Stations for Pre-Assessment in Preparation for 2(7)(C)

Materials:
- **Stations 1-3**
- Counters

Students will rotate through the stations to complete the three problems using the provided representation.

After all the stations have been completed, sort the student work to look for the following:
- Which models do students use the most often?
- With which models are students most successful?
- Which models are NOT being used by students?
- With which models are students least successful?
- Which processes or procedures are students using the most often?
- With which processes or procedures are students most successful?
- Which misconceptions are present in the work?
- Which steps are students taking the most often?

Based on the sorting, what are next steps?
- Which models or processes do we build from in our instructional activities?
- Which models or processes might we need to develop in our instructional activities?
- Which misconceptions or gaps do we need to address with the whole group?
- Which misconceptions or gaps do we need to address with a small group?

Station 1

- Model each situation using counters.
- Draw or take a picture of your work.

1 Marco had 7 toy cars. His mom gave him 4 more toy cars. How many toy cars does Marco have now?

2 Kaya has 12 books. Mia has 4 more books than Kaya. How many books does Mia have?

3 Layne had some stickers. She gave 6 stickers to her friend. Now Layne has 9 stickers. How many stickers did Layne have before giving some to her friend?

4 Ms. Watts had 18 unsharpened pencils. She sharpened 10 of the pencils. How many of the pencils are unsharpened?

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Station 2

- Represent each situation using pictorial models, number lines, or strip diagrams.
- Record your work.

1 Jada has 9 pink hair bows and 4 white hair bows. She only has these two colors of hair bows. How many hair bows does Jada have?

2 Isaac had 17 baseball cards. He gave some to his sister. Now he has 13 baseball cards. How many baseball cards did Isaac give his sister?

3 Angel had some flowers in a vase. She placed 5 more flowers in the vase. Now there are 14 flowers in the vase. How many flowers did Angel start with in the vase?

4 Aidan has 15 pieces of candy. Clare has 11 pieces of candy. How many fewer pieces of candy does Clare have than Aidan?

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Station 3

Write a number sentence to represent each situation.

1 Alana has 7 necklaces. Kali has 12 necklaces. How many more necklaces does Kali have than Alana?

2 Ray found 13 rocks. His sister gave him some more. Now he has 16 rocks. How many rocks did Ray's sister give him?

3 Hyo had 17 erasers. He had 9 pink erasers. The rest were blue erasers. How many blue erasers did Hyo have?

4 Jill had 20 dollars. She paid 7 dollars for her lunch. How much money does Jill have now?

Mathematics Achievement Academy, Grade 2

Determining Sums Using Mental Strategies

Materials:

- **Determining Sums Using Mental Strategies**

Prompt students to complete **Determining Sums Using Mental Strategies**.

Debriefing Questions:

- How did the student approach the problem?
- How is the second step different from the first step in the student's work? What thinking did the student use to move from step one to step two?
- How is _____ (the student's) thinking reflected in your work?

Determining Sums Using Mental Strategies

1 Jan was asked to determine the sum $64 + 32$. Jan's method and solution are shown below.

$$64 + 32$$
$$(60 + 4) + (30 + 2)$$
$$90 + 6$$
$$96$$

Determine this sum using Jan's method.

$$53 + 26$$

2 Charlie was asked to determine the sum $46 + 28$. Charlie's method and solution are shown below.

$$46 + 28$$
$$(40 + 20) + (6 + 8)$$
$$60 + 14$$
$$60 + 10 + 4$$
$$70 + 4$$
$$74$$

Determine this sum using Charlie's method.

$$56 + 37$$

3 Maria was asked to determine the sum $84 + 39$. Maria's method and solution are shown below.

$$84 + 39$$
$$(80 + 30) + (4 + 9)$$
$$110 + 13$$
$$(110 + 10) + 3$$
$$120 + 3$$
$$123$$

Determine this sum using Maria's method.

$$74 + 58$$

Determining Differences Using Mental Strategies

Materials:
- **Determining Differences Using Mental Strategies**

Prompt students to complete **Determining Differences Using Mental Strategies**.

Debriefing Questions:
- How did the student approach the problem?
- How is the second step different from the first step in the students' work? What thinking did the student use to move from step one to step two?
- How is _____ (the student's) thinking reflected in your work?

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Determining Differences Using Mental Strategies

Melanie and Kareen each determined the difference of $96 - 45$ and justified their answers as shown.

