IMKH California

GRADE 2

Student Edition

UNITS

1 | 2

Illustrative Mathematics® LEARN MATH FOR LIFE | Kendall Hunt

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GRADE 2

UNIT

Adding, Subtracting, and Working with Data

Content Connections

In this unit you will represent and solve story problems within 20 using picture graphs and bar graphs along with continued practice with addition and subtraction. You will make connections by:

- **Exploring Changing Quantities** while using place value to solve addition and subtraction problems within 20.

- **Discovering Shape and Space** while solving problems involving length measurement using addition and subtraction.
- **Taking Wholes Apart, Putting Parts Together** while comparing and contrasting different strategies to solve addition and subtraction problems.
- **Reasoning With Data** while answering questions and creating picture graphs and bar graphs.

Addressing the Standards

As you work your way through **Unit 1 Adding, Subtracting, and Working with Data,** you will use some mathematical practices that you may have started using in kindergarten and have continued strengthening over your school career. These practices describe types of thinking or behaviors that you might use to solve specific math problems.

Mathematical Practices	Where You Use these MPs
MP1 Make sense of problems and persevere in solving them.	Lesson 1, 15, and 16
MP2 Reason abstractly and quantitatively.	Lesson 2, 6, 9, 12, 13, 15, and 17
MP3 Construct viable arguments and critique the reasoning of others.	Lesson 2, 9, 10, and 11

Mathematical Practices	Where You Use these MPs
MP4 Model with mathematics.	Lesson 8 and 18
MP5 Use appropriate tools strategically.	Lesson 7, 12, 13, and 14
MP6 Attend to precision.	Lesson 5, 9, 10, 11, and 17
MP7 Look for and make use of structure.	Lesson 2, 3, 4, 5, and 15
MP8 Look for and express regularity in repeated reasoning.	

The California Common Core State Standards for Mathematics (CA CCSSM) describe the topics you will learn in this unit. Many of these topics build upon knowledge you already have and challenge you to expand upon that knowledge. The table below shows what standards are being addressed in this unit.

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Problem Solving with Measure • Number Strategies	**2.OA.1** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	Lesson 15, 16, and 18
• Number Strategies	**2.OA.2** Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.	Lesson 1, 2, 3, 4, 5, 6, 11, 12, 13, 15, and 16
• Represent Data • Dollar and Cents	**2.NBT.2** Count within 1000; skip-count by 2s, 5s, 10s, and 100s.	Lesson 17

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Dollar and Cents • Number Strategies	**2.NBT.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	Lesson 5, 6, 16, and 17
• Represent Data	**2.MD.10** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems4 using information presented in a bar graph.	Lesson 8, 9, 10, 11, 12, 13, 14, and 18

Unit 1, Lesson 1

Addressing CA CCSSM 2.OA.2, building on 1.OA.6; building towards 2.OA.2; practicing MP1

Add and Subtract within 10

Let's add and subtract within 10.

Warm-up

What Do You Know about Math?

What do you know about math?

Activity 1

Check It Off: Add or Subtract within 10

1. Choose 2 cards. Find the value of the sum or difference.
2. Check off the number you found. Write the expression.
3. The partner who checks off the most numbers wins.

	found it!	expression
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Activity 2

What's the Value?

1. Match each expression to the value of the sum or difference.

○ 5 + 3	○ 9
○ 3 – 1	○ 3
○ 10 – 1	○ 8
○ 4 + 5	○ 7
○ 6 + 3	○ 1
○ 6 – 5	○ 4
○ 1 + 6	○ 2
○ 9 – 5	
○ 8 – 5	
○ 3 + 6	

2. Circle the addition expressions with a value of 10.

0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	
2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8		
3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7			
4+0	4+1	4+2	4+3	4+4	4+5	4+6				
5+0	5+1	5+2	5+3	5+4	5+5					
6+0	6+1	6+2	6+3	6+4						
7+0	7+1	7+2	7+3							
8+0	8+1	8+2								
9+0	9+1									
10+0										

3. What patterns do you notice in the expressions with a value of 10?

Addressing CA CCSSM 2.OA.2; building on 1.OA.1; building towards 2.OA.2; practicing MP2, MP3, MP7

Relate Addition and Subtraction within 10

Let's think about how addition and subtraction relate.

Warm-up

What Do You Know about 10?

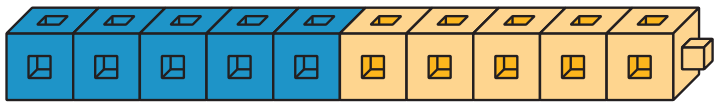
What do you know about 10?

Activity 2

Sums of 10

1. Write as many equations as you can to represent the cube towers.

A



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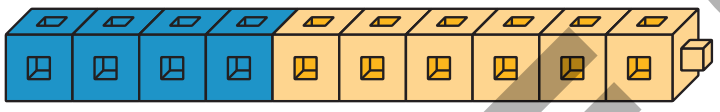
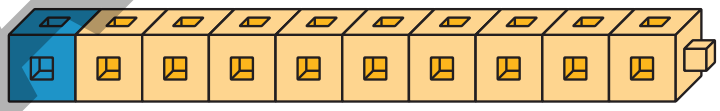


C

D

E



2. Find the number that makes each equation true. Then write the letter of the cube tower that represents the equation.

$3 + \_\_\_\_\_ = 10$ Letter: _____

$10 - 7 = \_\_\_\_\_$ Letter: _____

$10 - 5 = \_\_\_\_\_$ Letter: _____

$2 + \_\_\_\_\_ = 10$ Letter: _____

$10 - 1 = \_\_\_\_\_$ Letter: _____

$10 - 2 = \_\_\_\_\_$ Letter: _____

_____ + 6= 10 Letter: _____

_____ + 9= 10 Letter: _____

5 + _____ = 10 Letter: _____

10 – = _____ =4 Letter: _____

Addressing CA CCSSM 2.OA.2; practicing MP7

Relate Addition and Subtraction within 20

Let's find the number that makes each equation with 20 true.

Warm-up

Number Talk: Addition and Subtraction

Find the value of each expression mentally.

- 7 + 3
- 10 – 7
- 10 – 2
- 10 – 4

Activity 2

Make the Equation True

Find the number that makes each equation true.

1. $4 + \_\_\_\_ = 20$

2. $20 - \_\_\_\_ = 4$

3. $6 + \_\_\_\_ = 20$

4. $20 - \_\_\_\_ = 10$

5. _____ + 3 = 20

6. 20 – 15 _____

7. 20 – _____ = 18

8. If you have time:_____ –5 = 20

Addressing CA CCSSM 2.OA.2; practicing MP7

Add and Subtract Your Way

Let's add and subtract within 20.

Warm-up

Number Talk: Make 10

Find the value of each sum mentally.

- 8 + 2
- 8 + 3
- 8 + 5
- 7 + 6

Activity 1

Revisit How Close—Add To 20

5	8	2	4
6			

Activity 2

Add and Subtract within 20

Find the value of each expression.
Show your thinking using drawings, numbers, or words.

1. $4 + 9$

2. $15 - 3$

3. $7 + 6$

4. 17 – 9

5. 14 + 5

6. 12 – 4

7. $6 + 12$

8. $16 - 5$

Addressing CA CCSSM 2.NBT.5, 2.OA.2; building on 1.NBT.4; practicing MP6 and MP7

Add within 50

Let's add within 50.

Warm-up

Number Talk: 2-Digit, 1-Digit

Find the value of each sum mentally.

- 16 + 3
- 16 + 5
- 26 + 5
- 38 + 6

Activity 1

Revisit How Close—Add To 100

3	8	4	6
6	2	1	

Activity 2

Add within 50

Find the value of each sum. Show your thinking using drawings, numbers, or words.

1. 37 + 8

2. 24 + 23

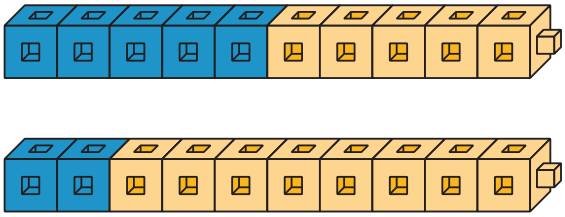
3. 16 + 30

4. $39 + 11$

5. $27 + 15$

Section A Summary

We used what we know about making 10 to add and subtract. We used different ways to find an unknown number in an equation.



$10 - 5 = \_\_\_\_$

$5 + \_\_\_\_ = 10$

$2 + \_\_\_\_ = 10$

$10 - 8 = \_\_\_\_$

Addressing CA CCSSM 2.NBT.5, 2.OA.2; practicing MP2

Center Day 1

Let's add and subtract.

Warm-up

Number Talk: Teen Numbers, 2-Digit Numbers

Find the value of each expression mentally.

- 14 + 22
- 19 + 22
- 15 + 25
- 17 + 25

Activity 2

Centers: Choice Time

Choose a center.

What's Behind My Back?

How Close?

☐ ☐ + ☐ ☐ = _____

Number Puzzles

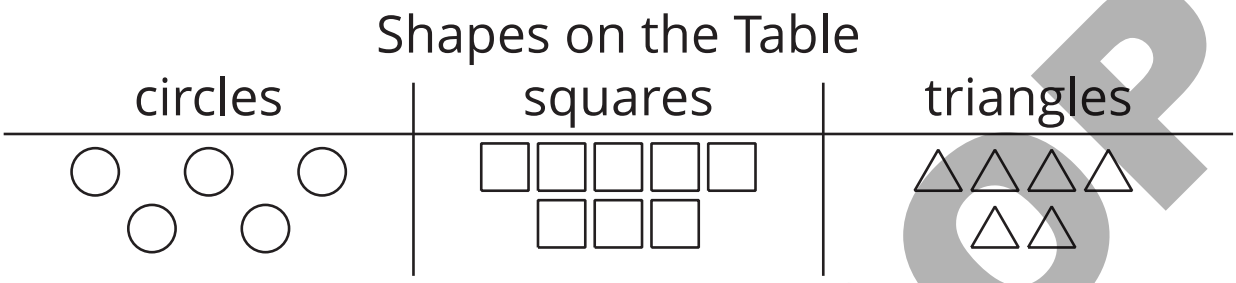
14 = 8 + ☐

Practice Problems

10 Problems

1 Pre-unit

The picture shows how Jada sorts the shapes on her table.



a. How many squares? _____

b. How many triangles? _____

c. Which shape has the fewest number? _____

2 Pre-unit

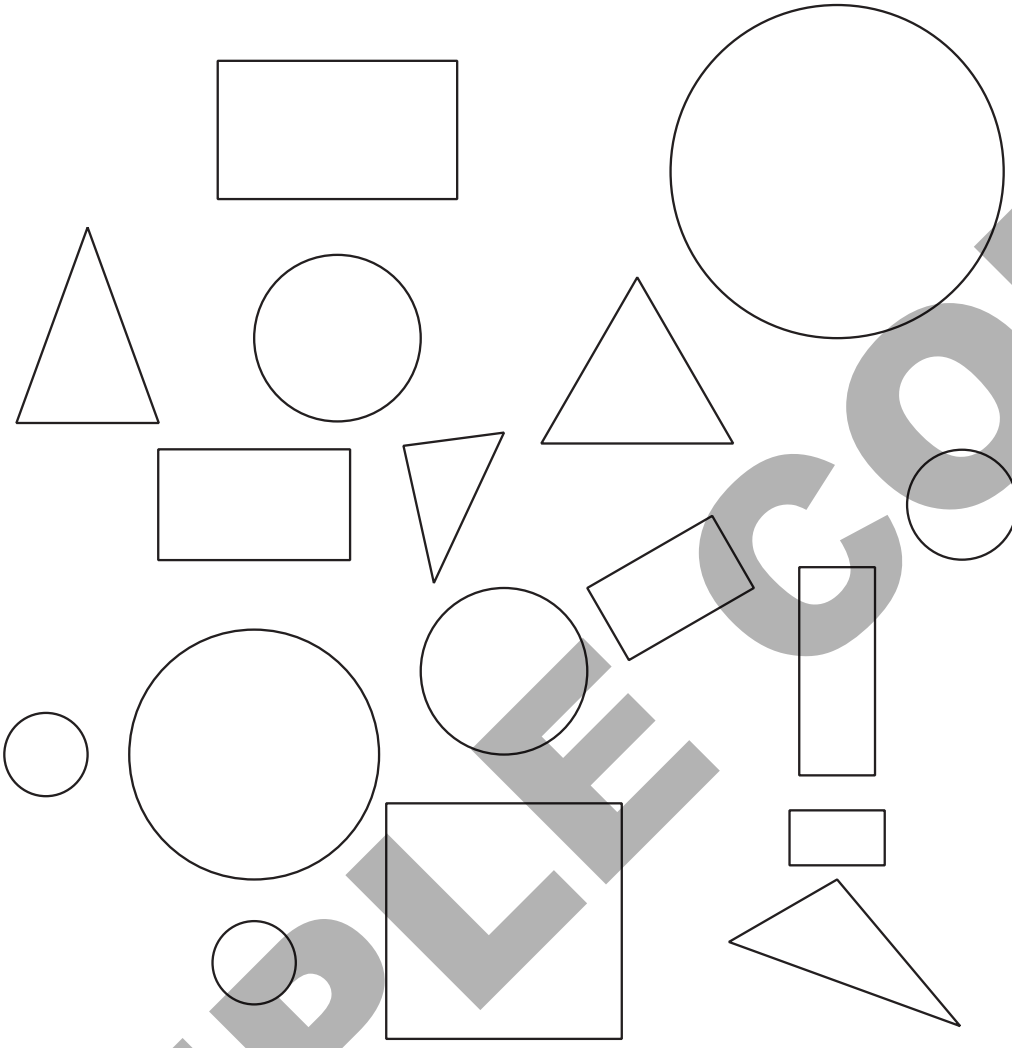
The table shows the favorite magical powers of some students.

Favorite Magical Power

read minds	become invisible	fly
6	8	3

- How many children prefer invisibility over flying?

- How many children prefer reading minds over flying?



Count each kind of shape. Write the numbers on the chart.

Shapes		
circle	triangle	rectangle

4 from Unit 1, Lesson 1

Find the value of each expression.

a. $9 - 2$

b. $5 + 3$

c. $2 + 8$

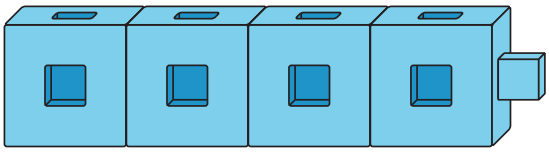
d. $7 - 4$

e. $10 - 3$

f. $1 + 6$

5 from Unit 1, Lesson 2

Jada plays "What's Behind My Back?" with Han. Han has 10 connecting cubes. He shows Jada these cubes.



a. How many connecting cubes are behind Han's back?

b. Write an addition equation that matches the game.

c. Write a subtraction equation that matches the game.

6 from Unit 1, Lesson 3

Find the number that makes each equation true. Show your thinking using drawings, numbers, or words.

a. $20 - 10 = \_\_\_\_\_$

b. $17 + \_\_\_\_\_ = 20$

c. $20 = 5 + \_\_\_\_\_$

d. $7 = 20 - \_\_\_\_\_$

7 from Unit 1, Lesson 4

Here are 7 numbers on cards.

1 2 3 5 6 7 9

a. Choose 3 numbers to add. Get as close as you can to 20.

b. Write the equation.

