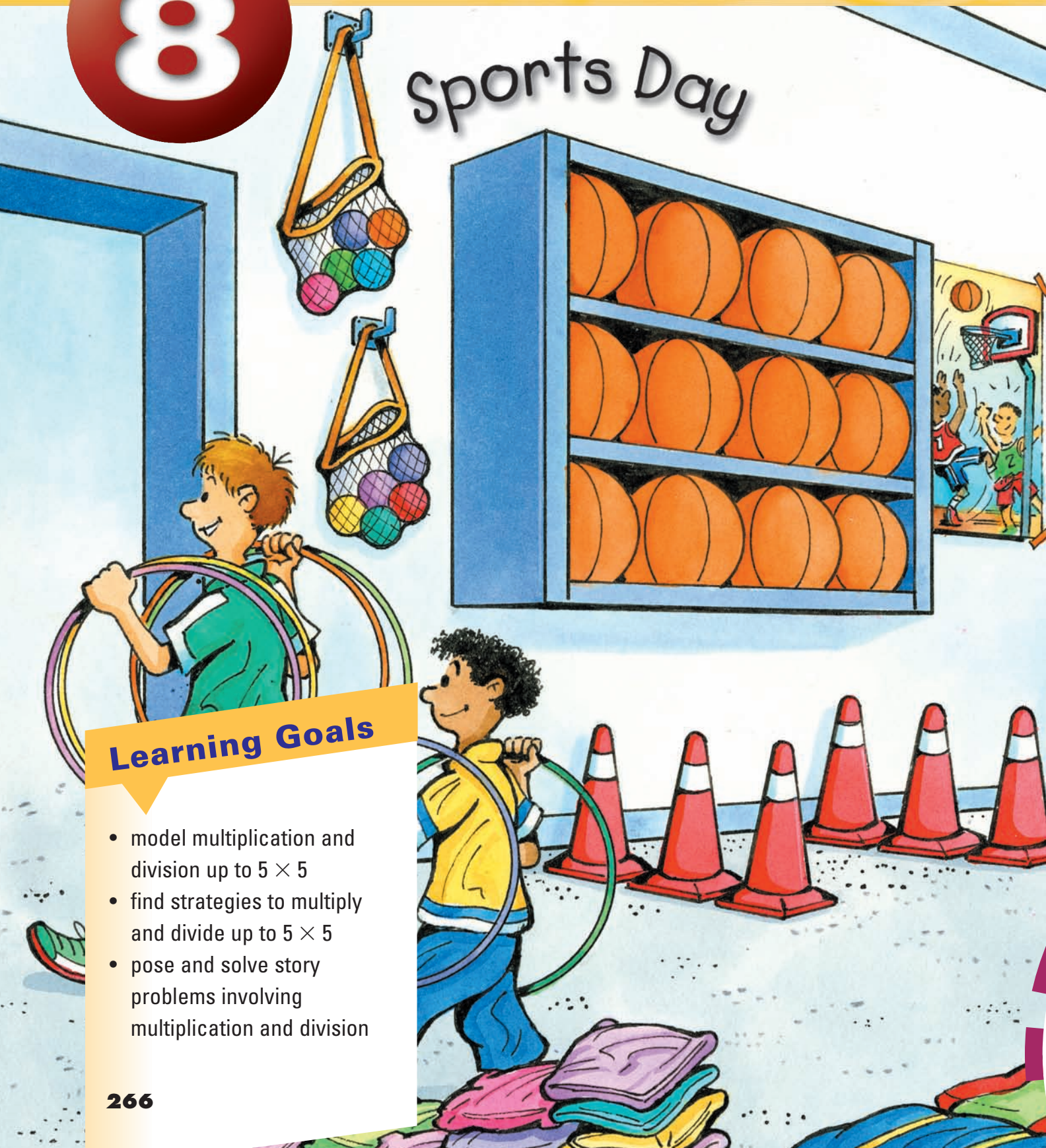


## Sports Day

### Learning Goals

- model multiplication and division up to  $5 \times 5$
- find strategies to multiply and divide up to  $5 \times 5$
- pose and solve story problems involving multiplication and division



# and Division

## Key Words

multiply

multiplication sentence

times

equal groups

array

product

divide

division sentence

divided by



The school is planning a Sports Day.  
The grade 3 class will get the equipment ready.

How many pylons are there?

How many basketballs?

How could you find out without counting  
each one?

## 1

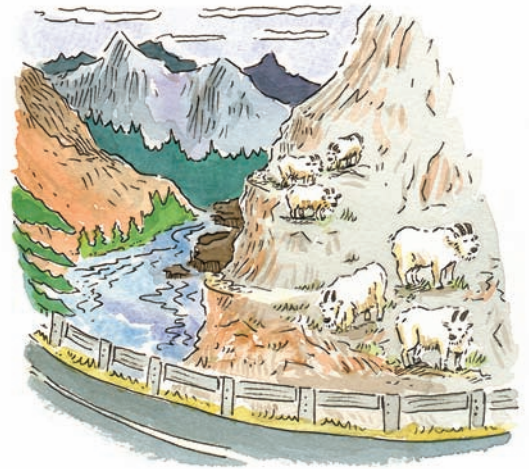
## Investigating Equal Groups

Yvan went to Jasper National Park with his family.

As they drove, he saw some mountain goats.

Yvan had only a few seconds to count the goats.

How can you find the number of goats without counting each one?



## Explore



You will need 5 sets of dot cards with 1 to 5 dots on each.

- Player 1, cover your eyes.
- Player 2,
  - select 2 to 5 cards with the same number of dots.
  - Place the cards face up on the table.
  - Ask your partner to open his eyes and tell how many dots there are.
- Take turns to repeat the activity.



## Show and Share

What strategies did you use to count the dots?

How can you find the total number of dots without counting each one?

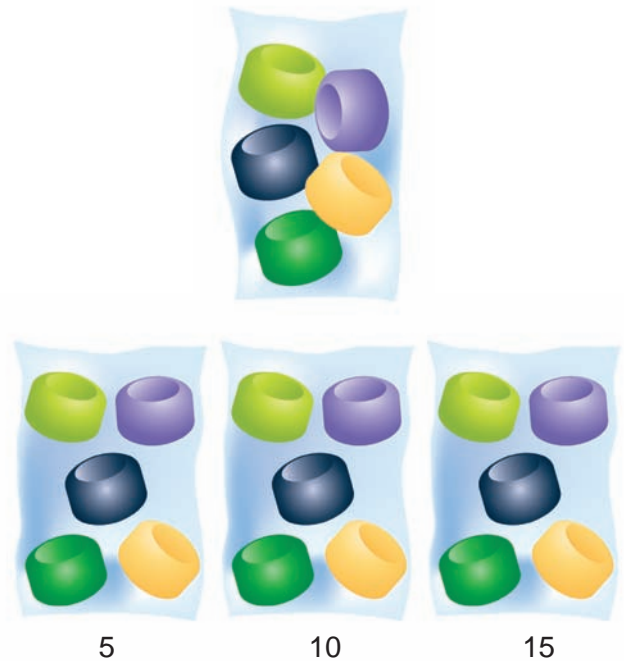
## Connect

**Equal groups** have the same number of things in each group.

These beads come in packages of 5.  
How many beads are in 3 packages?

Use equal groups to find how many.

- ▶ Draw the 3 packages.  
Show the number of beads in each package.
- ▶ Skip count to find the total number of beads.  
There are 15 beads in all.



We write "3 groups of 5 equals 15" as a **multiplication sentence**.

$$\begin{array}{ccccccc} 3 & \times & 5 & = & 15 \\ \uparrow & & \uparrow & & \uparrow \\ \text{Number} & & \text{Number} & & \text{Total number} \\ \text{of groups} & & \text{of things} & & \text{of things} \\ & & \text{in each} & & \\ & & \text{group} & & \text{The } \mathbf{product} \end{array}$$

We say, "3 **times** 5 equals 15."

I can show multiplication in different ways.

• • •

3 groups of 2 is 6.

$$3 \times 2 = 6$$



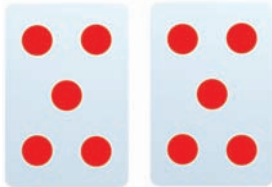
## Practice

1. Use dot cards or make a picture to show each set.

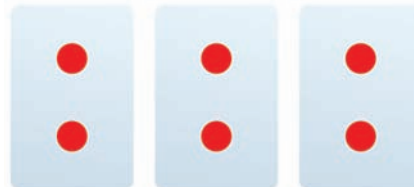
- a) 2 groups of 5
- b) 2 groups of 4
- c) 2 groups of 2
- d) 1 group of 5

2. Write a multiplication sentence for each picture.

a)



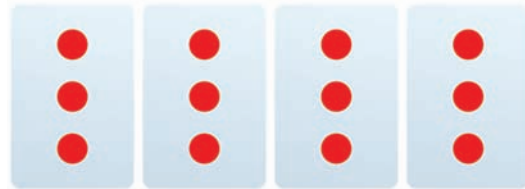
b)



c)



d)



3. Tennis balls come in packages of 3.

The gym teacher brought 3 packages for her class.

