Mathematical Ideas
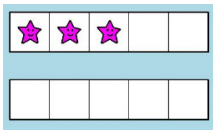
Composing and decomposing numbers, and counting are fundamentals of addition and subtraction.

The following are properties of addition.

1. Identity

$3 + 0 = 3$
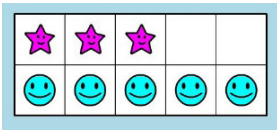

The sum is the number when zero is added to the number.
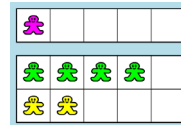
2. Commutative

$3 + 5$ = $5 + 3$

The sum is the same no matter the order of the numbers.

3. Associative

$(1 + 4) + 2$ = $1 + (4 + 2)$

The sum is the same no matter the order in adding.

The following are strategies used to learn addition facts.

Example 1: Counting All
$3 + 5 = ?$

1, 2, 3

1, 2, 3, 4, 5

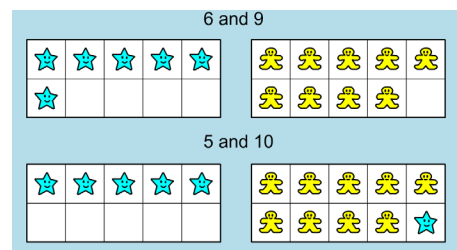Count: 1, 2, 3,..4, 5, 6, 7, 8
Last number in the count is the sum.

Example 2: Counting On
$3 + 16 = ?$

Count on from the greatest number: 16...17, 18, 19

Example 3: Making Tens
$6 + 9 = ?$

6 and 9

5 and 10

Addition to 20

Tips
- There are many strategies to develop math facts.
- Learning tools can be used to develop and apply foundational skills and concepts.
  - » the way your child interacts with the tool can reveal your child's thinking
  - » they can be used for your children to communicate their thinking
  - » encourage your child to take the time to use the learning tools in each activity

Mathematical Words/Symbols

Addition Expression - a mathematical phrase containing numbers and the addition symbol.
(e.g., 3 + 2 + 5)

Composing – is when numbers are combined to create a larger number

Decomposing – is when a number is broken down into smaller numbers

Sum or total – the result of addition

+ plus or add

= equals or same as

Materials
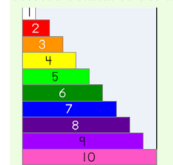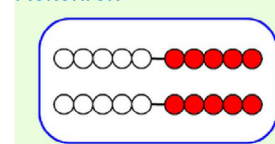
Activity 1:
- Whole Number Rods
- Number Cards

Activity 2:
- Colour Tiles
- Number Cards
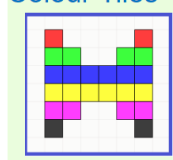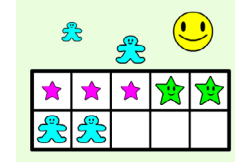
Activity 3:
- Set Learning Tool

Activity 4:
- Rekenrek

Activity 5:
- Catch a Bouncing Ball Game – Whole Number Operations

Activity 6:
- Number Charts
- Representation Cards

Whole Number Rods

Rekenrek

Colour Tiles

Set Tool

Catch a Bouncing Ball - Operations (Whole Numbers)

Learning Tools and Games can be accessed at mathies.ca

Adding by Counting On Rods   Activity 1

**Set Up for the Activity:**
- Open the whole number rods learning tool
- Shuffle two sets of black number cards 1 to 3 and place them face down in a pile.
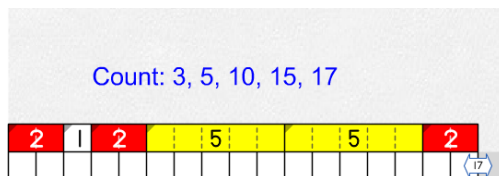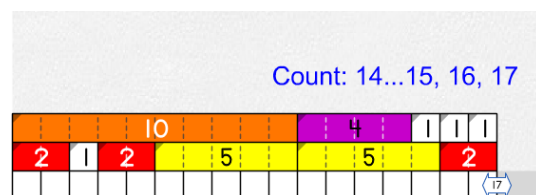- Shuffle one set of red number cards 10 to 17 and place them face down in a pile.

