Situations Involving Multiplication and Division with Products to 100

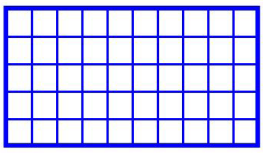
Mathematical Ideas

Composing, decomposing, addition, and subtraction of numbers are foundations of multiplication and division.

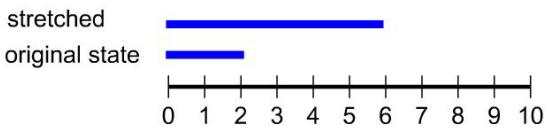
The following are examples of situations that involve multiplication and/or division:

1. **Groups of Equal Quantity** – involves a number of equal-sized groups and the total
   Examples:
   - There are 6 cookies on each tray. If there are 4 trays, how many cookies are there altogether?
   - Twenty-four cookies were baked. If each tray holds 6 cookies how many trays were needed?
   - Twenty-four cookies were baked. If 4 trays were used with the same number of cookies on each tray how many cookies were on each tray?

2. **Product or Quotient of Measures** – involves a multiplication or division of two measures
   Examples:
   - A rectangle is 5 cm by 10 cm. What is the area of the rectangle?
   - The area of the rectangle is 50 centimetres squared. If the length of the rectangle is 10 cm what is the width of the rectangle?
   - The area of the rectangle is 50 centimetres squared. If the width of the rectangle is 5 cm what is the length of the rectangle?



3. **Scale Factor** – involves a multiplicative comparison that relates an original quantity to a scaled quantity
   Examples:
   - An elastic band is 2 cm long before it is stretched. The band's length tripled. What is the length of the elastic band now?
   - A stretched elastic band is 6 cm in length. Before it was stretched the length measured 2 cm. How many times greater is the elastic band's length now?
   - A stretched elastic band is 6 cm in length. The band is 3 times its original length. What was the original length of the elastic band?



Mathematical Ideas

4. **Combinations** – involves a total number of combinations of two or more types of things
   Examples:
   - There are 4 different colours of shirts and 2 different sleeve lengths. How many different possible combinations are there?
   - There are 8 different possible combinations of colour and sleeve length. If there are 4 different colours how many different sleeve lengths are there?
   - There are 8 different possible combinations of colour and sleeve length. If there 2 different sleeve lengths how many different colours are there?

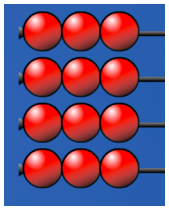
	Colour 1	Colour 2	Colour 3	Colour 4
Length A	A1	A2	A3	A4
Length B	B1	B2	B3	B4

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 array shows four equal groups of 3 horizontally and three equal groups of 4 vertically.



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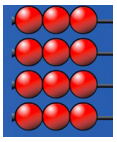
Helpful Information

Mathematical Words/Symbols

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



Expression – is a mathematical phrase that involves numbers and operation symbols. For example, 4 x 3 is a multiplication expression.
Factor – a number that divides exactly into another number. For example, 6 is a factor of 12.

Product – the result of multiplying. For example, 6 is the product of 2 x 3.
Quotient - the result of dividing. For example, 6 is the quotient of 24 ÷ 4

X multiplication symbol
÷ division symbol

6 ÷ 2 without context can be interpreted as:
- 6 divided into 2 groups
- 6 is made up of groups of 2

3 x 2 has many interpretations including:
- three times two
- three, two times
- three groups of two

Materials

Activity 1:
- Set Tool

Activity 2:
- Set Tool

Activity 3:
- Whole Number Rods
- Number Cards

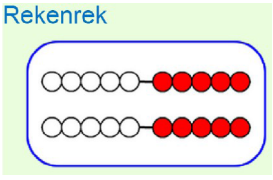
Activity 4:
- Whole Number Rods

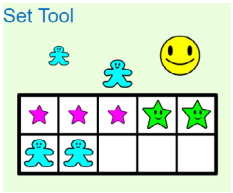
Activity 5:
- Colour Tiles
- Number Cards