8 from Unit 1, Lesson 5

Find the value of each sum. Show your thinking using drawings, numbers, or words.

a. $31 + 15$

b. $17 + 8$

c. $26 + 17$

9 Exploration

Choose 3 of these 7 cards. Get as close to 20 as you can.

1 3 4 5 7 8 9

a. Can you make 20?

b. Can you make 20 in more than 1 way?

c. Can you make 20 using the number 1 card?

10 Exploration

Clare has the 1, 2, 3, 4, 5, 6, 7, 8, and 9 cards.

She chooses 7 cards. Claire can't make 20 with 3 of her 7 cards. Which 3 cards do you think she chose? Explain your reasoning.

Building on CA CCSSM 1.MD.4; building towards 2.MD.10; practicing MP5

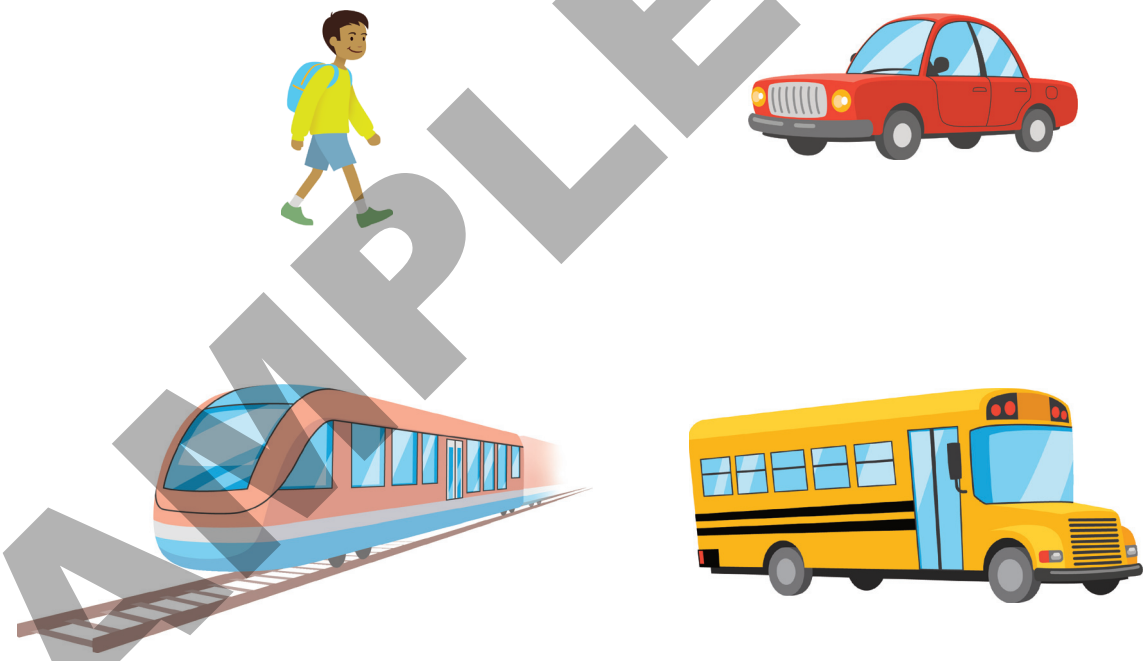
Collect and Represent Data

Let's organize **data** and share it.

Warm-up

Notice and Wonder: Let's Get There

What do you notice? What do you wonder?



Activity 1

How Do We Get to School?

Write your name on the picture that shows how you get to school.

Activity 2

Visual Representations of Data

Organize and represent class **data.**

Addressing CA CCSSM 2.MD.10; building on 1.OA.5, 2.MD.10; building towards 2.OA.2; practicing MP4

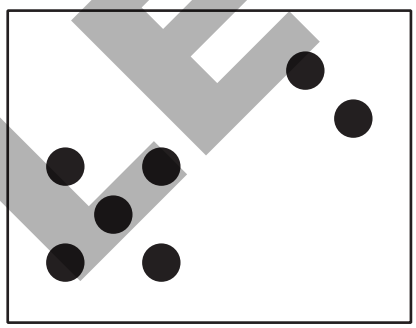
Interpret Picture Graphs

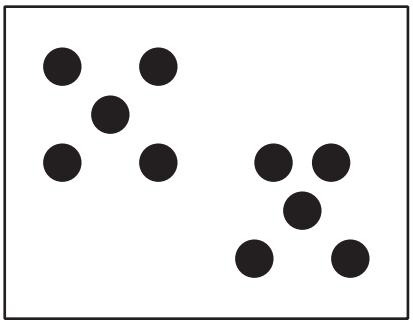
Let's answer questions about **picture graphs.**

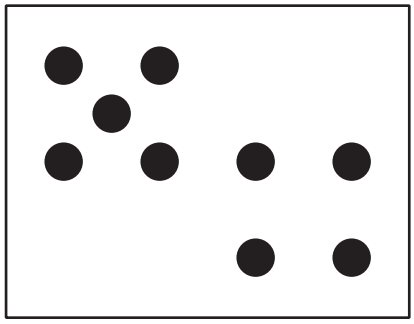
Warm-up

How Many Do You See: Dots within 10

How many do you see? How do you see them?



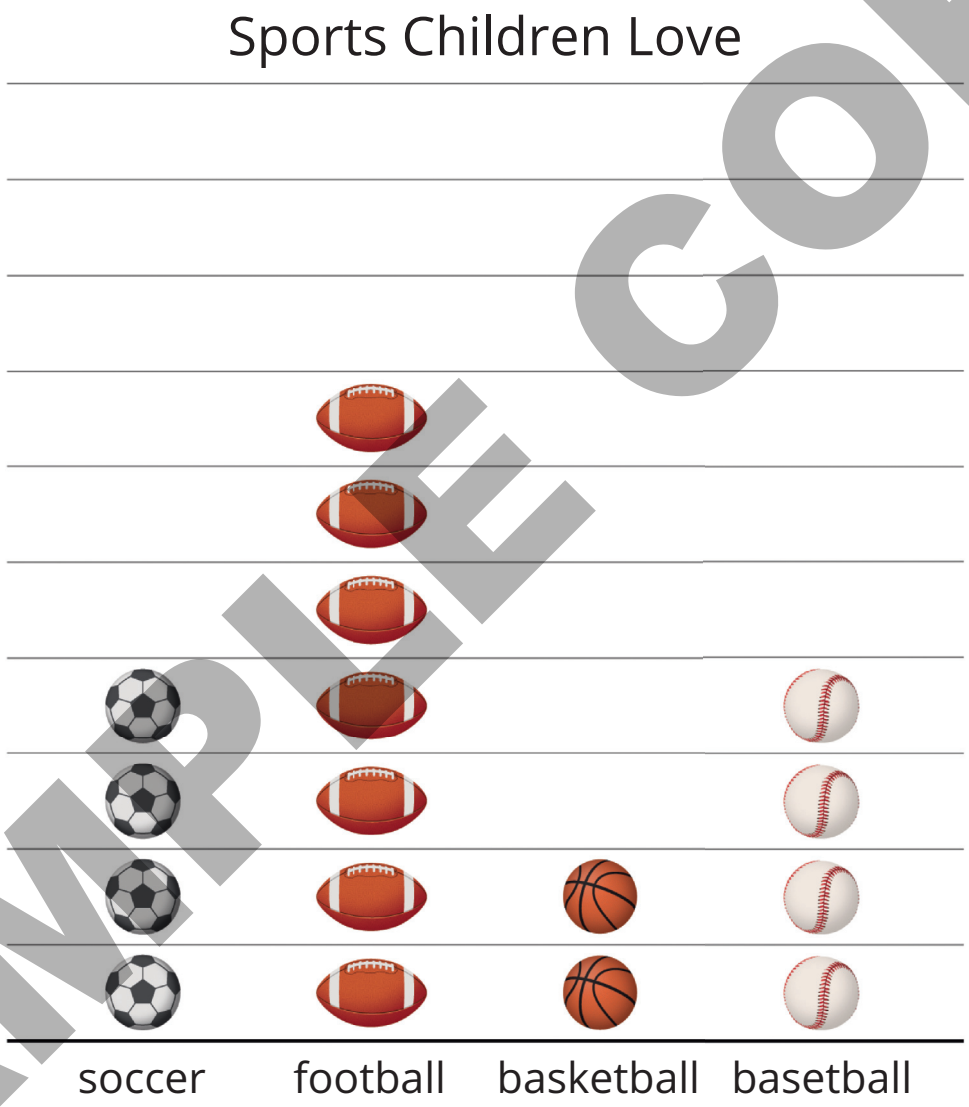




Activity 1

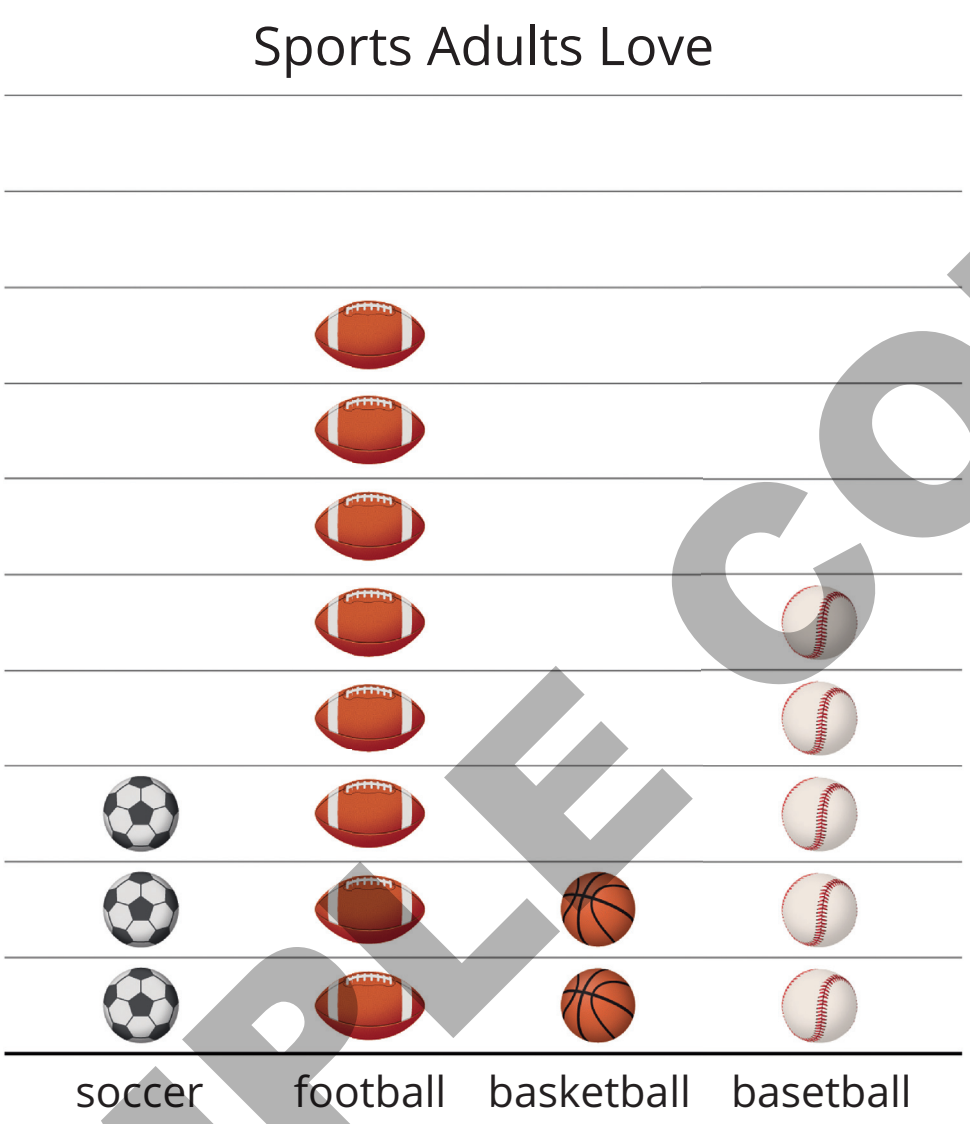
Sports People Love

Clare asked a group of children, "What sports do you love?" Their responses are shown in this picture graph.



What can you learn about the sports children love from Clare's picture graph?

A group of adults were asked, “What sports do you love?” Their responses are shown in this picture graph.



1. How many adults like basketball?

2. How many like football or baseball? Show your thinking using drawings, numbers, or words.

3. Write 1 fact you learned about the data in the picture graph.

Activity 2

Answer Questions

A group of children were asked, “What is your favorite art supply?” Their responses are shown in this picture graph.

1. Circle the 4 questions the graph can answer.

   a. How many children chose markers?

   b. How many chose crayons or clay?

   c. Why did so many children choose paint?

   d. How many more children chose markers than crayons?

   e. What is the total number of children who chose paint or markers?

2. Answer each question you circled.

Unit 1, Lesson 9

Addressing CA CCSSM 2.MD.10; building towards 2.MD.10; practicing MP2, MP3, and MP6

Interpret Bar Graphs

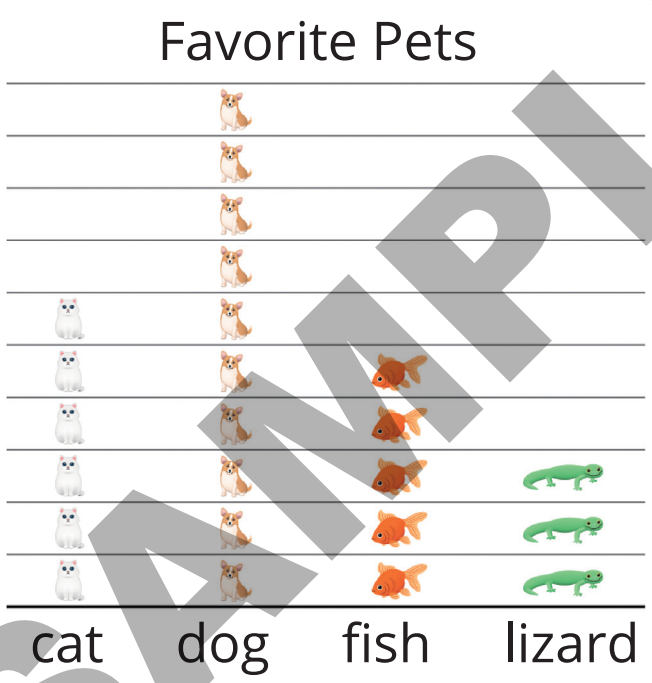
Let's answer **bar graph** data questions.

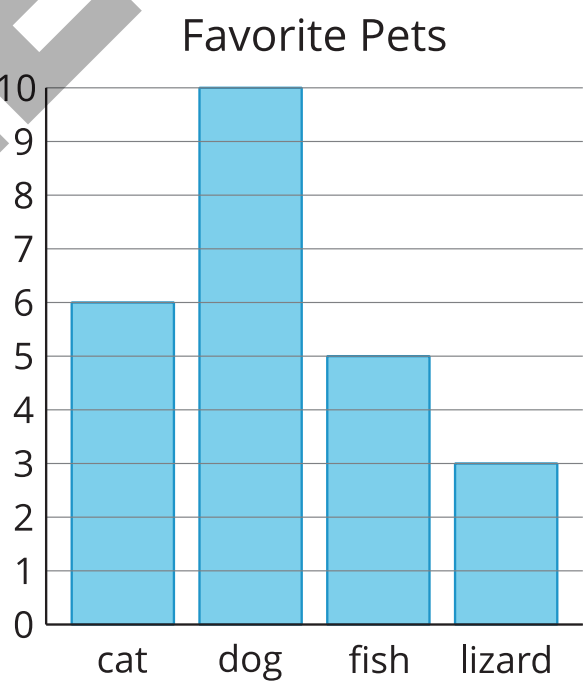
Sec B

Warm-up

Notice and Wonder: Favorite Pets

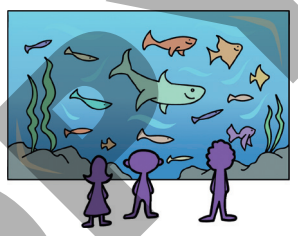
What do you notice? What do you wonder?