How many tennis balls did she bring?

Draw a picture and write a number sentence to show your solution.



4. Draw a picture to show the product of  $3 \times 4$ .

Write a story problem to go with your picture.

5. Find each product.

a)  $4 \times 2$

b)  $3 \times 4$

c)  $1 \times 3$

d)  $5 \times 1$

e)  $2 \times 5$

f)  $4 \times 5$

6. Multiply.

a)  $1 \times 4$

b)  $3 \times 3$

c)  $2 \times 3$

d)  $4 \times 3$

e)  $1 \times 5$

f)  $5 \times 2$

7. For which pictures can you write a multiplication sentence?  
Write the multiplication sentence when it is possible.  
If you cannot write a multiplication sentence, use words,  
pictures, or numbers to show why not.



8. a) Kayla uses straws and pipe cleaners to make triangles.  
She must not bend the straws.  
How many straws will Kayla need to make 4 triangles?  
b) Suppose Kayla makes 4 squares.  
Will she need more or fewer straws?  
How do you know?



9. Can you write a multiplication sentence for this picture?  
Explain why or why not.



**At Home**



**Reflect**

When can you use a multiplication sentence to find how many?  
Use words, pictures, or numbers to explain.

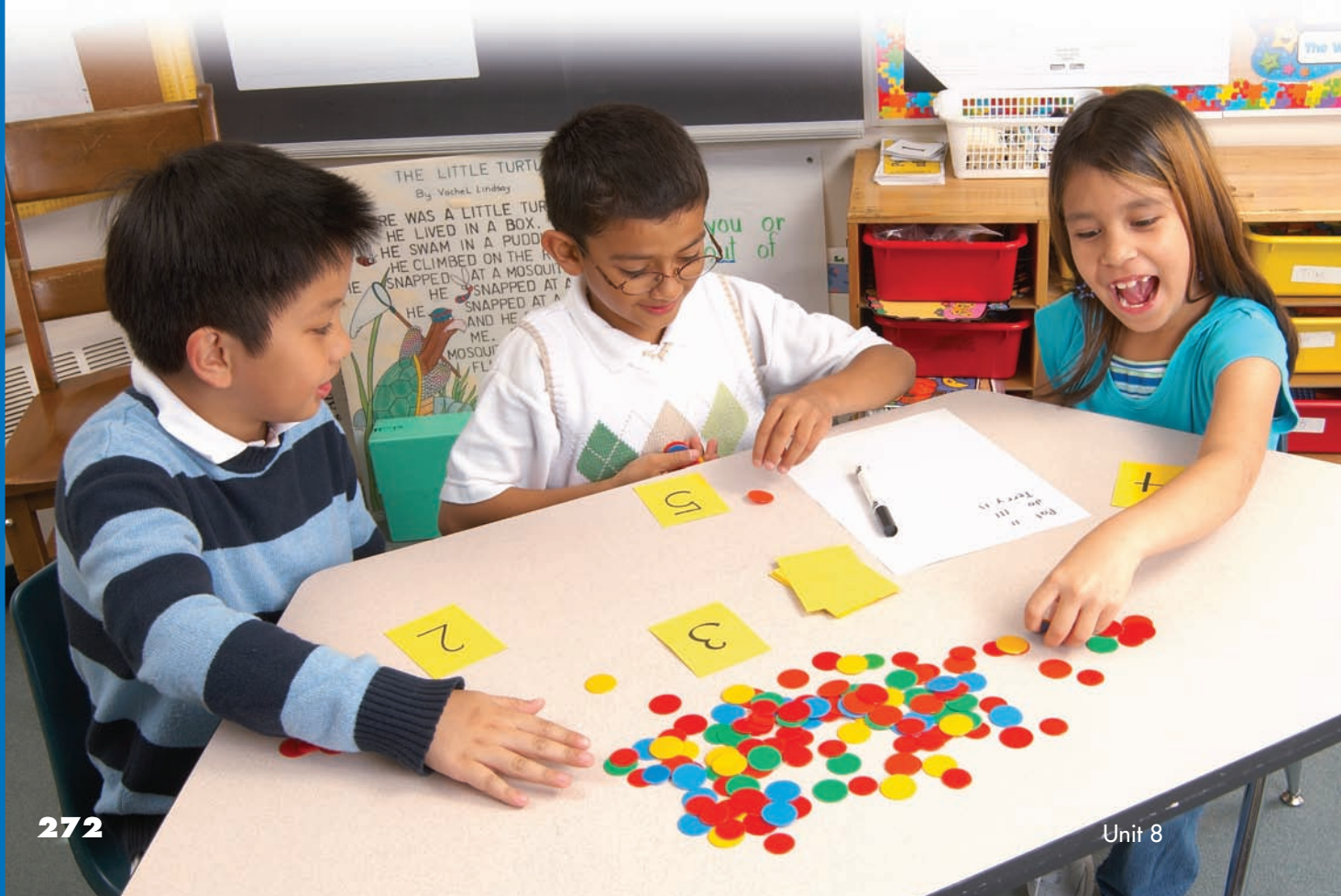
Find 3 things at home that come in equal groups.  
How many will there be in 2 groups? 3 groups?

# Closest to Twelve



You will need 75 counters and 4 sets of cards numbered 1 to 5. The object of the game is to get an answer closest to 12.

- Shuffle the cards and place them face down in a pile.
- Turn over the top card. Place it beside the pile. This card tells the number of groups of counters.
- Each player takes a card from the pile. This card tells the number of counters in each group.
- Take the counters you need. Write a multiplication sentence that shows how many counters you took.
- The player with the answer closest to 12 gets a point.
- If more than one player has an answer closest to 12, no one gets a point.
- The first player to get 5 points is the winner.



# 2

## Relating Multiplication and Repeated Addition

### Explore

Keera walks 4 blocks every school day. She adds each daily distance to find her weekly total.

How many blocks in all would she walk

- by Monday?
- by Tuesday?
- by Friday?

Record your work in pictures and in numbers.



### Show and Share

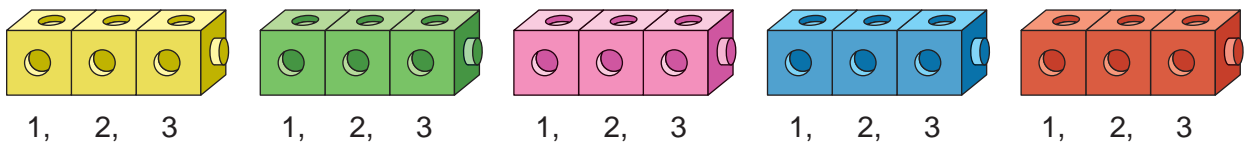
Share your work with a classmate.

How can you use addition to solve the problem?

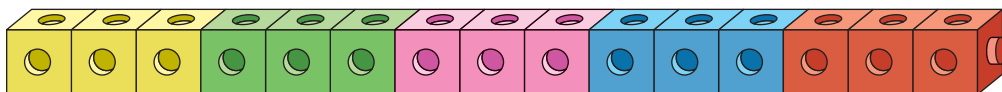
How can you use multiplication?

### Connect

You can use **repeated addition** to think about multiplication.



Join the Snap Cubes to make a long train.

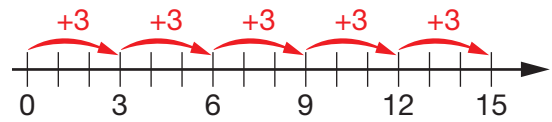


$$3 + 3 + 3 + 3 + 3 = 15$$

$$5 \times 3 = 15$$



A **number line** can also show multiplication as repeated addition.



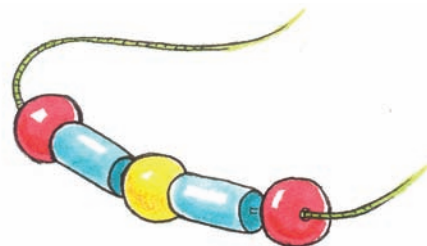
Add 3 each time.  
5 "times" 3 equals 15.

## Practice

- Show each repeated addition using Snap Cubes.  
Write a multiplication sentence for each addition sentence.
  - $1 + 1 + 1 + 1 = 4$
  - $5 + 5 = 10$
  - $4 + 4 + 4 + 4 + 4 = 20$
  - $0 + 0 + 0 = 0$
- Write an addition sentence for each multiplication sentence.  
Draw a picture to show the result.
  - $2 \times 3 = 6$
  - $5 \times 1 = 5$
  - $4 \times 3 = 12$
- For each picture, write an addition sentence and a multiplication sentence.
  - How many tickets do the children need?
  - How many toys fit on the shelves?