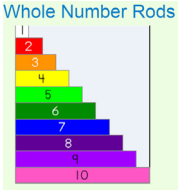
Activity 6:
- Colour Tiles

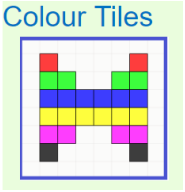
Activity 7:
- Notepad
- Number Cards

Activity 8:
- Notepad









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Equal Groups of Objects

Activity 1

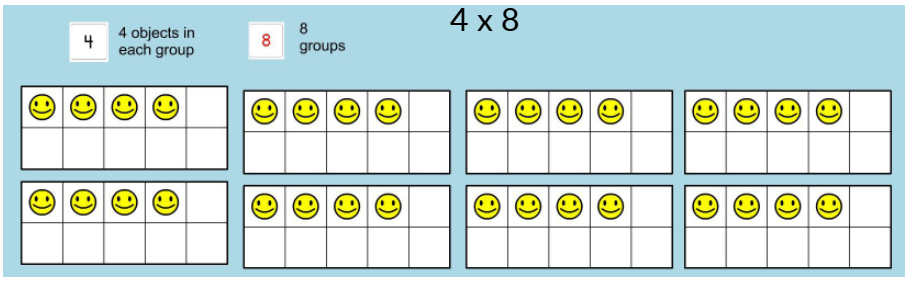
Set Up for the Activity:

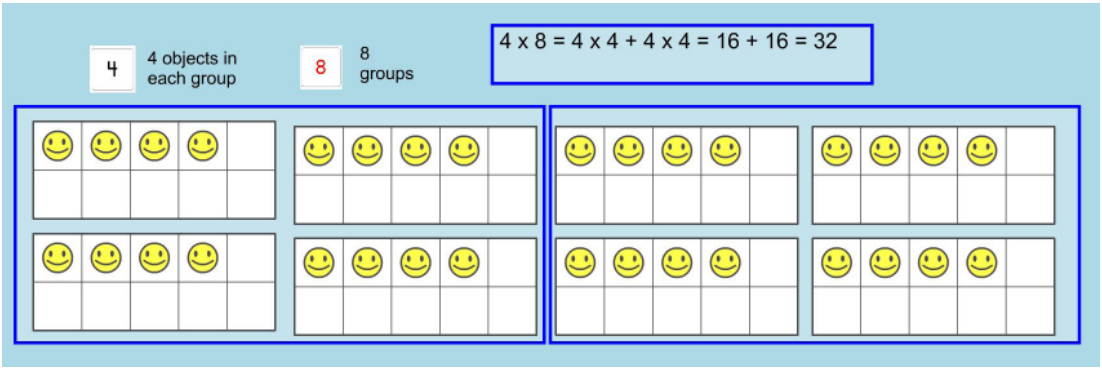
- Open the Set learning tool
  - » ensure the tool is in create mode
- Shuffle one set of black number cards 1 to 9 and place them face down in a pile.
- Shuffle one set of red number cards 6 to 9 and place them face down in a pile.

How to Play the Activity:

1. Have your child pick one black card and place that number of objects in a 10-frame.
2. Have your child pick a red card and make copies of the original 10-frame until the number of 10-frames matches the card.
3. Have your child write an expression to record the application of multiplying.
4. Have your child determine how many objects are on the workspace.
5. Repeat several times.

Example:





Your child may see 4 x 8 as two 4 x 4 added together.

Let's Talk About It

How did you determine the product?
How would the product change if you had one more (less) object in each group?
How would the product change if you had one more 10-frame?

Dividing Sets of Objects

Activity 2

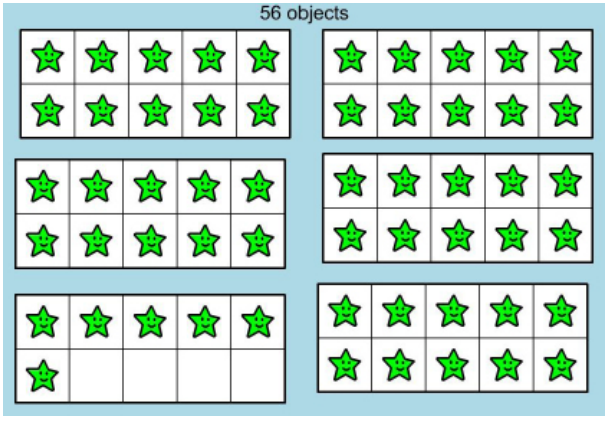
Set Up for the Activity:

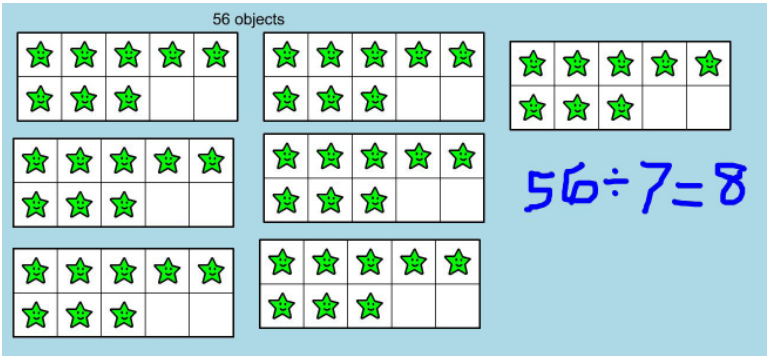
- Open the Set learning tool.
  - » ensure the tool is in create mode

How to Do the Activity:

1. Pick a number between 50 and 81.
2. Have your child represent this number using the same object.
3. Ask your child to determine if the set of objects can be divided equally among groups of 6 to 9 objects in each.
4. Have your child write a division equation to represent the action of dividing the objects into equal-sized groups in step 3. Ask your child to interpret the division equation.
5. a) If your child was able to divide into equal-sized groups, have your child write the division equations for it.
   b) If your child was unable to divide into equal-sized groups, ask your child how does the number of objects need to be adjusted to make equal-sized groups.
6. Repeat activity as desired.

Example:





Your child may start with filling 10-frames to represent the number and use trial and error to determine if it can be rearranged into equal-sized groups.

Let's Talk About It

What strategy did you use to create equal-sized groups?
Which numbers between 50 and 81 cannot be divided into equal groups of 6, 7, 8 or 9 ? How do you know?

Scaled Whole Number Rods

Activity 3

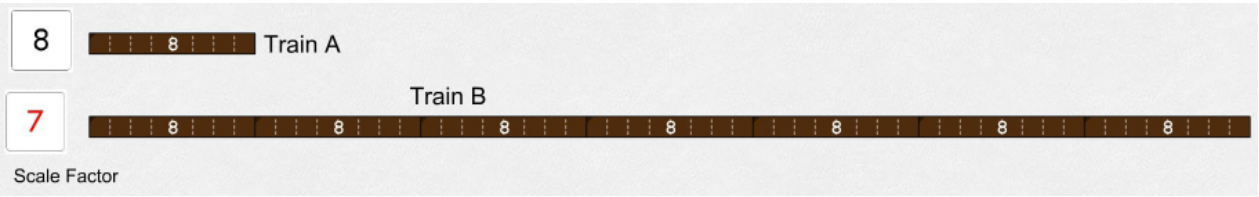
Set Up for the Activity:

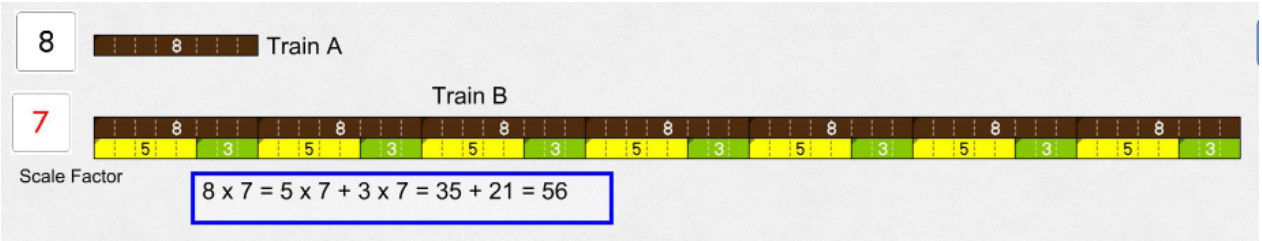
- Open the Whole Number learning tool.
- Shuffle two sets of black number cards 6 to 9 and place them face down in a pile.
- Shuffle two sets of red number cards 1 to 9 and place them face down in a pile.

How to Do the Activity:

1. Have your child pick a black card from the pile.
2. Have your child move the rod that represents that card onto the workspace. Annotate as Train A.
3. Have your child pick a red card from the pile. This card represents the number of times greater Train B is than Train A. This is called the scale factor.
4. Have your child write the multiplication equation and any steps used to determine the product (length of Train B).
5. Repeat the activity at least three times.