Melanie	Kareen
$96 - 45$	$96 - 45$
$(90 + 6) - (40 + 5)$	$(90 + 6) - 45$
$50 + 1$	$50 - 1$
51	49
I decomposed the numbers to solve the problem. I subtracted the numbers by place value. Then I added the differences for the answer.	I decomposed the numbers to solve the problem. Then I subtracted the differences because it is a subtraction problem.

Melanie disagreed with Kareen and justified her answer using a number line:
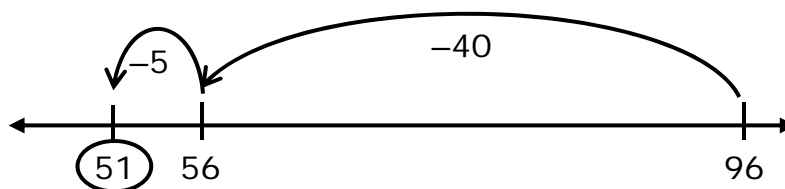
Melanie further explained:

When you decompose the numbers to solve, you need to compose the differences to determine the answer.

How are the strategies used by the students similar? How are they different?

- Determine each difference using a mental strategy.
- Use a number line to justify each answer.
- Write an explanation of your answer.

1 $65 - 32$

2 $53 - 12$

3 $86 - 24$

4 $77 - 33$

Compensation with Addition

Materials:

- **Compensation with Addition**

Prompt students to complete **Compensation with Addition**.

Debriefing Questions:

- Why would you increase one addend and decrease the other by the same amount?
- How did you choose what number to add or subtract?
- How can you represent your thinking on a number line?
- How is compensation reflected in your work?

Mathematics Achievement Academy, Grade 2

Compensation with Addition

A strategy for adding is to use **compensation** to make an equivalent addition problem. In the example, compensation is used by adding 3 to 57 and subtracting 3 from 68.

$57 + 68 = 125$

+3   **-3**

$60 + 65 = 125$
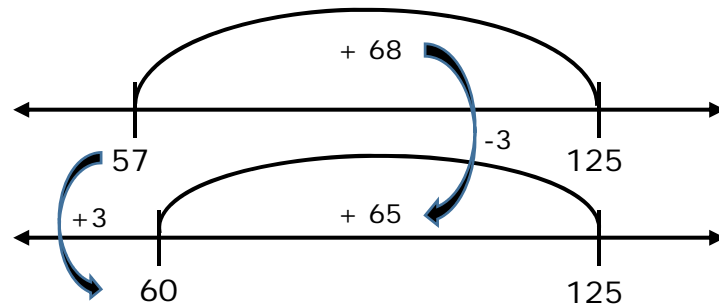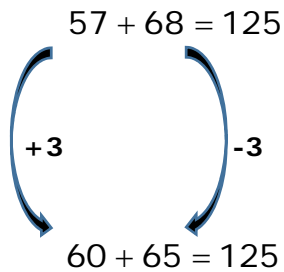
In the example, the first addend is increased by 3. The addend's location moves 3 units to the right on the number line. Then the second addend is decreased by 3 to compensate (make up) for the increase in the first addend.

The amount added to one addend must be the same amount subtracted from the other addend to keep the addition problems equivalent.

Use compensation to make an equivalent expression. Find the sum of the two numbers.

1 $77 + 44$

2 $38 + 21$

3 $86 + 39$

4 $55 + 92$

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Compensation with Subtraction

Materials:
- **Compensation with Subtraction**

Prompt students to complete **Compensation with Subtraction**.

Debriefing Questions:
- Why would you increase both numbers in an expression as a strategy for subtraction?
- How could you choose what number to use to increase or decrease the numbers in the problem?
- How can you represent your thinking on a number line?
- How is this strategy reflected in your work?

Compensation with Subtraction

A strategy for subtracting is to use **compensation** to make an equivalent subtraction problem. In the example, compensation is used by adding 4 to 64 and 4 to 36 to avoid regrouping.