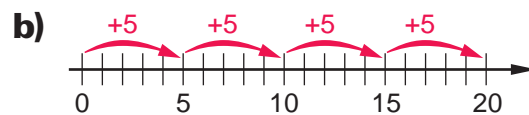
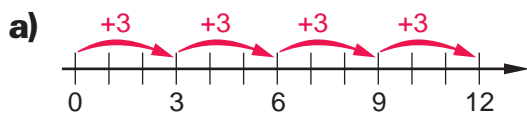
- Ken says you cannot use repeated addition for  $1 \times 5$ .  
Do you agree? Use words, pictures, or numbers to explain.
- Karla made a bead necklace to sell at the craft fair.  
She used 4 sets of beads like this.  
How many beads did Karla use?



6. Sia read the same number of books each school day this week. How many books did she read in all if she read
- 1 book each day?
  - 2 books each day?
  - 3 books each day?
  - 4 books each day?
  - 5 books each day?
- What patterns do you notice?



7. Write an addition sentence and a multiplication sentence for each number line.



8. Karen and 3 of her friends are hoop dancers. Each dancer uses 5 hoops for a special dance. How many hoops are used in all? Show your answer using pictures, words, or numbers.
9. Create a story problem for each question. Solve each problem using words, pictures, and numbers.
- a)  $3 \times 3$       b)  $5 + 5 + 5$       c)  $2 \times 5$       d)  $1 + 1 + 1 + 1$



10. Draw a picture for each question. Write the number sentence for each. How are the 2 number sentences the same? How are they different?
- Add: 4 and 5
  - Multiply: 4 and 5

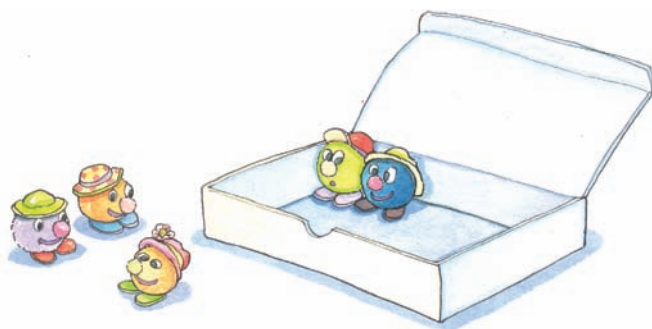
## Reflect

When can you use multiplication as a shortcut for adding?  
When can you not?

## 3

## Using Arrays to Multiply

Jesse's class is raising money for hunger relief. The children are making pompom people to sell. They have different size boxes. They want to pack the pompom people in equal rows in the boxes.

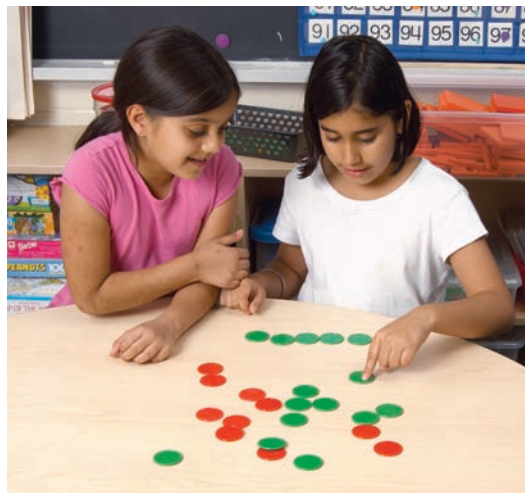


## Explore



You will need 25 counters for each pair.

- Find ways to pack up to 25 pompom people in equal rows. Use counters to show each way.
- Record each way you find.
  - Tell the number of rows.
  - Tell the number of pompom people in each row.
  - Tell the number of pompom people that will fit in the box.

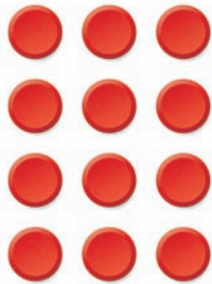


## Show and Share

Share your answers with another pair of classmates. See if they found any answers different from yours.

## Connect

An **array** is an arrangement of objects in equal rows.



This is a 4-by-3 array.  
There are 4 equal rows with  
3 counters in each row.  
 $4 \times 3 = 12$

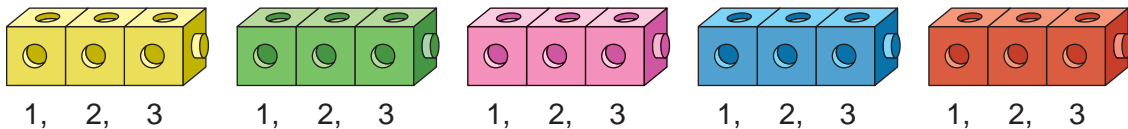


This is a 2-by-2 array.  
There are 2 equal rows with  
2 counters in each row.  
 $2 \times 2 = 4$



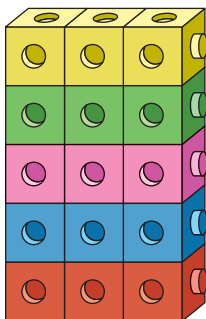
This is a 1-by-4 array.  
There is 1 row with  
4 counters in the row.  
 $1 \times 4 = 4$

We know that we can think of multiplication as repeated addition.



$$3 + 3 + 3 + 3 + 3 = 15$$
$$5 \times 3 = 15$$

We can arrange these Snap Cubes to make an array.



This is a 5-by-3 array.  
There are 5 equal rows with  
3 Snap Cubes in each row.  
 $5 \times 3 = 15$

# Practice

1. Write a multiplication sentence for each array.

a)



b)



c)



d)



2. There are 20 desks in a classroom. The teacher wants to move the desks from small groups into rows. He wants the same number of desks in each row. Write multiplication sentences to show how the desks could be arranged.



3. Sergio wants to grow tomato plants in his garden. He puts 5 plants in each row. How many rows does he need to plant to have at least 12 plants?

4. Use grid paper or counters to make an array for each sentence.

a)  $1 \times 1 = 1$

b)  $2 \times 2 = 4$

c)  $3 \times 3 = 9$

d)  $4 \times 4 = 16$

e)  $5 \times 5 = 25$

What do you notice about the shape of each array? Explain.

5. Use counters or grid paper. Make an array to find each product.

a)  $2 \times 3$

b)  $4 \times 3$

c)  $3 \times 5$

d)  $3 \times 4$

e)  $5 \times 1$

f)  $2 \times 4$

g)  $2 \times 5$

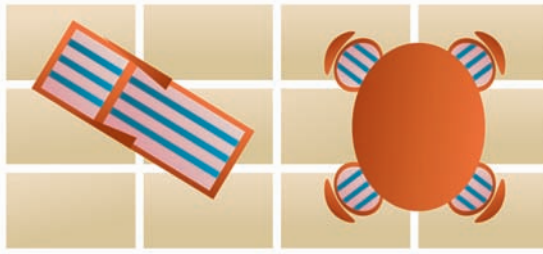
h)  $3 \times 2$

i)  $4 \times 1$



6. Write a multiplication sentence for each picture.  
Explain your thinking.

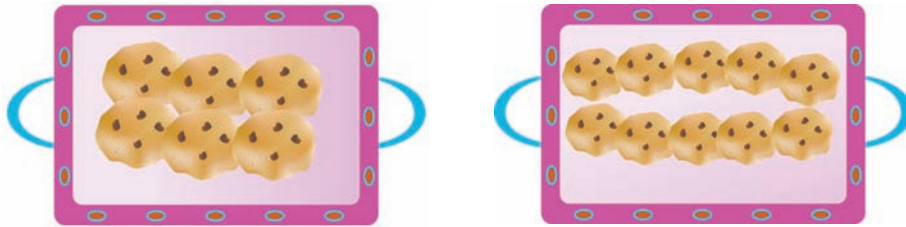
a) How many tiles are in the whole patio?



b) How many pieces are in the whole puzzle?



7. a) Bakers use arrays to count the cookies in each batch.  
Write a multiplication sentence for each tray of cookies.



b) The baker decided to make more cookies.  
He doubled the number of rows on each tray.  
What happened to the number of cookies?  
Will this always happen? Explain.

8. Make up a multiplication problem about something in an array.  
Trade problems with a classmate. Solve the problem.

### Reflect

How is using arrays to multiply like using equal groups?  
How is it different?

# Relating Multiplication Sentences

## 4

### Explore



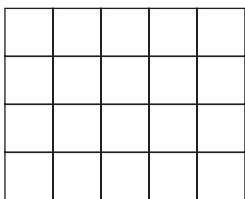
You will need scissors and sheets of 4-by-4 grid paper.  
Use the grid paper to draw as many different arrays as you can.  
Cut out each array.  
Write a multiplication sentence on each array.  
Look for arrays with the same shape and size.  
What do you notice?

### Show and Share

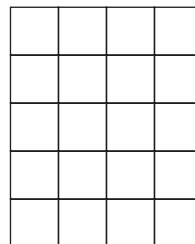
Share your arrays with another pair of classmates.  
Look for arrays that have the same product but different multiplication sentences. What do you notice?  
Why do you think that happens?