How to Do the Activity:
1. Have your child pick one black number card and one red number card.
2. Ask your child to write an addition expression for the two numbers.
3. Have your child represent the black number card using any combination of whole number rods forming a train just above the unit train.
   » unit train is at the bottom of the workspace
4. Have your child represent the red number card using a combination of 1-rods, 2-rods, and/or 5-rods.
5. Ask your child to move each of the rods in step 4 one at a time onto the train made in step 3.
   » as your child moves each rod ask your child to count on out loud
6. Ask your child what is the sum of the two numbers.
7. Slide the unit train arrow to match the end of the full train to check that the length matches the sum and the final count.
8. Have your child read the red card again and represent this number creating a train using the fewest number of rods.
   » place the rods above the previous train
9. Have your child read the number on the black card again and represent this number using 1-rods.
10. Ask your child to move the 1-rods in step 8 one at a time onto the train made in step 7.
    » as your child moves each rod ask your child to count on out loud
11. Have your child compare the two trains. Ask your child to tell you the sum of the red and black cards.
12. Have your child compare the two ways they added the numbers together.
13. Repeat activity as desired.

Example:

3 + 14

Count: 14...15, 16, 17

Count: 3, 5, 10, 15, 17
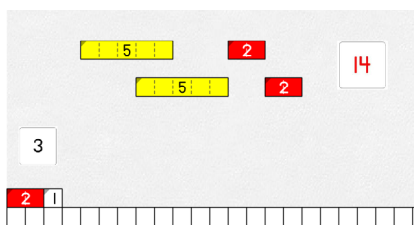
Your child may count on by making 5 first.

Let's Talk About It

Did you get the same sum no matter which order you added the numbers? Why or why not?
Will this happen every time?
Which was easier, counting on from the larger number or the smaller number? Why?

WINS

Doubles and Doubles Plus More Tiles

Set Up for the Activity:
- Open the Colour Tiles learning tool.
- Shuffle one set of number cards 4 to 9 and place them face down in a pile.

How to Do the Activity:
1. Have your child pick a card and place that many same coloured tiles in a row.
2. Have your child use a second colour and make a row of tiles that is double the row created in step 1.
   - » place this row below a couple of spaces below the other row
3. Have your child use a third colour and make a row of tiles that is double the row created in step 1 plus one more tile.
   - » place this row above the doubled row from step 2
4. Have your child use a fourth colour and make a row of tiles that is double the row created in step 1 plus two more tiles.
   - » place this row below the doubled row from step 2
5. Use the annotation tool to record the number of tiles in each row.
6. Have your child check the numbers using the tile count # .
7. Repeat activity as desired.

Example:

5

Your child may make a row of tiles to match the first row and then use copy to double it.

Colour	Count
(red)	5
(blue)	11
(green)	10
(yellow)	12
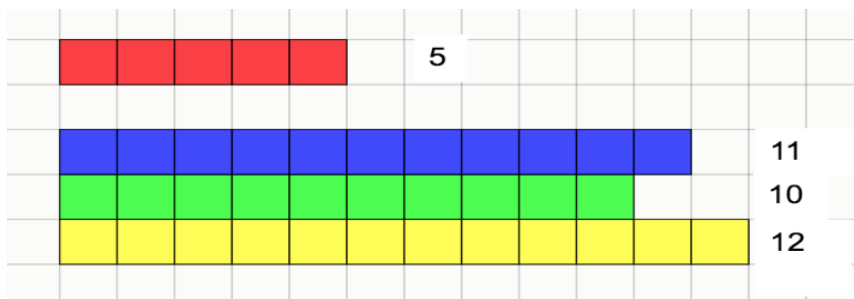
Let's Talk About It

Which row shows one more? How do you know?
Which row shows two more? How do you know?
How many tiles will you have if you added one more to your first row and then doubled that?

