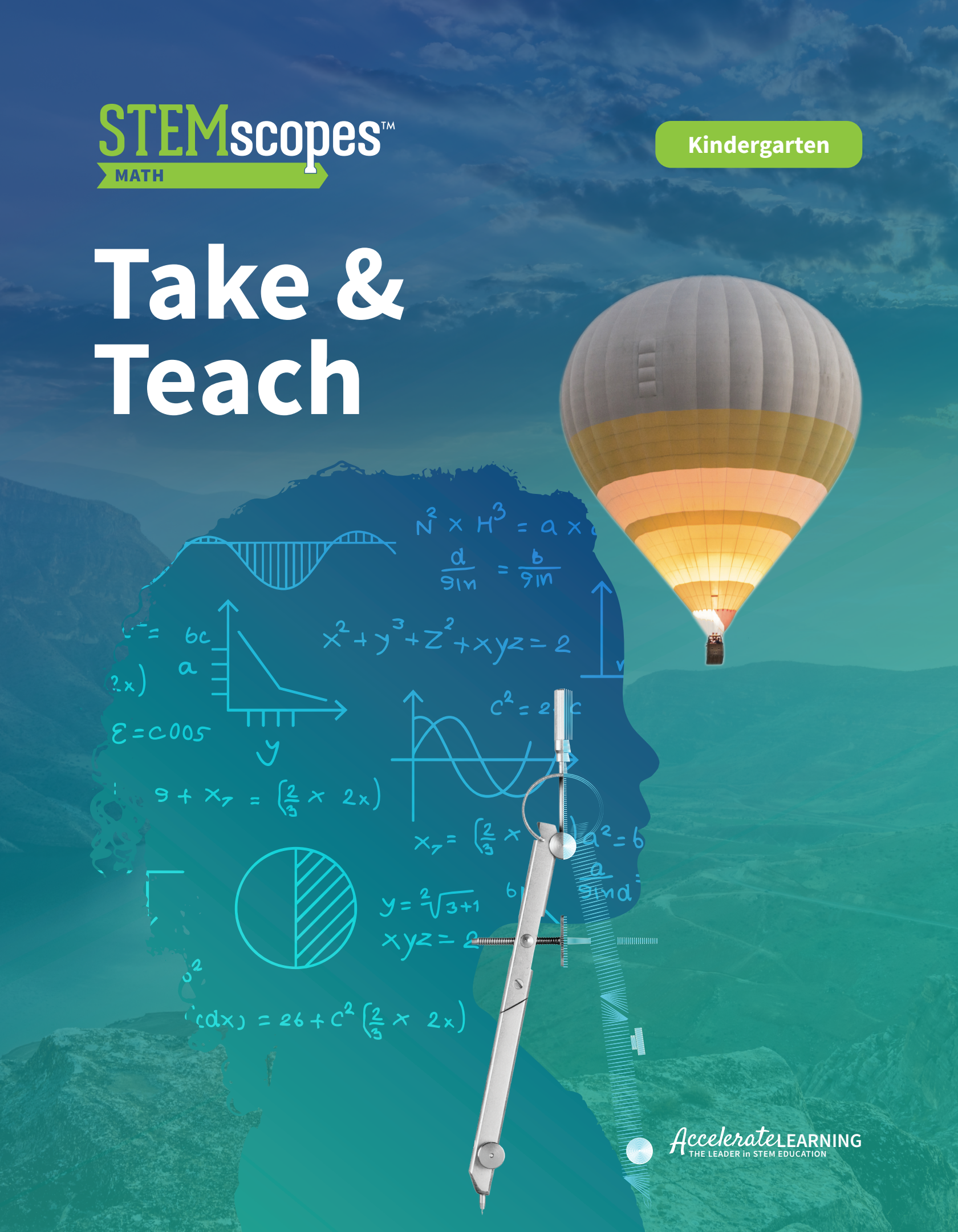
STEMscopes™ MATH

Kindergarten

Take & Teach



AccelerateLEARNING
THE LEADER in STEM EDUCATION

What's Inside This Sample Lesson?

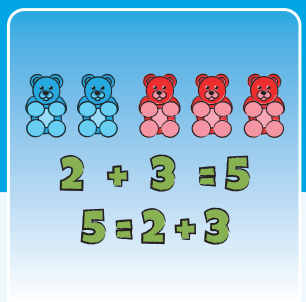
- A fully guided **Explore activity** written to meet rigorous state and national standards
- **Teacher Edition** pages, **Student Workbook** pages, and **other helpful resources** to fully experience a STEMscopes Math Explore activity

Table of Contents

Kindergarten, Join and Separate - Explore 1

Go Online!

Explore the digital resources for this lesson.



KINDERGARTEN | OPERATIONS AND ALGEBRAIC THINKING

JOIN AND SEPARATE

JUMP IN HERE

FOCUS STANDARDS

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

- Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.
- Decompose numbers less than or equal to 10 into pairs in more than one way, e.g., by using objects or drawings, and record each decomposition by a drawing or equation (e.g., 5 = 2 + 3 and 5 = 4 + 1).

CONNECTING STANDARDS

Know number names and the count sequence.

- Write numbers from 0 to 20. Represent a number of objects with a written numeral 0-20 (with 0 representing a count of no objects).

Count to tell the number of objects.

- Understand the relationship between numbers and quantities; connect counting to cardinality.
  a. When counting objects, say the number names in standard order, pairing each object with one and only one number name and each number name with one and only one object.
  b. Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they are counted.
  c. Understand that each successive number name refers to a quantity that is one larger.

Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from.

- Fluently add and subtract within 5. (Mastery of this standard is developed through Fact Fluency: Addition and Subtraction.)

ENGAGE ACTIVITIES

ACCESSING PRIOR KNOWLEDGE

In this activity, students explore the concepts of addition and subtraction using a 5 frame and bear counters.