### Connect

Kim used 5-by-5 grids to make arrays.  
Here are 2 matching arrays that Kim made.



4 rows of 5  
 $4 \times 5 = 20$



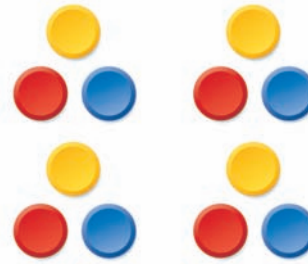
Turn the  
array on its side. 5 rows of 4  
 $5 \times 4 = 20$

When you **multiply** 2 numbers, you can switch the order of the numbers without changing the product.

We can show the same idea using **equal groups**.



3 groups of 4  
 $3 \times 4 = 12$



4 groups of 3  
 $4 \times 3 = 12$

When we switch the *number of groups* and the *number of objects in each group*, we still have the same total number of objects. So, the product is the same.

## Practice

1. Write 2 multiplication sentences for each array.



2. Arrange each set into an array with at least 2 rows and 2 columns.

Make a drawing to show your thinking.

Write 2 multiplication sentences and 2 repeated addition sentences for each array.







3. How can you show that 2 bags of 5 marbles and 5 bags of 2 marbles contain the same number of marbles?

Use words, pictures, and numbers to explain your thinking.

4. a) Make 2 arrays that each have only 1 multiplication sentence. Record your arrays.  
b) Describe why you can write only 1 multiplication sentence for the arrays you made.

5. **Cover Me!**

You will need

- a 10-by-10 grid,
- 2-colour counters, and
- 4 sets of cards numbered 1 to 5.

Start by choosing your colour of counter.



- Shuffle the cards and place them face down.
- Each player takes 2 cards from the top of the deck.
- Player 1 uses counters to make an array anywhere on the grid, to match the numbers showing on his cards.
- Player 2 uses counters to make an array to match her cards. You cannot put a counter on a square that is already covered!
- Players find the products for their arrays. The product tells you your score for that turn.
- Play again. Continue until both players cannot fit an array on the grid.
- Add your points. The player with the most points wins.

**Reflect**

Suppose you have to multiply 2 numbers.  
Tell 3 different strategies you can use to find the product.

## 5

## Division as Grouping

Many things come in equal groups.  
Where have you seen things in  
equal groups?



## Explore

You will need up to 20 blocks.

Ani is making grab bags for a garage sale.  
She wants to put the same number  
of toys in each bag.  
Help her plan ways to package the toys.

- Choose 8 blocks.  
Put the blocks into groups so there  
is the same number in each group.  
How many bags would Ani need?
- Repeat the activity with 15 blocks.
- Repeat with a number that you choose.
- Record your work.



## Show and Share

Share your answers with a classmate.  
Tell how you made equal groups.  
Could you always make equal groups? Why or why not?

## Connect

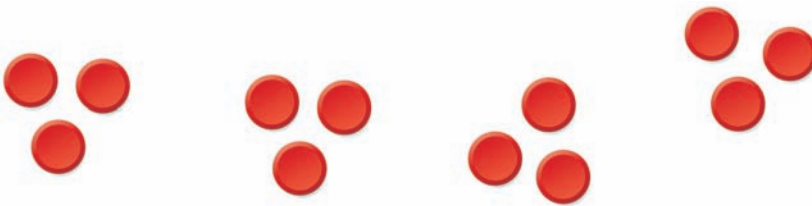
**Division** can be used to find how many equal groups there are when you know the size of the groups.

- Start with 12 counters.



I count out 3. Then I start a new group.

- **Divide** the 12 counters into groups of 3. Count the number of groups.



- Write the **division sentence**.

$$\begin{array}{ccccccc} 12 & \div & 3 & = & 4 \\ \uparrow & & \uparrow & & \uparrow \\ \text{Number of} & & \text{Number in} & & \text{Number of} \\ \text{counters} & & \text{each group} & & \text{groups} \end{array}$$



We say, "12 **divided by** 3 equals 4."



20 grouped into 4s is 5 groups.  
 $20 \div 4 = 5$

I can show division in different ways.



## Practice

1. Use blocks. Find the number of groups.  
Write a division sentence for each problem.

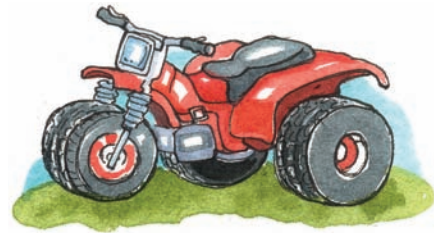
- a) Divide 6 blocks into groups of 2.
- b) Divide 8 blocks into groups of 4.
- c) Divide 12 blocks into groups of 4.

2. Draw a picture and write a number sentence to solve each problem.

- a) Each room has 4 beds.  
How many rooms are needed for 20 children?



- b) Each all-terrain vehicle has 3 wheels.  
How many all-terrain vehicles can be made with 15 wheels?



3. Use blocks. Make equal groups to divide.

- a)  $12 \div 4$
- b)  $10 \div 5$
- c)  $8 \div 2$
- d)  $15 \div 3$
- e)  $6 \div 2$
- f)  $10 \div 1$
- g)  $4 \div 2$
- h)  $8 \div 4$
- i)  $6 \div 3$

4. Terry's class is ordering extra-long submarine sandwiches for a party.  
Each submarine sandwich can feed 4 children.  
How many submarine sandwiches do they need to feed 16 children?



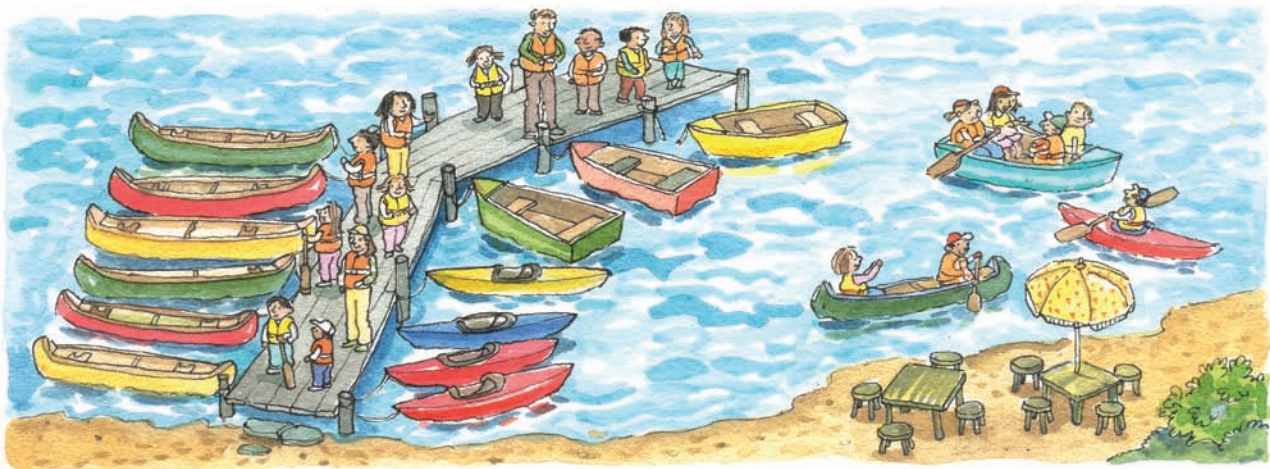
5. Zachary wanted to put 3 ice cubes into 3 glasses.  
When he opened the cooler, all the ice cubes were gone.  
Write a division sentence.  
Explain what will always happen when 0 is divided  
into equal groups.



6. Omar has 20 photos to put in an album. He has 5 blank pages.  
He wants to put the same number of photos on each page.  
How many photos might Omar put on each page?



7. The grade 3 classes are going on a field trip to a lake.  
Create at least 2 division problems from the picture.  
Solve the problems.



## Reflect

Think about division as making equal groups.  
What does each number in this division sentence represent?

$$9 \div 3 = 3$$

Use words, pictures, or numbers to explain your thinking.

## 6

## Division as Sharing

What card games do you know?

Some games start by giving each person the same number of cards.

## Explore



Antoine knows a game that starts with 15 number cards.

How can Antoine share the 15 cards equally among 3 players?

- Show a way using materials.
- Record your way using pictures, words, and numbers.
- Now find a way to share the 15 cards equally among 5 players. Record your way.



## Show and Share

Share your answers with another pair of classmates.

What strategies did you use to share the cards equally?

## Connect

Division can be used to find how many are in each group when you know the number of groups.

Four children helped clean the classroom. The teacher has 12 stickers to share equally among the 4 children as a reward.



The teacher puts the 12 stickers, one by one, into 4 piles until all the stickers are gone.

