Composing and Decomposing Whole Numbers to 10

Mathematical Ideas

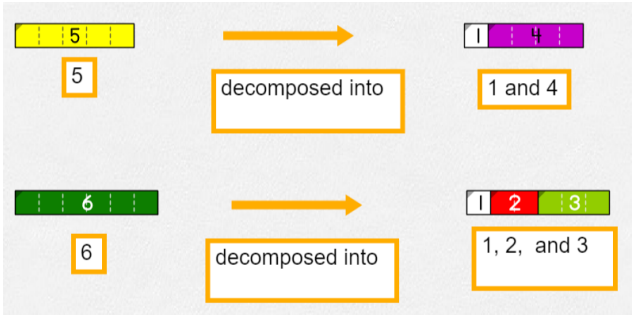
The ability to compose and decompose numbers is foundational to understanding numbers and their relationships.

Composing is when numbers are combined to create a larger number.
For example,

1 and 4 makes 5

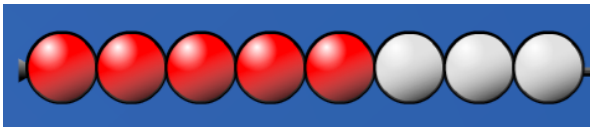
1 and 2 and 3 makes 6

Decomposing is when a number is broken down into smaller numbers. A number can be decomposed in multiple ways. For example,

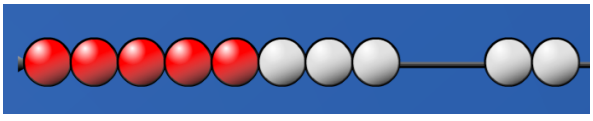


Understanding the relationship of numbers to 5 and 10 is helpful for knowing combinations of numbers. For example,

8 can be thought of as three more than 5



8 can be thought of as two less than 10



Understanding numbers relative to place value is important when working with our decimal system. For example,

18 can be thought of as 1 ten and 8 ones.

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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 learning tools in each activity.
- Organized concrete and visual representations can help with understanding numbers and the relationships between numbers.

For example,

From this visual, you can spatially see that when one number increased, the other number is decreased.

Mathematical Words/Symbols

Attribute – a characteristic of an object (e.g., colour, size, thickness, or number of sides).

Digits –the numerals 0 to 9 that form numbers. For example, the digits 2 and 7 can form the two-digit numbers 27 and 72.

Place value – the value of a digit that appears in a number. The value depends on the position or place in which the digit appears in the number. For example, in the number 54, the digit 5 is in the tens place and represents 50.

Set - A collection of objects.

Materials

Activity 1:
- Whole Number Rods
- Numbers cards 6 to 10

Activity 2:
- Set Learning Tool
- Numbers cards 4 to 10

Activity 3:
- Money
- 3 Sets of Number Cards 1 to 4

Activity 4:
- Rekenrek
- Numbers cards 5 to 10

Activity 5:
- Whole Number Rods
- Numbers cards 5 to 10

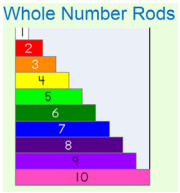
Activity 6:
- Numberline

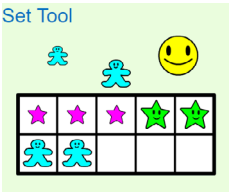
Activity 7:
- Pattern Blocks
- Number cards 1 to 3

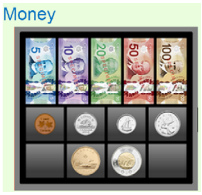
Activity 8:
- Rekenrek

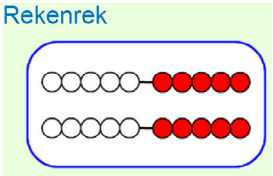
Activity 9:
- Set Learning Tool

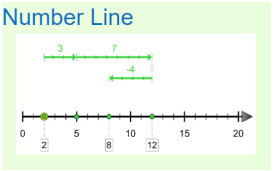
Activity 10:
- Colour Tiles
- Numbers cards 2 to 4

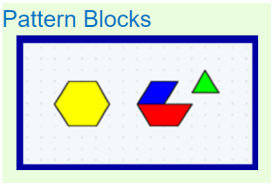


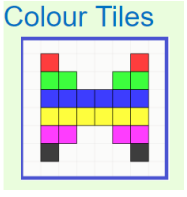












How Am I Composed?