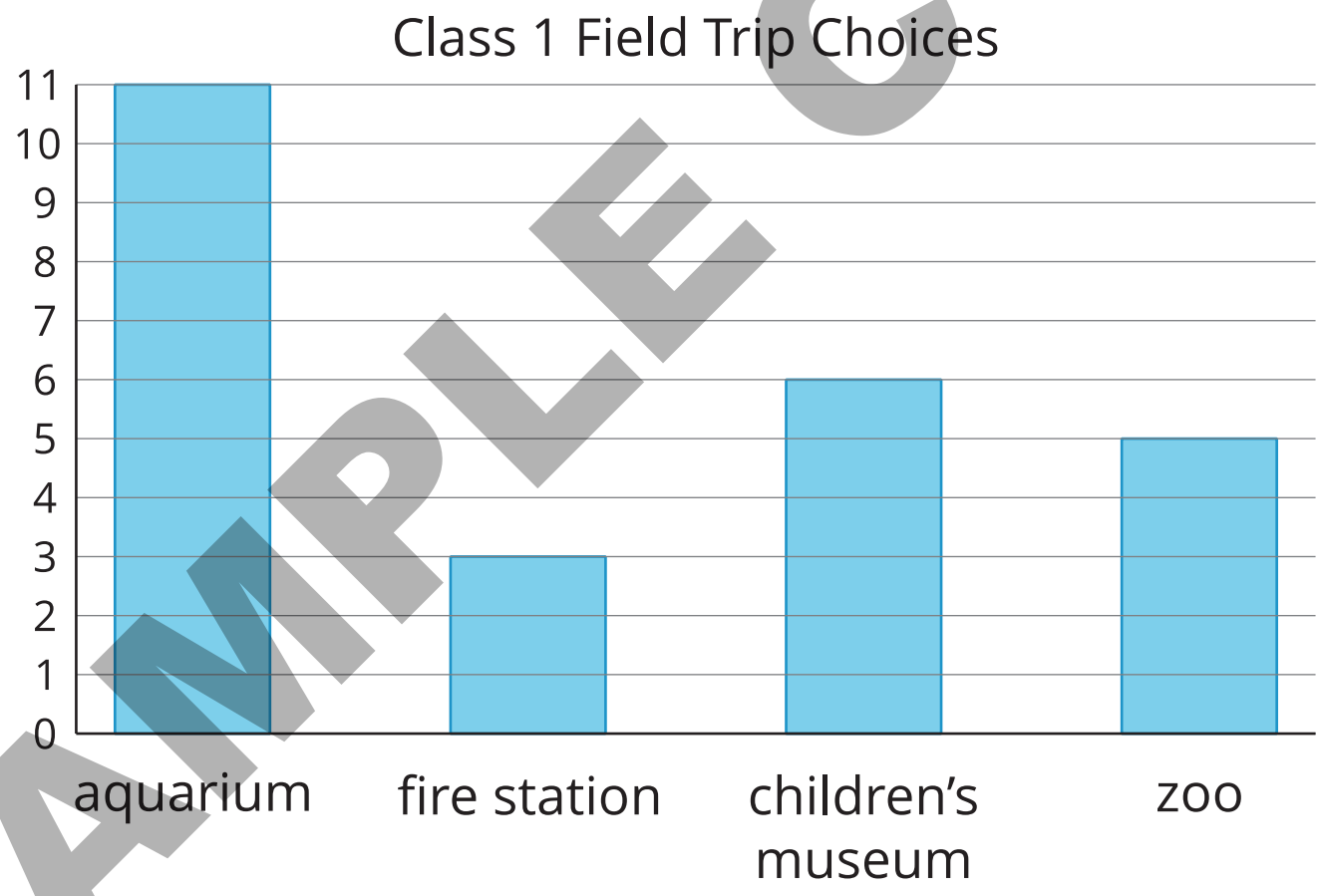
Activity 1

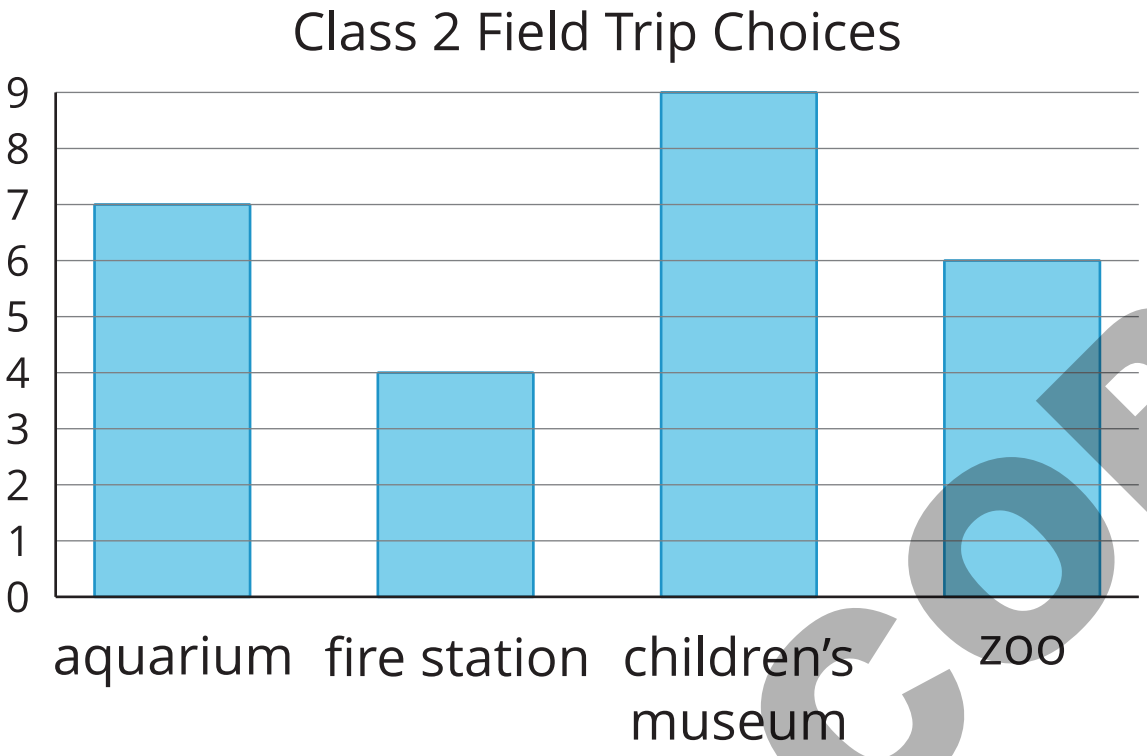
Field Trip Choices

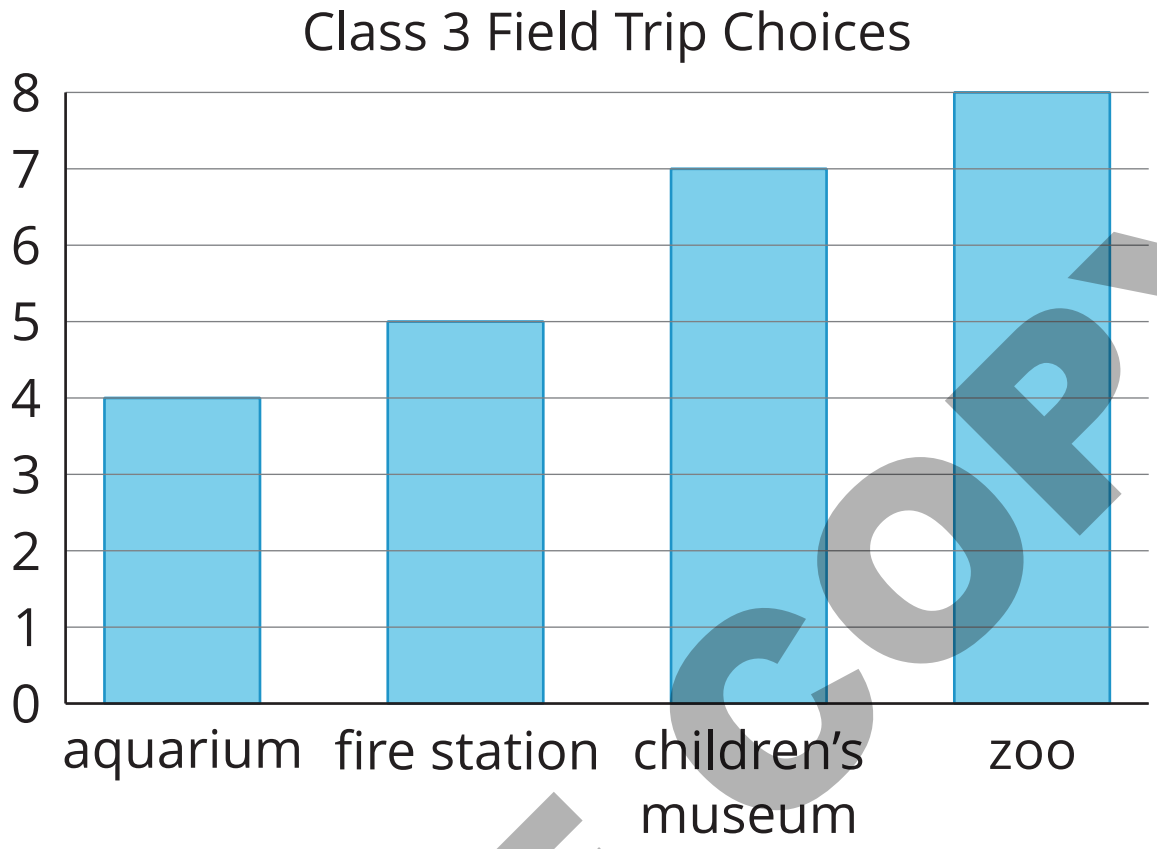


Groups of students in different classes were asked, "Where would you like to go on a field trip?" Their responses are shown in these bar graphs:

Write as many statements as you can about each bar graph.



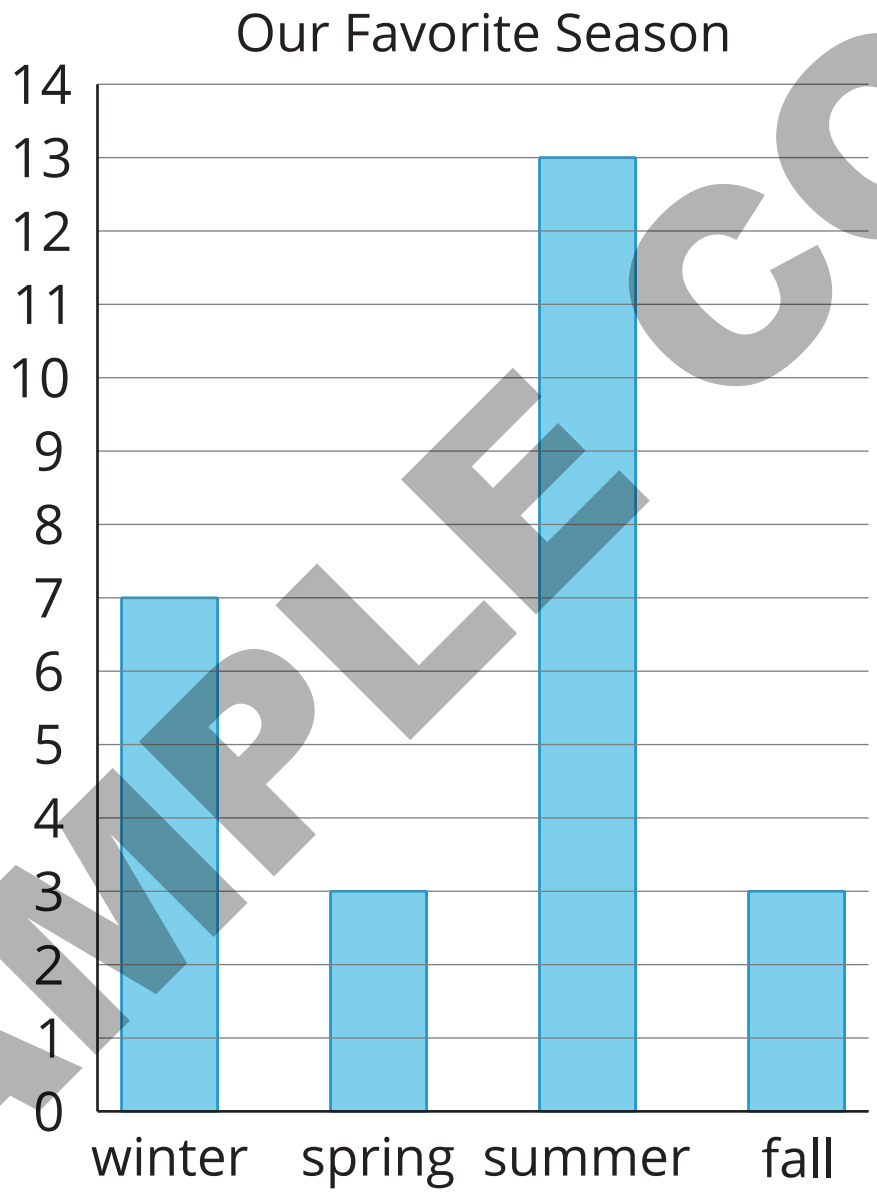



Class 3 Field Trip Choices
8
7
6
5
4
3
2
1
0
aquarium
fire station
children's museum
zoo

Activity 2

Our Favorite Seasons

A group of students were asked, “What is your favorite season?” Their responses are shown in the bar graph.



1. How many students voted for summer?

2. What is the total number of students who voted for fall or spring?

3. Which 2 seasons have a total of 10 votes?

4. How many students voted?

Addressing CA CCSSM 2.MD.10; building towards 2.MD.10; practicing MP3 and MP6

Represent Data Using Picture Graphs and Bar Graphs

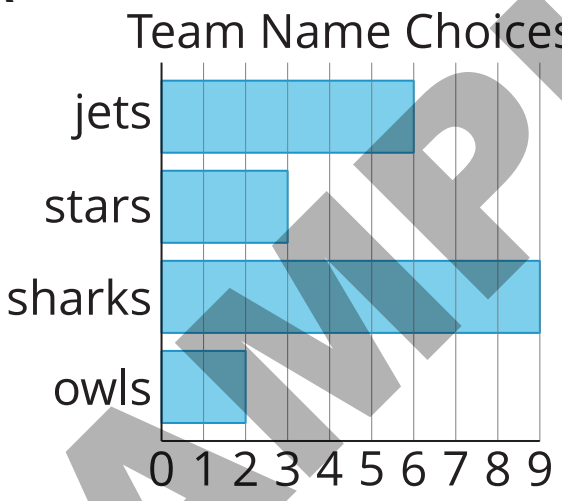
Let's make our own bar and picture graphs.

Warm-up

Which Three Go Together: Data

Which 3 go together?