- 1 sticker in each pile 
- 2 stickers in each pile 
- 3 stickers in each pile 

We can say, "12 shared equally into 4 groups is 3 in each group."  
Write the division sentence.

$$\begin{array}{ccccccc}
 12 & \div & 4 & = & 3 \\
 \uparrow & & \uparrow & & \uparrow \\
 \text{Number of} & & \text{Number of} & & \text{Number of stickers} \\
 \text{stickers} & & \text{groups} & & \text{in each group}
 \end{array}$$

We say, "12 divided by 4 equals 3."

## Practice

Use materials to model the problems.

1. Find the number of objects in each group.  
Write a division sentence to record your work.

- a)** 8 hockey sticks  
are divided into  
2 equal groups.



- b)** 25 marbles  
are divided into  
5 equal groups.



- c)** 9 balls  
are divided into  
3 equal groups.



2. The teacher put the desks into 4 equal groups. There are 20 desks in the classroom. How many desks are in each group?
3. Kim divided 25 markers into 5 equal piles. How many markers are in each pile?
4. Find the number of things in each group.
 

a) $15 \div 5$	b) $12 \div 4$	c) $6 \div 3$
d) $8 \div 2$	e) $9 \div 3$	f) $10 \div 5$
g) $4 \div 2$	h) $10 \div 2$	i) $8 \div 4$



5. The camp leader took 10 children on a scavenger hunt. She divided the children into equal teams. How many children might have been on each team?  
Show how you solved the problem.



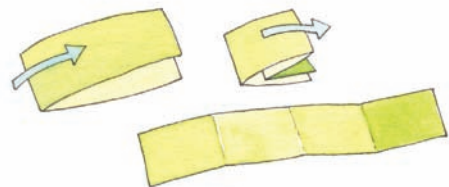
6. Create an equal sharing problem for each division question below. Show how to solve the problem using pictures, words, or numbers.

- |               |                |                |                |
|---------------|----------------|----------------|----------------|
| a) $9 \div 3$ | b) $15 \div 5$ | c) $10 \div 2$ | d) $25 \div 5$ |
|---------------|----------------|----------------|----------------|

## Math Link

### Measurement

Cut a strip of paper that is 12 cm long. Fold it in half twice to make 4 equal pieces. How long is each piece?  
How is your paper folding related to division?



## Reflect

What are 2 ways to think about division?  
Use examples to explain.



## 7

# Relating Division and Repeated Subtraction

## Explore



Jéanne has 8 photos from her school picnic. She wants to give 2 photos to each of her friends. How many friends will get 2 photos before she runs out?

- Choose materials to model the problem. Draw a picture to show your solution.
- Suppose Jéanne had 10 photos. How many friends would get 2 photos?

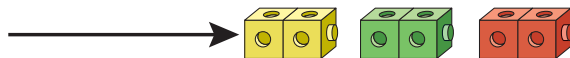
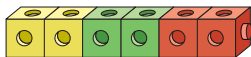
## Show and Share

Share your answers with another pair of classmates. How do your pictures remind you of division?

## Connect

Sophie and Alex use repeated subtraction to find  $6 \div 2$ .

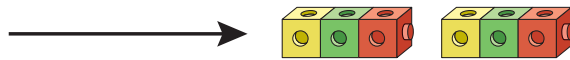
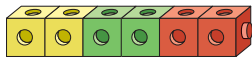
- Sophie counts how many groups of 2 she has to subtract until no items remain.



6 subtract 2 is 4,  
subtract 2 more is 2,  
and subtract 2 more is 0.  
That's 3 groups.

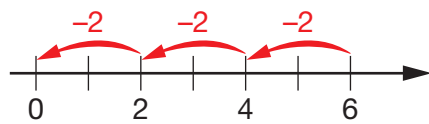


- Alex puts the 6 items into 2 equal groups, then counts.



6 subtract 2 is  
1 in each group,  
subtract 2 more is  
2 in each group, and  
subtract 2 more is  
3 in each group.

- A number line can also show how division is like repeated subtraction.



Start at 6. Subtract 2 each time until you reach 0.

$$6 - 2 - 2 - 2 = 0$$

Count the number of jumps to get from 6 to 0.

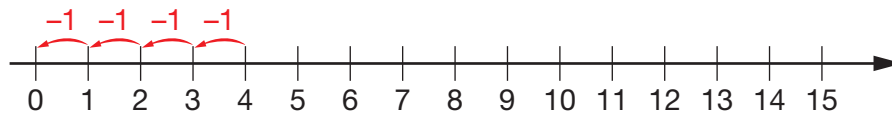
$$6 \div 2 = 3$$



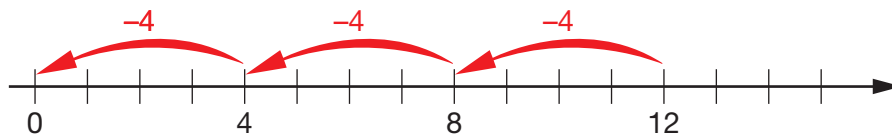
## Practice

- Write a division sentence for each repeated subtraction sentence.

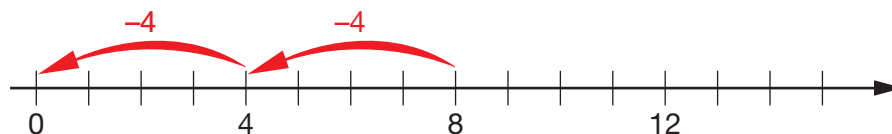
**a)**  $4 - 1 - 1 - 1 - 1 = 0$



**b)**  $12 - 4 - 4 - 4 = 0$



**c)**  $8 - 4 - 4 = 0$



2. Write each division sentence as repeated subtraction.  
Show the repeated subtraction in a picture.  
a)  $25 \div 5 = 5$       b)  $10 \div 2 = 5$       c)  $5 \div 5 = 1$

3. Brianna's CD player uses 2 batteries.  
She has a pack of 8 batteries.  
How many times can Brianna change  
the batteries?

4. Jason delivers 15 newspapers every  
Saturday morning.  
He can deliver 3 newspapers every minute.  
How long does it take Jason to deliver  
all 15 newspapers?



5. Kaytlyn gave out stickers as prizes at the school fair.  
After each game, Kaytlyn gave 1 sticker  
to each child who placed first, second, and third.  
The stickers came in strips of 12.  
How many games were played before the stickers ran out?
6. Write your own division problem.  
Trade problems with a classmate.  
Show how you would solve your classmate's problem.



7. How is  $8 - 2$  different from  $8 \div 2$ ?  
Show your thinking using pictures, words, or numbers.

## Math Link

### Money

Suppose you wanted something that costs 20¢.  
To find how many nickels are in 20¢, divide by 5.  
What division statement can you write to show  
the number of pennies in 5¢?



8. Nathan visited the Athabasca Glacier when he was 7 years old. He learned that the glacier melts 3 m every year.

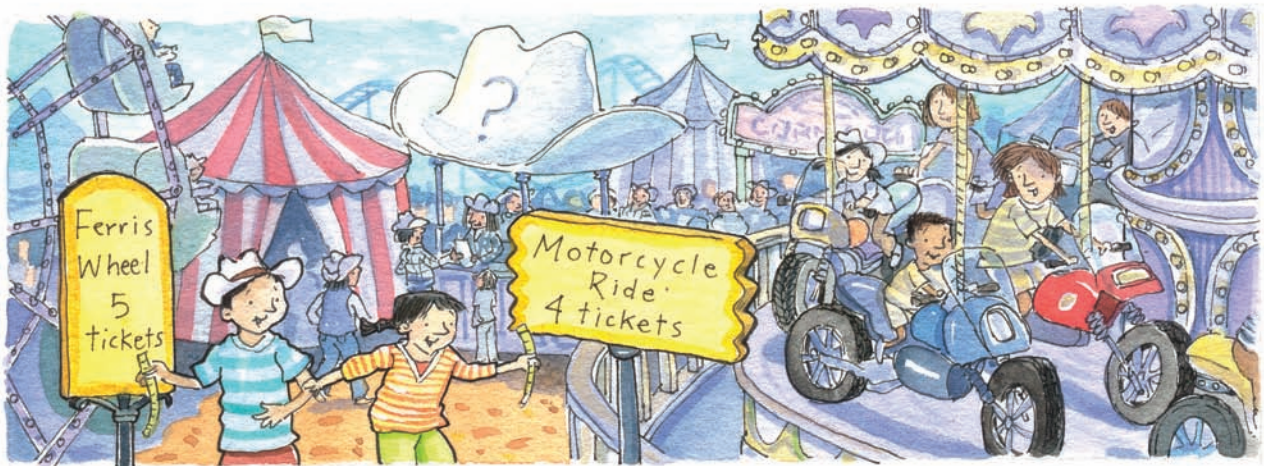


Nathan returned to see the glacier when he was older. He learned it had melted 15 m since his first visit.

How many years had it been since his first visit?

Athabasca is the Cree name for “where there are reeds.”