Activity 1

Set Up for the Activity:

- Open the Whole Number Rods learning tool.
- Shuffle one set of number cards 6 to 10 and place them face down in a pile.

How to Do the Activity:

1. Have your child pick a number card from the pile.
2. Ask your child to use Whole Number Rods to create this number in a variety of ways.
3. Ask your child to compose the number on the card using the greatest number of rods.
4. Ask your child to compose the number on the card using the greatest number of different types of rods.
5. Repeat activity as desired.

Example:

Using the greatest number of rods

Using at least two rods

Your child may use the unit train to make 8 and then find rods that will connect together to make the same distance.

Using the greatest number of different types of rods

Let's Talk About It

What patterns do you see with the numbers you used to create the number on the card?
How many different ways can you compose the number on the card?

How Many in Each Group

Activity 2

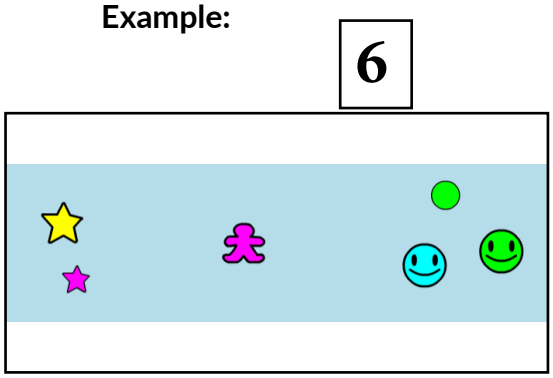
Set Up for the Activity:

- Open the Set learning tool.
  - » Select Auto Mode.
  - » Select all three shapes (star, circle, gingerbread).
- Shuffle one set of the number cards 4 to 10 and place face down in a pile.

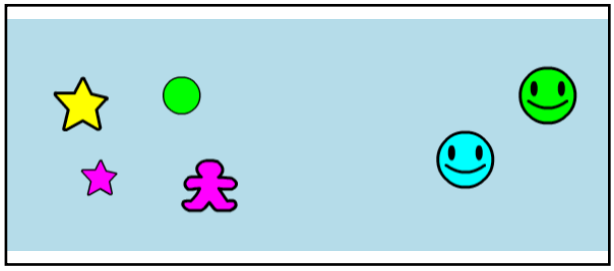
How to Do the Activity:

1. Have your child pick a number card from the pile.
2. Input this number into the Number of Objects and press New.
3. Have your child sort the objects into groups. Ask your child to tell you how many objects are in each group. Have your child find one or two more ways to sort the objects. Count the groups each time.
4. Select New (New) to create a new set with the same number of objects. Have your child repeat step 3. Repeat at least once more.
5. Change the number and repeat activity as desired.

Example:

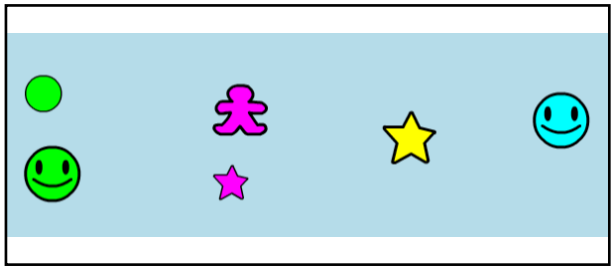


2 stars, 1 gingerbread, 3 happy faces



4 without a face , 2 with faces

Your child may sort the objects by shape, colour, or feature such as faces.



2 green, 2 purple, 1 yellow, 1 blue

Let's Talk About It

How many ways can you decompose the number you picked?
What patterns do you see?

Making a Dime

Activity 3

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

- Open the Money learning tool.
  - » Customize the money tray to only show 1 cent, 5 cents, and 10 cents.
  - » Create a game board as shown in the example below, using the annotation tool
- Shuffle four sets of number cards 1 to 4 and place them face down in a pile.