A



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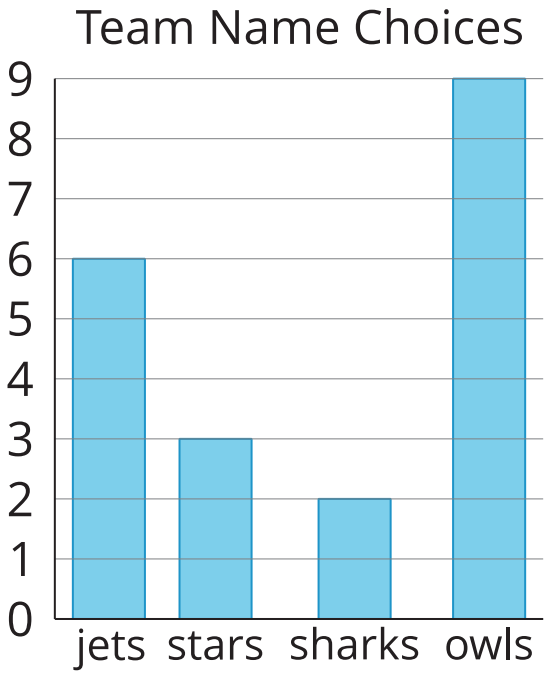

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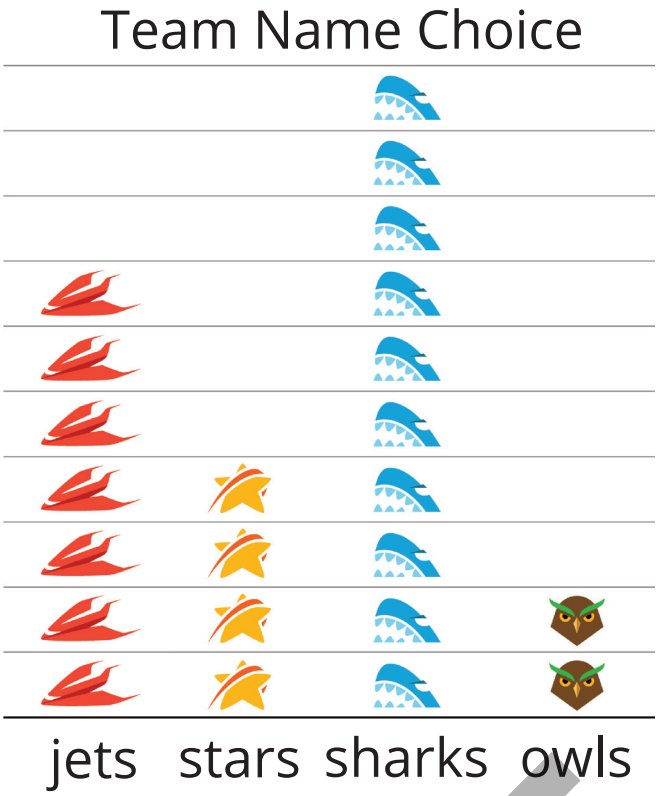
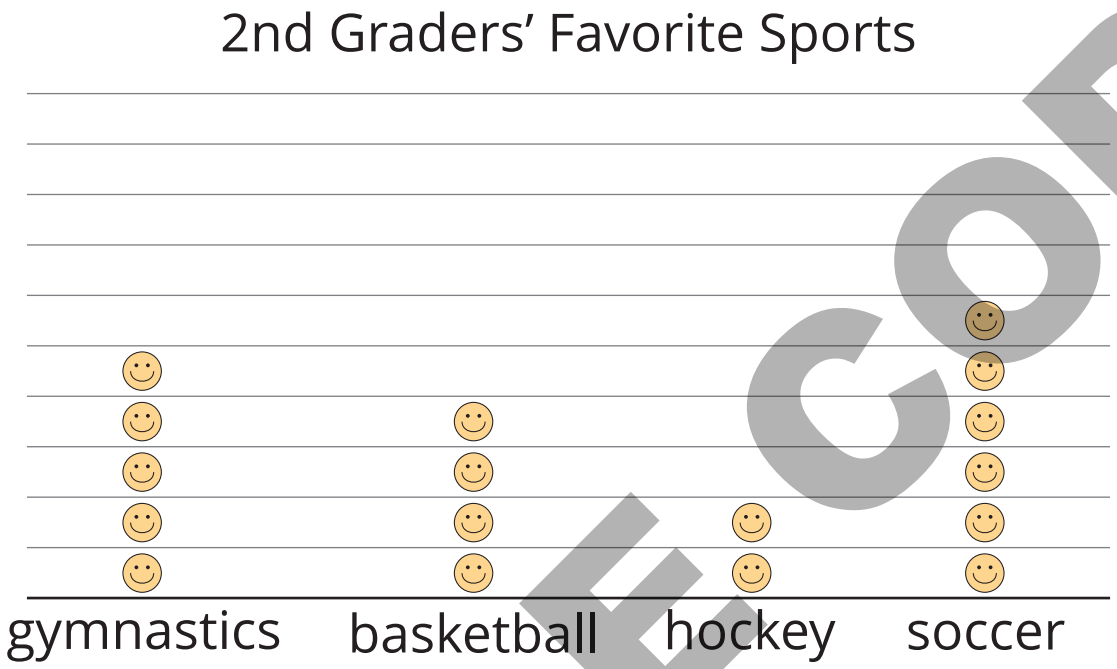


D

jets	stars	sharks	owls
6	3	9	2

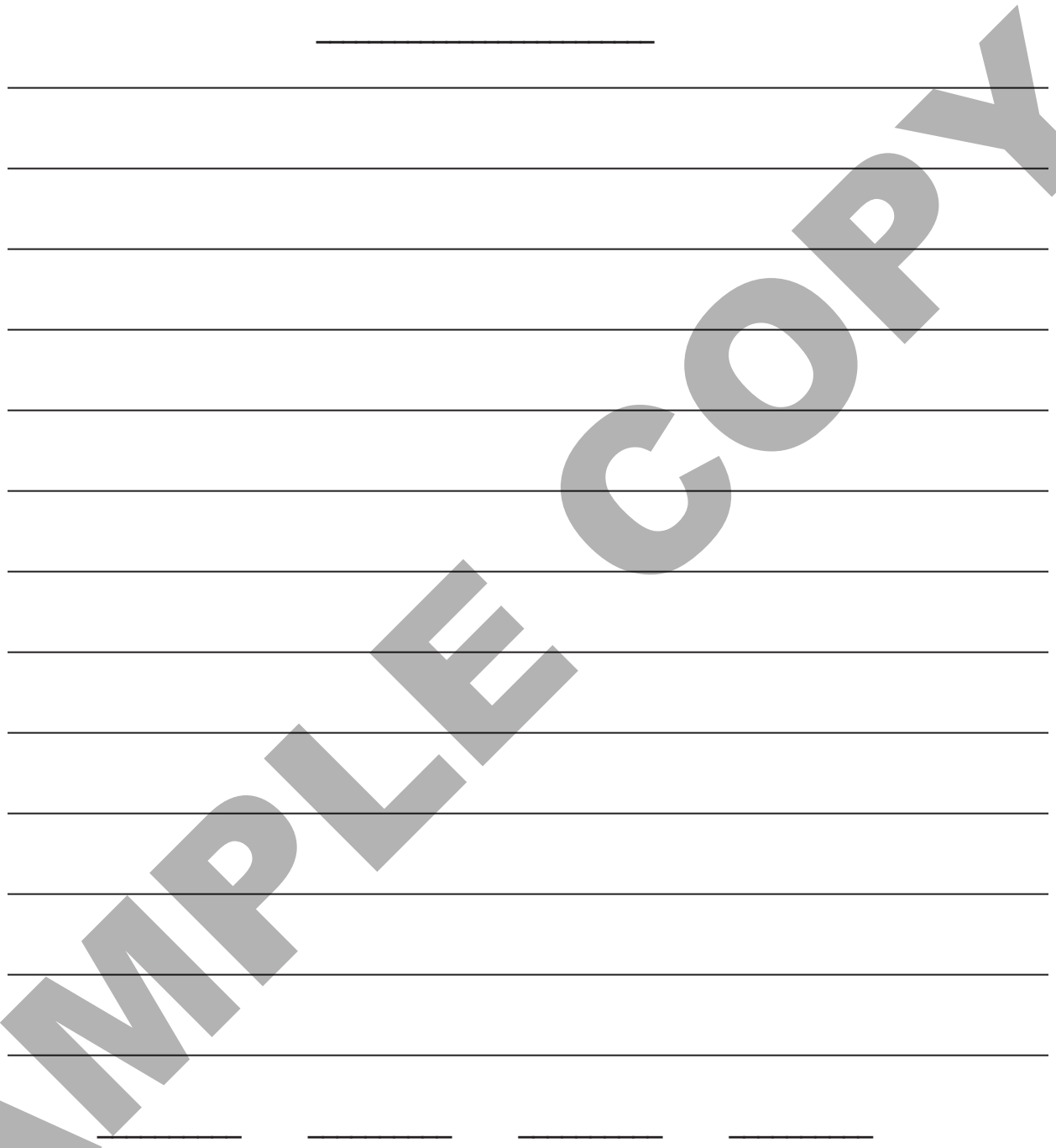
Activity 1

Draw Picture Graphs



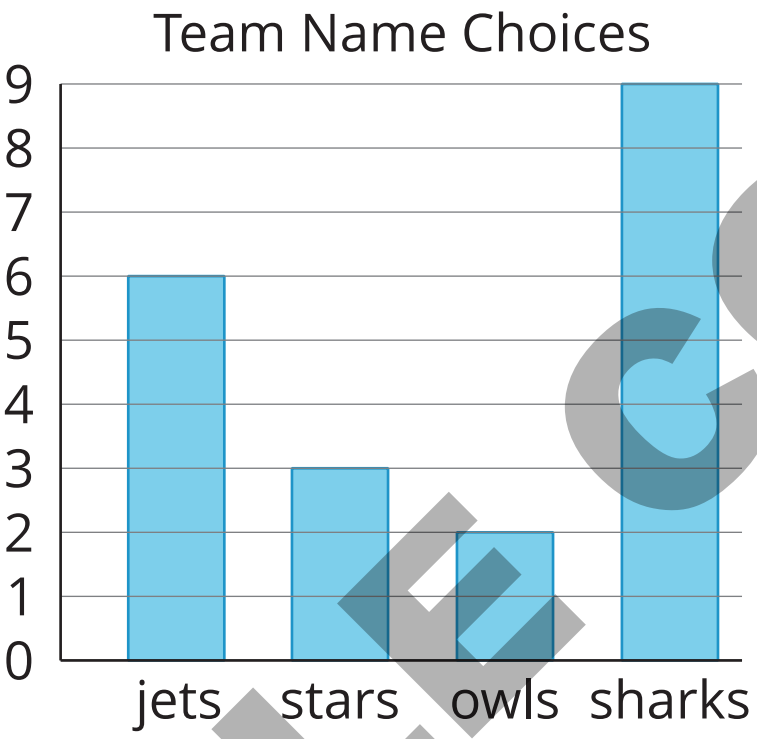
Represent the table data shown in your table in a picture graph.

Table # _____



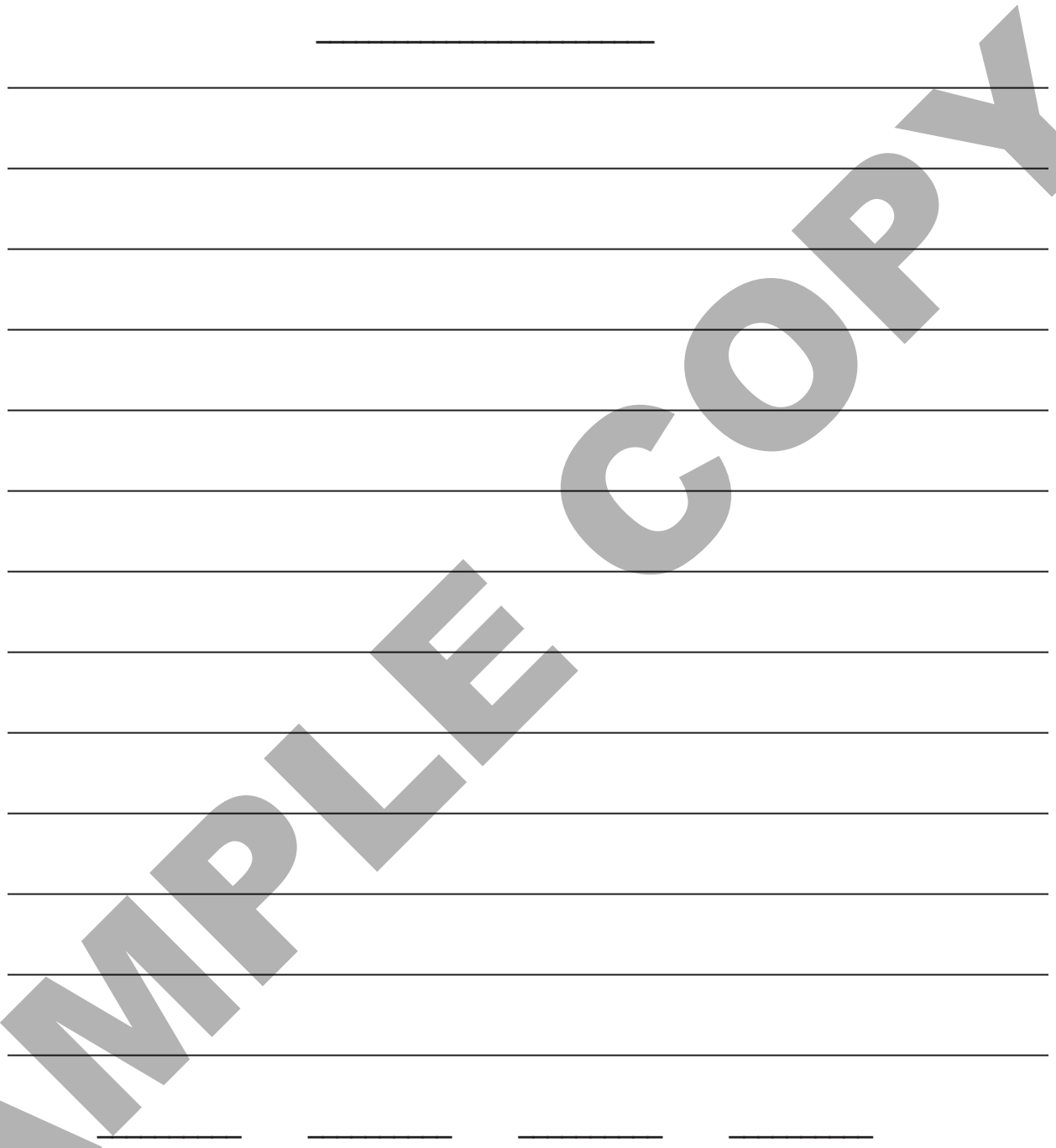
Activity 2

Draw Bar Graphs



Represent your table data in a bar graph.

Table # _____



Addressing CA CCSSM 2.MD.10, 2.OA.2; building on 1.OA.6; practicing MP3 and MP6

Questions about Data

Let's ask and answer questions about bar graphs and picture graphs.

Warm-up

Number Talk: Make a Ten with 3 Addends

Find the value of each sum mentally.

- 3 + 7
- 3 + 7 + 2
- 5 + 7
- 2 + 4 + 8

Activity 1

Write Questions Based on Graphs

1.

2.

3.

4.

Bonus question:

Activity 2

Answer Questions Using Graphs

Answer your partner's questions using the graphs.