Sums Less than Twenty Using the Set Tool

Activity 3

Set Up for the Activity:
- Open the Set learning tool.
  - » ensure it is in Create mode

How to Do the Activity:
1. Ask your child to pick two numbers that when added together have a sum that is less than 20.
   - » have your child tell you the numbers and their sum
   - » accept any two numbers even if the sum is greater than 20
2. Have your child verify the sum by completing the following steps:
   - » represent the first number; filling in 10-frames using the same object
   - » represent the second number; filling in 10-frames using a different object
   - » determine the combined number of objects (sum)
3. Have your child compare this sum to 10.
4. Have your child compare this sum to 20.
5. Have your child compare this sum with the stated sum in step 1.

Example:

"I think that 7 plus 9 is 15."

7

9

6

sum is 16

10
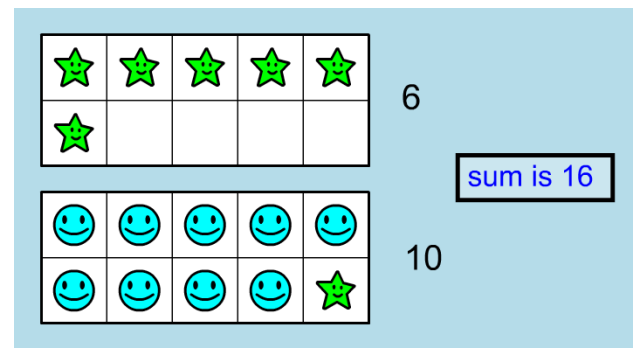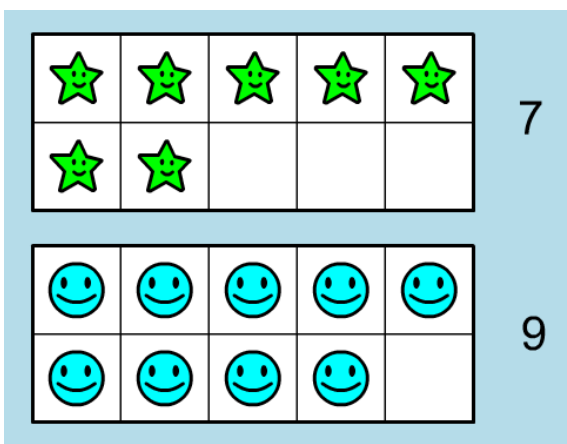
"7 plus 9 is 16"
"It is 6 more than 10...and...4 less than 20"
"I was 1 off of what the sum is."

Your child may decompose one number to make a ten.

Let's Talk About It

How did you pick your numbers?
What was your strategy for determining the sum?
How many do you have to add on (or take away) to make 20?

## Even or Odd Sums Less than Twenty Using the Rekenrek

Activity 4

Set Up for the Game:
- Open the Rekenrek Learning Tool
  - » show three racks with the beads on the right hand side
- Set up a chart with the headings as shown in the example.

How to Play the Game:
1. Have your child select a number from 3 to 7 and represent this number on the Rekenrek.
2. Ask your child to determine whether it is even (by forming two equal groups) or odd.
3. Record the number and state if it is even or odd in the chart.
4. Have your child select a number from 5 to 13 and ask if the number is even or odd.
5. Have your child represent this number on the Rekenrek and verify whether it is even or odd.
   » add to the chart
6. Have your child determine the sum of the two numbers from step 1 and step 4.
7. Ask your child to determine if the sum is even or odd.
8. Record the sum and state if it is even or odd in the chart.
9. Repeat the activity several times and then have your child look for patterns in the chart.