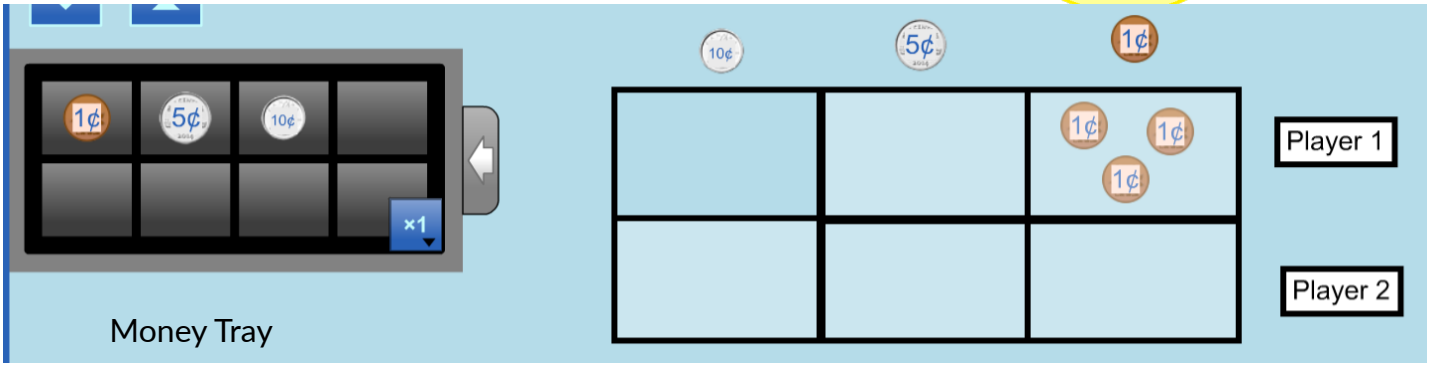
How to Play the Game:

1. Decide who goes first.
2. Each player takes a turn to pick a card from the pile. The number shown on the card is the number of 1 cent coins removed from the money tray and placed into the player's 1-cent coin section on the game board.
   - » Once a player has 5 1-cent coins, the coins must be traded in for a nickel which is placed in the nickel section on the game board.
   - » Once a player has 2 nickels, the nickels must be traded in for a dime which is placed in the dime section on the game board.
3. The first player to get a dime wins that round.
4. The one with the most dimes after 5 rounds wins the game.

Example: Player 1's turn

3 cents placed in Player 1's 1 cent section

Your child may start off each turn placing all the new cents in the 1 cent section and then convert 5 cents to a nickel.



Game Board

Let's Talk About It

How many 1 cents are worth the same as a nickel?
How many nickels are worth the same as a dime?

Ways to Compose a Number

Activity 4

Set Up for the Activity:

- Open the Rekenrek learning tool.
  - » Show 4 racks with all the beads on the right side.
  - » Spread the 4 racks apart.
  - » Place one bead on the left side of the first Rekenrek rack.
- Shuffle one set of number cards 5 to 10 and place them face down in a pile.

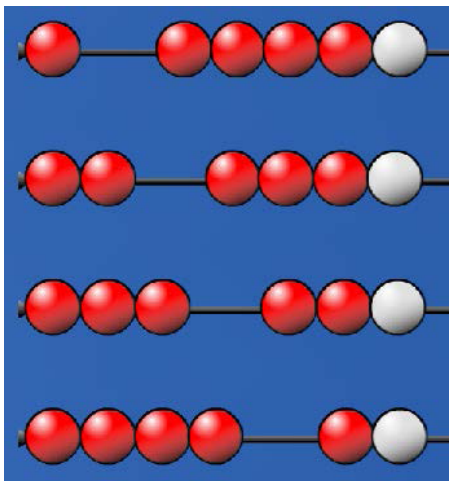
How to Do the Activity:

1. Have your child pick a number card from the pile.
2. Place one bead on the left side of the first Rekenrek rack.
3. Ask your child to slide enough beads over to the single bead to finish creating the number on the card. Leave a space between the one bead and the other beads. Have your child tell you the two numbers that compose the number on the card.
4. Place two beads on the next Rekenrek rack.
5. Ask your child to slide enough beads over to finish creating the number on the card. Leave a space between the two beads and the other beads. Have your child tell you the two numbers that compose the number on the card.
6. Continue for three beads and four beads.
7. Repeat activity with other target numbers.