9. Leila and Leo enjoy the rides at the Calgary Stampede. They can buy ride tickets in strips of 10, 15, or 20.



- a) Leila likes the motorcycle ride.  
How many rides can she have with each strip of tickets?  
Which strip of tickets will be completely used up?  
How do you know?
- b) Leo likes the Ferris wheel.  
How many rides can he have with each strip of tickets?

## Reflect

How can repeated subtraction help you divide?  
Use an example to explain.

# Relating Multiplication and Division Using Arrays

## 8

### Explore

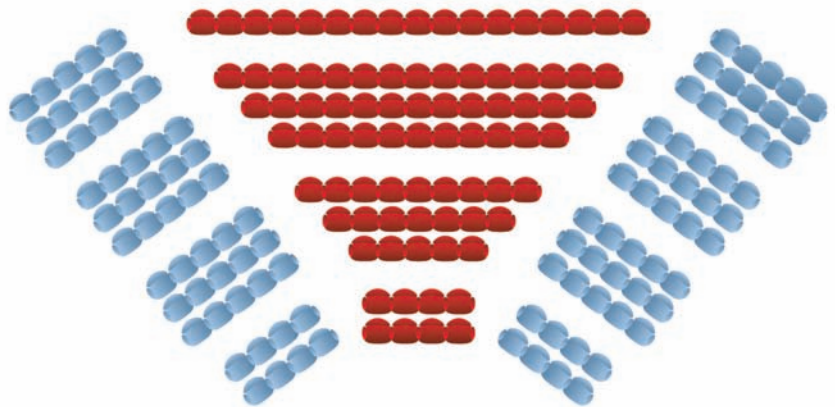


You will need counters and a copy of the picture below.

Zachary's school is going to a concert.

The teachers are buying tickets in the blue seats.

Class	Number of People
Grade 1A	16
Grade 1B	15
Grade 2A	15
Grade 2B	15
Grade 3A	20
Grade 3B	25



Find a way to fit everybody in the blue seats.

Try to keep the people in each class together.

Record your plan.

### Show and Share

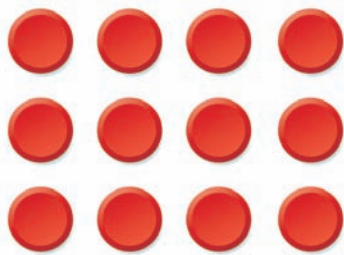
Share your work with another pair of classmates.

How could multiplication help you complete your seating plan?

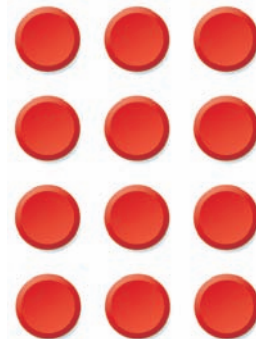
How could division help you decide the number of rows for each class?

## Connect

An array can show multiplication.

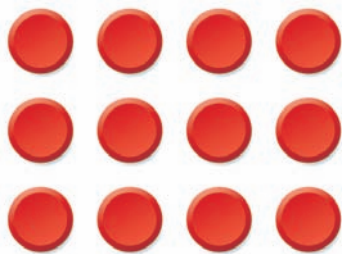


3 rows of 4  
 $3 \times 4 = 12$

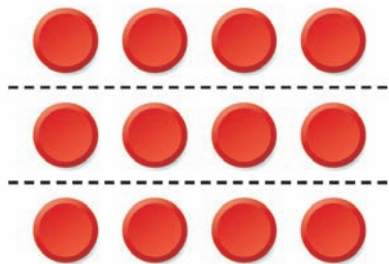


4 rows of 3  
 $4 \times 3 = 12$

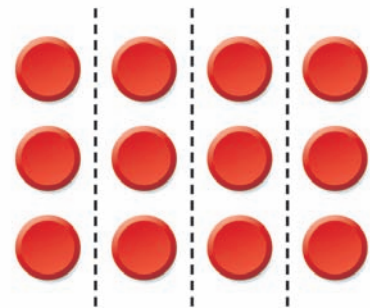
An array can also show division.



12 objects in all



12 divided into  
3 groups  
 $12 \div 3 = 4$



12 divided into  
4 groups  
 $12 \div 4 = 3$

$$3 \times 4 = 12$$

$$4 \times 3 = 12$$

$$12 \div 3 = 4$$

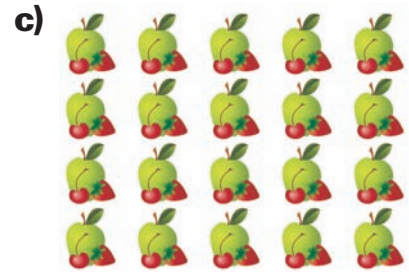
$$12 \div 4 = 3$$

These multiplication and  
division sentences  
are **related** sentences.



# Practice

1. Write a multiplication sentence for each picture.  
Write a division sentence for each picture.



2. Use counters to make an array for each number.  
For each array, write 2 multiplication sentences  
and 2 division sentences.

a) 12                      b) 8                      c) 6

3. Divide. How can you use multiplication to help you?

a)  $9 \div 3$               b)  $15 \div 3$               c)  $20 \div 4$               d)  $4 \div 4$   
e)  $10 \div 5$               f)  $25 \div 5$               g)  $6 \div 3$               h)  $5 \div 1$

For questions 4 and 5, show your work using pictures,  
words, or numbers.

4. Lydia is putting her collection of hockey cards  
into an album.  
Each page can hold 12 cards.  
Each page has 4 rows of pockets.  
How many cards can go in each row?



5. How can you use an array to multiply?  
How can you use an array to divide?  
Explain using words, pictures, and  
number sentences.

## Reflect

How can multiplication help you understand division?

## 9

# Relating Multiplication and Division Using Groups

In art class, the Grade 3 students learned how to make beads out of paper. Suppose you are helping to organize the beads to sell at a school fair. What do you know about counting collections that could help you?



## Explore



You will need 50 counters and 2 sets of cards numbered 1 to 5.

- Each partner selects 2 cards without looking.
  - Card 1 tells the number of groups of counters.
  - Card 2 tells the number of counters in each group.
 Take that many counters and put them in a pile. Write a multiplication sentence to show how many counters you took.
- Switch piles with your partner. Find ways to make equal groups with the counters. Write a division sentence for each way you find.
- Share your multiplication and division sentences. What do you notice?

Replace the counters and the cards. Repeat the activity.

## Show and Share

Share your work with another pair of classmates. Talk about any patterns you see.



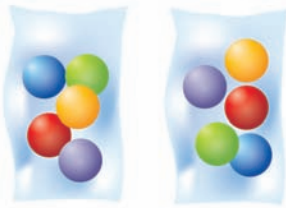
## Connect

Multiplication and division are related.

### Multiplication

You know:

- the number of groups
- the number of objects in each group



$$2 \times 5 = 10$$

You need to find:

- the number of objects in all

### Division as Grouping

You know:

- the number of objects in each group
- the number of objects in all



$$10 \div 5 = 2$$

You need to find:

- the number of groups

### Division as Sharing

You know:

- the number of objects in all
- the number of groups



$$10 \div 2 = 5$$

You need to find:

- the number of objects in each group

Sometimes multiplication can help you think about division.

What is  $20 \div 4$ ?

$$4 \times \square = 20$$

You know  $4 \times 5 = 20$ .

So,  $20 \div 4 = 5$ .

Think: 4 times which number is 20?

## Practice

1. Write a multiplication and a division problem for each picture.



2. Tao bought some packs of collector cards.  
Each pack holds 5 cards. There are 25 cards altogether.  
How many packs did he buy?
3. Write the related number sentences for each set of numbers.
 

a) 3, 5, 15	b) 4, 2, 8
c) 2, 5, 10	d) 4, 3, 12
e) 5, 5, 25	f) 4, 5, 20
4. Sean bought 4 submarine sandwiches.  
He cut each sandwich into 3 pieces.  
Then Sean and his 2 friends shared  
the sandwiches equally.  
How many pieces did each person get?
5. Dana's dog is 20 kg. It is 4 times as heavy  
as it was as a puppy. What was the mass  
of Dana's dog when it was a puppy?
6. Samuel walks 8 blocks to school each day.  
Samuel walks 4 times as far to school as  
his friend Craig.  
How many blocks does Craig walk to school?
7. Make up a multiplication and division problem  
for each set of numbers.
 

a) 4, 2, 2	b) 15, 3, 5	c) 10, 2, 5
------------	-------------	-------------



8. Explain what each of the numbers 4, 3, and 12  
could mean in these related number sentences.

$$4 \times 3 = 12 \quad 3 \times 4 = 12$$

$$12 \div 4 = 3 \quad 12 \div 3 = 4$$

### Reflect

Show 3 different ways to find  $15 \div 3$ .  
Use words, numbers, or pictures to explain each way.

# Strategies Toolkit

## Explore



Karlee has 3 T-shirts and 2 pairs of pants. How many different outfits can Karlee make? Show your work.



