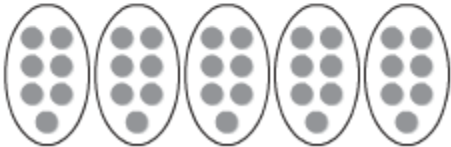


6.1

Problem solving model division

Problem Solving • Model Division

There are 35 people going to the amusement park. They will all travel in 5 vans with the same number of people in each van. How many people will travel in each van?

Read the Problem	Solve the Problem
<p>What do I need to find?</p> <p>I need to find the number of <u>people</u> who will travel in each van.</p>	<p>Describe how to act out the problem to solve.</p> <p>Step 1 Start with 35 counters.</p> <p>Step 2 Make 5 equal groups. Place 1 counter at a time in each group until all 35 counters are used.</p> <p>Step 3 Count the number of counters in each group. <u>7</u></p>  <p>So, 7 people will travel in each van.</p>
<p>What information do I need to use?</p> <p>There are <u>35</u> people. <u>5</u> vans are taking all the people to the amusement park.</p>	
<p>How will I use the information?</p> <p>I can act out the problem by making equal <u>groups</u> with counters.</p>	

6.2

Size of equal groups

Size of Equal Groups

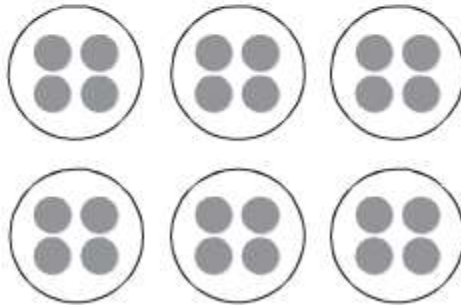
When you **divide**, you separate into equal groups.

Use counters or draw a quick picture. Make equal groups.
Complete the table.

Counters	Number of Equal Groups	Number in Each Group
24	6	■

The number in each group is unknown, so divide.

Place 1 counter at a time in each group until all 24 counters are used.



There are 4 counters in each of 6 groups.

6.3

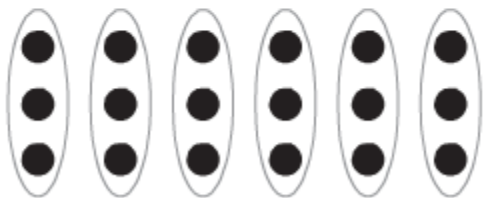
Number of equal groups

Number of Equal Groups

Complete the table. Use counters to help find the number of equal groups.

Counters	Number of Equal Groups	Number in Each Group
18	■	3

The number of equal groups is unknown, so divide.
Circle groups of 3 counters until all 18 counters are in a group.



There are 6 groups of 3 counters each.

Model with Bar Models

Use counters to find $15 \div 5$.

Step 1 Use 15 counters. Draw 5 circles to show the number of equal groups.



Step 2 Place 1 counter at a time in each circle.



Step 3 Continue until you have placed all 15 counters.

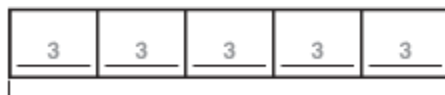


Step 4 Count the number of counters in each circle.

There are 3 counters in each of the 5 groups.

You can use a bar model to show how the parts of a problem are related.

- There are 15 counters.
- There are 5 equal groups.
- There are 3 counters in each group.



15 counters

Write a division equation for the model.

$$15 \div 5 = 3$$

Algebra relate subtraction and division

Find $18 \div 6$.

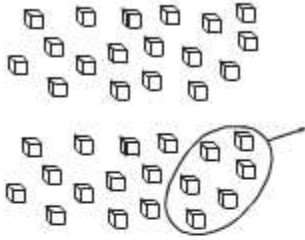
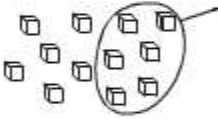
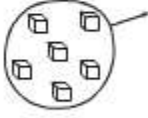
Step 1 Start with the number you are dividing, 18.