Example:

6

Target Number



1 and 5

2 and 4

3 and 3

4 and 2

Your child may move one bead at a time to make the target number.

Let's Talk About It

What pattern do you notice with the number of beads given and the number of beads needed to create the number?
How can we create this number if we use more than two groupings of beads?

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Composing to 10 Using Whole Number Rods

Activity 5

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

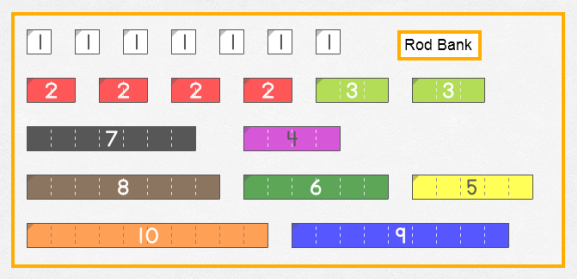
- Open the Whole Number Rods learning tool.
  - » Create a rod bank at the top/bottom of the workspace (see example).
- Shuffle one set of number cards 5 to 10 and place them face down in a pile.

How to Play the Game:

1. Place 20 rods into the rod bank. Ensure there is at least one rod of each type and several of each of the small rods.
2. Ask your child to pick a number card and read it aloud.
3. Player 1 uses rods from the rod bank to form a train that matches the number card.
4. Player 2 uses rods from the rod bank to form a train that matches the number card.
5. Each player continues to take turns making trains until all the rods are gone from the rod bank or no one can find another way to form a train.
6. The player who made the most trains wins one point.
7. Repeat. The first person to earn 5 points wins the game.

Example:

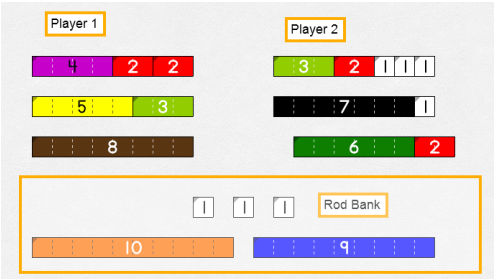
Rod Bank



Your child may start with the 8 train and then build trains of the same length.

At the end of the game:

8



Both players made the same number of trains, which results in a tie.

Let's Talk About It

Which rods in the rod bank are the most useful? Why?
How can I make the number another way using rods from the rod tower, not the rod bank?

Composing Numbers to 10 Using a Number Line

Activity 6

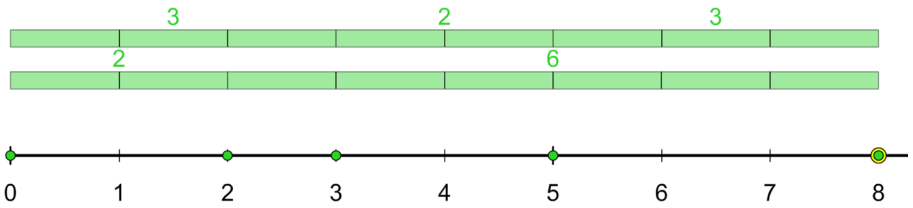
Set Up for the Activity:

- Open the Number Line learning tool.
  - » Select 0 to 10.
  - » Select number ribbon 
  - » Turn on the guidelines using the  icon.
  - » Put a point on one of the hash marks on the number line.

How to Do the Activity:

1. Ask your child to start at zero and drag the number ribbon to the point on the number line. Ensure your child notices that the value on the ribbon is the same value as the point on the number line.
2. Now ask your child to use two ribbons to make the same value.
   - » Your child can use the guidelines lines to help see how each ribbon is connected to the number line.
3. Turn the guidelines off.
4. Ask your child to make the same number again using a different number of ribbons.
5. Have your child compare the two ways of making the same value.
6. Repeat the activity changing the placement of the point on the number line and/or the number of ribbons used.
   - » You may wish to only show the numbers on the number line by selecting 

Example:



3 and 2 and 3 makes 8
2 and 6 makes 8

Your child may start with a random ribbon length and then stop the second ribbon at the point 8 on the number line.