1. _____

2. _____

3. _____

4. _____

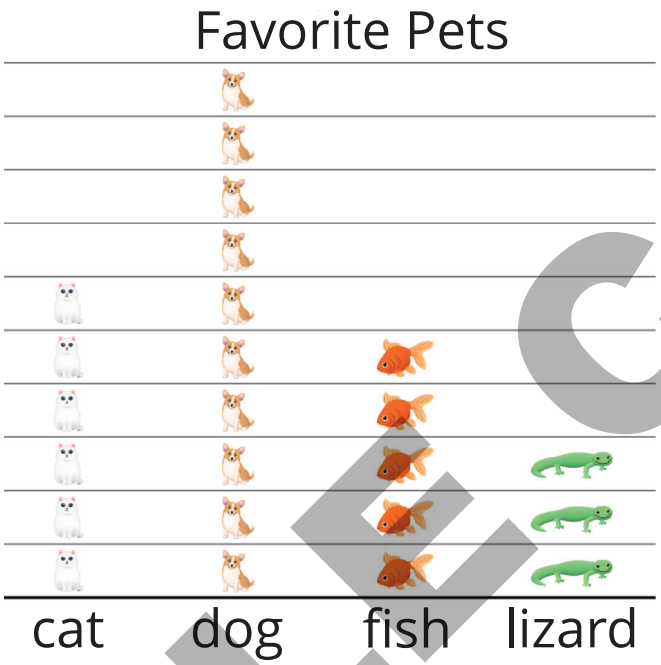
5. How did you find the answers?

_____

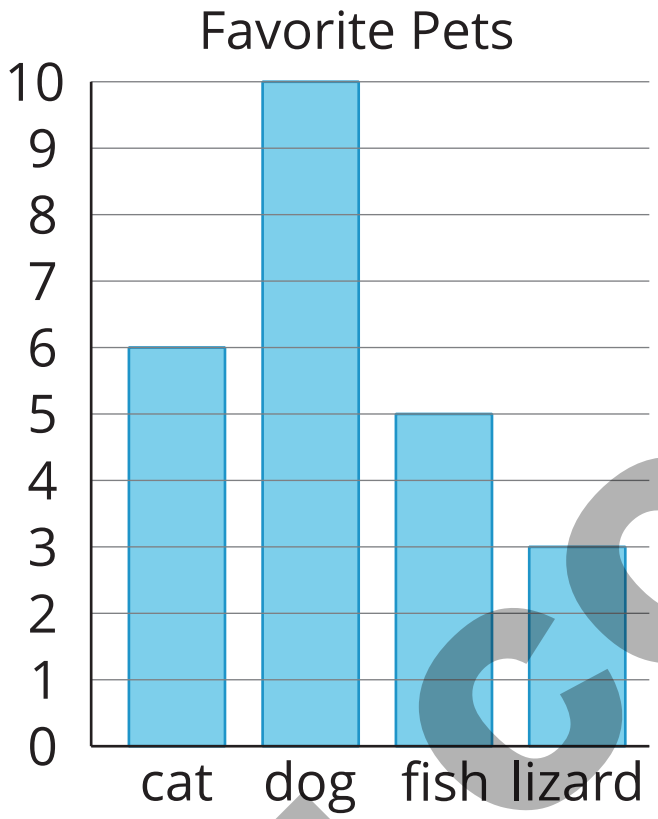
_____

Section B Summary

We represented data with picture graphs and bar graphs. We used graphs to answer questions. **Data** is a collection of facts, such as numbers, measurements, or observations. We used data to answer questions.



A **picture graph** shows data using pictures or symbols to represent how many are in each group or category.



A **bar graph** shows data about a group or category using the height and length of rectangles.

Answer the questions below.

1. How many children picked a dog?
2. How many more children picked cats than lizards?
3. How many children voted?

Addressing CA CCSSM 2.MD.10, 2.OA.2; practicing MP2 and MP5

Center Day 2

Let's sort a collection and make graphs about it.

Warm-up

Number Talk: Differences

Find the value of each expression mentally.

- 17 – 7
- 17 – 9
- 15 – 5
- 15 – 8

Activity 2

Centers Choice Time

Choose a center.

What's Behind My Back?

How Close?

☐ + ☐ = ☐ _____

Number Puzzles

14 = 8 + ☐

Practice Problems

9 Problems

1 from Unit 1, Lesson 7

Diego records the favorite colors of his classmates.

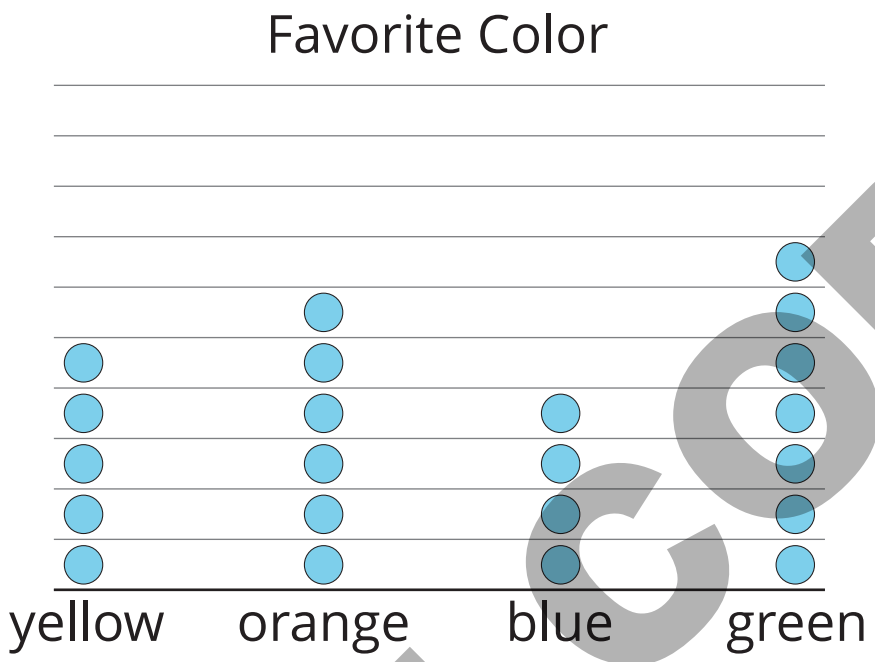
yellow red red blue red blue purple

yellow red

red blue purple red blue blue yellow red red

Create a graph to represent his data.

2 from Unit 1, Lesson 8



Circle **3** true statements about the data in the graph.

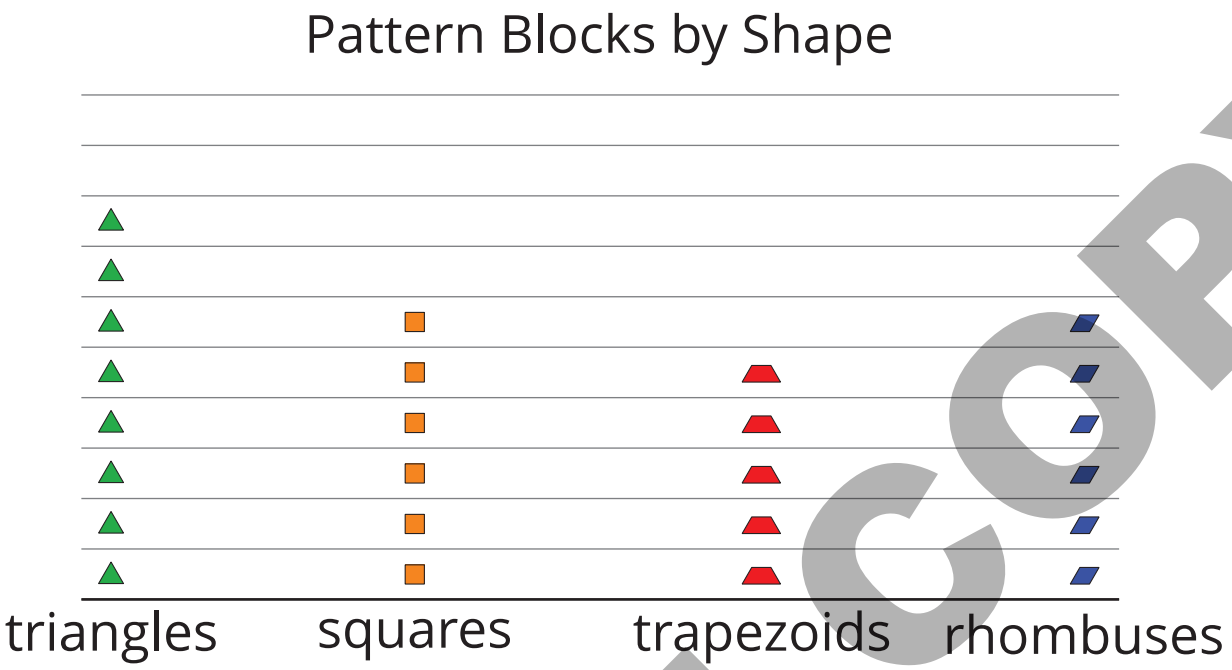
A. More students like green than any of the other colors.

B. 5 students chose blue.

C. 2 more students chose blue than orange.

D. 22 students voted in all.

E. 3 fewer students chose blue than green.



Circle **3** questions the graph answers.

A. Are there more trapezoids than squares?

B. Are all of the triangles together in the pattern?

C. How many hexagons?

D. How many more triangles than rhombuses?

E. How many squares and trapezoids?

4 from Unit 1, Lesson 9

Use the bar graph. Answer questions about the trees in a park.

a. How many trees in all?

b. How many more maple trees than willow trees?

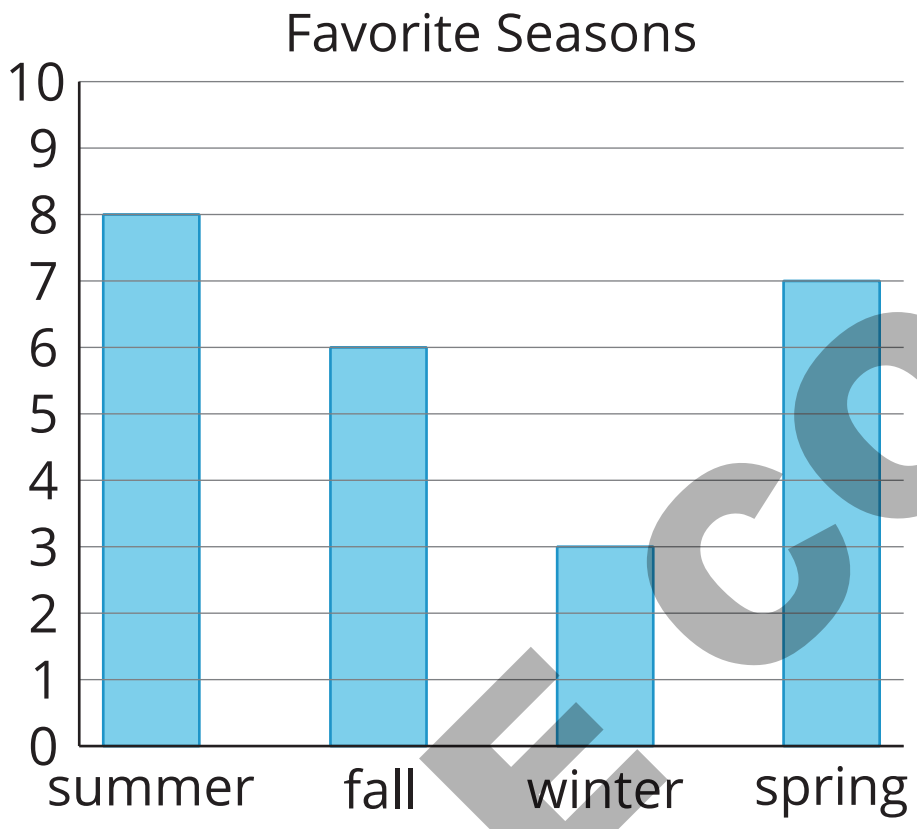
c. Which kind of tree has the fewest number?

5 from Unit 1, Lesson 10

This table shows the fish in a tank.

name	Number
goldfish	3
guppy	9
angel fish	4
molly	5

Make a bar graph about the table.



a. Write 2 questions that you can answer using the graph.

b. Answer the questions.

The data shows the kinds of shapes in a bag. It doesn't show how many of each are in the bag.

triangles	squares	circles

Create a set of data about the shapes that makes all of these statements true.

a. There are more than 15 shapes but fewer than 25.

b. There are 6 more squares than circles.

c. There are 7 fewer circles than triangles.

8 Exploration

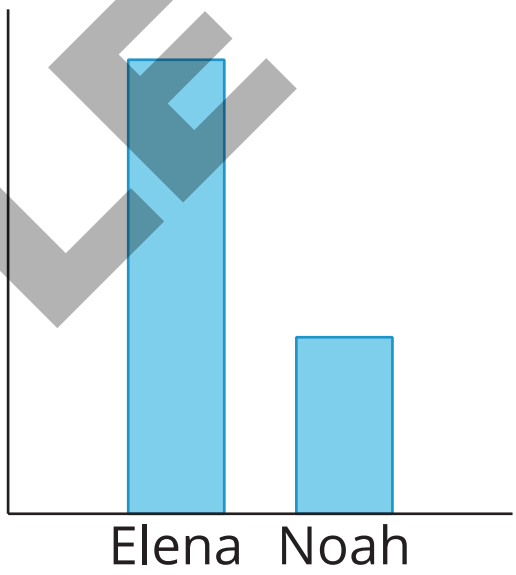
a. Gather data and make a graph.

b. Ask a math question that can be answered with the data.

c. Trade with a partner. Answer your partner's questions.

9 Exploration

Han makes this bar graph to show the number of songs Elena and Noah listened to on Saturday.



a. How can Han improve the bar graph?

b. If Noah listened to 7 songs, how many songs did Elena listen to? Explain your reasoning.

Addressing CA CCSSM 2.MD.10, 2.OA.2;
practicing MP2 and MP5

Use Bar Graphs to Compare

Let's use bar graphs to solve Compare problems.

Warm-up

True or False: Make 10 with 9

Decide if each statement is true or false. Be prepared to explain your reasoning.

