MATH Literacy

Toolkit

Making and Breaking 5 and 10

SNIPPETS FROM THE LESSON

ProActiveEd

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State Standards

☑ TEKS K.2I

NCTM Process Standards

Problem Solving	Build new mathematical knowledge through problem solving. Solve problems that arise in mathematics and in other contexts. Apply and adapt a variety of appropriate strategies to solve problems. Monitor and reflect on the process of mathematical problem solving.
Reasoning and Proof	Make and investigate mathematical conjectures. Select and use various types of reasoning and methods of proof.
Communication	Organize and consolidate student mathematical thinking in written and verbal communication. Communicate mathematical thinking clearly to peers, teachers, and others. Use the language of mathematics to express mathematical ideas precisely
Connections	Recognize and use connections among mathematical ideas. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole. Recognize and apply mathematics in contexts outside of mathematics.
Representations	Create and use representations to organize, record, and communicate mathematical ideas. Select, apply, and translate among mathematical representations to solve problems. Use representations to model and interpret physical, social, and mathematical phenomena.

Learning Objective

Students compose and decompose numbers up to 10 with objects and pictures.

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Toolkit Materials

Concrete Representations

- ☑ Cubes
- ☑ 6 sided dice
- ☑ Foam Marshmallows (S.T.E.A.M. Connection)
- ☑ Toothpicks (S.T.E.A.M. Connection)

Blackline Masters

- ☑ Ten Frame
- ☑ Part-Part-Whole Mat
- ☑ Score Sheet
- ☑ Writing Sheets

Not Included

- ❒ Pencil

Literacy Guide

	Academic Discourse	Engage in conversations about the big ideas
	Conceptual Understanding	Explore the math using hands-on materials
	Informational Text	Read and write about concepts and problem solving strategies
	S.T.E.A.M. Connections	Investigate science, technology, engineering and art topics using the math
	Technical Writing	Present and write about the S.T.E.A.M. Connections

Recommended Intervention Toolkit

Comparing Numbers Toolkit

Recommended Acceleration Toolkit

Two Digit Place Value Toolkit

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Teacher Tips

Anchor 1: Academic Discourse

- ☑ Use games like a scavenger hunt to help students see the mathematics in the universe that surrounds them.
- ☑ Connect prior learning to make real-world connections to the learning goal.
- ☑ Reduce the barrier of academic vocabulary by focusing on big ideas and real world representations.

Anchor 2: Conceptual Understanding

- ☑ Use concrete realia or virtual manipulatives to represent the learning objective.
- ☑ Use hand-on manipulatives and student created pictures before transitioning to abstract concepts and standard algorithms.
- ☑ Use laboratory procedures that follow a constructivist approach to investigate the topic and learn key concepts.
- ☑ Communicate learning experiences through academic dialogue
- ☑ Write expository pieces to demonstrate conceptual understanding of the learning topic.

Anchor 3: Informational Text

- ☑ Use informational text to investigate the topic and learn key terms.
- ☑ Use reading strategies like previewing, chunking, annotating, and text dependent questioning to help students process the density text.
- ☑ Encourage reading and English teachers to utilize informational text about mathematics in their classroom settings.
- ☑ Communicate learning experiences through academic dialogue
- ☑ Write expository pieces to analyze the concepts and strategies presented in the text.

Anchor 4: S.T.E.A.M. Connections

- ☑ Use research, context clues, and access student schema to comprehend the given scenario
- ☑ Investigate invented strategies and standard algorithms to determine potential successes and failures.
- ☑ Design a prototype that satisfies the criteria outlined in the project before creating the final product.
- ☑ Collaborate with others to share strategies, critique reasoning, and justify methods.

Anchor 5: Technical Writing

- ☑ Write paragraphs that summarize the S.T.E.A.M. scenario. Be sure to include the criteria and scoring guide.
- ☑ Write paragraphs that describes the steps that will be used to address the scenario. Be careful to use numbers with a description of the role those numbers play in those steps.
- ☑ Write paragraphs that incorporates the steps used to address the scenario into actual calculations that include graphs, charts, diagrams and other representations as deemed appropriate
- ☑ Write paragraphs that investigate alternative problem solving strategies as a means for verifying the accuracy and validity of solutions
- ☑ Write paragraphs that reflect on strengths, misconceptions, and potential future applications of the concepts that were addressed and the strategies that were used.

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Math Conversations

SETUP THE GAME

Step 1: Find and count objects.

Step 2: Look around your classroom for small objects.
They should be things that can easily fit into your hand.

PLAY THE GAME - PART 1

Step 3: Find 10 small objects and put them at your work space. Remember to count while you are looking.

Step 4: Compare your objects with a partner.

Think about how many objects you have and how many objects your partner has. Who has the bigger number?

Neither! You should have the same, or an equal amount.

Math Conversations Wrap-up

- How many objects did you find?
- How do you know how many objects you found?

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What's Old?

How many buttons are in the picture below?

