ST Math.
Summer Immersion

Grade 2 | Problem Solving Journal Answer Key

<div style="background:orange">

Module 1

</div>

Day 1

Create a "Get to Know Our Class" chart.

Student charts will vary.

Ask the students questions to gather data about the class and record the information on a chart. For example:

- How many students are in this class?
- How many students have brown eyes? (Blue eyes? Green eyes?)
- How many students in the class have black hair? (Brown hair? Blonde hair? Red hair?)

Day 2

Describe the class mathematically.

Student descriptions will vary.

Remind students about yesterday's Problem of the Day.

Generate a list of 3-5 things students want to know about each other. For example:

Favorite ice cream flavor, favorite color, number of siblings, number of pets, favorite subject in school, month of birth, favorite sport, etc.

Day 3

Yolanda made 48 cookies for a party. Hector made 33 more. How many cookies do they have altogether?

Yolanda and Hector have 81 cookies altogether.

Possible Student Strategies*

Friendly Numbers	Decomposing by Place Value	Adding with Extras
33 = 2 + 31	40 + 30 = 70	48 + 2 = 50
48 + 2 = 50	8 + 3 = 11	50 + 33 = 83
50 + 31 = 81	70 + 11 = 81	83 - 2 = 81

*similar strategies may also be represented with models or on a number line.

Day 4

Valerie had 67 beads. She used some to make a necklace and the others she put in a box. How many could she have used for the necklace and how many could she have put in the box? Explain your answer using pictures or words.

> **Student solutions will vary.** *Look for:*
> - *The sum of the beads used to make the necklace and those that went back into the box will equal 67.*
> - *Visual models should clearly identify the number of beads on the necklace, the number in the box, and how they combine to make 67 total beads.*
> - *During classroom discussions of this problem, students should notice the relationship between the beads used on the necklace and how many beads are placed in the box. As the number of beads on the necklace increases, the number of beads that go into the box decreases. Encourage connections between the addends students wrote in their equations and their visual models, "Where can you see each part of this problem in ___'s representation?"*

Grade 2 | Problem Solving Journal Answer Key

Module 2

Day 1

Kayla is selling 45 brownies to raise money for a trip. She sold 8 brownies on Monday. On Tuesday, she sold 16 brownies. How many brownies does she have left? Write or draw a picture to show how you got your answer.

Kayla has 21 brownies left.

Possible Student Strategies

Monday

Tuesday

21 remaining

Monday

Tuesday

24   +6 = 30   6 + 15 = 21

+15 = 45

8 + 16 = 24
45 - 24 = 21

*Students may have different strategies for decomposing numbers to complete these equations.

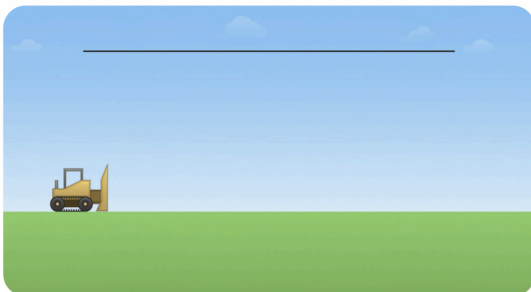## Grade 2 | Problem Solving Journal Answer Key

Day 2

Create two examples of a new JiJi puzzle. Each example must have 2 steps like the puzzles you did earlier and result in an answer of 18. Write your equation on the line. Then compare the two puzzles. How are they alike? How are they different?
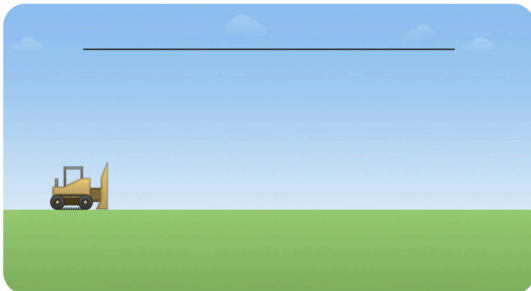
Student solutions will vary.

Look for:
- *Two steps (two stacks of blocks).*
- *18 total blocks*
- *Addition equations are representative of student solutions.*

Look for:
- *Both equations have two steps and a common sum.*

Grade 2 | Problem Solving Journal Answer Key

Day 3

Devin has some cards in his collection. Joe gave him 16 cards and Mark gave him 27 cards. He has 92 cards in total. How many cards did he start with? Use words or pictures to explain how you found your answer.

Devin started with 49 cards.