- Students use bear counters to model addition and subtraction scenarios, enhancing their understanding of these operations.
- They engage in practical problem-solving by acting out scenarios and discussing their strategies.
- The activity encourages students to articulate their thought processes and reasoning behind joining or separating counters.

HOOK - CRABBING AT NIGHT

Students engage in problem-solving using objects and drawings to find differences within 10.

- Students work in groups to explore a scenario involving crabs, using cutouts to model and solve a problem about distributing crabs into buckets.
- They draw pictorial models and write equations to represent their solutions, focusing on decomposing numbers.
- The activity encourages students to discuss and compare different strategies and solutions, enhancing their understanding of addition and subtraction concepts.

EXPLORE ACTIVITIES

EXPLORE 1 - JOIN AND SEPARATE WITH OBJECTS AND DRAWINGS

Students engage in hands-on learning to model and solve joining and separating word problems using manipulatives and story mats.

- Students work in pairs to use Cookie Cutouts and a Cookie Plate Story Mat to act out and solve word problems involving addition and subtraction.
- They draw their solutions in a Student Journal and explain their problem-solving strategies verbally.
- The activity includes guided questions and Math Chats to encourage discussion and reflection on the strategies used.
- Students complete an Exit Ticket to assess their understanding of the concepts learned.

EXPLORE 2 - COMPOSE WITH OBJECTS AND DRAWINGS

Students engage in modeling and solving word problems using objects and a story mat. They will draw and explain their problem-solving strategies.

- Students work in groups to explore story problems using Panda Bear Cutouts and Composing Mats at various stations.
- They use dry-erase markers to illustrate solutions and record their findings in Student Journals.
- Students rotate through stations, combining groups of pandas to find totals and discussing strategies with peers.
- The activity concludes with a Math Chat to share observations, followed by completing an Exit Ticket for assessment.

EXPLORE 3 - DECOMPOSE WITH OBJECTS AND DRAWINGS

Students engage in modeling and solving decomposing word problems using objects and a story mat. They will draw their solutions and explain their strategies orally.

- Students work in pairs to use manipulatives and mats to solve word problems involving decomposing numbers.
- They explore different ways to arrange objects, such as books and magazines, on a bookshelf.
- Students draw pictorial models of their solutions and describe them in their Student Journals.
- The activity encourages discussion and sharing of strategies, highlighting multiple ways to decompose numbers.

EXPLORE 4 - WRITING EQUATIONS AND EXPLAINING STRATEGIES

Students engage in solving addition and subtraction problems using pattern blocks and task cards.

- Students build models with pattern blocks to represent different scenarios and then draw and color these models in their Student Journals.
- They write equations to describe their models, deciding whether the scenario involves joining or separating, and use appropriate mathematical symbols.
- Students explain their problem-solving strategies to partners, using sentence stems to articulate their thought processes.
- The activity concludes with a Math Chat, where students share strategies and observations, and complete an Exit Ticket to assess understanding.

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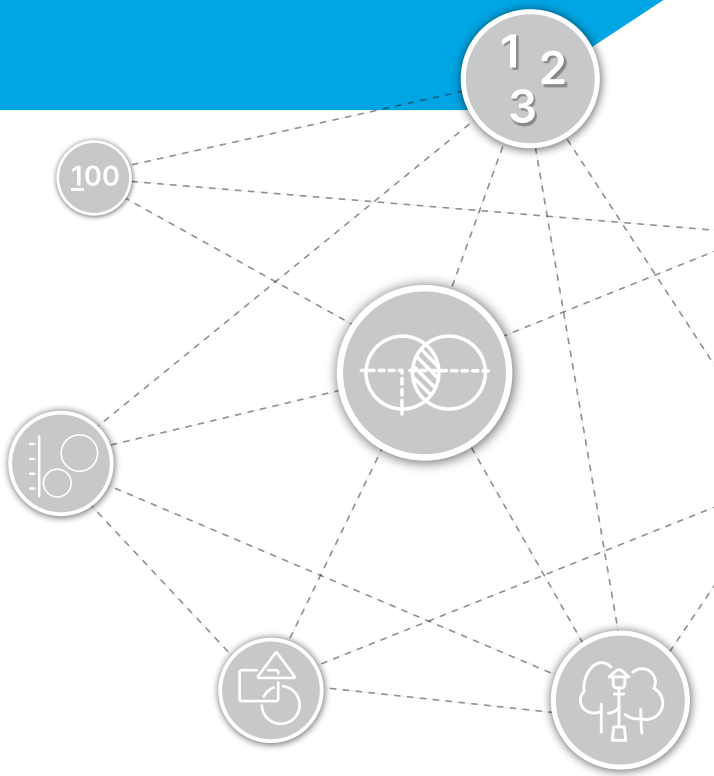
SCOPE **BIG IDEAS**



MODEL WITH NUMBERS

Students use manipulatives, drawings, verbal explanations, and equations to represent addition and subtraction. Students act out problems, use structured sentence stems, and transition from concrete to abstract representations to model and solve problems.

BEING FLEXIBLE WITHIN 10

Students solve a variety of joining and separating (result unknown) problems as well as problems related to part-whole relationships. They apply counting strategies to support the solving process and continue developing their ability to fluently add and subtract within 5.

KEY CONCEPTS

- I can represent addition and subtraction with objects, fingers, mental images, drawings, sounds, acting out situations, verbal explanations, expressions, or equations.
- I can solve addition and subtraction word problems.
- I can add and subtract within 10 by using objects to represent the problem.
- I can add and subtract within 10 by using drawings to represent the problem.
- I can decompose numbers that are less than or equal to 10 into pairs in more than one way by using objects and record each decomposition by a drawing.
- I can decompose numbers that are less than or equal to 10 into pairs in more than one way by using objects and record each decomposition by an equation.
- I can decompose numbers that are less than or equal to 10 into pairs in more than one way by using drawings and record each decomposition by a drawing.
- I can decompose numbers that are less than or equal to 10 into pairs in more than one way by using drawings and record each decomposition by an equation.