Example:
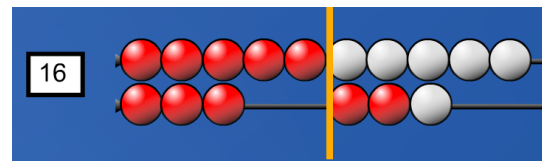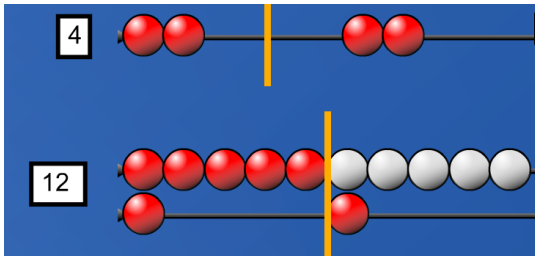
Number from 3 to 7	4 (even)					
Number from 5 to 13	12 (even)					
Sum of the two numbers	16 (even)					

Your child may add on the smaller amount of beads onto the greater amount.

Let's Talk About It

What strategies did you use to determine your sum?
What patterns do you see between numbers being even or odd and their sum?

Catch a Bouncing Ball – Operations

Set Up for the Game:
- Open the Catch a Bouncing Ball – Operations game
  - » Choose Addition
  - » Choose Sums to 20
  - » Select Play

How to Play the Game:
1. An addition expression will appear on the baseball.
2. Move the baseball glove to the location on the number line that represents the sum of the expression.
3. If the location is correct a new expression will appear. If the location is incorrect try to find the correct sum and move the glove to the new location.
4. The game is played until ten balls have been caught.
5. Review any mismatches at the end of the game.

Example:

?

2 + 17 = ?

6 + 6 = ?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19
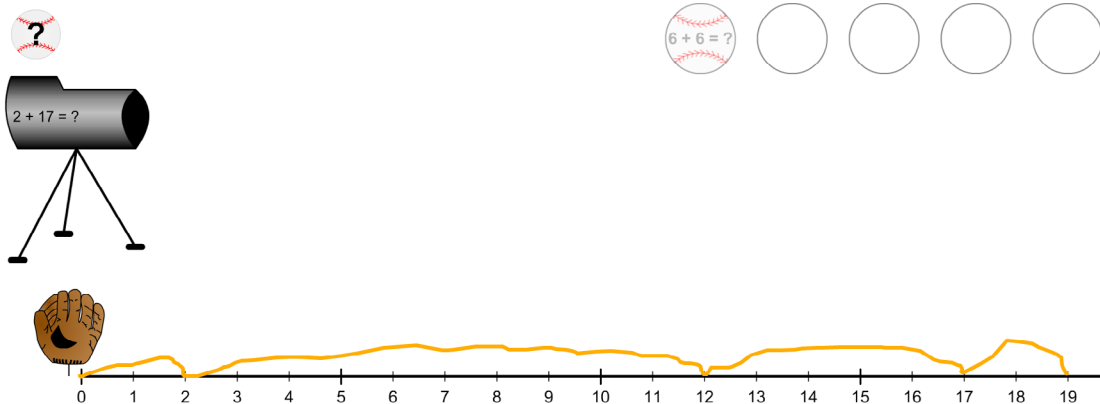
Your child may hop from 0 to 2 and then decompose 17 into 10, 5 and 2 to get the sum of 19.

Let's Talk About It

How did you find the sum of the numbers?
What is another way you can determine the sum?

Addition to 20

Add up to 20 on the Number Chart

Set Up for the Game:
- Open the Number Chart learning tool.
  - » Select 1 to 100 version of the chart
  - » Choose Hide All
- Shuffle a set of cards 1 to 5 and place face down in a pile. Choose a representation – Dice, Fingers, Random Dots, Beads, Numerals, Tallies or Ten Frames.
  - » When all the cards are played, shuffle and reuse the cards.

How to Play the Game:
1. Share that the object of the game is to be the first person to reach the number 20 on the chart.
2. Players take turns:
   - » picking a card
   - » predicting what number will be flipped
   - » counting the squares and flips over the square of the final count
3. Play is repeated until one player reaches, or passes, 20.
4. Repeat activity as desired.

Example:

Your child may use known facts instead of counting.

Let's Talk About It

How did you predict which number was going to be flipped?
How can you check that the sum of your cards matches the final card flipped?