We know how to count to find out how many buttons there are. Touch the buttons as we count. 1 2 3 4 5. There are 5 buttons!

I know that I can count to figure out how many, and I know that I can write a number that shows how many I counted!

5

What's New?

Now we'll take what we already know about counting and writing numbers, and use it to practice breaking our numbers apart and putting them back together. We can think of it like a puzzle. With puzzles, we can take the pieces out and put them back again.

Counting in Order

Look at the numbers below. Point to each number while we count it. Remember that numbers go in an order, and that each one we touch shows a symbol that represents that number. The number we say is the number that's shown!

1 2 3 4 5

6 7 8 9 10

How did you know that the number you said was the number you touched? We know the number we said was the number we touched because we followed the counting order!

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Recognizing Numbers

Look at the numbers below. Point to the number five. Point to the number eight.

1 2 3 4 5

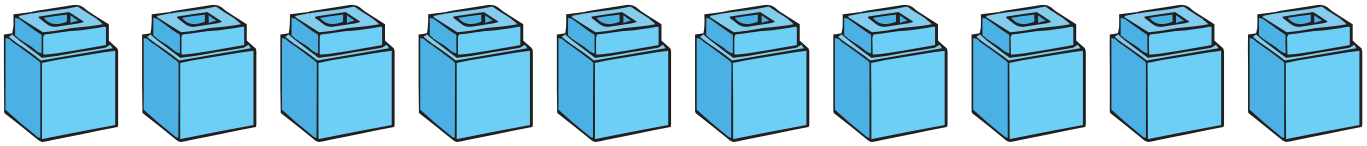
6 7 8 9 10

How did you know that the number you read was the number you touched? We can check that the number we read is the number we touched by following the counting order!

Connecting Cubes

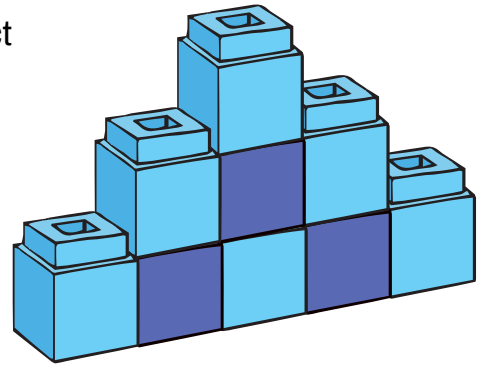
Let's practice connecting cubes to make letters, shapes, and patterns.

Step 1: Count out 10 cubes to use at your work space.
Remember to touch each cube as you count it to make sure you have 10.



Step 2: Use the 10 cubes to explore! Try and connect the cubes together.

Can you make different shapes?



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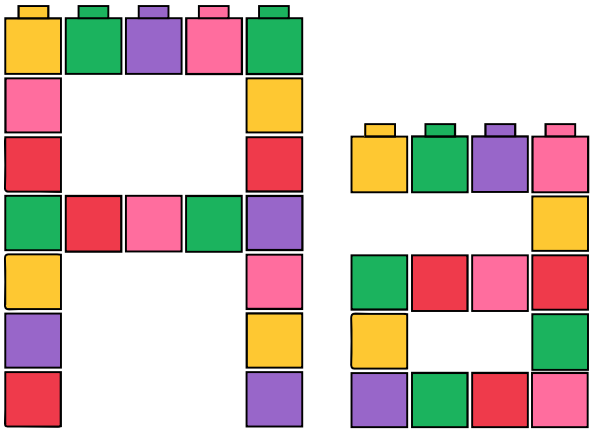
Can you use the cubes to make different letters?



Can you make a pattern?

STEP 3: You have 5 minutes to create as many different things as you can.

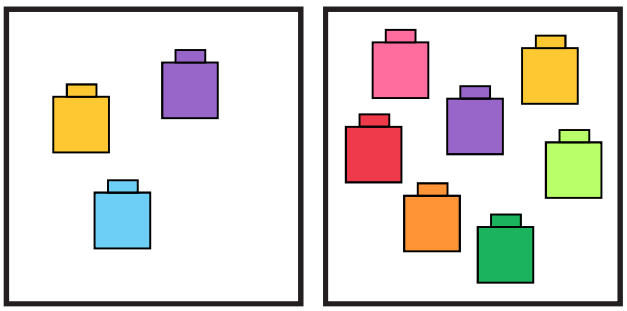
See how the cubes can connect with each other.
See how many things you can create before the time is up.

Breaking Cubes Apart

Let's practice breaking cubes apart into different groups.

Step 1: Break apart your 10 cubes into 2 different groups.

Step 2: Put 1 of the groups in 1 square, and the other group in the other square.