Possible Student Strategies

| *Overcompensating*	*Decomposing by Place Value, Adding On*	*Decomposing by place value, Finding the Difference*
$16 + 27 = 43$	$16 = 10 + 6$	$16 = 10 + 6$
$43 + 50 = 93$	$27 = 20 + 7$	$27 = 20 + 7$
$93 - 1 = 92$		
"I added 1 more than I needed to make 92, so my answer will be 1 less."	$10 + 20 = 30$	$10 + 20 = 30$
	$6 + 7 = 13$	$6 + 7 = 13$
$50 - 1 = 49$	$30 + 13 = 43$	$30 + 13 = 43$
	$43 + 40 = 83$	$92 - 43$
	$83 + 9 = 92$	$92 - 40 = 52$
	$40 + 9 = 49$	$52 - 3 = 49$

Grade 2 | Problem Solving Journal Answer Key

Day 4

Brittany bought a box of cards. The box had 30 cards inside. Brittany wanted to give a card to all 17 girls on her soccer team. She also wanted to give each of her 6 friends a card. Brittany's mom needs 8 cards for her family. Brittany says there will be enough cards for her mom to use. Is she correct? Write or draw a picture to explain your answer

Brittany will not have enough cards left for her mom to use.

Possible Student Representation

Only one remaining when 8 are needed.

17   6
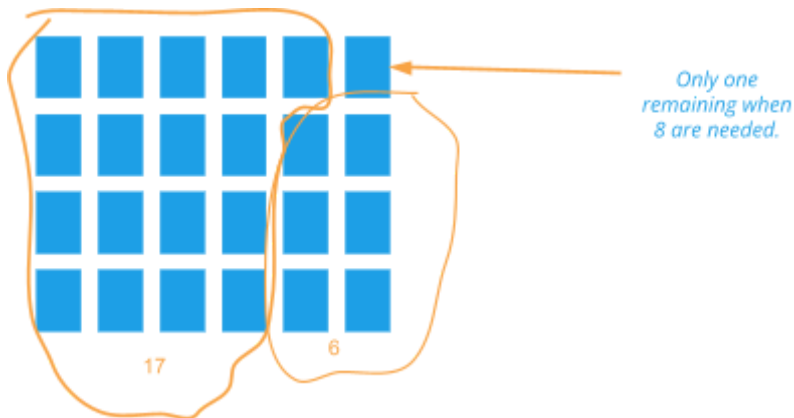
ST Math.
Summer Immersion

Grade 2 | Problem Solving Journal Answer Key

<div style="background:orange">

Module 3

</div>

Day 1

You have 15 pieces of gum. You gave some away on Monday and you gave some away on Tuesday. You now have 6. Draw a picture to show a possible solution to this problem. Explain how you found the answer.

Student solutions will vary. *Look for:*

- *Combinations to 9 (3 + 6, 1 + 8, 2 + 7, 4 + 5)*

Possible Student Representation

| M | M | M | M | M |

Amount split between Monday and Tuesday

| T | T | T | T |

Remaining Gum Pieces

-

Grade 2 | Problem Solving Journal Answer Key

Day 2
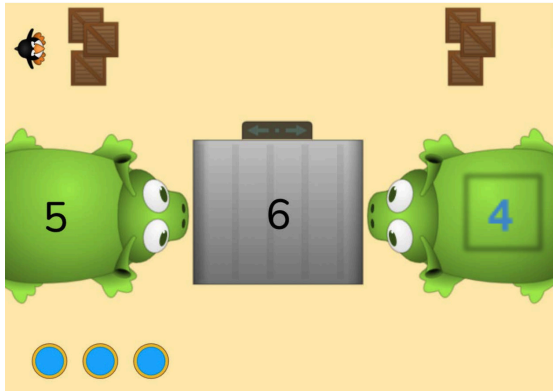
Fill in the blank square to solve the JiJi puzzle. Explain how you solved the puzzle.

There are 6 pies represented on the conveyor belt and 3 more blue pies. That makes 9 pies altogether. One monster eats 5 pies so the other is left with 4.
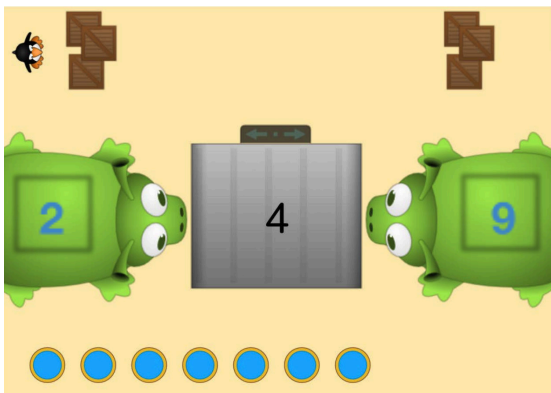
Fill in the blank square to solve the JiJi puzzle. Explain how you solved the puzzle.