$64 - 36 = 28$

+4   **+4**

$68 - 40 = 28$
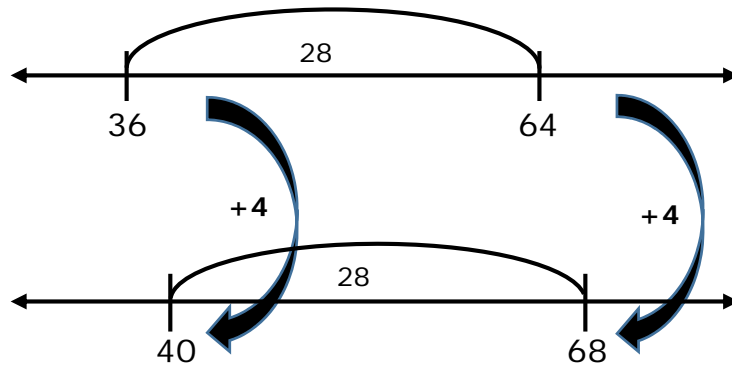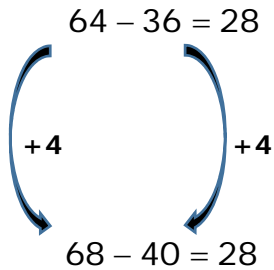
In the example, the first number in the problem is increased by 4. The location of the minuend (first number) moves 4 units to the right on the number line. Then the subtrahend (second number) is increased by 4 to compensate for the increase in the minuend.

The amount added to the minuend must be the same amount added to the subtrahend to keep the subtraction problems equivalent.

Use compensation to make an equivalent expression. Find the difference between the two numbers.

1 $73 - 46$

2 $56 - 28$

3 $65 - 29$

4 $82 - 47$

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Compatible Numbers and Making Tens

Materials:
- **Compatible Numbers and Making Tens**

Prompt students to complete **Compatible Numbers and Making Tens**.

Debriefing Questions:
- Why did you use compatible numbers as a strategy?
- How do you choose what number to use to make an equivalent problem?
- How are compatible numbers reflected in your work?
- What do you look for to decide if you are going to use the making ten strategy or compatible numbers strategy?

Compatible Numbers and Making Tens

Making Tens	Compatible Numbers	Compatible Numbers	Decomposing to a 10
$24 + 32 + 16 + 18$	$24 + 32 + 16 + 18$	$46 - 18$	$46 - 18$
$10 + 10$	$24 + 16 + 32 + 18$	$46 - 16 - 2$	$46 - 10 - 8$
$20 + 30 + 10 + 10 + 20$	$40 + 50$	$30 - 2$	$36 - 8$
90	90	28	$36 - 5 - 3$
			$31 - 3$
			28

Use mental strategies to determine each sum or difference.

1 $35 + 27 + 45 + 53$

2 $99 + 88 + 11 + 22$

3 $54 - 18$

4 $75 - 37$

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Solving Addition and Subtraction Problems
Using Mental Strategies

Materials:
- **Solving Addition Problems Using Mental Strategies**
- **Solving Subtraction Problems Using Mental Strategies**

Prompt students to complete **Solving Addition Problems Using Mental Strategies** and **Solving Subtraction Problems Using Mental Strategies**

Debriefing Questions:
- How did you determine which strategy to choose?
- What did you look for in the numbers to allow you to choose one strategy over another?
- When would you use compensation over making ten? Place value? Compatible numbers?

Mathematics Achievement Academy, Grade 2

Solving Addition Problems Using Mental Strategies

- Solve the first problem using one of the strategies. Cross off the strategy you used.
- Pass your paper to the person on your right.
- Solve the second problem using a different strategy from the list. Cross off the strategy you used.
- Pass your paper to the person on your right.
- Repeat this process until all four problems have been solved.

Strategies
Compatible numbers
Compensation
Making tens
Place value

1 $26 + 47$

2 $46 + 72 + 94 + 38$

3 $67 + 55 + 43$

4 $68 + 79$

Mathematics Achievement Academy, Grade 2

Solving Subtraction Problems Using Mental Strategies

- Solve the first problem using one of the strategies. Cross off the strategy you used.
- Pass your paper to the person on your right.
- Solve the second problem using a different strategy from the list. Cross off the strategy you used.
- Pass your paper to the person on your right.
- Repeat this process until all four problems have been solved.

Strategies
Compatible numbers
Compensation
Decomposing to a 10
Place value

1 68 – 49

2 87 – 34

3 96 – 58

4 52 – 15

Mathematics Achievement Academy, Grade 2

Check Point: Determining Sums Using Mental Strategies

- Evaluate the following expressions.
- Choose a strategy that you would use to determine each sum.
- Explain your reasoning for choosing each strategy.