Step 2 Subtract the number you are dividing by, 6.

Step 3 There are more than 6 left. Subtract 6 again.

Step 4 There are 6 left. Subtract 6 again.

Use base-ten blocks.

Use repeated subtraction.

$$\begin{array}{r} 18 \\ - 6 \\ \hline 12 \end{array}$$

$$\begin{array}{r} 18 \\ - 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array}$$

$$\begin{array}{r} 18 \\ - 6 \\ \hline 12 \end{array} \quad \begin{array}{r} 12 \\ - 6 \\ \hline 6 \end{array} \quad \begin{array}{r} 6 \\ - 6 \\ \hline 0 \end{array}$$

Step 5 Count the number of times you subtract 6.

You subtract 6 three times, so there are 3 groups of 6 in 18.

Write: $18 \div 6 = 3$

6.6

Model with Arrays

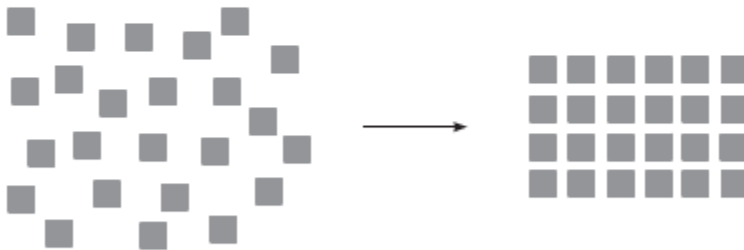
You can use arrays to model division.

How many rows of 6 tiles each can you make with 24 tiles?

Use square tiles to make an array. Solve.

Step 1 Use 24 tiles.

Step 2 Make as many rows of 6 as you can.



You can make 4 rows of 6.

So, there are 4 rows of 6 tiles in 24.

6.7

Algebra relate multiplication and division

You can use an array to complete $21 \div 3 = \underline{\quad}$.

Use 21 counters.

Make 3 equal rows.

●●●●●●● There are 7 counters in each row.

●●●●●●● 3 rows of 7 = 21

●●●●●●● So, $21 \div 3 = 7$

The 21 tells the total number of counters in the array.

The 3 stands for the number of equal rows.

The 7 stands for the number of counters in each row.

You can use a related multiplication fact to check your answer.

$$21 \div 3 = 7 \quad 3 \times 7 = 21$$

So, 3 rows of 7 represents $21 \div 3 = 7$ or $3 \times 7 = 21$.


6.8

Algebra write related facts

Related facts are a set of related multiplication and division equations.

Write the related facts for the array.

There are 4 equal rows of tiles.
There are 6 tiles in each row.
There are 24 tiles.



Write 2 multiplication equations and 2 division equations for the array.

factor \times factor = product dividend \div divisor = quotient

$\boxed{4} \times \boxed{6} = \mathbf{24}$ $\mathbf{24} \div \boxed{4} = \boxed{6}$
 $\boxed{6} \times \boxed{4} = \mathbf{24}$ $\mathbf{24} \div \boxed{6} = \boxed{4}$

The equations show how the numbers 4, 6, and 24 are related.

So, the related facts are $4 \times 6 = 24$, $6 \times 4 = 24$, $24 \div 4 = 6$, and $24 \div 6 = 4$.


6.9

Algebra division rules for 1 and 0

Division rules can help you understand how to divide with 1 and 0.

Rule A: Any number divided by 1 equals that number.


$5 \div 1 = 5$ or $1 \overline{)5}$



One group of 5

Rule B: Any number (except 0) divided by itself equals 1.


$5 \div 5 = 1$ or $5 \overline{)5}$



Five groups of 1

Rule C: Zero divided by any number (except 0) equals 0.

$0 \div 5 = 0$ or $5 \overline{)0}$



Five groups of 0

Rule D: You cannot divide by 0.