Example:





Your child may replace 8 using known facts for 5 and 3 to determine the product.

Let's Talk About It

What is another way to find out the length of Train B?

Dividing Scaled Trains

Activity 4

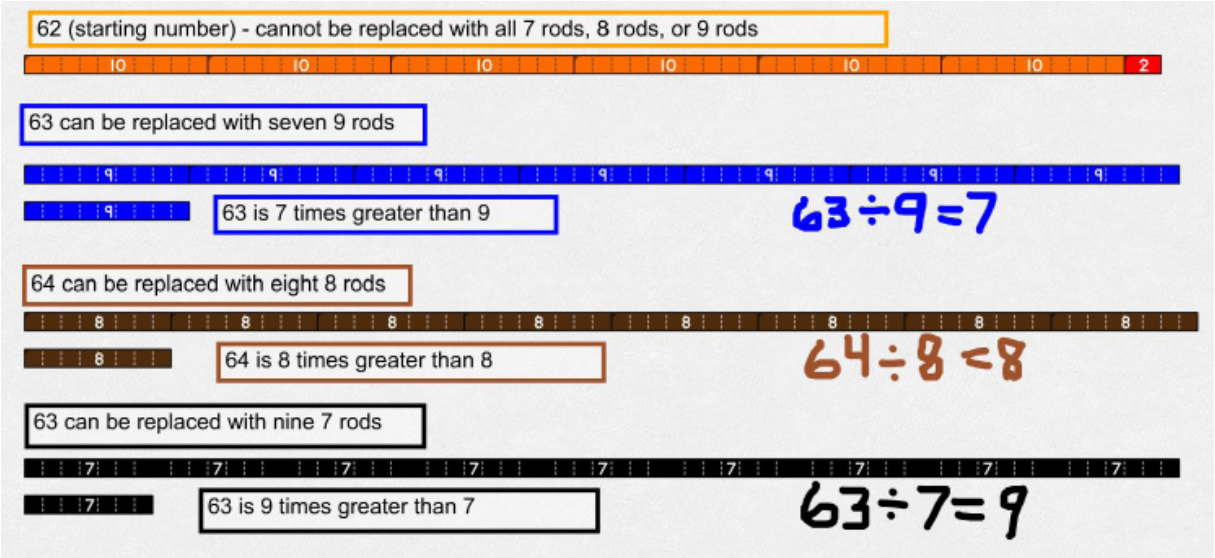
Set Up for the Activity:

- Open the Whole Number Rod learning tool.
  - » in the settings, adjust the size of the rods such that the unit train at the bottom of the workspace has a length of at least 81

How to Do the Activity:

1. Have your child pick a number between 50 and 81.
2. Ask your child to represent this number using the whole number rods.
3. Have your child explore to determine if the number can be represented using only 7, 8 or 9 rods.
4. a)If your child is able to replace with just 7, 8 or 9 rods, ask your child to determine how many times greater the number is then a single rod (scale factor)?
   b)If your child is not able to replace with just 7, 8 or 9 rods, have your child determine the closest number to this number that can be replaced by just 9 rods, the closest number that can be replaced by just 8 rods, the closest number that can be replaced by just 7 rods. For each have your child determine how many times greater that number is to the single rod.
5. Ask your child to write the division equation that can be used to determine the scale factor.
6. Repeat activity as desired.

Example:



Your child may use repeat subtraction to determine the scale factor.

Let's Talk About It

How can you use known facts to help you predict the number of rods?
What would happen if the scale factor was increased by one?