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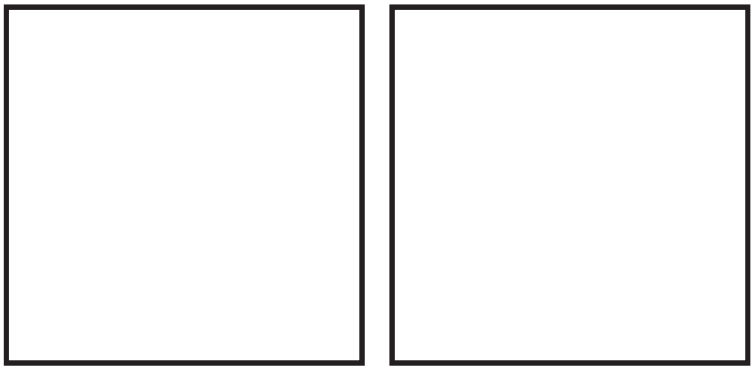
Step 3: Can you break apart your numbers another way? There are lots of different ways to take 10 things and split them into 2 different groups.

Take 1 minute to explore how you can make 2 different groups in the circles using 10 cubes.



Stop and Think

How do I know that I broke the group apart?
I know I broke them apart because there are 2 smaller groups of things.

How many smaller groups did I make?
I made 2 smaller groups.

Did I change the total number of cubes I had?
I didn't change the total number of cubes, because I didn't put any more cubes on my work space, and I didn't take any cubes off of my work space.

Parts and Wholes

When we are breaking apart our numbers we are breaking them into **parts**, or smaller pieces from what we started with. When you play kickball you are **part** of a team. A page is a **part** of a book. A **part** is something smaller than what we started with, or something that can be put together with another **part**.

When we put our numbers together, this is called the **whole**. The **whole** is the number we start with, or how many things there are in total. If I look at all the players on a team, that is the **whole** team. If I look at all the pages in a book, that is the **whole** book. The **whole** is all the numbers or parts put together.

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Stop and Think

What other ways can we break apart 3?
We could break it into parts of 3 and 0, or parts of 0 and 3.

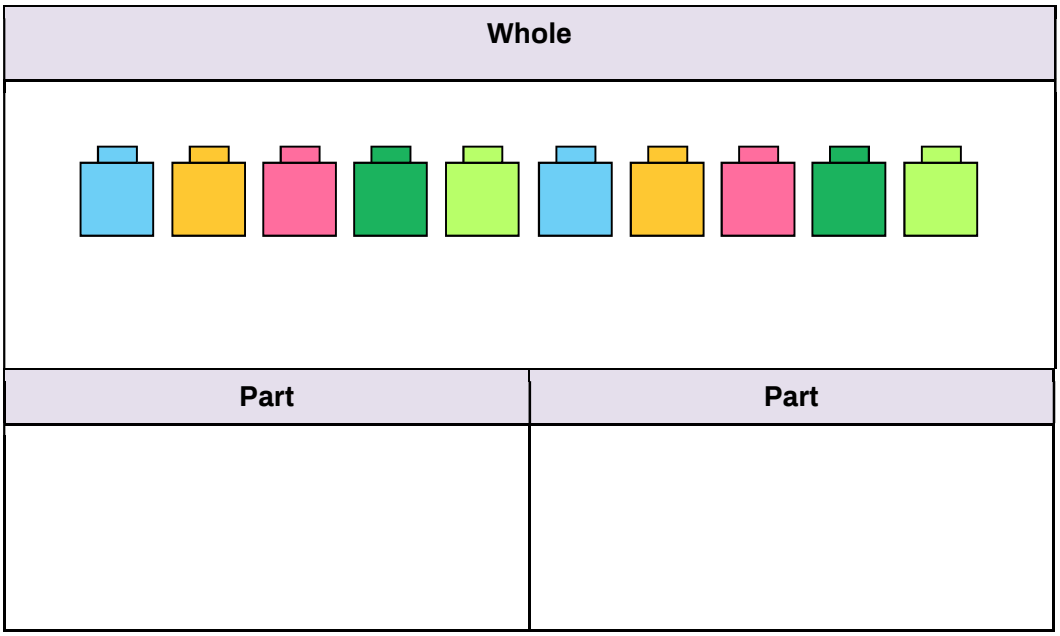
What do you notice about the difference between breaking apart a 5 and breaking a part a 3?
There are only a few different ways to break apart a 3. That's because it's a smaller number! Since the number is smaller, there are fewer ways to break it apart.

Making Ten Using Cubes

Now that we know how to break apart whole numbers into smaller parts, let's use it to make 10! 10 is a special number because when we look at it, there is a 1 and a 0 put together. We need two digits to make a 10.

Step 1: Let's start by getting 10 cubes.

Step 2: Put them in the "whole" on your work mat. Make sure you touch each cube as you count to make sure you have 10.