## Show and Share

Show how you found the outfits. Explain your strategy.

## Connect

Ben is getting a new bike. He can choose a racing bike, a mountain bike, or a BMX bike. Each bike comes in blue, black, silver, or red. How many different bikes can Ben choose?



What do you know?

- There are 3 different bikes.
- There are 4 different colours.
- You want to find how many different bikes are possible.



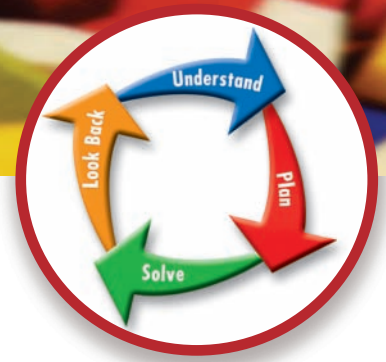
Think of a strategy to help you solve the problem.

- You could **make a chart**.
- Here are the bikes that are blue. Copy and complete the chart for each of the other colours.

## Strategies

- Make a chart.
- Use a model.
- Draw a picture.
- Solve a simpler problem.
- Work backward.
- Guess and test.
- Make an organized list.
- Use a pattern.

Colour	Bike
blue	racing
blue	mountain
blue	BMX



There are 3 bikes that are blue.  
 How many bikes are there for  
 each of the other colours?  
 How many different bikes are there in all?

How can multiplication help you to  
 solve the problem?

## Practice

Choose one of the

## Strategies

- Zakia will pack 1 game and 1 toy for her overnight stay with her aunt.
  - For the game, she will choose either checkers or cards.
  - For the toy, she will choose a truck, a bear, a rabbit, or a hula hoop.
 How many choices does Zakia have?
- Make a plan for a school break day in the day-care centre. Children can choose 1 outside activity and 1 afternoon movie. List up to 4 choices for the outside activity. List up to 4 choices for the movie. How many choices will the children have?

## Reflect

How does making a chart help to solve a problem?  
 Can you solve the problem without completing the chart?  
 Explain.

## LESSON

- 1** 1. Multiply.
- a)**  $3 \times 2$       **b)**  $4 \times 1$       **c)**  $1 \times 3$       **d)**  $5 \times 5$   
**e)**  $4 \times 5$       **f)**  $2 \times 4$       **g)**  $2 \times 1$       **h)**  $5 \times 1$
2. Draw a picture for each answer.
- a)** Find 2 ways to make equal teams from 8 children.  
**b)** Find 2 ways to make equal teams from 10 children.
- 2** 3. Design an Inukshuk with Pattern Blocks.  
Suppose you want to make 3 Inukshuks.  
How many of each type of block do you need?  
Write a repeated addition and a multiplication sentence for each answer.
- 3** 4. Draw arrays for the following multiplication sentences:
- a)**  $3 \times 1 = 3$       **b)**  $4 \times 1 = 4$       **c)**  $5 \times 1 = 5$   
 $3 \times 2 = 6$        $4 \times 2 = 8$        $5 \times 2 = 10$   
 $3 \times 3 = 9$        $4 \times 3 = 12$        $5 \times 3 = 15$
- What patterns do you notice? Why are they happening?  
Write the next 2 multiplication sentences in each set.
- 4** 5. Nadine found that  $2 \times 5 = 10$  and  $5 \times 2 = 10$ .  
She wonders why the answers are the same.  
Use pictures, numbers, and words to show why.
- 5** 6. Write a list of 3 things that come in equal groups of 5 or less.  
Write a division problem for each. Solve each problem.
7. Use counters. Find the number of counters in each group.
- a)**  $9 \div 3$       **b)**  $16 \div 4$       **c)**  $12 \div 3$   
**d)**  $20 \div 4$       **e)**  $6 \div 2$       **f)**  $8 \div 4$

LESSON

- 6 8. How could these cards be shared equally among 4 children? Explain using pictures and a number sentence.



- 7 9. Tao has 20 tokens to play either *Basketball* or *Skee Ball*. Use repeated subtraction and division to show how many times Tao could play each game.



- 8 10. Write multiplication sentences that can help you solve the division problems.

a)  $12 \div 3 = \square$       b)  $16 \div 4 = \square$

Draw an array to show how the sentences are related.

11. Write related facts for each set of numbers.

a) 2, 4, 8                      b) 3, 5, 15

c) 4, 3, 12                    d) 5, 5, 25

- 9 12. Write division sentences that are related to the multiplication sentences.

a)  $3 \times 3 = 9$               b)  $5 \times 4 = 20$

UNIT

8

Learning Goals

- ✓ model multiplication and division up to  $5 \times 5$
- ✓ find strategies to multiply and divide up to  $5 \times 5$
- ✓ pose and solve story problems involving multiplication and division

# Unit Problem

# sports Day

The group leaders need to make equal teams for each Sports Day activity.

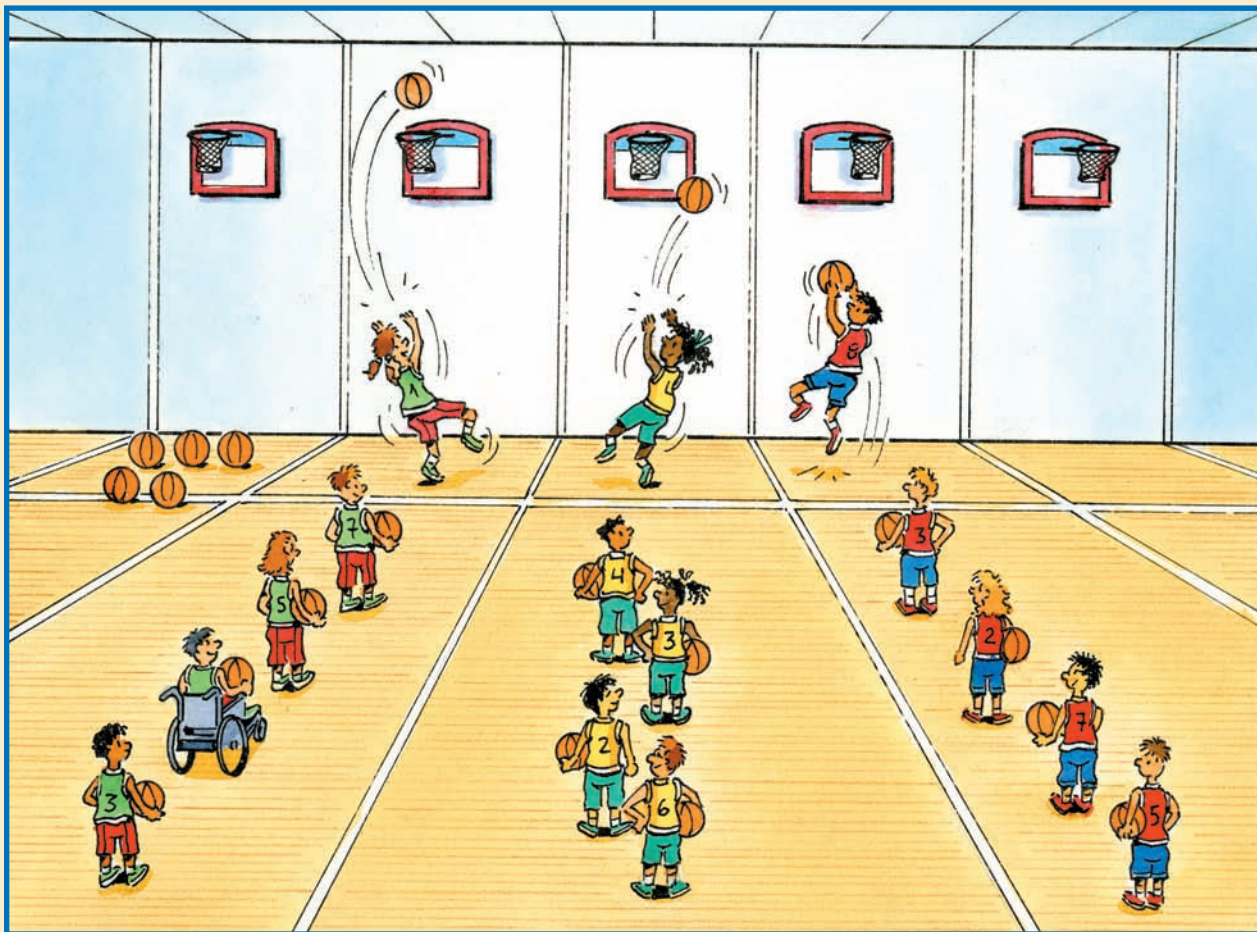
## Part 1

Organize each class into equal teams, with at least 3 children on a team.

Show your work using pictures, numbers, or words.

Kindergarten	12 children
Grade 1	15 children
Grade 2	20 children
Grade 3	16 children
Grade 4	25 children

## Activity 1: Basketball Throw



## Check List

Your work should show

- ✓ how you organized the classes into equal teams
- ✓ the multiplication problem you made
- ✓ the division problem you made
- ✓ clear explanations of how to solve your problems

### Part 2

Pick a Sports Day activity.