Strategies	
compatible numbers	making tens
compensation	place value

1 $57 + 68$

To determine the sum, I am using the _____ strategy.

I chose this strategy because the numbers allow me to think about . . .

_____

_____

_____

_____

2 $22 + 43 + 68 + 87$

To determine the sum, I am using the _____ strategy.

I chose this strategy because the numbers allow me to think about . . .

_____

_____

_____

_____

Mathematics Achievement Academy, Grade 2

Check Point: Determining Differences Using Mental Strategies

- Evaluate the following expressions.
- Choose a strategy that you would use to determine each difference.
- Explain your reasoning for choosing each strategy.

Strategies	
compatible numbers	decomposing to a 10
compensation	place value

1 73 – 36

To determine the difference, I am using the _____ strategy.

I chose this strategy because the numbers allow me to think about . . .

_____

_____

_____

_____

2 96 – 54

To determine the difference, I am using the _____ strategy.

I chose this strategy because the numbers allow me to think about . . .

_____

_____

_____

_____

Mathematics Achievement Academy, Grade 2

Use Objects to Represent Addition and Subtraction Problems

Materials:
- Base-10 blocks

Prompt students to use base-10 blocks to complete **Ice Cream Purchases**.

Debriefing Questions:
- How is the situation represented by your base-10 blocks?
- How is the situation represented by your picture?
- How is the situation represented by your equation?
- What other representation(s) can be used to model the situation?

Ice Cream Purchases

- Use your counters to represent the situation.
- Draw a picture of your model.
- Solve the problem.

1 Ms. Oliver paid for 159 gallons of chocolate ice cream for her store. She also paid for 72 gallons of strawberry ice cream. Ms. Oliver paid for how many gallons of ice cream?

Picture:

2 Ms. Oliver paid for 135 gallons of mint ice cream for her store. She also paid for some gallons of vanilla ice cream. She paid for a total of 218 gallons of ice cream. Ms. Oliver paid for how many gallons of vanilla ice cream?

Picture:

3 Ms. Oliver paid for 247 gallons of vanilla ice cream for her store. She paid for 86 more gallons of chocolate ice cream than gallons of vanilla ice cream. Ms. Oliver paid for how many gallons of chocolate ice cream?

Picture:

Check Point: Representing and Solving Addition and Subtraction Problems

- Use pictures, diagrams, or equations to represent each situation.
- Solve each problem.

1 Gwen had a collection of bracelets. At a party, she gave 85 of the bracelets to her friends. Now she has 72 bracelets. How many bracelets did Gwen have before the party?

2 At Alex's party, there were 145 balloons. There were 81 blue balloons. The rest of the balloons were silver. How many of the balloons were silver?

3 Jena had 465 stickers. Mark had 278 stickers. How many fewer stickers does Mark have then Jena?

Mathematics Achievement Academy, Grade 2

Check Point: Solving Addition and Subtraction Problems Using Strategies Based on Place Value

- Fold your paper along the dotted line.
- Use your mental strategies and knowledge of place value to solve the problem in Part I.
- Once you have solved the problem, unfold your paper and answer Part II.

Part I

Farmer Bob was packing crates of oranges to take to the farmers' market. While packing the truck, 147 oranges spilled onto the street. Farmer Bob had 478 oranges left in the truck. How many oranges did Farmer Bob have before the spill?

- -

Part II

Nasima and Marco both solved the same problem situation using different strategies. Whose strategy is more like yours? Justify your answer.

Nasima	Marco
Before	
oranges left on the truck	−147
After	
oranges left on the truck | oranges spilled	478 ?
?	
$478 + 147$	
$(400 + 100) + (70 + 40) + (8 + 7)$	+2
$500 + 110 + 15$	+100
$(500 + 100) + (10 + 15)$	478 578 +20 +25
625	600 625
	580

Mathematics Achievement Academy, Grade 2

Identify Representations of Addition and Subtraction Problems

Materials:
- **Fruit Stand**
- Scissors
- Tape or glue

1. Prompt students to match the strip diagram to the problem it best represents in order to complete **Fruit Stand.**
2. Prompt students to tape or glue the matching card.

Debriefing Questions:
- How is each problem represented by the strip diagram?
- What other representation(s) could be used to represent the problem?
- How do you know the remaining strip diagrams do not match any problem?

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Fruit Stand

Mr. Smith purchased some apples and oranges for his fruit stand.