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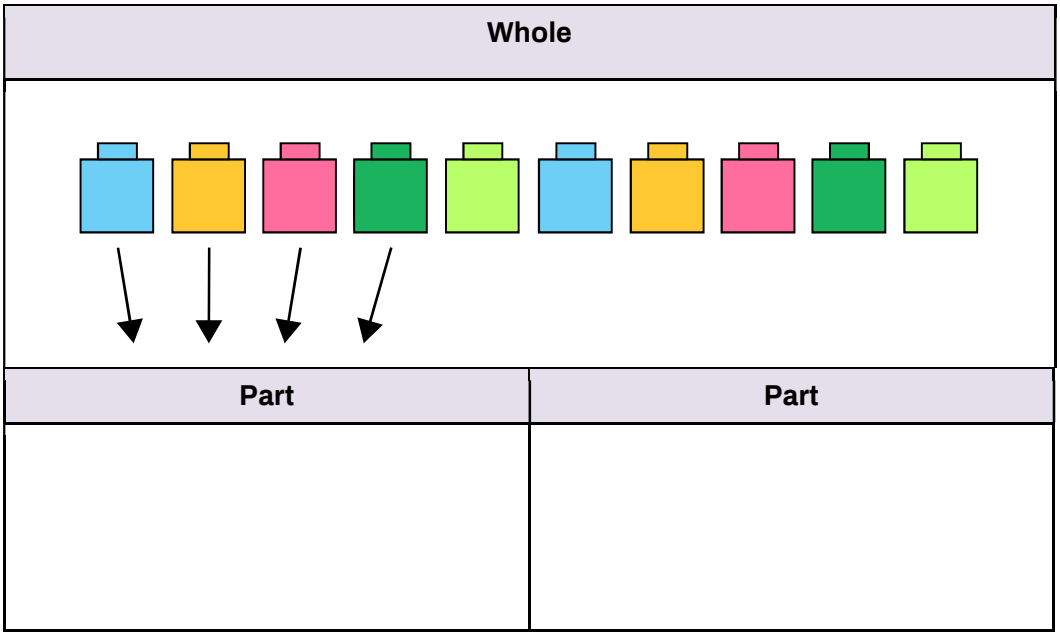

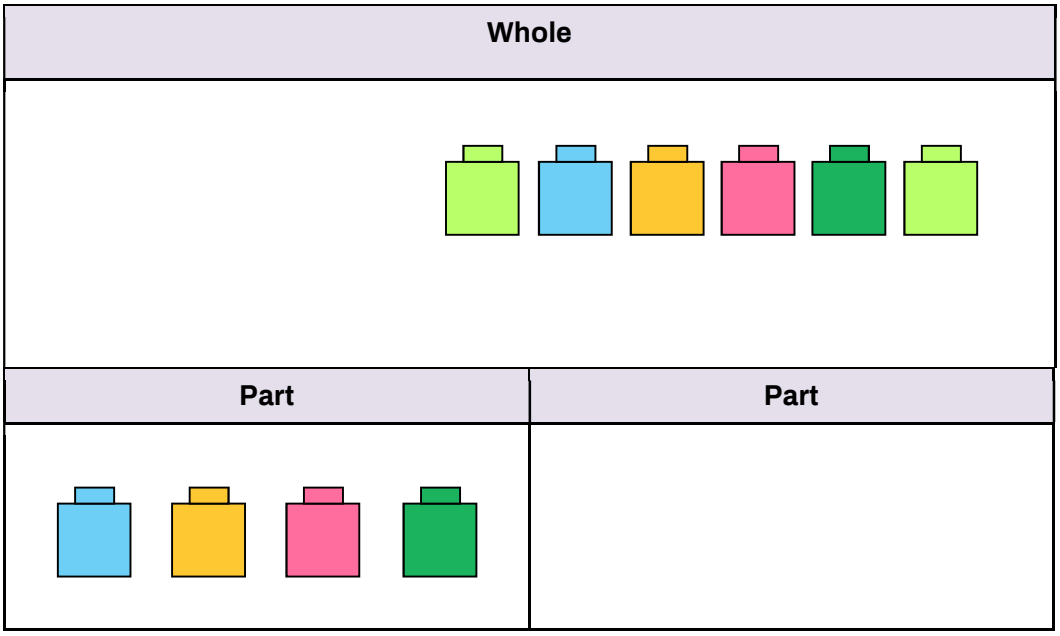

How many cubes will go in the second part?

Step 4: We have 6 cubes left. So, place 6 cubes into the second part.