Areas of Rectangles

Activity 5

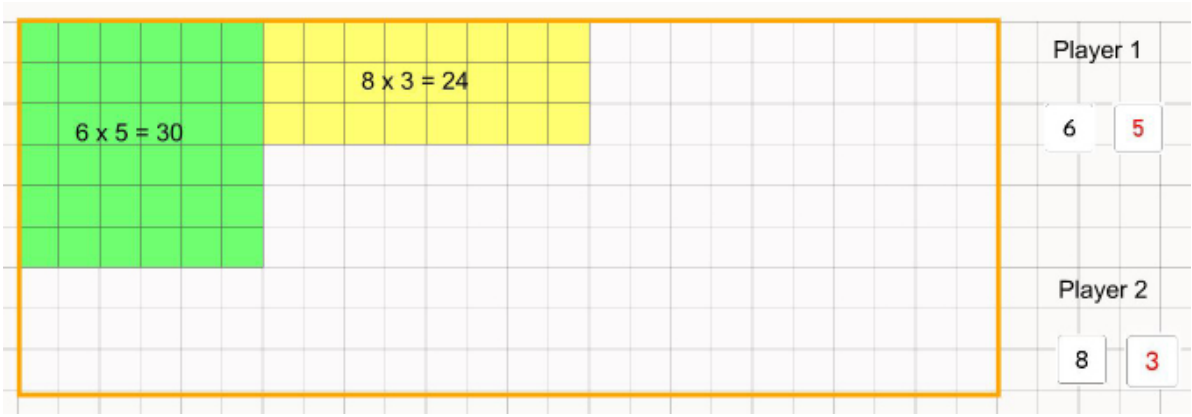
Set Up for the Game: **Number of Players: 2**

- Open the Colour Tiles learning tool.
  - » Create a large rectangle using the annotation tool.
- Shuffle four sets of black number cards 5 to 9 and place them face down in a pile.
- Shuffle four sets of red number cards 1 to 9 and place them face down in a pile.

How to Do the Game:

1. Decide who goes first.
2. Players take turns:
   - » picking one card from each pile
   - » creating a rectangle using colour tiles with the dimensions noted on the two cards
   - » placing these tiles in empty space in the large drawn rectangle
   - » writing a multiplication equation for the area of their rectangle created by the tiles
3. When the pile of cards is finished, or there are no more possible moves, the players find the sum of their products. The player with the greatest sum wins the game.

Example:



Your child may notice that the order in which the two numbers are multiplied does not matter. This is the commutative property.

Let's Talk About It

Does it matter which order we multiply the numbers together? Why or why not?
What strategies did you use to determine the area of your rectangles?

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Rectangle Measures

Activity 6

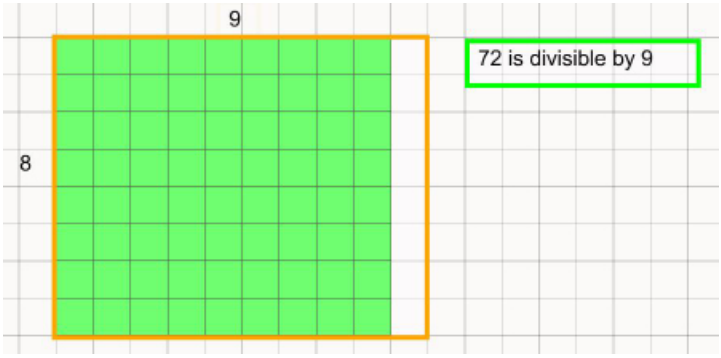
Set Up for the Activity:

- Open the Colour Tiles learning tool.
- Create a recording chart with headings identified in the example.

How to Do the Activity:

1. Have your child pick a number between 50 and 81 that is divisible by 7, 8 or 9.
2. Have your child verify the number by creating a rectangle using colour tiles with the length of its divisor.
3. Ask your child to identify the width of the rectangle.
4. Have your child write the multiplication equation that determines the area of the rectangle.
5. Have your child write the division equation such that the result is the length of the rectangle.
6. Have your child write the division equation such that the result is the width of the rectangle.

Example:



Your child may use trial and error to find a number that divides evenly.

Multiplication Equation	Division Equation 1	Division Equation 2
9 x 8 = 72	72 ÷ 8 = 9	72 ÷ 9 = 8

Let's Talk About It

Why are there two division equations when we only have one multiplication equation for each rectangle?
Can you create a rectangle with different dimensions that has the same area? What would its dimensions be? What would the division equations be?

