



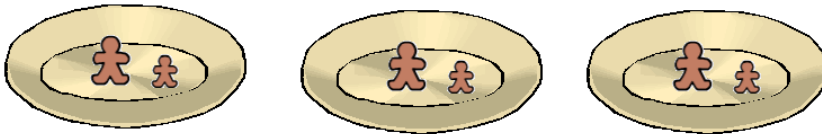
# Exploring Division

## Mathematical Ideas

Composing, decomposing, subtraction, and multiplication of numbers are foundations of division. The inverse operation of division is multiplication.

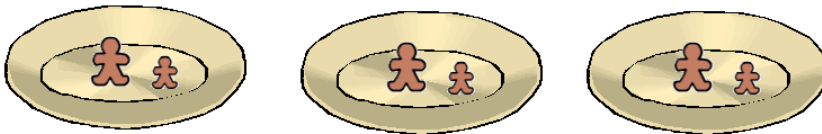
One way to think of division is creating equal sized groups.

For example: There are 6 cookies in total. If the cookies are divided equally onto 3 plates, how many cookies are on each plate?



There are two cookies on each plate.

For example: There are 6 cookies in total. If two cookies are on each plate, how many plates are there?

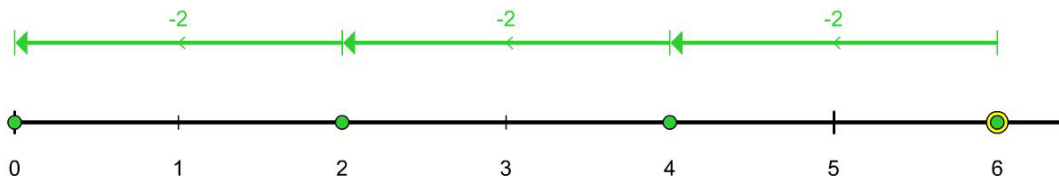


There are three plates of cookies.

Examples of strategies for division:

$6 \div 2$  can be determined by

- Distributing six equally among the two groups one by one
- Making groups of 2 until you have six
- Skip counting backwards by two until you get to zero, and keep track of the number of counts
- Subtracting 2 repeatedly from 6 until you get to zero, and track the number of subtractions





## Exploring Division

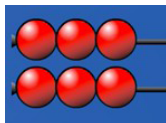
### Helpful Information

#### Tips

- Learning tools are used to explore mathematical ideas and are a way for children to share their thinking. Encourage your child to take the time to use the tools for each activity.
- Organized concrete and visual representations allow your child to use spatial sense to deepen understanding of number and the relationships between numbers.

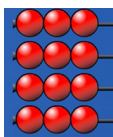
For example,

This visual shows 6 beads spatially as 2 groups of 3 beads horizontally or 3 groups of 2 beads vertically.



#### Mathematical Words/Symbols

**Array-** is a set of objects, symbols, or numbers organized in rows and columns.



**Decomposing-** Decomposing is when a number is broken down into smaller numbers.

**Even Number** – a number that can be divided into two whole numbers that are the same (e.g., 14 can be divided into two groups of 7)

**Odd Number** – a number that cannot be divided into two whole numbers that are the same (e.g., 15 can be divided into two groups of 7.5 which is not a whole number)

**Product** – is the result of multiplying. For example, 6 is the product of  $2 \times 3$ .

**Quotient** – is the result of dividing. For example,  $6 \div 2$  has a quotient of 3.

**Remainder** – the portion of the number that is left over when dividing into equal groups

**Whole Number** - the set of numbers 0, 1, 2, 3, 4.....

X multiplication symbol

$\div$  division symbol

$3 \times 2$  has many interpretations including:

- three times two
- three, two times
- three groups of two

$6 \div 2$  without context can be interpreted as:

- 6 divided into 2 groups
- 6 is made up of groups of 2



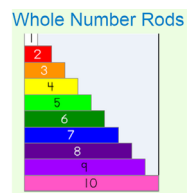
# Exploring Division

Helpful information

## Materials

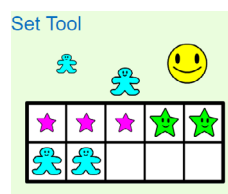
### Activity 1:

- Whole Number Rods
- Number Cards



### Activity 2:

- Set Learning Tool
- Tally Cards

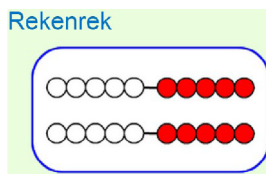


### Activity 3:

- Rekenrek

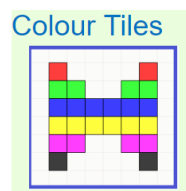
### Activity 4:

- Rekenrek
- 10-frame cards



### Activity 4:

- Colour Tiles
- Number Cards





# Exploring Division

## Decomposing Whole Number Rods to Explore Division

## Activity 1

### Set Up for the Activity:

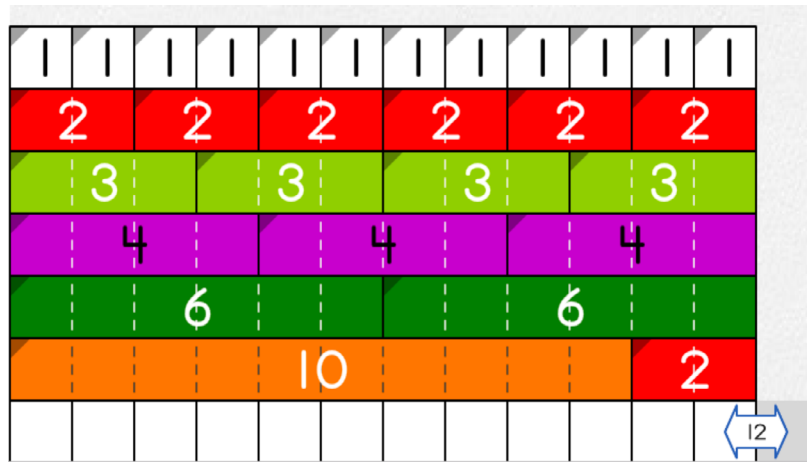
- Open the Whole Number Rods learning tool
- Shuffle number cards 2 to 24 and place them face down in a pile.

### How to Play the Activity:

1. Have your child pick a card and make a train of that length using two or more colours of whole number rods.
2. Ask your child to make another train of the same length using only one colour.
3. Have your child state the size of the rod and the number of rods used.
4. Have your child try to find other matching trains using only one colour and repeat step 3.

Example:

12



Your child may notice that 12 could be made as three groups of 4 or four groups of 3.

### Let's Talk About It

What patterns do you notice between the rods?  
How do you know you found all the same colour rods that can make this number?  
Which numbers could only be made one way? Why?



## Exploring Division

### Exploring Odd and Even Numbers Through Division Using the Set Tool Activity 2

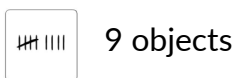
#### Set Up for the Activity:

- Open the Set learning tool.
  - » Select Auto Mode
- Shuffle tally cards 2 to 20 and place face down in a pile.
- Create a chart with the headings as shown in the example using the annotation tool.

#### How to Do the Activity:

1. Have your child pick a card and adjust the “Number of Objects” in the panel.
2. Ask your child to try to place the objects into two groups of equal amounts. Note: if the number is odd there will be one object left over.
3. Have your child tell you how many objects are in each group.
4. Have your child record the information on the chart.
5. Repeat activity as desired.

#### Example:



Number of Objects	Number of Groups	Number of Objects in a Group	1 leftover Yes or No	Even or Odd
9	2	4	Yes	Odd

Your child may notice that the numbers in the counting sequence alternate even and odd.

#### Let's Talk About It

- What numbers to 20 are even? How do these numbers match skip counting by 2s?  
What numbers to 20 are odd? How do these numbers match skip counting by 2s from 1?  
What numbers can you start at to skip count by 2s so that your counts are always odd?



# Exploring Division

## Using Division to Explore Even Numbers of Beads

### Activity 3

#### Set Up for the Activity:

- Open the Rekenrek learning tool.
  - » Show 2 racks of beads with the beads on the right side of the tool.
- Create a chart with the headings as shown in the example using the annotation tool.

#### How to Do the Activity:

1. Ask your child to pick an even number from 8 to 20.
2. Have your child represent this number on the left side of the racks.
3. Have your child verify that the number is even by forming two equal groups.
  - » If it isn't even have your child adjust the number so it is even.
4. Record the number of groups and number of beads in each group on the chart.
5. Have your child predict the number of groups of two that can be formed using this number.
6. Verify the prediction by rearranging the beads on the racks.
7. Record the number of groups and number of beads in each group on the chart.
8. Repeat at least three times.

#### Example:

14

Total Number of Beads	Number of Groups	Number of Beads in a Group
14	2	7
14	7	2

#### Let's Talk About It

How do you know if the number is even?  
What patterns do you see on the chart?