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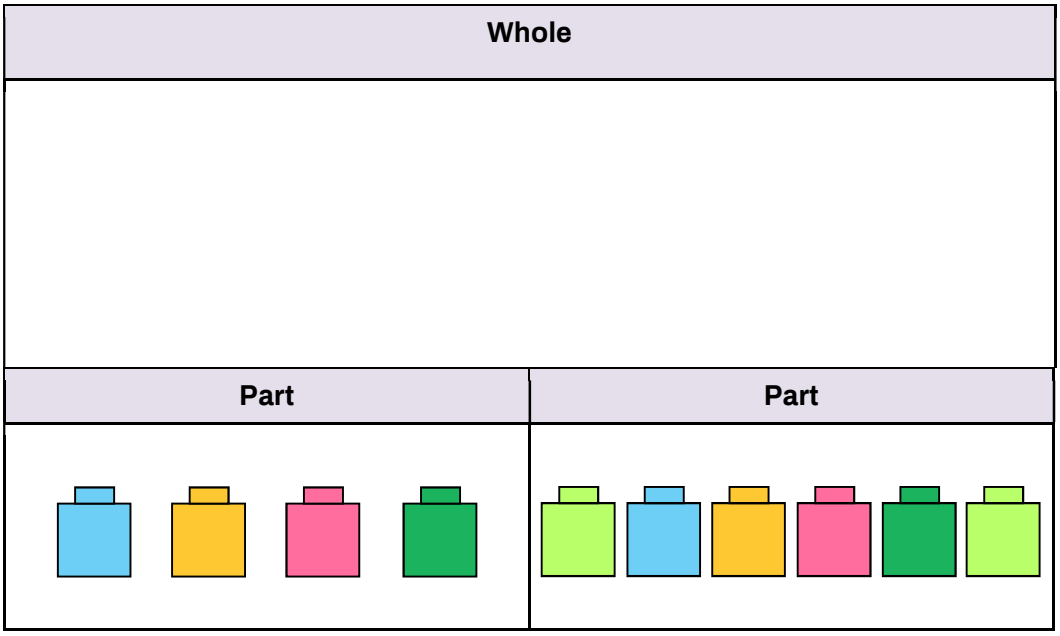
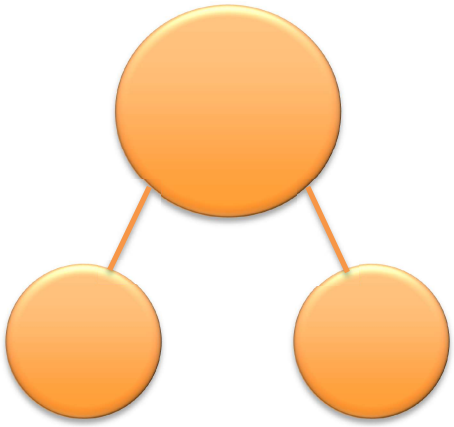


Step 5: Draw the number bond.

10 whole cubes can be broken into parts of 4 and 6.



Step 6: Write the number sentence.

10 cubes can be broken into parts of 4 and 6.

Now we can write the number sentence below:

Whole		Part		Part
10	=	4	+	6

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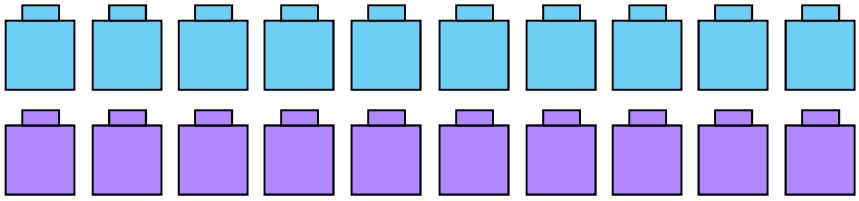
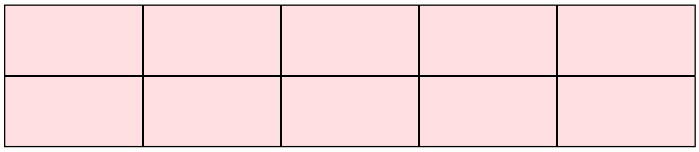
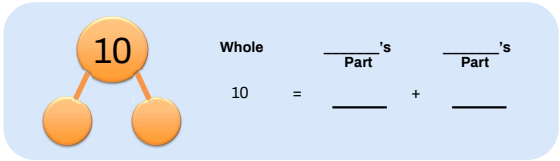
The Making Ten Game

Now it's time to play the Making Ten Game!

Step 1: Find a partner, a die, 20 cubes, a ten frame, and a score sheet.