FUNDAMENTAL QUESTIONS

- Can you draw a picture to show how to add ___ and ___? What is the sum?
- Can you draw a picture to show how to subtract ___ from ___? What is the difference?
- How would you solve this addition/subtraction problem?
- Can you use a drawing to illustrate the decomposition of ___ (a number 1-10)?
- Can you use an equation to illustrate the decomposition of ___ (a number 1-10)?
- How many different ways can you decompose _____ (a number 1-10) using objects or drawings?

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KINDERGARTEN JOIN AND SEPARATE

EXPLORE > EXPLORE 1

SCAN HERE for the Teacher Prep Video

INSTRUCTIONAL LESSON

EXPLORE 1 - JOIN AND SEPARATE WITH OBJECTS AND DRAWINGS

Prior to completing this Explore, have students complete **Skill Basics - Acting Out Word Problems and Drawing Models**, **Skill Basics - Representing Addition and Subtraction with Objects, Fingers, Mental Images, Drawings and Sounds**, and **Skill Basics - Problem Solving Model** so they can apply the skill to this concept.

Standard(s)

- **Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from**. Represent addition and subtraction with objects, fingers, mental images, drawings, sounds (e.g., claps), acting out situations, verbal explanations, expressions, or equations.
- **Understand addition as putting together and adding to, and understand subtraction as taking apart and taking from**. Solve addition and subtraction word problems, and add and subtract within 10, e.g., by using objects or drawings to represent the problem.

Big Ideas	Standards for Mathematical Practice	Content Connections	Drivers of Investigation
Being Flexible within 10 Model with Numbers	**MP.1** Make sense of problems and persevere in solving them. **MP.2** Reason abstractly and quantitatively. **MP.6** Attend to precision.	**CC3** Taking Wholes Apart, Putting Parts Together	**DI1** Make Sense of the World (Understand and Explain)

DESCRIPTION

Students model and solve joining and separating word problems using objects and a story mat. They draw the result of the word problems and verbally explain the strategies they used to solve.

MATERIALS

PRINTED

- 1 Student Journal (per student)
- 1 Cookie Plate Story Mat (per pair)
- 1 Set of Cookie Cutouts (per pair)
- 1 Set of Task Cards for projection (per teacher, optional)
- 1 Exit Ticket (per student)

REUSABLE

- 1 Projector or document camera (per teacher)
- 1 Resealable bag (per pair)
- 1 Pair of scissors (per student)
- 1 Glue stick (per pair)

CONSUMABLE

- 1 Sheet of card stock (per pair, optional)

PREPARATION

- Plan to have students work in pairs to complete this activity.
- Print the set of Cookie Cutouts and the Cookie Plate Story Mat for each pair. Cut apart the Cookie Cutouts, and place them in a resealable bag for each pair.
- Prepare to project the Task Cards one at a time during the lesson.
- Print the Student Journal and an Exit Ticket for each student.
- For students who need more support in recalling information, see our 1–10 Number Chart Supplemental Aids element in the Intervention section.
- **Go Digital!** Have students explore or present their solutions using virtual manipulatives. The manipulatives used in this lesson can be found in the Explore drop-down menu and can be digitally assigned to students. (Two-Color Counters)

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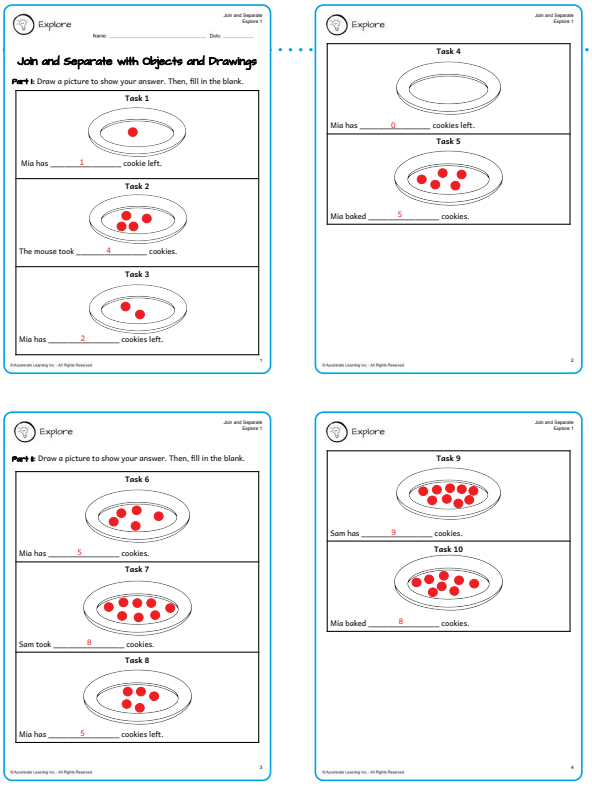

STUDENT JOURNAL
ANSWER KEY

PROCEDURE AND FACILITATION POINTS

PART I: THE MOUSE THIEF (JOIN AND SEPARATE THROUGH 5)