- $9 + 4 = 9 + 1 + 3$

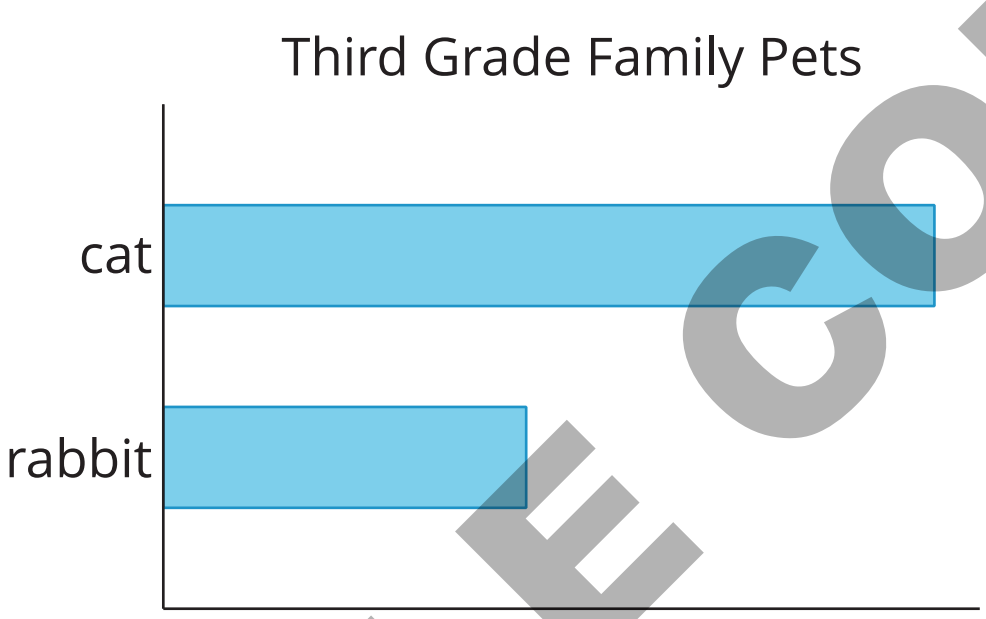
- $9 + 4 = 10 + 3$

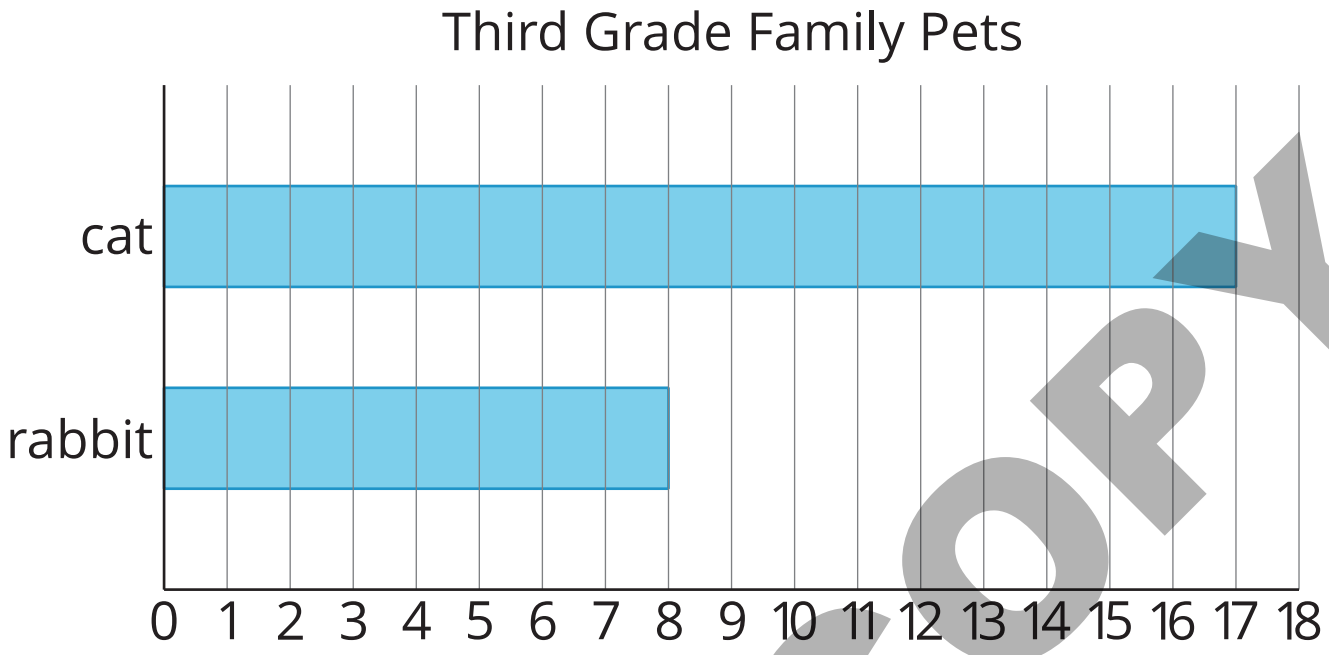
- $9 + 5 = 10 + 6$

Activity 1

What's the Difference?

What do you notice? What do you wonder?



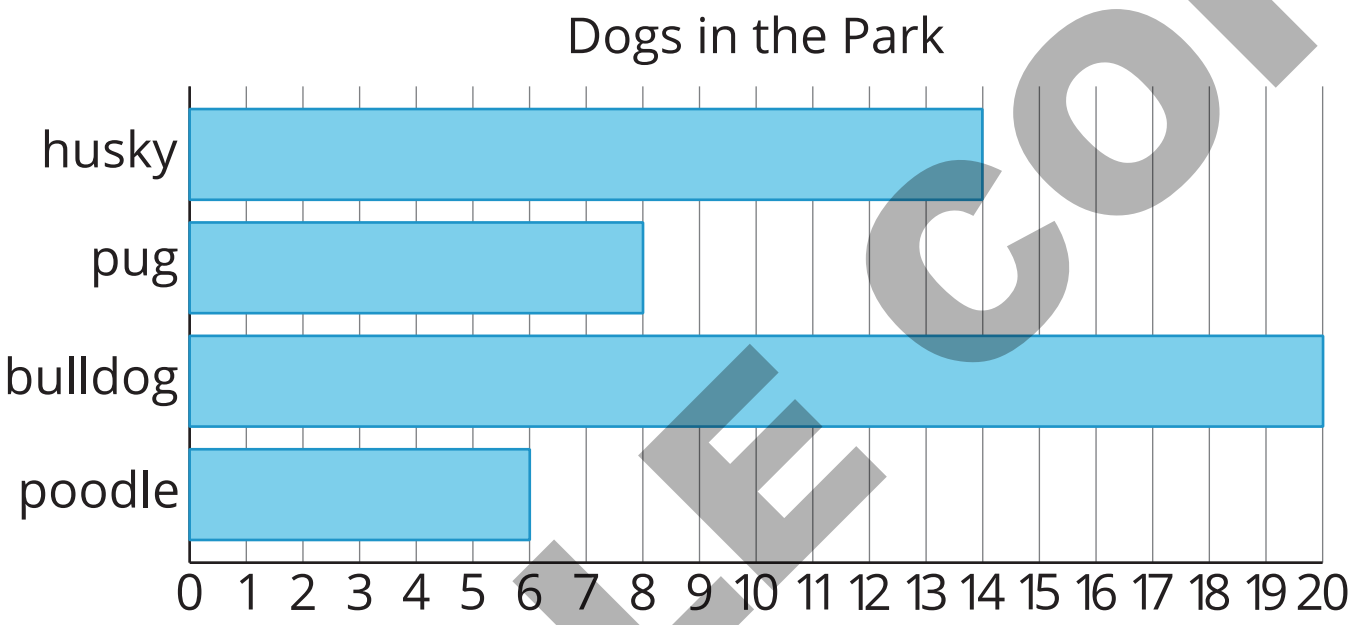


How many more students have cats than rabbits? Show 2 ways to find the difference.

Activity 2

Dogs in the Park

Kiran and Lin counted the types of dogs in a park. Their data is in this bar graph.



1. Make this statement true. There are more _____ than _____.

2. Write an addition and subtraction equation to show how many more.

3. Make this statement true. There are fewer _____ than _____.

4. Write an addition and a subtraction equation to show how many fewer.

Unit 1, Lesson 14

Addressing CA CCSSM 2.MD.10; building on 2.MD.10; building towards 2.OA.1; practicing MP5

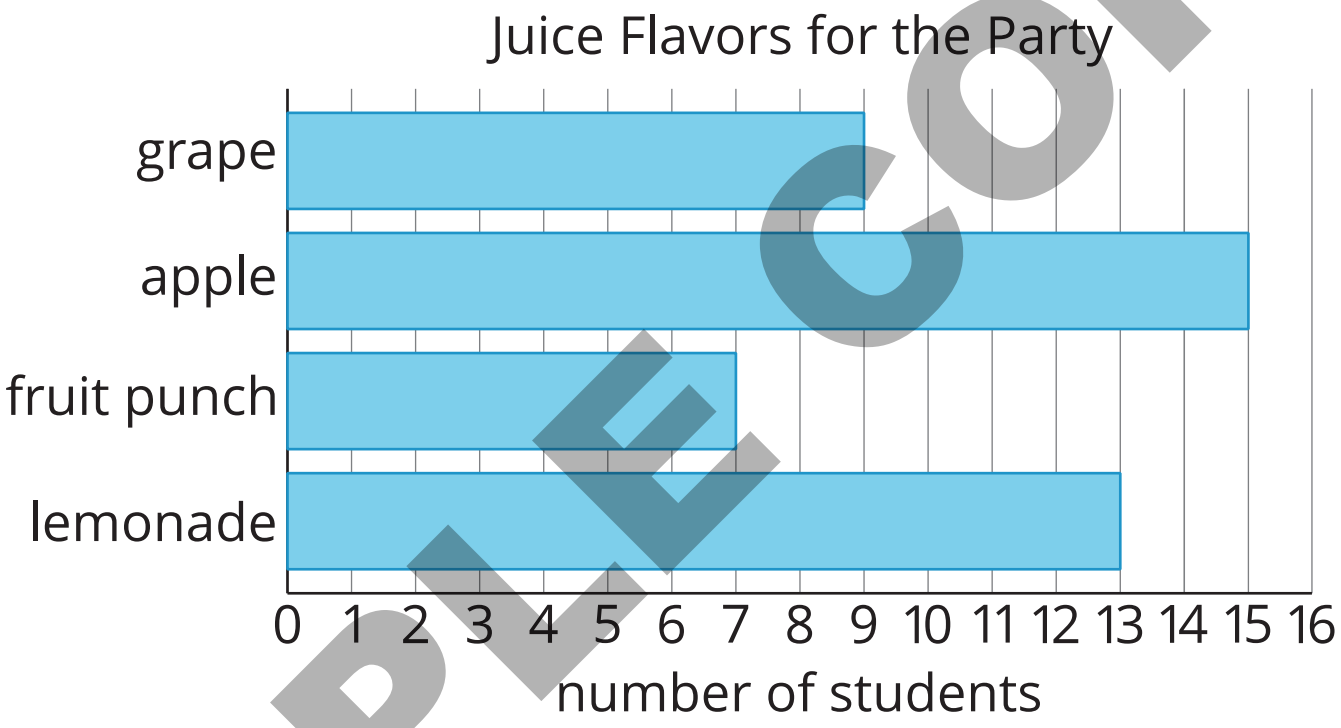
Use Diagrams to Compare

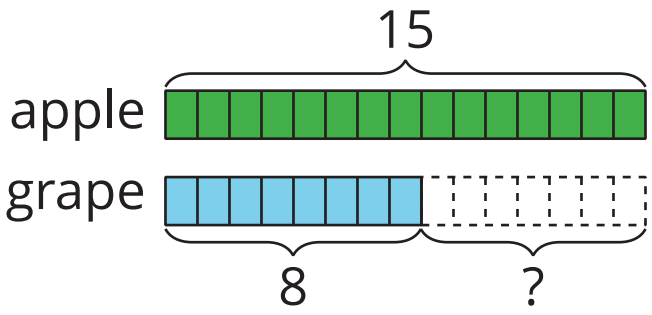
Let's use bar graphs and diagrams to solve Compare problems.

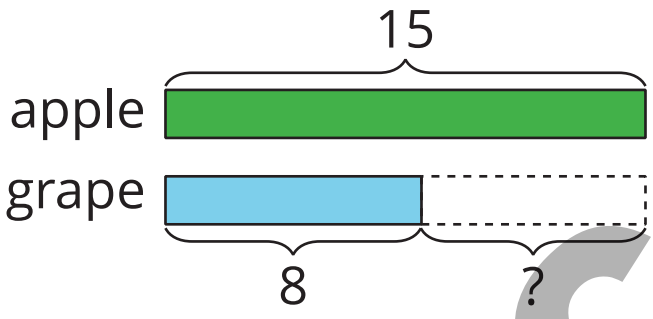
Warm-up

Notice and Wonder: What Kind of Graph Is This?

What do you notice? What do you wonder?







Activity 1

Party Time (Part 1)

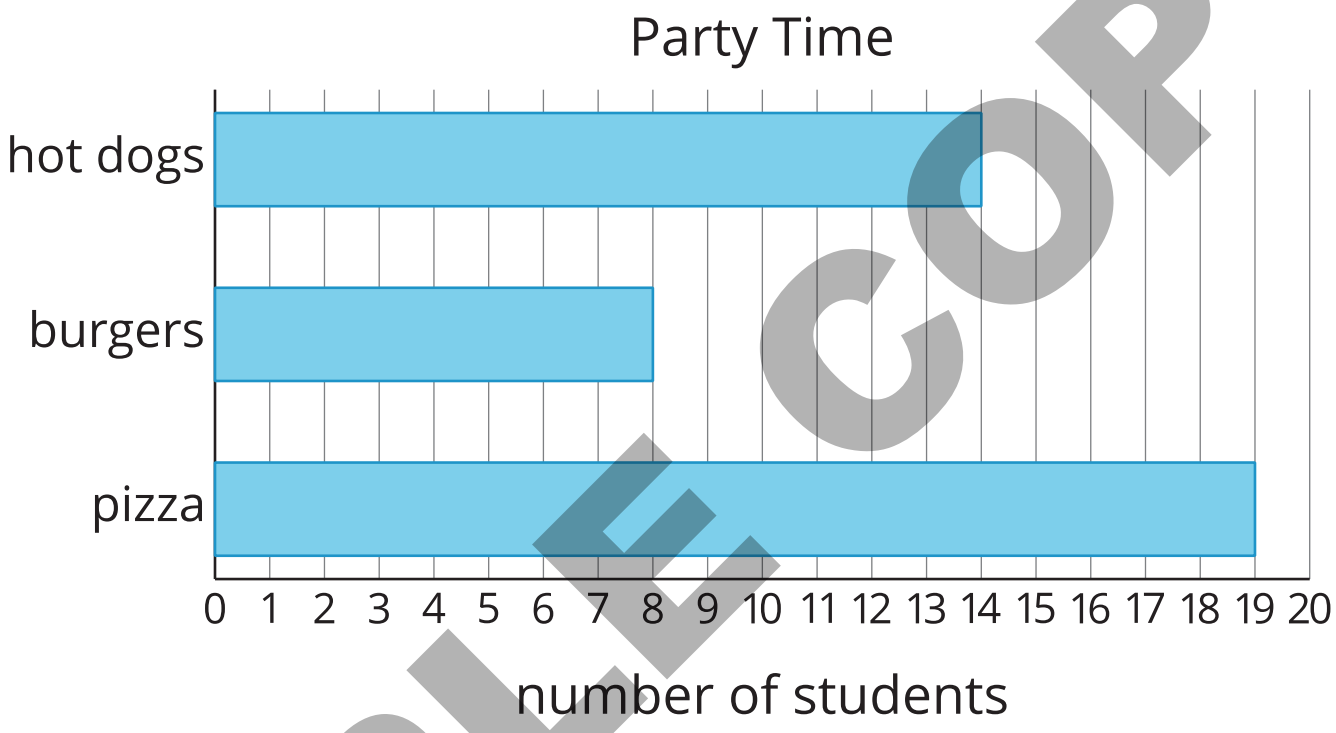
1. Glue down the 2 bars that compare the number of students who chose hot dogs to the number who chose burgers.

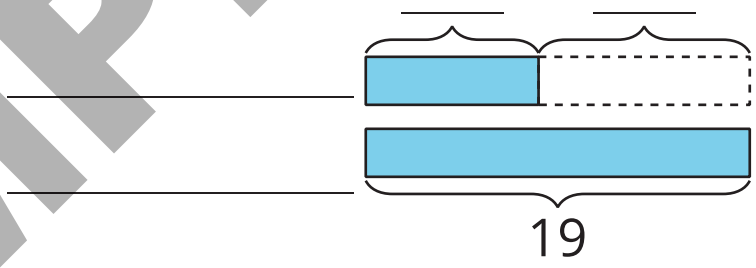
2. Write 2 statements. Compare the number of students who chose hot dogs to the number who chose burgers.