Let's Talk About It

What patterns do you see?
How can I make the number another way using the same number of ribbons?
How can I make the number another way using a different number of ribbons?

Composing Blocks

Activity 7

Set Up for the Activity:

- Open the Pattern Block learning tool.
- Shuffle one set of number cards 1 to 3 and place them face down in a pile.

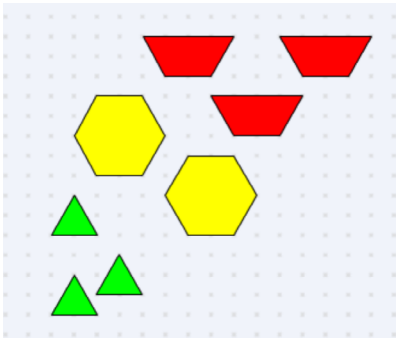
How to Do the Activity:

1. Pick a target number from 3 to 10.
2. Have your child pick a card and read the number. This is the number of different block colours your child will use to create the target number.
3. Ask your child to make the target number by moving blocks onto the workspace.
4. Challenge your child to create the target number again using a different combination of blocks.

Example:

3

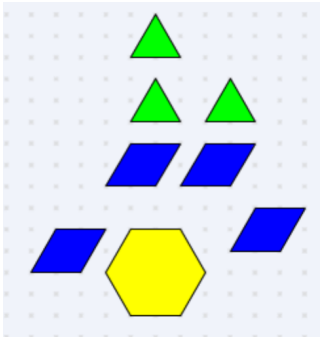
Target number: 8



3 colours of blocks

Your child may select one block of each colour, then a second block of each colour, etc. until the target number is reached.

2nd combination



Let's Talk About It

How are your two sets of blocks the same? How are they different?

Decomposing Numbers to 10 Using the Rekenrek

Activity 8

Set Up for the Activity:

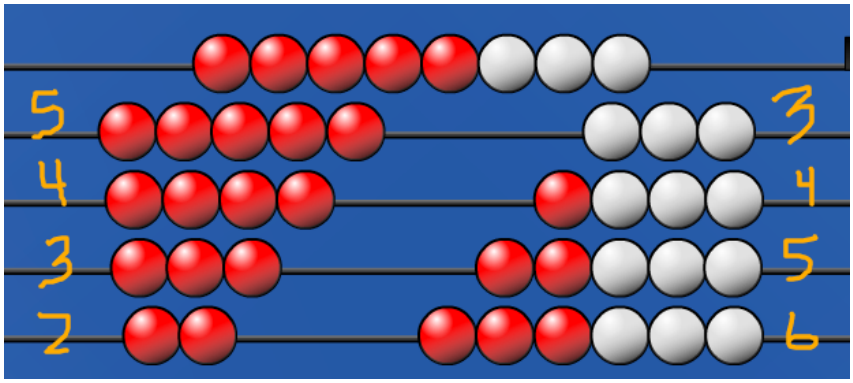
- Open the Rekenrek learning tool.
  - » Show 5 racks of beads with 5 to 10 beads all in the center
  - » Use add a row to add more racks
  - » Hide extra beads with the shade

How to Do the Activity:

1. Ask your child to count the number of beads shown on the first rack.
2. Confirm with your child that each of the racks shows the same amount of beads.
3. Ask your child to separate the beads into two groups on the second rack.
4. Have your child tell you how many are in each group. Record the number using the annotation tool.
5. Ask your child to show different ways to separate the beads into two groups on the other racks.
6. Repeat activity using different initial amounts of beads in the center of the racks and with different numbers of groups.

Example:

Starting with 8 beads in the center of each rack



Your child may decompose the number using a pattern.

Let's Talk About It

How did you know how many beads are in each group?
What patterns do you notice with the groups you made?
How can you check that the combined number of beads in each group will give us the number of beads we started with?