1. Help students access the task by asking the following guiding questions:
   a. What do you already know about addition and subtraction?
   b. Can you think of a time when you smelled cookies or another dessert baking in the oven?
   c. What did you think about when you smelled the cookies?
   d. What did you want to do after smelling the cookies?
2. Read the following scenario to the class: Last weekend, Mia baked cookies for her family. Several times when Mia turned around, some of her cookies were missing, so she had to bake more. Mia decided to hide around the corner to see if she could catch the cookie thief. She did! The thief was a cute little mouse carrying cookies back to his family waiting in his mouse hole.
3. Give each pair of students a bag of Cookie Cutouts and the Cookie Plate Story Mat. Tell students that they are to use the manipulatives and mat to act out and solve the problems. Allow the students a few moments to discover the manipulatives and experience how they work with their partners.
4. Project the first Task Card. Read the problem aloud as students follow along: Mia baked 5 cookies. The mouse took 4 of the cookies. How many cookies does Mia have left?
5. Allow students to model and solve the problem with their partners. Ask the following questions after students have had the opportunity to work:
   a. **DOK-1** What are we trying to find out? *How many cookies are left*
   b. **DOK-1** How many cookies did we start with? *Mia started with 5 cookies.*
   c. **DOK-1** What happens to the cookies in this story problem? *The mouse took 4 of the cookies.*
   d. **DOK-1** How many cookies were left at the end? *There was only 1 cookie left.*
   e. **DOK-2** How did you solve the problem using the mat and the cookies? *Answers will vary. We put the 5 cookies Mia started with on our plate. Then we took away the 4 cookies that the mouse took. We were left with only 1 cookie on the plate.*
6. Give each student the Student Journal. Explain to students that they have solved the problem using their mats and Cookie Cutouts, and now they should show their solutions by drawing them and filling in the sentence stems on their Student Journals. Explain that they can represent the cookies in the problems by drawing circles.
7. Repeat this process for Task Cards 2–5. When each Task Card is complete, have students clear their mats by removing all the Cookie Cutouts.
8. Monitor and talk with students as needed to check for understanding by using the following guiding questions:
   a. **DOK-2** How did you and your partner solve this problem? *Answers will vary. Students should be able to explain how many cookies they started with, why they think they need to join more cookies or separate the cookies, and how many total cookies there are in the end.*
   b. **DOK-2** How did counting help you solve the problem? *Answers will vary. I counted the cookies every time I added more or took some away. I knew I had 2, so I started counting from 2 when I added on 3 more cookies. I finished counting at 5, so there was a total of 5 cookies. I knew I had 4 cookies, so I started counting from 4 and counted back the 2 cookies eaten by the mouse. I finished counting back at 2, so there are 2 cookies left on the plate.*
   c. **DOK-1** Can you tell me the answer to this problem without counting? *Answers will vary. Yes, I can see 4 cookies on the plate. I do not need to count them to know there are 4.*

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9. After students have completed all five tasks and the first part of the Student Journal, bring the class together as a whole group.
10. After the Explore, invite the class to a Math Chat to share their observations and learning.

MATH CHAT

- **DOK-2** Before you begin solving a problem, what should you do first? I need to read the whole problem and make sure that I understand what is happening and what I am trying to find.
- **DOK-1** What actions did we see in our problems from Part I? Sometimes cookies were being joined together, and sometimes cookies were being separated, or taken away.
- **DOK-1** What does joining mean? Two parts were combined to find a total.
- **DOK-1** What does separating mean? A total amount was split apart, and one part was taken away.

PART II: OH BROTHER!

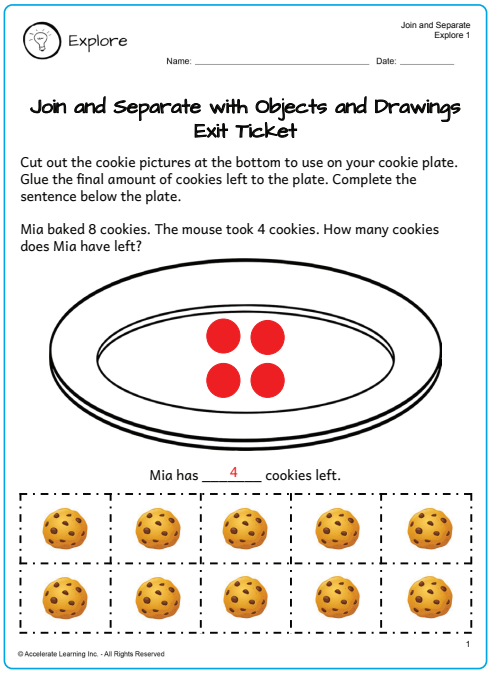
1. Read the following scenario to the class: After Mia faced the mouse thief, she decided to bake more cookies to share with her math club after school. When she was baking cookies this time, she faced a much bigger thief than the mouse—her brother Sam! He had friends over, and they loved to eat her cookies hot out of the oven. Before she knew it, she was in a battle to bake and save enough cookies for her math club.
2. Challenge students to work with their partners to model and solve the problems as they are read aloud.
3. Remind students to perform the same steps they did in Part I:
   a. Read/listen to the problem all the way through.
   b. Model the problem using the Cookie Cutouts and Cookie Plate Story Mat.
   c. Draw the number of cookies on the plate on their Student Journals.
   d. Fill in the blank to complete the sentence stem on the Student Journal.
4. After students have completed Task Cards 6–10 and the second part of their Student Journals, bring the class together as a whole group.
5. Ask students to share their strategies, and encourage them to ask each other questions and make connections. Encourage students to notice the similarities and differences between the strategies used to solve each problem.
6. After the Explore, invite the class to a Math Chat to share their observations and learning.

MATH CHAT

- **DOK-2** What was similar about the Task Cards in Part II? Some of the Task Cards had joining problems, and some of the Task Cards had separating problems. We used the cookies and the plates. The Student Journal still had us draw our answer and fill in the correct number in the sentence stem.
- **Choose a Structured Conversation routine to facilitate the following question:**
  - **DOK-2** What was different about the Task Cards in Part II? The Task Cards used larger numbers—up to 10 instead of just up to 5. Some of the Task Cards had us doing two steps, like joining and separating as part of one task.
- **DOK-1** What operation did you perform today when you joined cookies together? Addition
- **DOK-1** What operation did you perform today when you separated cookies? Subtraction

POST-EXPLORE

1. Have students complete the Exit Ticket to formatively assess their understanding of the concept.
2. Complete the Anchor Chart as a class.
3. Have each student complete their Interactive Notebook.