Activity 2

Party Time (Part 2)

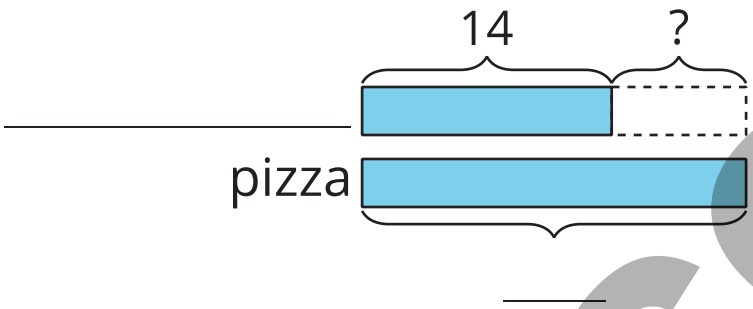
1. Use the data from the bar graph to complete the diagram.





2. How many more students chose pizza than burgers? Write an equation to show how you found the difference.

3. Use the data from the bar graph to complete the diagram.



4. Write a statement. Compare the student votes in the diagram.

Addressing CA CCSSM 2.OA.1, 2.OA.2; practicing MP1, MP2, MP7

Diagrams with All Kinds of Compare Problems

Let's connect problems to tape diagrams.

Warm-up

Number Talk: 10 and Some More

Find the value of each sum mentally.

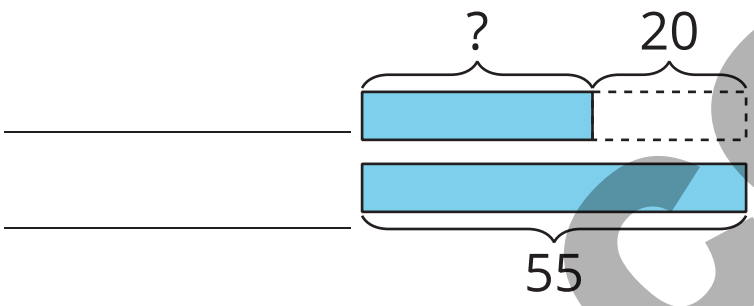
- 4 + 8 + 2
- 4 + 5 + 3 + 2
- 9 + 3 + 1
- 9 + 5

Activity 1

Shell Collections

Diego has 55 shells. Lin has 20 fewer shells than Diego.

1. Use the story problem to complete the diagram.



2. Write an equation to find the unknown number of shells. Use ? to represent the unknown.

Activity 2

Card Sort: At the Beach

1. Read a story problem card.
2. Match each story problem to a diagram and an equation.
3. Be prepared to explain your reasoning.

Addressing CA CCSSM 2.NBT.5, 2.OA.1, 2.OA.2; practicing MP1

Solve All Kinds of Compare Problems

Let's solve Compare problems.

Warm-up

True or False: Multiples of 10

Decide if each statement is true or false. Be prepared to explain your reasoning.

- $18 + 5 = 18 + 2 + 3$
- $28 + 5 = 30 + 3$
- $38 + 4 = 40 + 3$

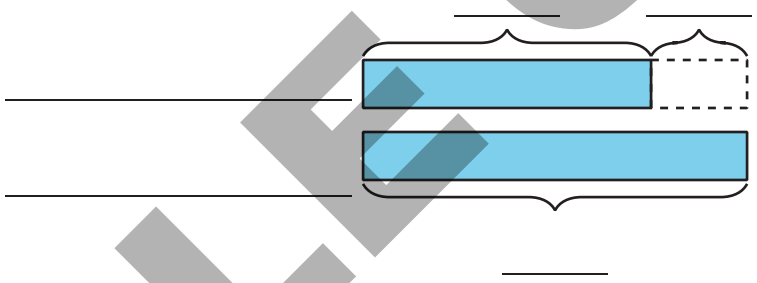
Activity 1

A Trip to the Library

1. Priya returns 29 books to the library. Andre returns 8 more than Priya.

   a. Who returns more books?

   b. Use the story problem to fill out the tape diagram.

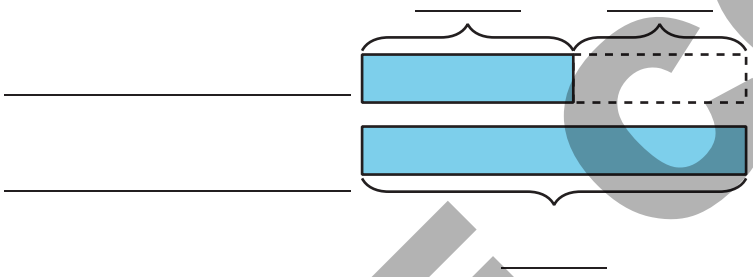


   c. How many books does Andre return?

2. Andre reads 45 pages of his book. Priya reads 20 fewer.

   a. Who reads more pages?

   b. Use the story problem to fill out the tape diagram.



   c. How many pages does Priya read?

Activity 2

Solve Compare Problems

1. Jada reads 10 fewer pages than Noah. Noah reads 27 pages. How many pages does Jada read?

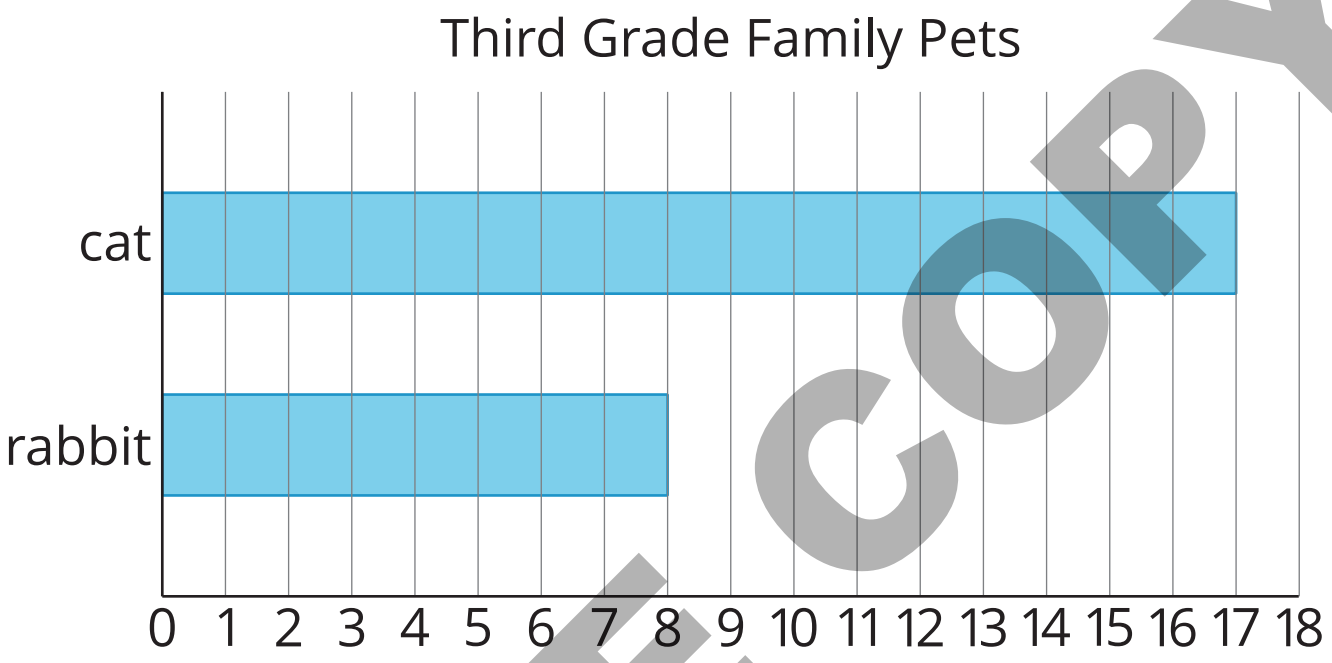
2. Noah reads for 25 minutes. Jada reads for 30 more minutes than Noah. How long does Jada read?

3. Jada reads 47 pages. Noah reads 20 pages. How many fewer pages does Noah read?

4. Noah stacks 14 more books than Jada. Jada stacks 28. How many books does Noah stack?

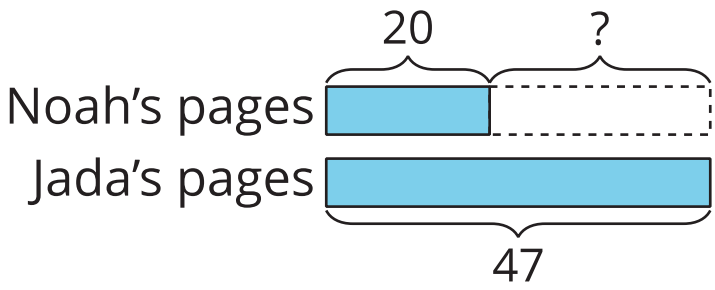
Section C Summary

We represented and solved Compare problems. We used bar graphs to find the difference between 2 categories.



How many more students have cats than rabbits? Show 2 ways to find the difference.

We used diagrams to make sense of story problems. We used the diagrams to show which part of a comparison we need to find.



Jada reads 47 pages. Noah reads 20 pages. How many fewer pages does Noah read?

In this problem, we find the difference. We know how many pages Noah and Jada read. The ? represents the difference.

Addressing CA CCSSM 2.NBT.2, 2.NBT.5; practicing MP2 and MP6

Center Day 3

Let's count objects, play addition games, and create graphs.

Warm-up

Number Talk: Add 10 More

Find the value of each sum mentally.

- 27 + 10
- 27 + 10 + 10
- 27 + 30
- 37 + 30

Activity 2

Centers Choice Time

Choose a center.

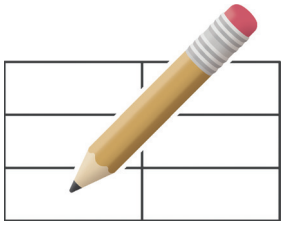
What's Behind My Back?

How Close?

Number Puzzles

$14 = 8 + \square$

Sort and Display



Addressing CA CCSSM 2.MD.10, 2.OA.1; building on 2.MD.10; practicing MP4

Class Surveys

Let's create our own surveys to get to know our classmates.

Warm-up

What Do You Know about Bar Graphs?

What do you know about bar graphs?

Activity 1

Classroom Survey and Graph

1. What is your survey question?

   _____

   _____

2. What are your categories?

   - Category 1: _____
   - Category 2: _____
   - Category 3: _____
   - Category 4: _____

3. Record the data.

4. Organize and represent the data in a bar or picture graph.

Activity 2

Analyze the Data with Diagrams

1. Draw a diagram. Your diagram should compare 2 facts you learned from your survey.

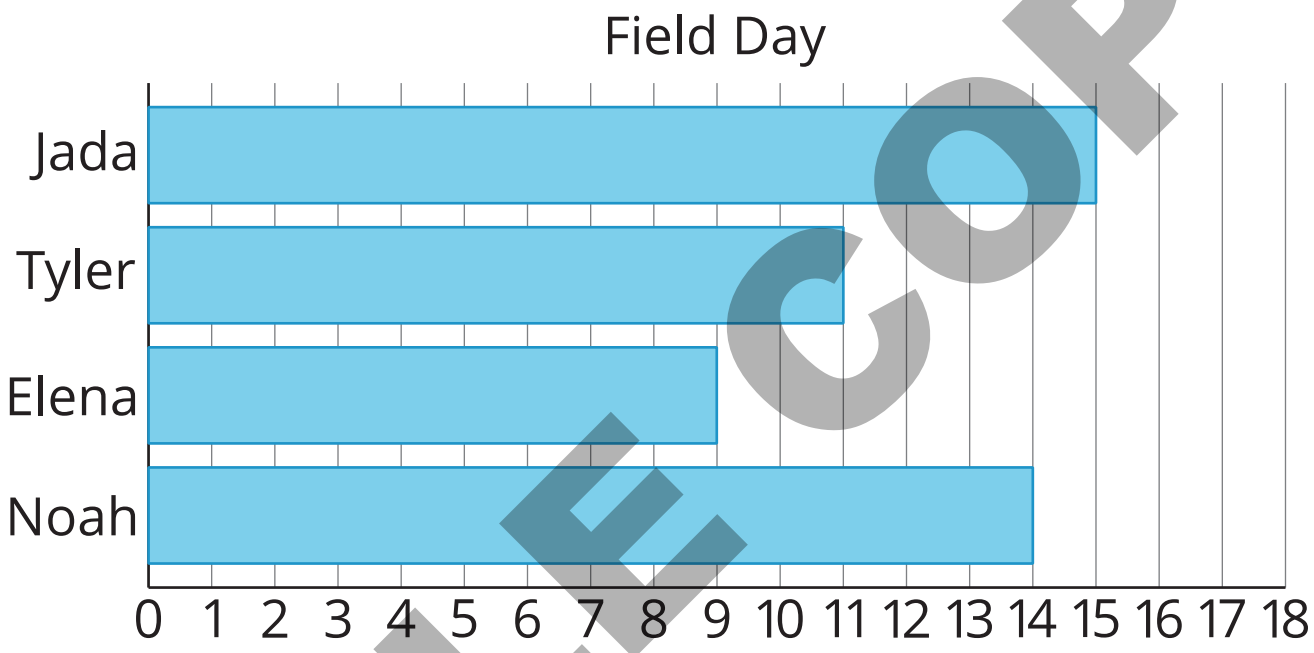
2. Write an equation that represents the comparison.

Practice Problems

7 Problems

1 from Unit 1, Lesson 13

The graph shows the number of games these students played on field day.

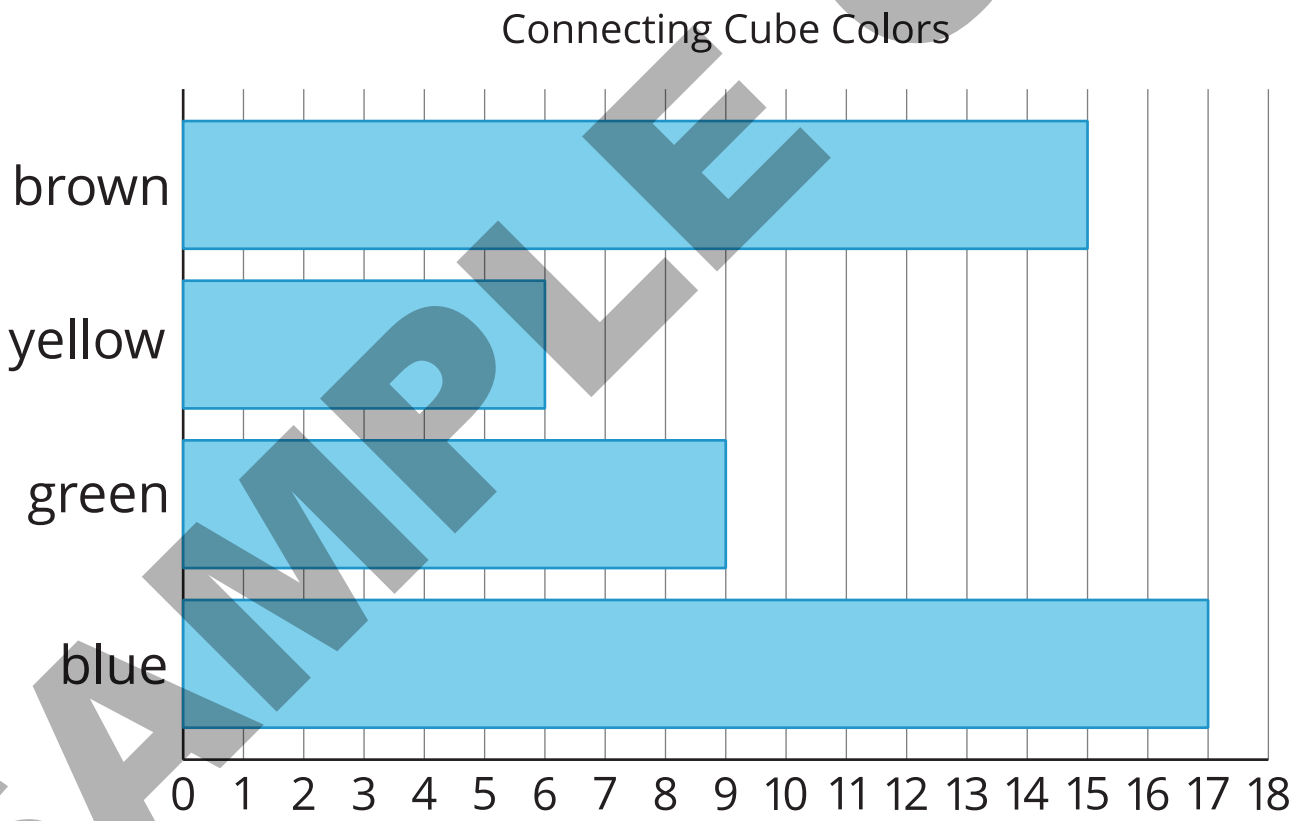


a. How many fewer games did Elena play than Jada?