Combining Shapes and Colours

Activity 7

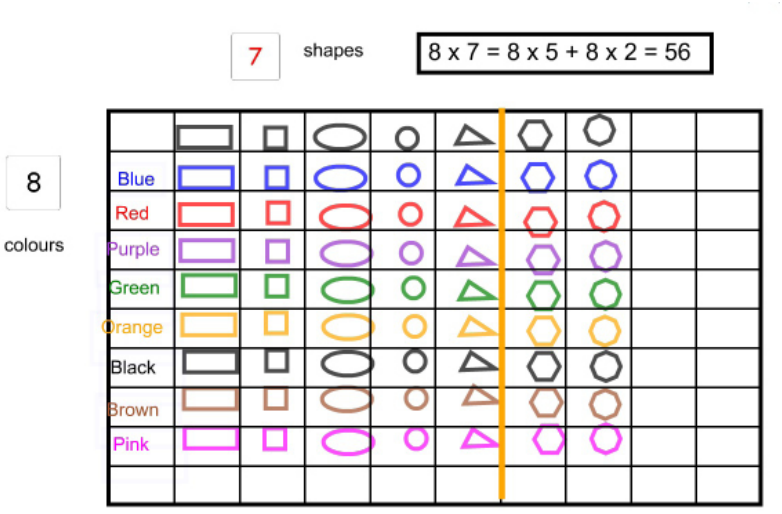
Set Up for the Activity:

- Open the Notepad learning tool.
  - » insert a table with 10 columns and 10 rows (not all columns and rows may be used in the activity) label the columns Shapes and the rows Colours (see example)
- Shuffle two sets of black number cards 5 to 9 and place them face down in a pile.
- Shuffle two sets of red number cards 2 to 9 and place them face down in a pile.

How to Do the Activity:

1. Have your child pick a black number card. This card represents the number of different colours that will be used.
2. Have your child pick a red number card. This card represents the number of different shapes that will be used.
3. Have your child fill in one colour for each row until the number of colours matches the card.
4. Have your child place one shape for each column until the number of shapes matches the card.
5. Ask your child to predict how many different combinations can be created.
6. Have your child check the prediction by filling in the grid creating combinations of colours and shapes.
7. Have your child write the multiplication equation and any steps in determining the product.
8. Repeat the activity as desired.

Example:



Your child may decompose the number(s) and use known facts to determine the product.

Let's Talk About It

How did you determine the product?
What would the product be if you had one more shape? One fewer colour?

How many Colours?

Activity 8

Set Up for the Activity:

- Open the Notepad learning tool.
- Using the information from the Combinations Chart, pick one of the Number of Shapes and select one of its corresponding Number of Combinations.

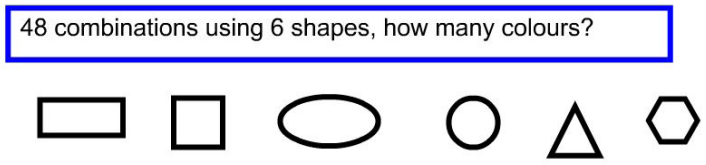
Number of Shapes	Number of Combinations
6	6, 12, 18, 24, 30, 36, 42, 48, 54
7	7, 14, 21, 28, 35, 42, 49, 56, 63
8	8, 16, 24, 32, 40, 48, 56, 64, 72
9	9, 18, 27, 36, 45, 54, 63, 72, 81

How to Do the Activity:

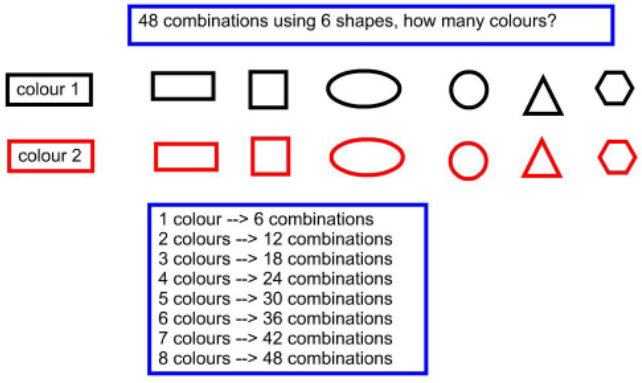
1. Tell your child the total number of combinations of colours and shapes.
2. Tell your child the number of shapes (6, 7, 8, or 9).
3. Have your child use the annotation tool to determine the number of colours needed to create that many combinations.
4. Ask your child to write the division equation such that the result is the number of colours.
5. Repeat activity as desired.

Example:

48 combinations
6 shapes



Your child may use patterning to determine the number of colours of 6 shapes will result in 48 combinations.



48 ÷ 6 = 8

Let's Talk About It

How did you determine the number of colours?
How many combinations would you have if you had one more shape?