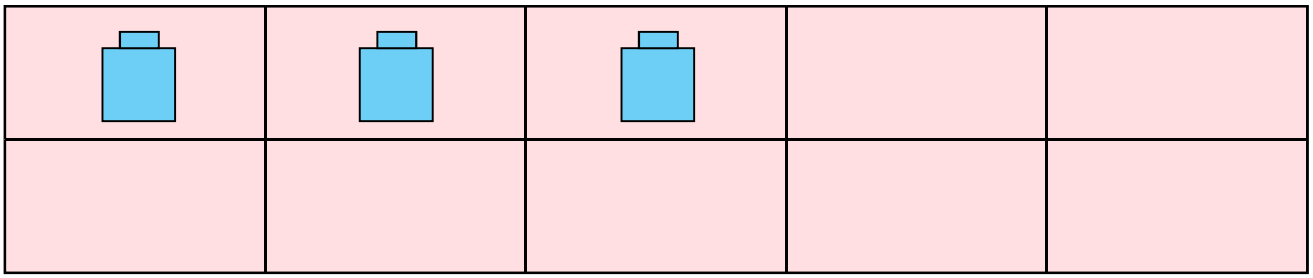




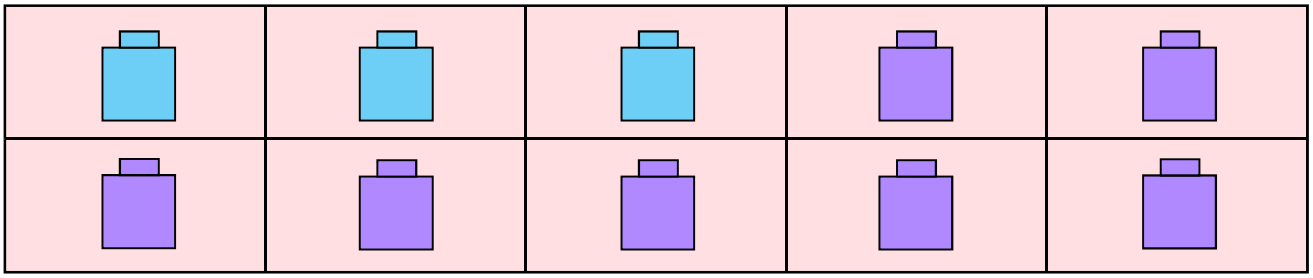


Step 2: Make sure you and your partner have 10 cubes each. You should have 10 cubes of one color, and your partner should have 10 cubes of a different color.

Step 3: In this game, you will take turns. The first person rolls the die and puts that many cubes on the ten frame. For example, if the first person rolls a three. Then they would put three cubes on the ten frame like below:



Step 4: Now, the person who did not roll the die fills in the rest of the ten frame with their cubes.



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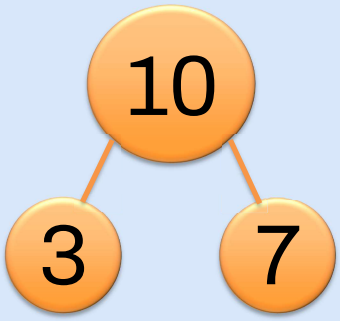
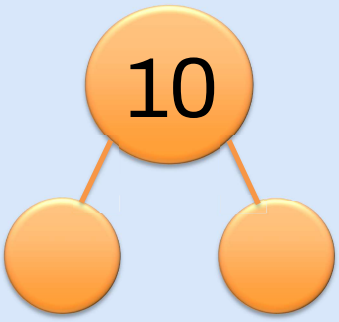
Step 5: The person who rolled the die now puts the number sentence on their score sheet, and then the other person rolls. Keep going until your whole sheet is filled!

EXAMPLE SCORE SHEET

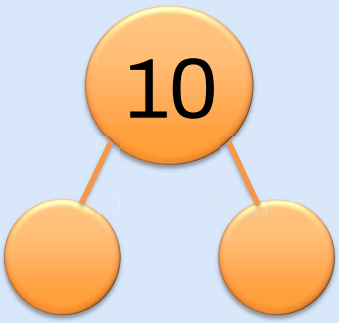


Whole		Mia's Part		Sam's Part
10	=	3	+	7

SCORE SHEET



Whole		_____'s Part		_____'s Part
10	=	_____	+	_____



Whole		_____'s Part		_____'s Part
10	=	_____	+	_____

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Reading Instructions

Identify the Craft and Structure

- What pattern do you see in the story?
- Can you find the numbers in the story?
- What numbers did you find?

Find the Key Ideas and Details

- What is the text about?
- How do you know what the text is about?