# Exploring Division

## Exploring Remainders Using Beads

## Activity 4

### Set Up for the Activity:

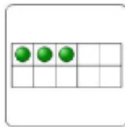
- Open the Rekenrek learning tool.
  - » Show 2 racks of beads with the beads on the right side of the tool.
- Shuffle one set of 10-frame cards 1 to 10 and place them face down in a pile.
- Create a chart as shown in the example using the annotation tool.

### How to Do the Activity:

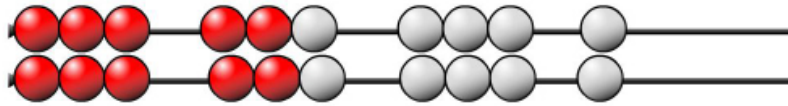
1. Move 10 to 20 beads to the left. Use the shade to cover the unused beads.
2. Have your child pick a 10-frame card from the pile and identify the number represented. This quantity represents the number of beads in a group.
3. Have your child move the beads into the groups indicated on the card.
4. Ask your child to identify the number of full groups and the quantity of beads that are left over.
5. Record on the chart.
6. Repeat as desired.

### Example:

20 beads



3 beads in a group



Total Number of Beads	Number of Beads in a Group	Number of Groups	Number of Beads Leftover
20	3	6	2

Your child may form groups on each rack separately and then count the left overs on each rack.

### Let's Talk About It

Which numbers did you find easiest to group?  
Why are there sometimes beads leftover?



# Exploring Division

## Exploring Division as Repeat Subtraction Using Colour Tiles

### Activity 5

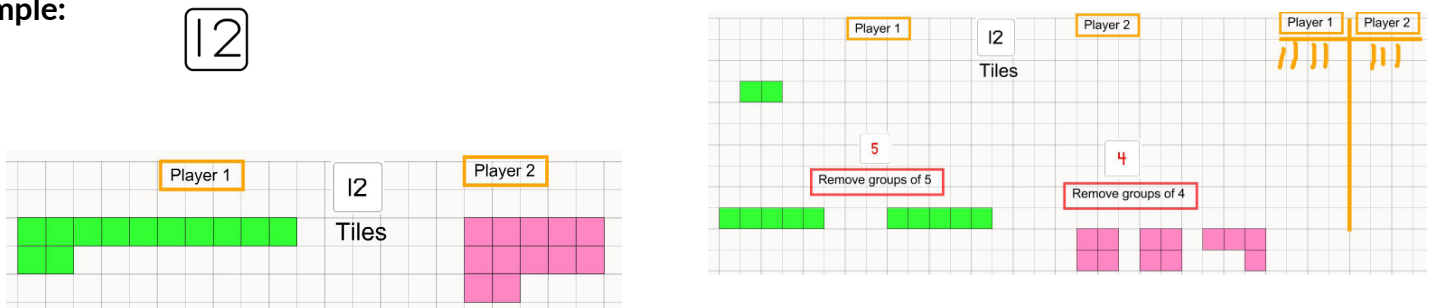
#### Set Up for the Game:

- Open the Colour Tiles learning tool.
- Shuffle one set of black number cards 5 to 20 and place them face down in a pile. This quantity represents the number of tiles each of the players begin with.
- Shuffle one set of red number cards 2 to 5 and place them face down in a pile. This number represents the size of the groups.
- Create a score chart for tracking points.

#### How to Play the Game:

1. Pick a black card. Players each use one colour of tiles to represent this number in their own spaces.
2. Player 1 picks a red number card and removes one group of tiles of that size from the game space.
3. Repeat removing groups of tiles until all the tiles have been moved. Note: there may be one or more tiles left over.
4. Player 2 repeats steps 2 and 3.
5. Each player counts the number of groups removed and earns a point for each group. Left over tiles count one point per tile.
6. Record points earned using tally marks.
7. Return the red cards and shuffle before the next round.
8. Play five rounds.
9. Have players count the tallies to determine the total number of points. The player with the most points wins.

#### Example:



The 12 divided by 5 resulted in two groups of 5 plus 2 left over.

The 12 divided by 4 resulted in three groups of 4 with no tiles left over.

Player 1 earned 2 points for two groups and 2 points for the remainder of 2.

Player 2 earned 3 points for three groups and 0 points for the remainder of 0.

Your child may count backwards by 5 as the tiles are removed from the original group of tiles.

#### Let's Talk About It

Was it better to have groups that are small or groups that are large? Why?

Can you predict who will earn the most points in this round? Explain?

Can you predict whether you might have left over tiles in this round? Explain?