Explore

Join and Separate
Explore 1

Name: _____ Date: _____

Join and Separate with Objects and Drawings
Exit Ticket

Cut out the cookie pictures at the bottom to use on your cookie plate. Glue the final amount of cookies left to the plate. Complete the sentence below the plate.

Mia baked 8 cookies. The mouse took 4 cookies. How many cookies does Mia have left?

Mia has 4 cookies left.

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EXIT TICKET
ANSWER KEY

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INSTRUCTIONAL SUPPORTS

1. Monitor students as you read the Task Cards. After students have acted out a part of the problem, ask them to use their fingers to show how many cookies are on their plates. This allows you to check the students' accuracy and see who needs assistance as you read.
2. If a student needs additional support in acting out the problem while listening, then pause after each part of the problem to allow all students to process what was said and act it out before you move to the next part.
3. Prepare more Cookie Cutouts or have additional cookies as replacements if one is misplaced or torn.
4. If students are overwhelmed by the amount of work on each Student Journal page, then consider cutting out each task and creating a flipbook. This helps them focus on only one task at a time. Alternatively, student pairs can share one Student Journal and take turns being the scribe.
5. If students need additional support in drawing the picture models of their answers, then guide them to remove one cookie manipulative at a time as they draw the cookie on their Student Journals.
6. Provide a number path for students to use when writing the numbers for each task on their Student Journals.
7. As an extension, allow students to create a cookie problem and have their partners act it out.

LANGUAGE SUPPORTS

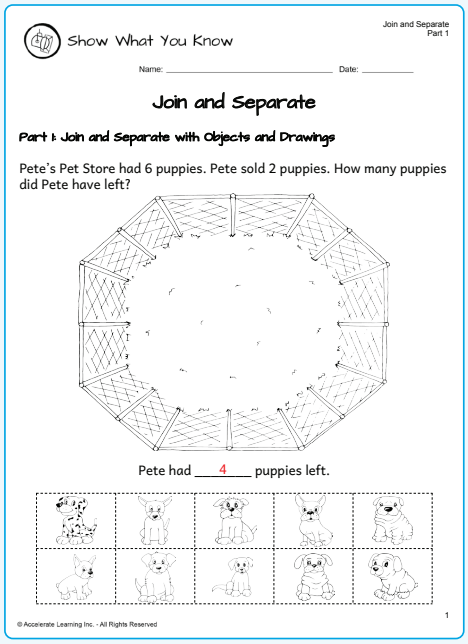
As you project each Task Card, point to the words as you read aloud. Read it more than once, and allow students to choral-read with you.

When reading a Task Card, reiterate the verbs used in the scenario. Allow students to act out the verbs to help them decide whether they need to add more cookies or subtract some.

Support students in understanding each scenario by reading the problem stem (without the question) three times. After the first read, ask, "What is this scenario about?" Listen for and clarify any questions about the context. After the second read, ask, "What are the numbers we see in the scenario? What do these numbers represent?" After the third read, ask, "What math questions could be answered with this information?" Then read aloud the question to solve, and allow students to begin working.

As students work and discuss ideas with their groups, summarize what you hear and repeat key ideas and vocabulary through intonation, slower speech, and visual cues. Ideas and words to listen for include add/join, subtract/separate, more, less, and take away.

Teach using gestures or hand motions. For example, for the word join, have students bring their hands together, and for separate, have them pull their hands apart. Ask students to chant and act the words out.



Show What You Know

Join and Separate
Part 1

Name: _____ Date: _____

Join and Separate

Part 1: Join and Separate with Objects and Drawings

Pete's Pet Store had 6 puppies. Pete sold 2 puppies. How many puppies did Pete have left?

Pete had 4 puppies left.

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SHOW WHAT YOU KNOW - PART 1
ANSWER KEY

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Explore

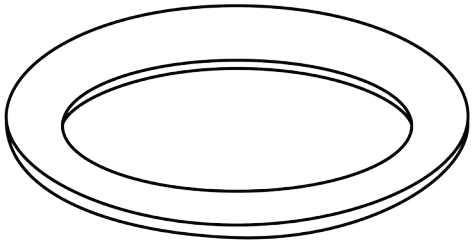
Join and Separate
Explore 1

Name: _____ Date: _____

Join and Separate with Objects and Drawings

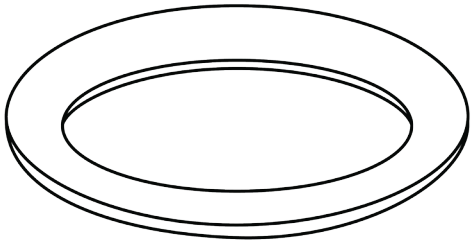
Part 1: Draw a picture to show your answer. Then, fill in the blank.

Task 1



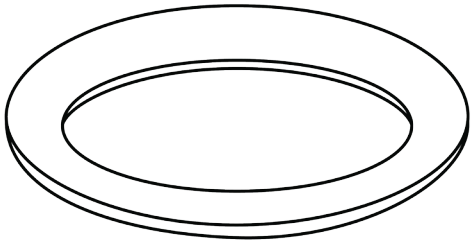
Mia has _____ cookie left.

Task 2



The mouse took _____ cookies.

Task 3



Mia has _____ cookies left.