Decomposing Numbers to 10 Using the Set Tool

Activity 9

Set Up for the Activity:

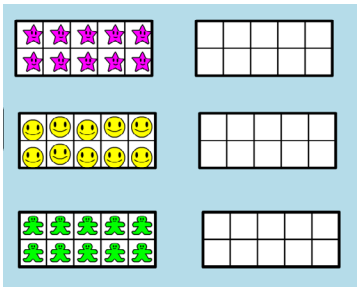
- Open the Set learning tool.
  - » Drag out six ten frames such that they are three rows of two each.
  - » In one ten- frame place 10 stars. In a second ten-frame place 10 happy faces. In a third ten-frame place 10 gingerbreads (see example).

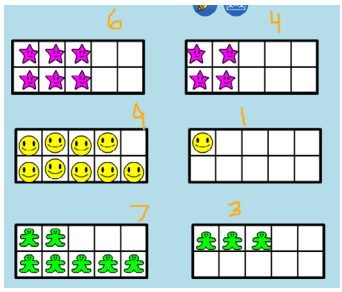
How to Do the Activity:

1. Ask your child to state the number objects shown in each ten-frame.
2. Have your child move some stars out of the ten-frame and place them into the ten-frame that is beside it. Have your child tell you how many are in each ten frame. Record the number using the annotation tool.
3. Repeat step 2 moving a different number of happy faces.
4. Repeat step 2 moving a different number of gingerbreads.
5. Repeat activity using different initial amounts of objects in the ten-frames and with different numbers of ten-frames.

Example:

Starting Frames





Your child may use x5 multiplier function to fill the frames.

Let's Talk About It

How did you know how many objects are in each group?
What patterns do you notice with the objects in the pairs of ten frames?
How can you check that the combined number of objects will give us the number of objects we started with?

Composing and Decomposing to 10 Using Colour Tiles

Activity 10

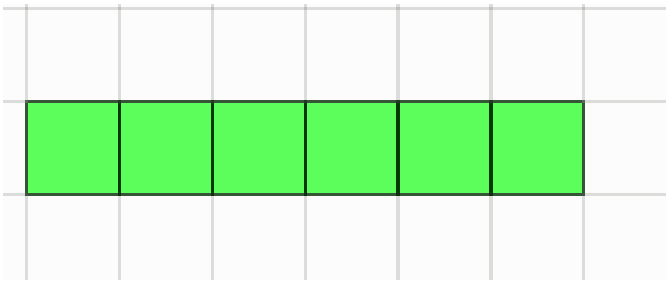
Set Up for the Activity:

- Open the Colour Tiles learning tool.
  - » Select Few.
- Shuffle one set of number cards 2 to 4 and place face down.

How to Do the Activity:

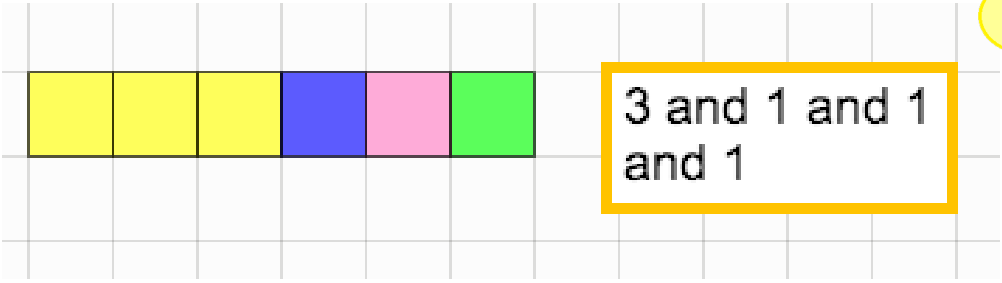
1. Pick a number from 5 to 10. This is the target number.
2. Have your child move this number of same colour tiles into the workspace using the multipliers x2, x5, and x1.
3. Pick a card.
4. Have your child change the number of tile colours used to match the number on the card.
   - » To change the colour select the tile(s) and the palette icon .
5. Ask your child to describe how the original number has been decomposed. Record these numbers using the annotation tool.
6. Repeat as desired.

Example: Target number: 6



4 colours

Your child may have created 6 by using x5 and adding one (x1) more or using x2 three times.



Let's Talk About It

What is another way to compose the target number?
What is another way to decompose the target number?