- He purchased 420 oranges.
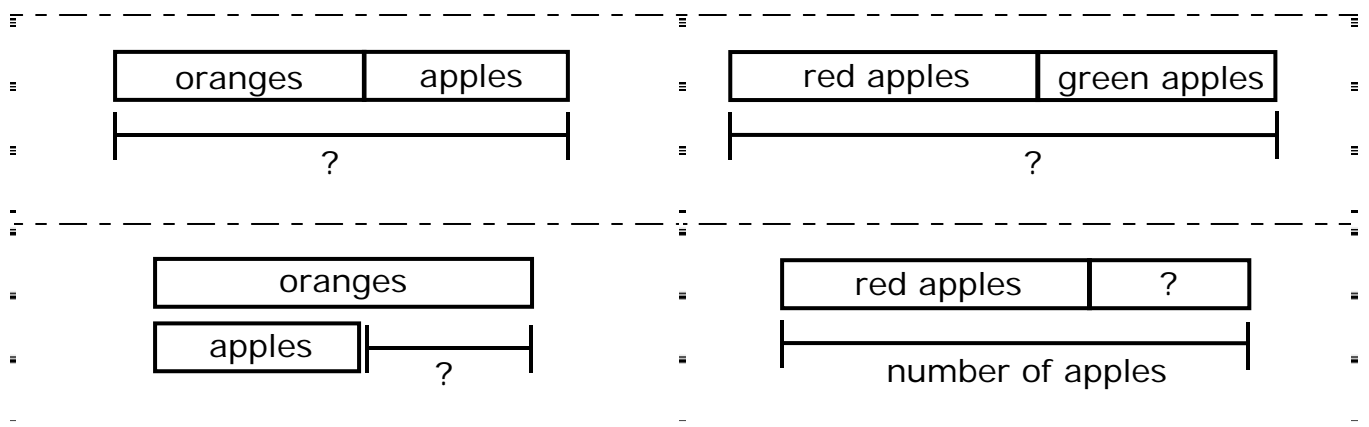- He purchased 294 apples.

1 How many more oranges than apples did Mr. Smith purchase?

Which strip diagram can be used to represent the problem?

2 Of the apples Mr. Smith purchased, 205 of them were red. The rest of the apples were green. How many green apples did Mr. Smith purchase?

Which strip diagram can be used to represent the problem?

Cut along the dotted lines.

oranges	apples

?

red apples	green apples

?

oranges

apples

?

red apples	?

number of apples

Mathematics Achievement Academy, Grade 2

Selecting Appropriate Representations for Addition and Subtraction

Materials:
- **Representations Card Match**
- **Representing Addition and Subtraction Cards**
- Scissors
- Tape or glue

Prompt students to complete **Representations Card Match** using the **Representing Addition and Subtraction Cards**.

Debriefing Questions:
- How is the situation represented in the model and/or strip diagram? The equation?
- How is the equation represented in the model and/or strip diagram?
- What other representation(s) can be used to model the situation?

Representations Card Match

- Cut apart the **Representing Addition and Subtraction Cards**.
- Match the model(s) and an equation(s) that can be used to represent the situation.
- Solve the problem.

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1 Jake had some baseball cards in a box. Then his mother gave him 218 baseball cards. Now Jake has 623 baseball cards. How many baseball cards did Jake have in his box at the start?

Model(s):   Equation(s):

                                                                                 Answer:

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2 Last week the Soda Shop sold 623 glasses of cola. This week they sold 218 more glasses of cola. How many glasses of cola did the Soda Shop sell this week?

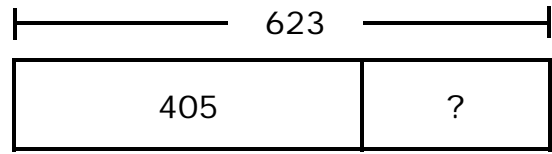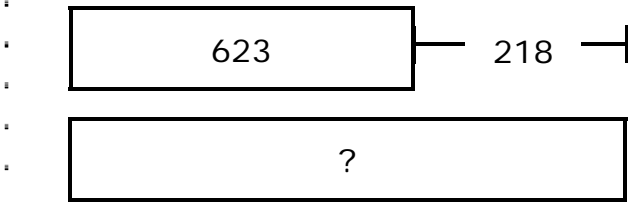Model(s):   Equation(s):

                                                                                 Answer:

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3 A shop has 405 blue t-shirts and some red t-shirts. They have 623 blue t-shirts and red t-shirts altogether. How many red t-shirts does the shop have?