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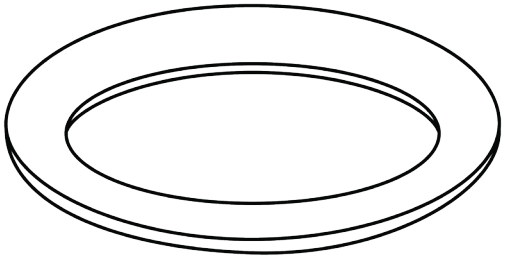
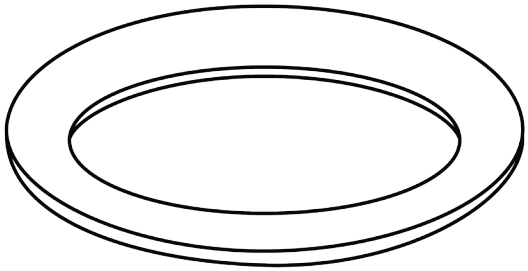
Explore

Task 4



Mia has _____ cookies left.

Task 5



Mia baked _____ cookies.

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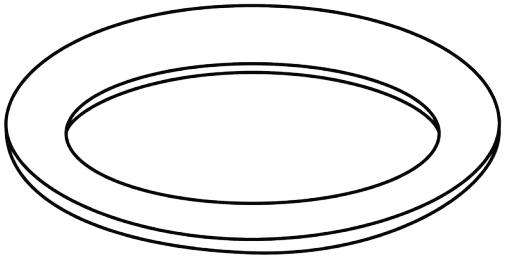
Explore

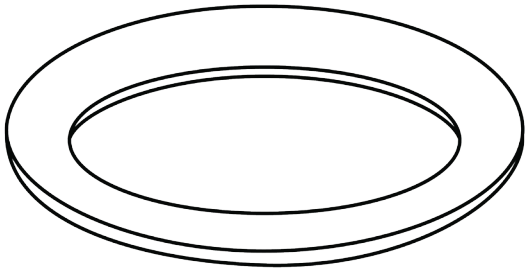
Part II: Draw a picture to show your answer. Then, fill in the blank.

Task 6



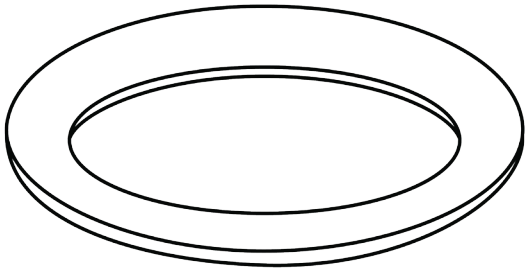
Mia has _____ cookies.

Task 7



Sam took _____ cookies.

Task 8



Mia has _____ cookies left.

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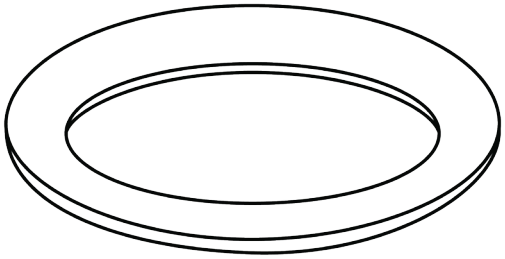
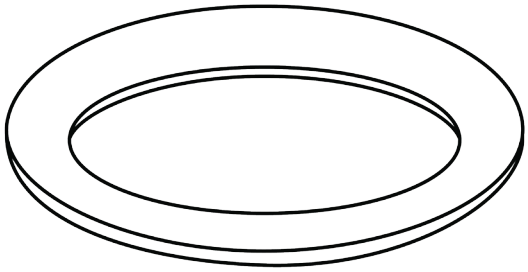
Explore

Task 9



Sam has _____ cookies.

Task 10



Mia baked _____ cookies.