Student solutions will vary.

Look for:
 - 9 and 2 is one possible answer. There are several others.
 - Combinations to 11.
 - Number Relationships: As one pie monster eats more pies, the other eats fewer. The sum stays the same for all solutions.

Day 3

Lacey had a collection of dolls. Her mom was making pink shoes for each of her doll's feet. If her mom made 12 pairs of shoes, how many dolls does Lacey have?

Lacey has 6 dolls.

Possible Student Strategies

Skip Counting *2, 4, 6, 8, 10, 12* *"I skip counted 6 times so there are 6 dolls."*	*2 + 2 + 2 + 2 + 2 + 2 = 12*

similar strategies may also be represented with models.

Day 4

Zach has 18 pencils and 3 pencil boxes. He is putting an equal number of pencils in each box. How many pencils will he put in each box? Write or draw a picture to explain your answer.
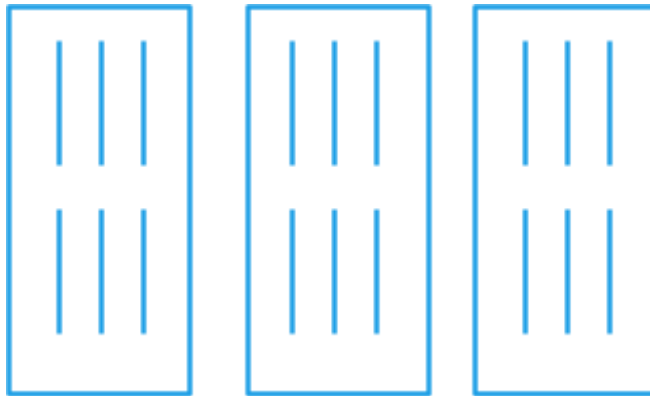
Zak will put 6 pencils into each box.

Possible Student Strategies

Repeated Addition
6 + 6 + 6 = 18

*While 3 + 3 + 3 + 3 + 3 + 3 = 18 may also help students to see that "6" is the correct answer to this problem, it may be worthwhile to discuss which equation better represents the story problem.
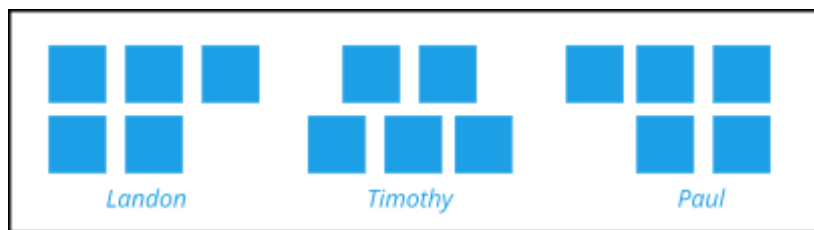
Module 4

Day 1

Landon has 5 cars. Timothy has 3 cars. Paul has 7 cars. The boys wanted to each have the same number of cars. In the space below draw a picture to show how many cars each boy should have.

Day 2

Raven had 4 packs of markers. Each pack had 3 markers. How many markers does Raven have altogether? Draw a picture to show how you found your answer. If she received 2 more packs of markers, how many markers will she have? Draw another picture to show how you found your answer

Raven had 12 markers altogether.

Raven now has 18 markers. 12 + 3 + 3 = 18 markers.

Grade 2 | Problem Solving Journal Answer Key

Day 3 (You'll use this problem again tomorrow)

Mariana was arranging 24 cupcakes on a plate. Draw an array to represent one way Mariana could have arranged the cupcakes. Write an equation using repeated addition to represent your array.

Student solutions will vary. *Look for:*

- *Student arrays should match their written repeated addition equation.*
- *All rows in the array should have the same number of cupcakes*
- *All columns in the array should have the same number of cupcakes.*

Possible Student Solutions

1 by 24 cupcakes

$1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 24$

2 by 12 cupcakes

$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 24$

Or

$12 + 12 = 24$

3 by 8 cupcakes

$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24$

Or

$8 + 8 + 8 = 24$

4 by 6 cupcakes

$4 + 4 + 4 + 4 + 4 + 4 = 24$

Or

$6 + 6 + 6 + 6$

Grade 2 | Problem Solving Journal Answer Key

Day 3 (You'll use this problem again tomorrow)

Mariana was arranging 24 cupcakes on a plate. Draw an array to represent one way Mariana could have arranged the cupcakes. Write an equation using repeated addition to represent your array.