Model(s):   Equation(s):

                                                             Answer:

4 Taylor had $623. She paid $405 for a video game system. How much money does Taylor have now?
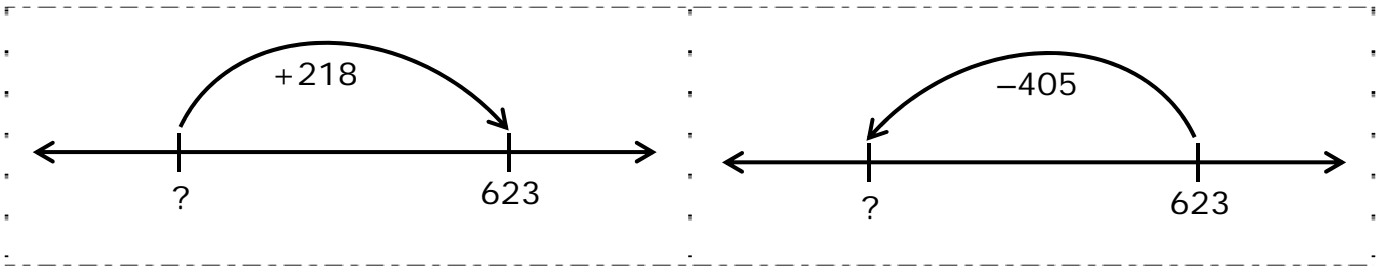
Model(s):   Equation(s):

                                                             Answer:

Mathematics Achievement Academy, Grade 2

Representing Addition and Subtraction Cards

Cut along the dotted lines.

+218

?   623

−405

?   623

623	218

| ? |

| 623 |

| 405 | ? |

$\square + 218 = 623$

$623 - 405 = \square$

$405 + \square = 623$

$623 + 218 = \square$

| ? | 218 |

| 623 |

| 623 | 405 |

| ? |
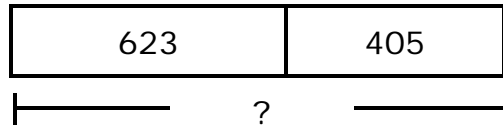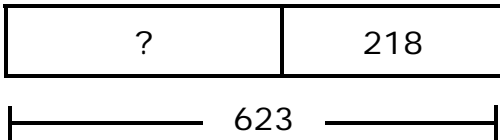
Representing and Solving Addition and Subtraction Problems

Prompt students to complete **Representations for Addition and Subtraction**.

Debriefing Questions:
- What model did you use to represent the problem?
- How does your model represent the problem?
- What other model can be used to represent the problem?
- How did you determine the answer to the problem?

Representations for Addition and Subtraction

- Represent the following situations using two different models in the space provided.
- Solve each problem.

Possible Models	
strip diagram	equation
picture	number line

1 Ms. Kasey had 750 party favors.

- She purchased some of the party favors on Monday.
- She purchased 234 party favors on Tuesday.

How many party favors did Ms. Kasey purchase on Monday?

Representation 1

Representation 2

Answer:

Mathematics Achievement Academy, Grade 2

2 Mr. Reyes is saving money for a new computer. Computer A costs $499 and Computer B costs $583. How much money would Mr. Reyes save by purchasing Computer A?

Representation 1

Representation 2

Answer:

Representing and Solving Addition and Subtraction Problems

Materials:
- **Determining Sums and Differences: Carousel Cards**
- Chart paper
- Markers – 1 marker per group of students. Each group should have a different color marker.
- Timer