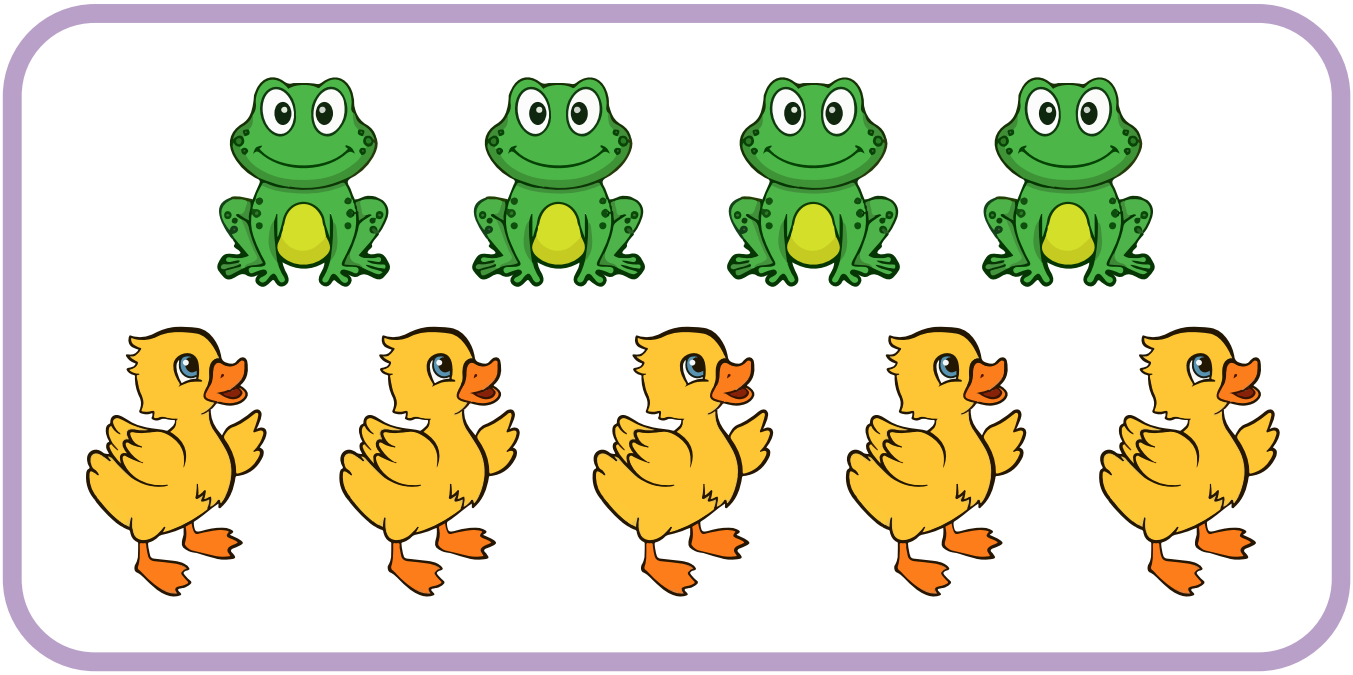
Integrate Your Knowledge and Ideas

- Provide an example of a way to make ten.

Writing Instructions

Write a story to read to a parent or guardian

Step 1: Look at the picture below with frogs and ducks.



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Step 2: Pick your own two different kinds of objects and draw a picture of them in the space below:

Stop and Think

What will your two objects be?
My objects will be _____ and _____.

How many of the first object will you have?
I will have ___ _____.

How many of the second object will you have?
I will have ___ _____.

How do you know you will have 10 in total?
I know I have 10 because _____.

Step 3: Pick a total of 10 things from your picture. You can pick how many of each object. For example, if I had 6 ducks I would need 4 frogs to make 10 in total.

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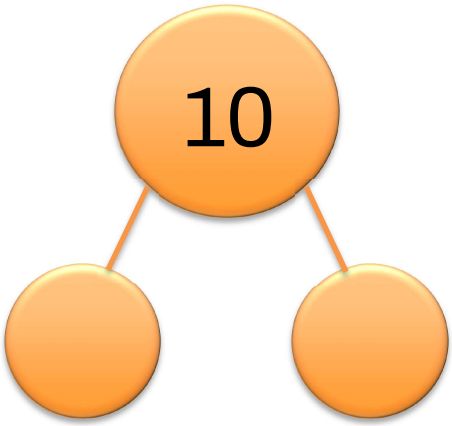
Step 4: Use the whole section of the part-part-whole mat below to draw your 10 things.

Whole	
Part	**Part**

Step 5: Use the Part-Part section of the part-part-whole mat above to break apart your whole into two groups. Each part should have the same type of objects in it.

Step 6: Draw the number bond for your part-part-whole relationship.



Step 7: Write the number sentences

I have a total of _____ things.

There are _____

There are _____.

Whole		Part		Part
10	=	_____	+	_____

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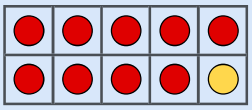
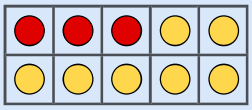
I Can Make Ten

I can make ten



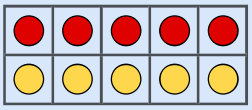
9 + 1 = 10

I can make ten



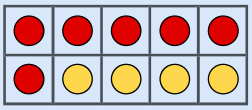
3 + 7 = 10

I can make ten



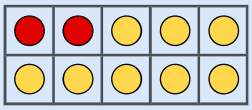
5 + 5 = 10

I can make ten



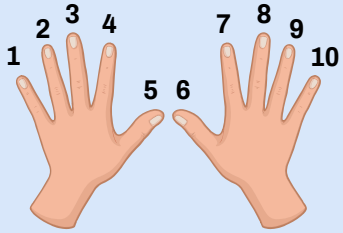
6 + 4 = 10

I can make ten



2 + 8 = 10

I can make ten



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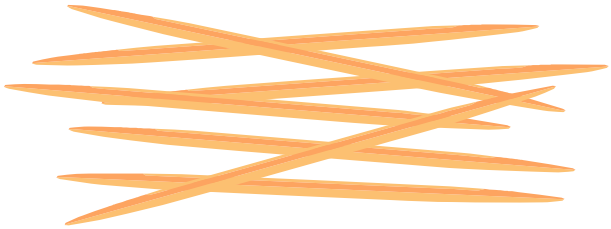
Majestic Marshmallows