Student solutions will vary. *Look for:*
- *Student arrays should match their written repeated addition equation.*
- *All rows in the array should have the same number of cupcakes*
- *All columns in the array should have the same number of cupcakes.*

Possible Student Solutions

1 by 24 cupcakes

$1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 24$

2 by 12 cupcakes

$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 24$

Or

$12 + 12 = 24$

3 by 8 cupcakes

$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24$

Or

$8 + 8 + 8 = 24$

4 by 6 cupcakes

$4 + 4 + 4 + 4 + 4 + 4 = 24$

Or

$6 + 6 + 6 + 6$

Grade 2 | Problem Solving Journal Answer Key

Day 3 (You'll use this problem again tomorrow)

Mariana was arranging 24 cupcakes on a plate. Draw an array to represent one way Mariana could have arranged the cupcakes. Write an equation using repeated addition to represent your array.

Student solutions will vary. *Look for:*
- *Student arrays should match their written repeated addition equation.*
- *All rows in the array should have the same number of cupcakes*
- *All columns in the array should have the same number of cupcakes.*

Possible Student Solutions

1 by 24 cupcakes

$1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 = 24$

2 by 12 cupcakes

$2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 24$

Or

$12 + 12 = 24$

3 by 8 cupcakes

$3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 = 24$

Or

$8 + 8 + 8 = 24$

4 by 6 cupcakes

$4 + 4 + 4 + 4 + 4 + 4 = 24$

Or

$6 + 6 + 6 + 6$

Grade 2 | Problem Solving Journal Answer Key

Day 4 (See POD from Day 3)

Yesterday, Mariana moved 24 cupcakes from the plate onto a tray. She arranged the cupcakes differently. Draw a different array and write an equation to represent your thinking. Compare the two arrays you drew. How are they alike? How are they different?

Student solutions will vary. *See POD in Module 4 Day 3 for the student's original solution.*

Possible Student Solutions

1 by 24 cupcakes *1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 +1* *+ 1 + 1 + 1 +1 + 1 + 1 + 1 +1 + 1* *+ 1 + 1 +1 + 1 + 1 + 1 = 24*	*2 by 12 cupcakes* *2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 + 2* *+ 2 + 2 + 2 = 24* *Or* *12 + 12 = 24*	*3 by 8 cupcakes* *3 + 3 + 3 + 3 + 3 + 3 + 3 + 3 =* *24* *Or* *8 + 8 + 8 = 24*
4 by 6 cupcakes *4 + 4 + 4 + 4 + 4 + 4 = 24* *Or* *6 + 6 + 6 + 6*		

ST Math
Summer Immersion

Grade 2 | Problem Solving Journal Answer Key

Module 5

Day 1

A garden is pictured below. Using addition, create two equations that represent the garden.

Student solutions will vary. *Look for addition statements representing combinations to 12.*

Possible Student Strategies:
- 6 + 6 = 12
- 4 + 4 + 4 = 12
- 3 + 3 + 3 + 3 = 12

How does decomposing a number help you to solve a problem? Draw a picture to help explain your answer.

Student explanations will vary. *Look for:*
- *Decomposing a number means breaking apart a number into friendly pieces to combine with other numbers, like making tens.*
- *Visual models may show students decomposing a number by tens and ones, or decomposing to make friendly combinations (such as a group of ten using the 3 and 7 from 13 and 17).*
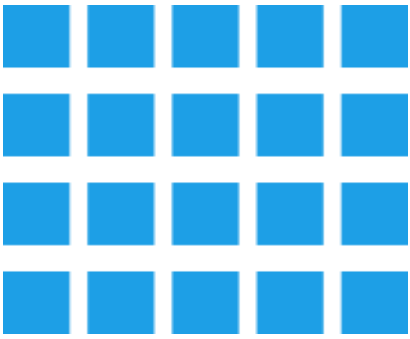
Grade 2 | Problem Solving Journal Answer Key

Day 2

A farmer planted 20 stalks of corn in a rectangular field. He had the same number of corn stalks in each row. Draw a picture to show two ways the farmer could have planted the corn. Explain how you came up with your pictures.

Student solutions will vary.

Possible Student Solutions

4 x 5 array

5 x 4 array

2 x 10 array

10 x 2 array

Students may also justify a 1 x 20 or 20 x 1 array

John's toy car case has rows that will hold 5 cars in each row. How many cars might the full case hold? Explain how you know.

Student explanations will vary. *Look for:*
- *Solutions that are multiples of 5.*
- *Skip-Counting by 5s to the student-select number of rows.*
- *Visual representation showing groupings of 5*