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Explore

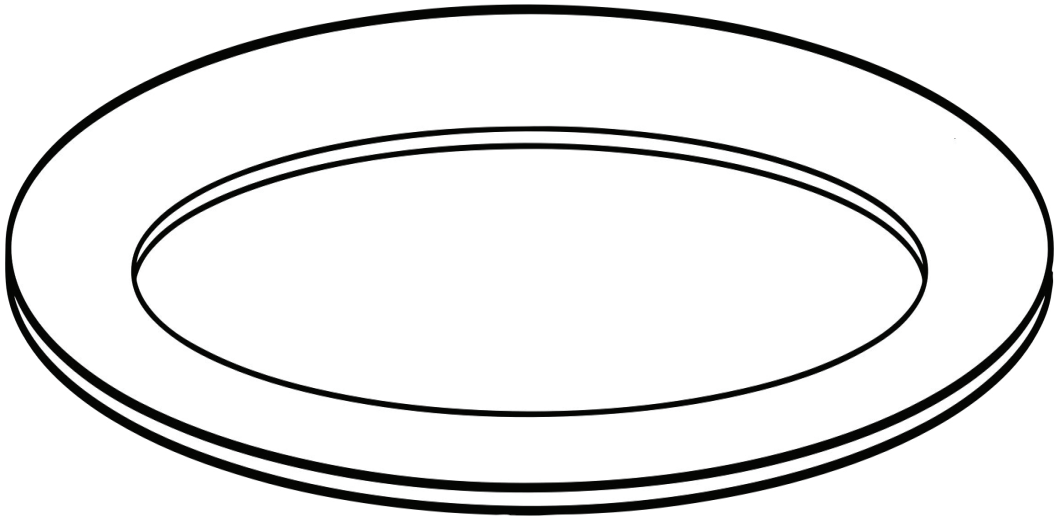
Join and Separate
Explore 1

Name: _____ Date: _____

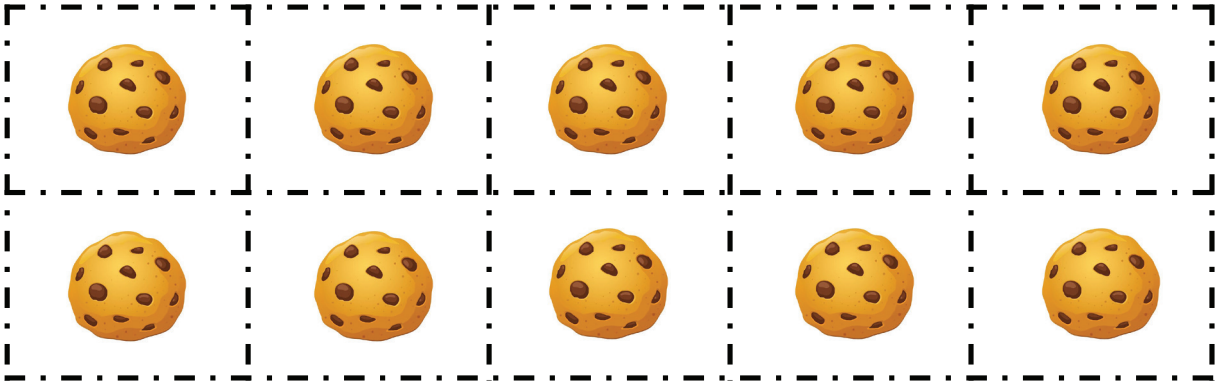
Join and Separate with Objects and Drawings Exit Ticket

Cut out the cookie pictures at the bottom to use on your cookie plate. Glue the final amount of cookies left to the plate. Complete the sentence below the plate.

Mia baked 8 cookies. The mouse took 4 cookies. How many cookies does Mia have left?



Mia has _____ cookies left.



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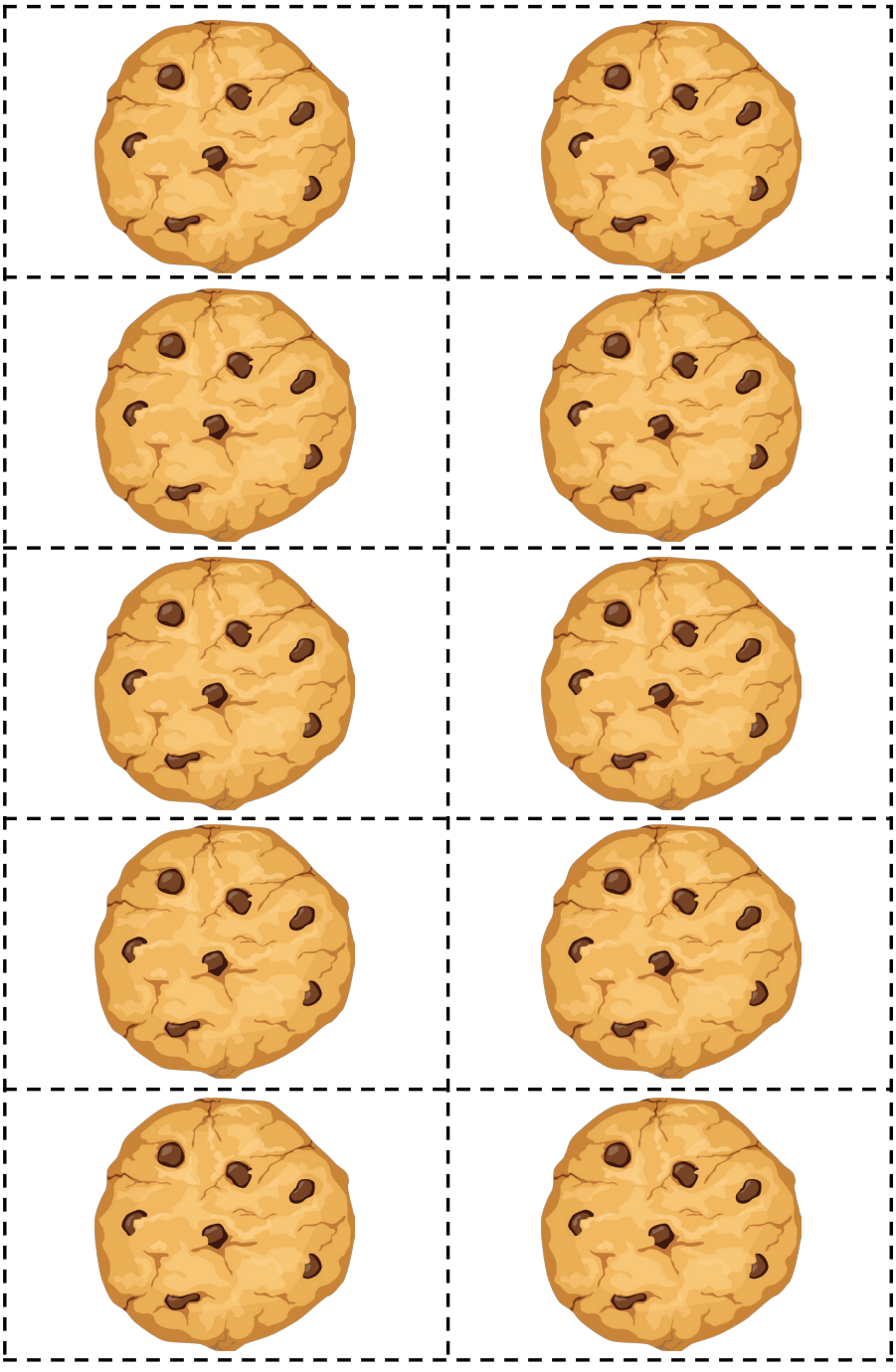
Explore