Make up a multiplication problem for the activity.

Show how you would solve your problem.

Think of a division problem related to your multiplication problem.

Show how you would solve your problem.

#### Activity 2: Freeze Tag



#### Activity 3: Ping Pong Throw



### Reflect on Your Learning

What do you know about multiplication and division that you did not know before? Describe your ideas using pictures, numbers, and words.



## Investigation

# Are You a Square or a Rectangle?



### Part 1

You will need a measuring tape.

- Measure your partner's height with her shoes off.
- Measure her arm span.
- Record these measurements in a chart.

Height	Arm Span

- Have your partner take the same measurements from you.  
Compare your height and your arm span.
  - If your height is greater than your arm span, you are a tall rectangle.
  - If your height is less than your arm span, you are a short rectangle.
  - If your height and arm span are within 2 cm, you are a square.

Are you a tall rectangle, a short rectangle, or a square?





Tall rectangle



Short rectangle



Square

## Part 2

You will need grid paper.

- Collect data from your classmates. Have each student record his shape on a tally chart or line plot.
  - Which shape is most common? Least common?
- Draw a bar graph to show the data. Compare your graph with those of other classmates. How are the graphs the same? Different?
- Write your own question about the graph. Answer your question.







## Display Your Work

Record your findings using words, pictures, or numbers.

## Take It Further

Find the shapes of friends and family members. How do their shapes compare with your classmates' shapes? Write about what you find out.

## UNIT

- 1**
- Make a pattern that starts with 1 , and adds more s each time.
    - Show your pattern in a picture.
    - Write the pattern rule.
  - What is the pattern rule?  
Copy the pattern to fill in the missing numbers.
    - 24, 27, \_\_, \_\_, 36, 39, \_\_
    - 87, 77, \_\_, 57, \_\_, \_\_, 27
  - Make a pattern that starts with 15 s, and removes some s each time.
    - Show your pattern in a picture.
    - Write the pattern rule.
- 2**
- Use the digits 5, 9, and 7. Use each digit once.
    - Write as many 3-digit numbers as you can.
    - Order the numbers from least to greatest.
    - Which of your numbers is the greatest? The least?
  - Start at 350. Count on by 25s to 900.  
Write each number as you count.  
What patterns do you see in the ones digits?  
The tens digits? The hundreds digits?
  - Find 3 different ways to make two dollars and twenty-eight cents, using pennies, dimes, and loonies.
- 3**
- 9, 5, and  $\square$  are the numbers in a set of related facts.
    - What could the missing number be?  
Write the related facts.
    - What is another possible missing number?  
Write the related facts for this number.
  - Find each missing number. Explain your strategy.
    - $3 + \square = 8$
    - $16 - \square = 7$
    - $\square + 3 = 14$

9. Add or subtract. Show your strategy.

a)  $138 + 722$

b)  $427 + 299$

d)  $495 - 303$

e)  $400 - 105$

c)  $291 + 305$

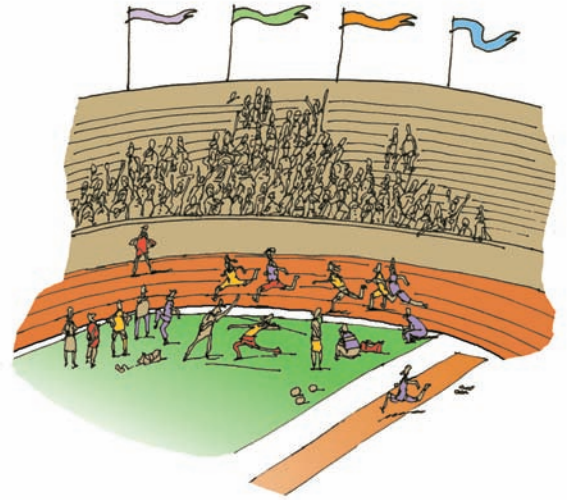
f)  $757 - 238$

10. Five hundred sixty-seven children are at track and field day.

- 163 are in track events only.
- 139 are in field events only.
- All the others are in the stands.

Make a story problem about track and field day.

Solve your problem. Show your work.



4

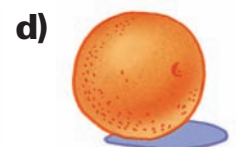
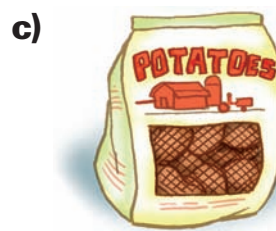
11. Jan is planning a trip with her family. They plan to leave on July 7. They plan to come home on August 3. How many days will their trip last?

12. Use a ruler. Draw a line that is

- a) 14 cm long
- b) 5 cm long
- c) 23 cm long

13. You will need a ruler and a book. Find the perimeter of the book cover.

14. Which unit would you use to measure the mass of each object, grams or kilograms?

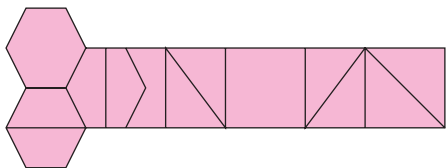


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- 15.** Draw a picture to show each fraction.
- 2 fourths of a pie
  - 3 eighths of a pie
  - 5 eighths of a pie
- 16.** Make a story about one of your pictures from question 15.
- 17.** Which fraction in each pair is greater? Use pictures, words, or numbers to explain your thinking.
- $\frac{1}{3}$  and  $\frac{2}{3}$
  - $\frac{1}{4}$  and  $\frac{4}{4}$
  - $\frac{7}{8}$  and  $\frac{3}{8}$
  - $\frac{5}{9}$  and  $\frac{2}{9}$

6

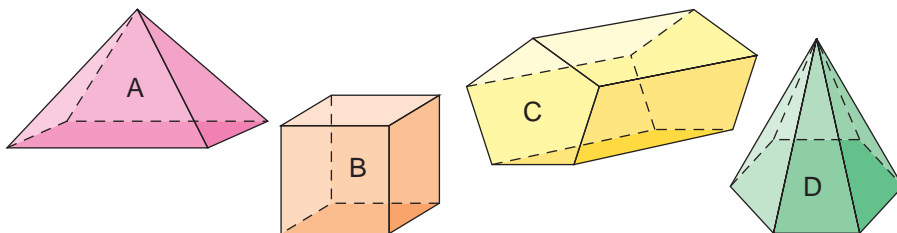
- 18.** Name each polygon you see in this picture.



Write the name of each polygon.

Write the number of sides.

- 19. a)** Which objects below are prisms?  
Explain your thinking.
- b)** Which objects are pyramids?  
Explain your thinking.



**20.** Use the objects in question 19. Name each object.  
For each object, tell the number of faces, edges, and vertices.

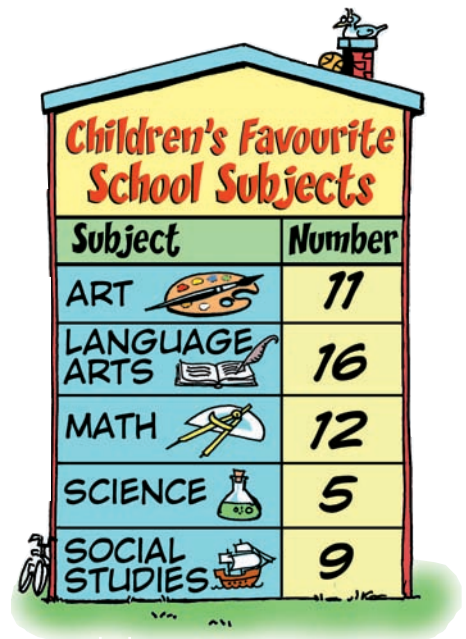
7

**21.** Amira asked some friends to spell their names.  
She listed the number of letters in each name.  
3, 5, 4, 7, 5, 4, 6, 4, 3, 7, 5, 5, 3, 8, 7, 5, 6, 3

**a)** Show the data in a line plot.  
**b)** Write a question that you can answer from the line plot.  
Answer your question.

**22.** Madison asked some Grade 3 children about their favourite school subject. The chart shows her results.

- a)** How many children did Madison ask?  
**b)** How many children prefer language arts?  
How many do not?  
**c)** Draw a bar graph to show Madison's data.  
**d)** Write a question about Madison's data.  
Answer your question.



8

**23.** These friends each bought stickers for their collections.

How many stickers did each child buy?

- a)** Ali bought 4 strips of 5 stickers.  
**b)** Kerri bought 3 strips of 4 stickers.  
**c)** Tia bought 4 strips of 4 stickers.

**24.** What could the missing numbers be?  
Find all the ways you can to solve each problem.

**a)**  $\underline{\quad} \times \underline{\quad} = 12$

**b)**  $\underline{\quad} \div \underline{\quad} = 3$