1. Attach each card to a separate piece of chart paper.
2. Post the chart paper around the room. Repeat problems as needed to accommodate class size, but be sure to repeat the same problem order as you post the chart paper.
3. Facilitate the carousel using the instructions below.
   a. Each group of 2-3 students starts at a poster.
   b. The first group reads the problem and creates a pictorial representation of the situation. This could be a strip diagram, number line, number sentence, or other representation. Do NOT solve the problem.
   c. Every group rotates to the next poster.
   d. Each group should read the problem and verify that the work completed by the previous group is correct. If they agree, draw a smiley face next to the previous group's work. Make changes if needed.
   e. Once the work has been verified or modified, solve the problem. Be sure to show _how_ you determined the solution and make your thinking visible to others. Draw additional pictorial representations if they support your solution process.
   f. Every group rotates to the next poster.
   g. Verify the work completed by the previous two groups. Again, draw a smiley face or make changes if needed.
   h. Solve the problem again, using a _different_ process than the previous group. Again, be sure to show _how_ you determined the solution and make your thinking visible to others. Draw additional pictorial representations if they support your solution process.
   i. Every group rotates to the next poster.
   j. Verify the work completed by the previous three groups. Again, draw a smiley face or make corrections if needed.
   k. Discuss with your group:
      - How are the two solution strategies similar? How are they different?
        Make notes on the poster to indicate similarities and differences.
      - If you were asked to solve this problem, would your solution strategy look like one on the poster, or do you have thoughts about a third way to solve this problem?

Teacher Reflection Questions:
- Is there one color of marker being used that seems to have required frequent corrections? If so, are the errors consistent? What would be appropriate next steps with this group of students?
- What representations are the students using most often? Do they seem to be successful with these representations?
- What representations are students not using?
- What representations do students seem to be using without success?
- What are the implications for instruction? What would be some appropriate next steps for this class?

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A

Harry and Zayn go to a carnival and play some games. Harry wins 236 tickets. Zayn also wins some tickets. Together the boys have 448 tickets. How many tickets did Zayn win?

B

Harry and Zayn go to a carnival and spend $118 on tickets and food. The boys have $17 left at the end of the day. How much money did Harry and Zayn have at the beginning of their day?

C

A carnival game has a large board with 158 balloons attached. The board has space for 175 balloons. How many more balloons can be attached to the board?

D

Harry and Zayn go to a carnival and track the steps they walk during the morning. Harry walked 746 steps. Zayn walked 51 fewer steps than Harry. How many steps did Zayn walk?

Mathematics Achievement Academy, Grade 2

Solving Addition and Subtraction Problems

Materials:
- **Determining Sums and Differences: Speed Learning Cards** – 2 sets of cards each on a different color of paper or cardstock for every 8 students.
- Timer

Facilitate the speed learning using the instructions below:
1. Students will work in pairs. Distribute two of the same problem card to each pair. The cards should be different colors. Repeat problems as needed to accommodate class size. Be sure to distribute repeated sets in the same order around the room so that when students rotate, they will rotate from A to B to C to D.
2. Students work together to solve the problem on their cards. Students should verify their solutions and discuss their thinking with each other in order to become the "experts" with this problem. Let students know that if anyone else needs help with this problem, they should now be able to offer assistance. Therefore, they should take the time to discuss the problem with their "expert" partner to be sure they each understand this problem well.
3. Determine which color card will be the "stayers" and which color card will be the "movers." Ask the "movers" to rotate to the next group. The "stayers" will not move. The "movers" will take their card with them.
4. Once seated with a new partner, students should trade cards and solve each other's problem. If help is needed, the new partner is an "expert" in solving the problem.
5. Prompt students to verify that each partner arrived at the correct solution.
6. Prompt students to return cards to the "expert" owners.
7. The teacher should verify that the cards have been returned to their original owners before again asking the "movers" to rotate to the next group. Again, the "stayers" do not move.
8. Repeat this process until every student has had an opportunity to solve each problem.

Debriefing Questions:
- What representations and/or models did you use to solve the problems?
- How did you decide which model to use?
- What mental thinking strategies did you use to calculate the answers for the problems?
- How did you decide which mental strategy to use for each problem?

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Determining Sums and Differences: Speed Learning Cards

A

Farmer Ted collected 293 eggs from his chicken coop. His wife used some of the eggs to make breakfast for the family. Farmer Ted has 278 eggs left. How many eggs did Farmer Ted's wife use to make breakfast?

B

Farmer Ted has 375 cows on his ranch. Farmer Ted also has some horses. Altogether, there are 615 cows and horses on Farmer Ted's ranch. How many horses are on the ranch?

C

Farmer Ted sheared some wool from his sheep. He sold 132 pounds of the wool. He still has 83 pounds. How many pounds of wool did Farmer Ted shear from his sheep?

D

Farmer Ted had 265 bales of hay on his ranch. He buys some more bales of hay from a neighbor. Now Farmer Ted has 458 bales of hay. How many bales of hay did Farmer Ted buy?

Mathematics Achievement Academy, Grade 2