Cookie Cutouts



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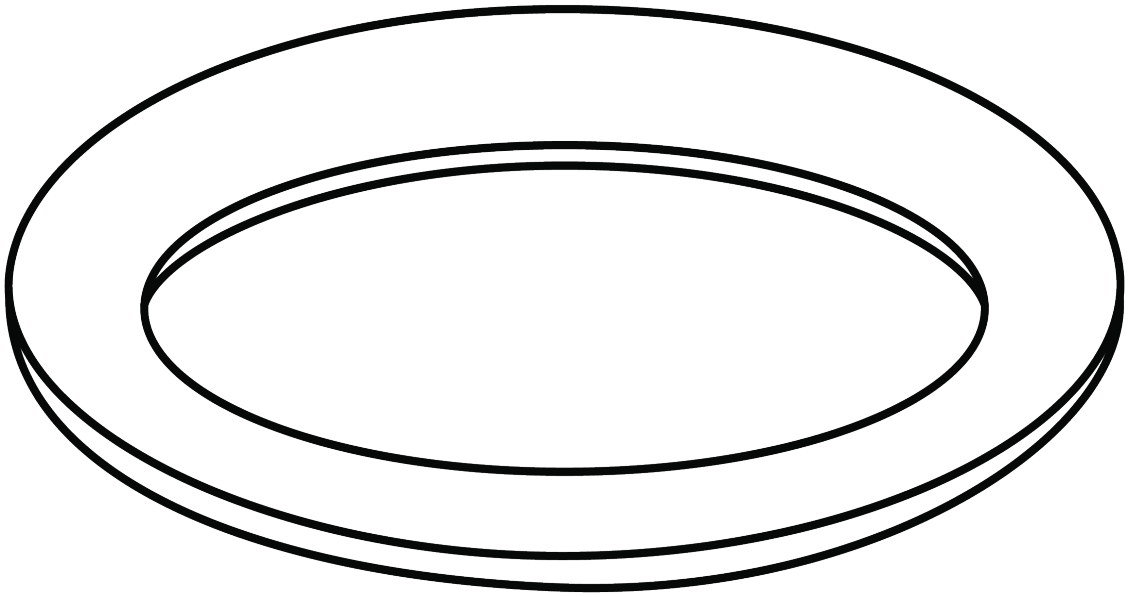
Explore

Cookie Plate Story Mat



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Math Chat

Join and Separate
Explore 1
Part 1

Math Chat
Before you begin solving a problem, what should you do first?
What actions did we see in our problems from Part I?
What does *joining* mean?
What does *separating* mean?

Math Chat

Join and Separate
Explore 1
Part 2

Math Chat
What was similar about the task cards in Part II?
What was different about the task cards in Part II?
What operation did you perform today when you joined cookies together?
What operation did you perform today when you separated cookies?

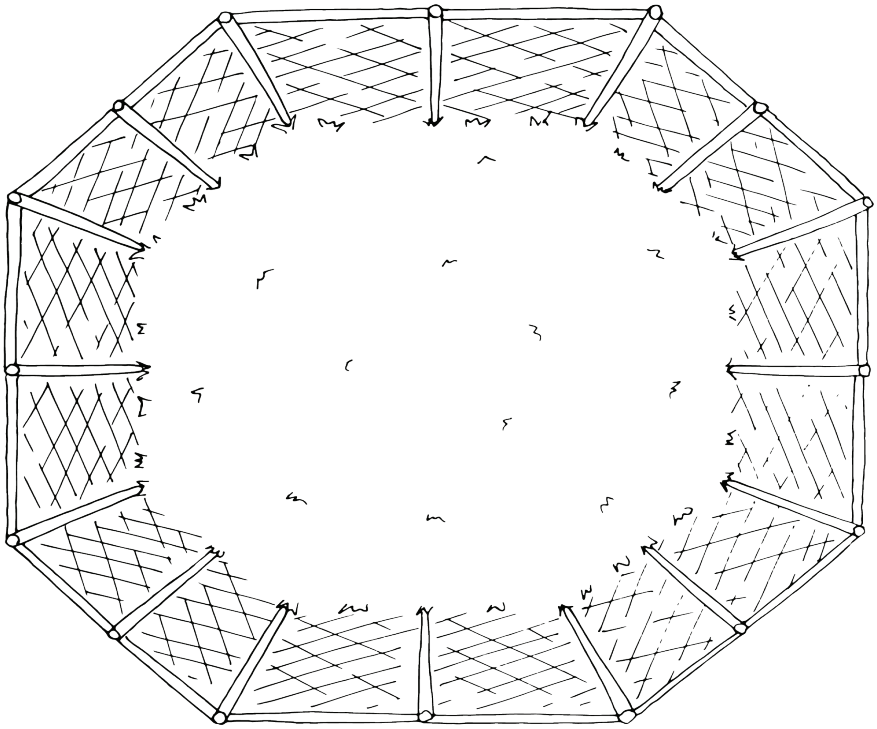
Show What You Know

Name: _____ Date: _____

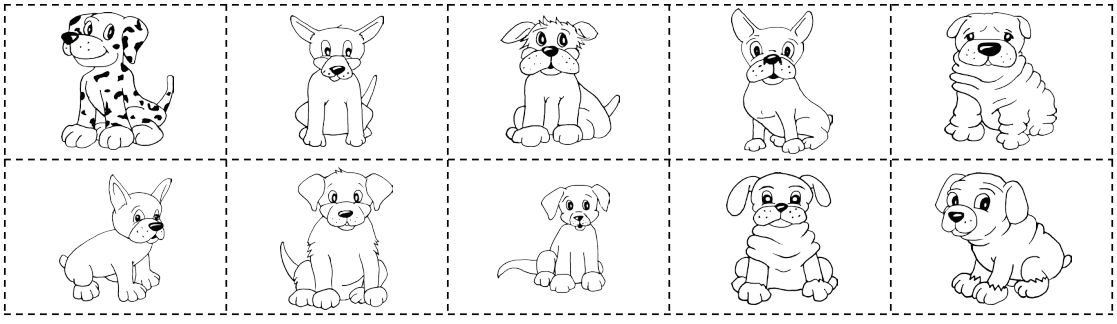
Join and Separate

Part 1: Join and Separate with Objects and Drawings

Pete's Pet Store had 6 puppies. Pete sold 2 puppies. How many puppies did Pete have left?



Pete had _____ puppies left.



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