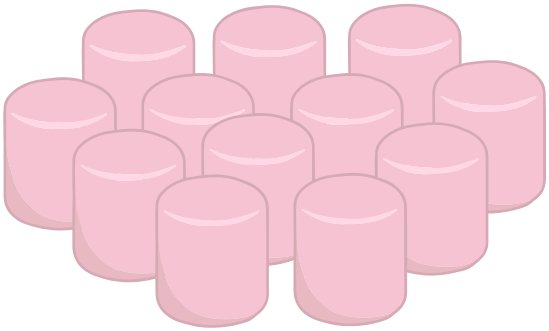
ENGINEERING CONNECTION

We can use different materials to create things. It's important to think about how much of a material we are using. Builders need to think about how many bricks they need for a building. Artists need to think about how much paint they need for a picture.

Today, you are going to make a 3d object! A 3d object is something that you can touch in real life, and that is solid instead of flat.

To make your 3d object, you will need 2 different materials. We are going to use marshmallows and toothpicks to make our 3d objects.





Step 1: Explore how you can connect your marshmallows and toothpicks. Think about different ways to put them together and how you can use that to design an object. Explore different ways to use more or less marshmallows and more or less toothpicks.

For your object, you will need 10 materials in total. When you count your marshmallows and toothpicks together, you should have 10. You can use more toothpicks or more marshmallows, but the total needs to be 10.

Step 2: Decide how many marshmallows you will use and how many toothpicks you will use.

I will use ___ marshmallows

I will use ___ toothpicks.

I will use a total of _____ marshmallows and toothpicks.

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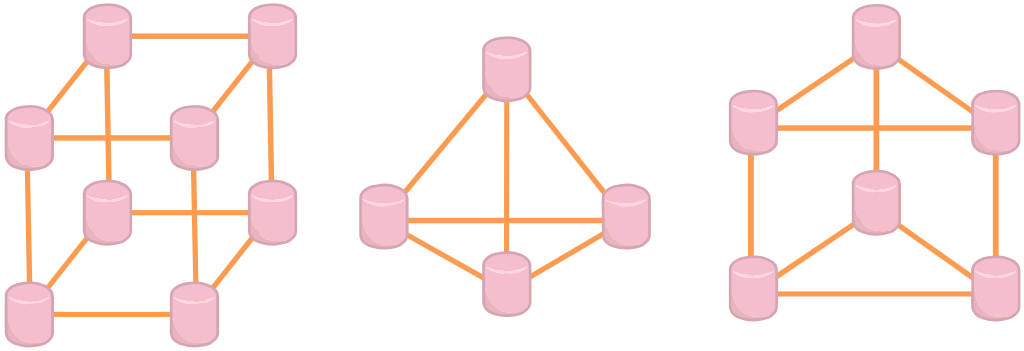
Step 3: Use your marshmallows and toothpicks to make your 3d object. It can look any way you want but it should not be flat.



Step 4: Check to make sure you have a part-part-whole.

I know I have a part-part whole because I used _____ marshmallows and I used _____ toothpicks.

I used a total of _____ marshmallows and toothpicks

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MAJESTIC MARSHMALLOWS S.T.E.A.M. Presentation

We are going to write a book about your toothpicks and marshmallows! Our book will have 5 pages, and each page will have questions to answer.

When you are finished writing your book, add illustrations to each page. Make sure the illustrations match your sentences

Paragraph 1: Summary

What did you make and what did you use?

I made a _____ and I used _____.

Paragraph 2: Strategy

How did you pick how many tooth-picks to use?
How did you pick how many marsh-mallows to use?

I picked ____ toothpicks because _____.
I picked _____ marshmallows because _____

Paragraph 3: Solution

What is a number sentence that goes with your object?

_____ + _____ = _____
Part Part Whole

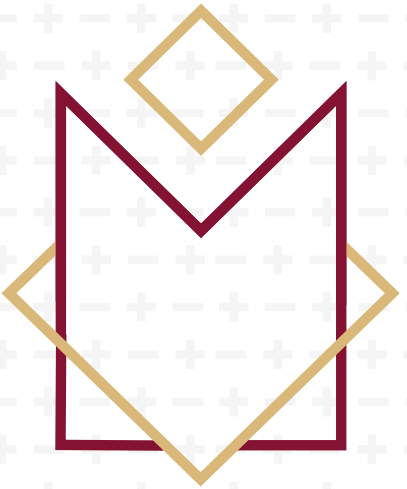
Paragraph 4: Justification

How do you know that you picked the right number of materials for your object?
What different way could you make ten from toothpicks and marshmallows?

I know I picked the right number because _____.

Paragraph 5: Reflection

What was easy about this project?
What was tricky about this project?
What did you learn about making ten?

This project was easy because _____.
This project was tricky because _____.
From this project, I learned _____ about making ten.

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