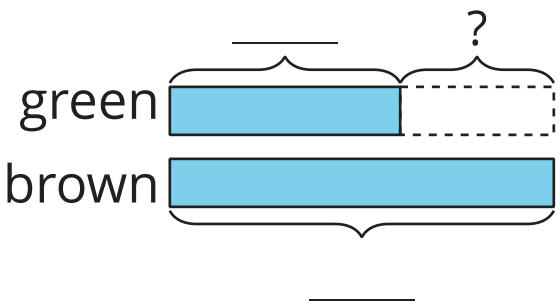
b. Write an equation to show how you found the difference.

2 from Unit 1, Lesson 14

The bar graph shows the number of connecting cubes of different colors in a bag.



a. Use the bar graph to complete the diagram. Be prepared to explain your reasoning.



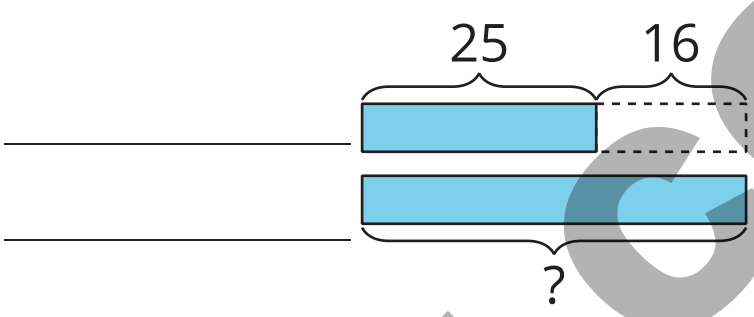
b. How many fewer green connecting cubes than brown connecting cubes are in the bag? Explain your reasoning.

3 from Unit 1, Lesson 15

There are 25 crickets chirping in the front yard.

There are 16 fewer crickets chirping in the front yard than the back yard.

a. Label the diagram to match the story. Explain your reasoning.



b. Write an equation about the story problem.

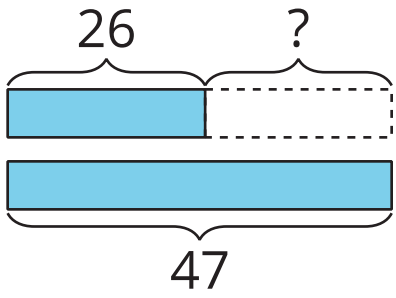
4 from Unit 1, Lesson 16

There are 35 cherries in a bowl. There are 17 more cherries in the bowl than on a plate. How many cherries are on the plate? Show your thinking using drawings, numbers, or words.

5 from Unit 1, Lesson 16

There are 26 students in the cafeteria. There are 18 more students on the playground than in the cafeteria. How many students are on the playground? Show your thinking using drawings, numbers, or words.

Write a story to match the diagram. Explain your reasoning.



7 Exploration

Write a Compare story problem.

Solve your problem. Make an equation and a diagram.

GRADE 2

UNIT

2

Adding and Subtracting within 100

Content Connections

In this unit you will solve addition and subtraction problems using strategies based on place value, properties of operations and the relationship between addition and subtraction. You will make connections by:

- **Exploring Changing Quantities** while solving addition and subtraction problems using different strategies based on place value, properties of operations and composing and decomposing tens.

- **Discovering Shape and Space** while solving problems involving length measurement using addition and subtraction.
- **Taking Wholes Apart, Putting Parts Together** while comparing and contrasting different strategies to solve addition and subtraction problems.
- **Reasoning with Data** while comparing different methods to solve addition and subtraction problems.

Addressing the Standards

As you work your way through **Unit 2 Adding and Subtracting within 100,** you will use some mathematical practices that you may have started using in kindergarten and have continued strengthening over your school career. These practices describe types of thinking or behaviors that you might use to solve specific math problems.

Mathematical Practices	Where You Use these MPs
MP1 Make sense of problems and persevere in solving them.	Lesson 5, 10, 11, 12, and 16
MP2 Reason abstractly and quantitatively.	Lesson 1, 4, 9, 12, 13, and 14
MP3 Construct viable arguments and critique the reasoning of others.	Lesson 6, 7, 8, 9, and 14
MP4 Model with mathematics.	Lesson 2, 12, 13, and 17

Mathematical Practices	Where You Use these MPs
MP5 Use appropriate tools strategically.	Lesson 2 and 3
MP6 Attend to precision.	Lesson 9, 15, and 16
MP7 Look for and make use of structure.	Lesson 8, 9, 12, and 13
MP8 Look for and express regularity in repeated reasoning.	Lesson 1 and 6

The California Common Core State Standards for Mathematics (CA CCSSM) describe the topics you will learn in this unit. Many of these topics build upon knowledge you already have and challenge you to expand upon that knowledge. The table below shows what standards are being addressed in this unit.

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Problem Solving with Measure • Number Strategies	**2.OA.1** Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	Lesson 1, 3, 11, 12, 13, 14, 15, 16, and 17
• Number Strategies	**2.OA.2** Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.	Lesson 4 and 5
• Represent Data • Dollars and Cents	**2.NBT.2** Count within 1000; skip-count by 2s, 5s, 10s, and 100s.	Lesson 2

Big Ideas You Are Studying	California Content Standards	Lessons Where You Learn This
• Dollars and Cents • Number Strategies	**2.NBT.5** Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	Lesson 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, and 17
• Dollars and Cents • Number Strategies	**2.NBT.6** Add up to four two-digit numbers using strategies based on place value and properties of operations.	Lesson 7 and 17
• Dollars and Cents • Skip Counting to 100	**2.NBT.9** Explain why addition and subtraction strategies work, using place value and the properties of operations.	Lesson 2, 7, 8, and 10
• Represent Data	**2.MD.10** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems4 using information presented in a bar graph.	Lesson 1

Unit 2, Lesson 1

Addressing CA CCSSM 2.MD.10, 2.NBT.5, 2.OA.1; building towards 2.OA.1; practicing MP2 and MP8

Add and Subtract to Compare

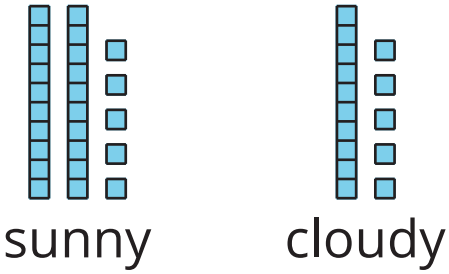
Let's solve Compare problems with greater numbers.

Warm-up

Which Three Go Together: Compare Representations

Which 3 go together?

A



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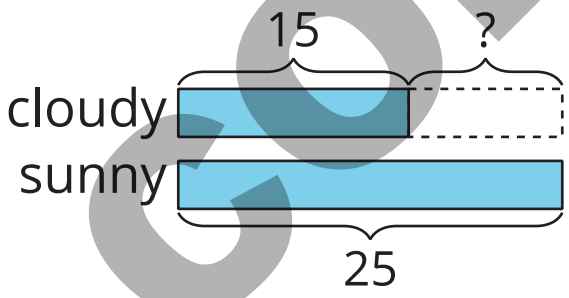

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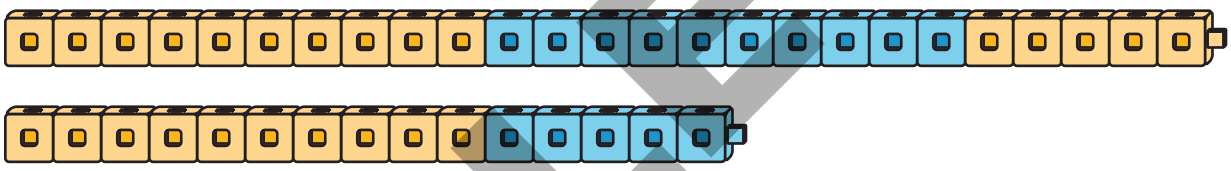

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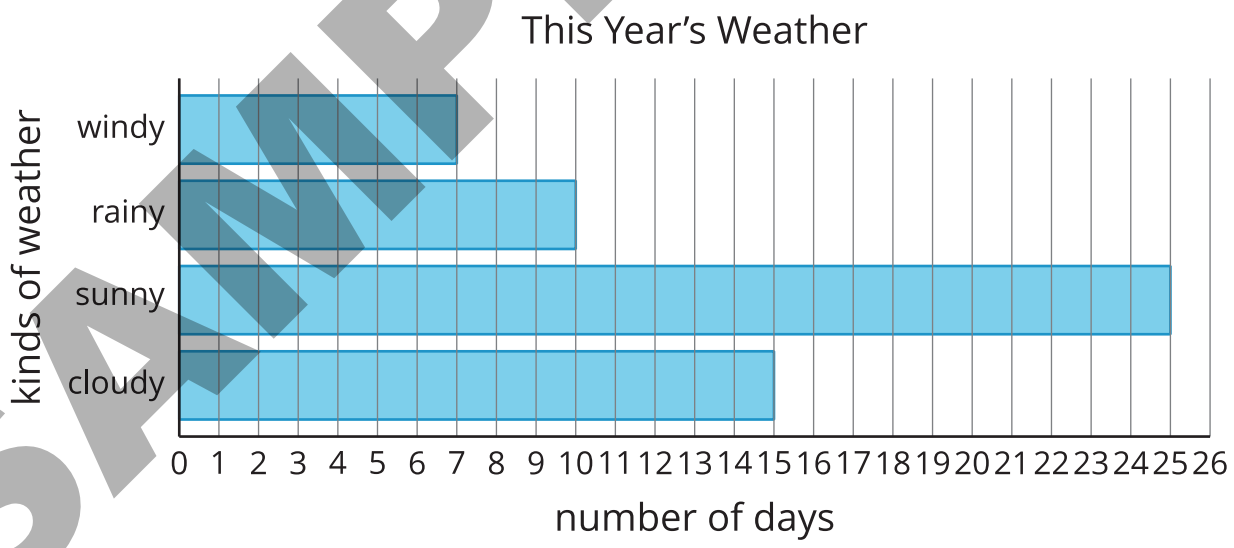
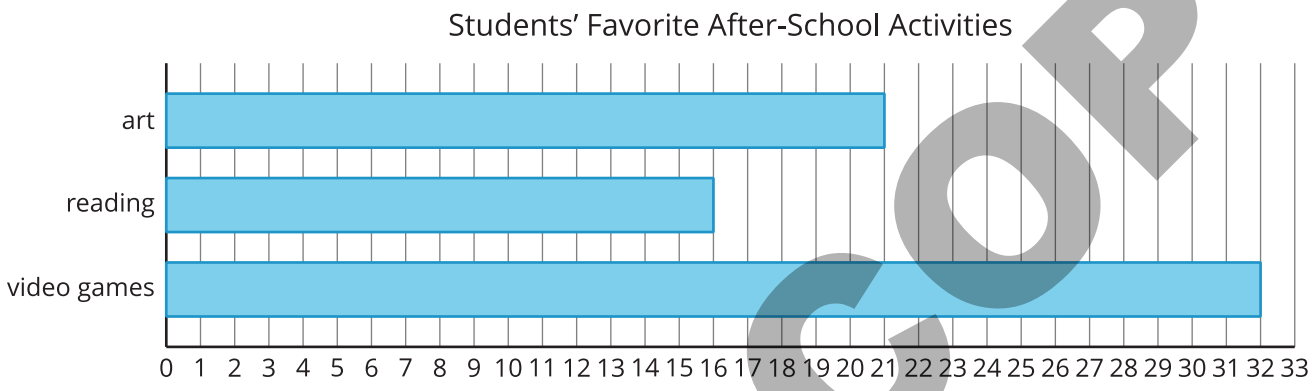


Activity 1

After-School Activities

Use the bar graph to answer the questions.



1. How many students chose art or reading? Show your thinking using drawings, numbers, or words.

2. How many more students chose video games than art?

Activity 2

Build and Compare

1. Lin and Clare make cube trains. What do you notice? What do you wonder?

Lin 

Clare 

2. Make cube trains.

partner	number of cubes
Partner A	46
Partner B	22

3. Find the total number of cubes you both used. Show your thinking using drawings, numbers, or words.

4. Find the difference between the number of cubes you each used. Show your thinking using drawings, numbers, or words.

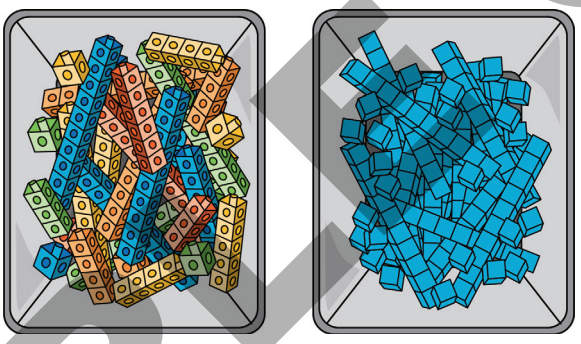
Addressing CA CCSSM 2.NBT.2, 2.NBT.5, 2.NBT.9; building towards 2.NBT.5; practicing MP4 and MP5

Find the Unknown Addend

Let's find values that make the equations true.

Activity 1

How Did You Find It?



1. How are the tools alike? How are they different?

2. Find the number that makes the equation true. Show your thinking using drawings, numbers, or words.

   41 + _____ = 84

Activity 2

You Go This Way, I'll Go That Way

Han and Mai use blocks to find the number that makes the equation true.

17 + _____ = 48

1. Han uses blocks to show 17. Show how to find the number that makes the equation true.

2. Mai uses blocks to show 48. Show how to find the number that makes the equation true.

3. Work with a partner. One partner starts with 21. The other partner starts with 96.

   21 + _____ = 96

4. Show your partner how you found the number that makes the equation true.

Addressing CA CCSSM 2.NBT.5, 2.OA.1; building towards 2.NBT.5; practicing MP5

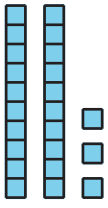
Add or Subtract to Solve Story Problems

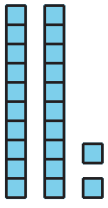
Let's solve story problems.

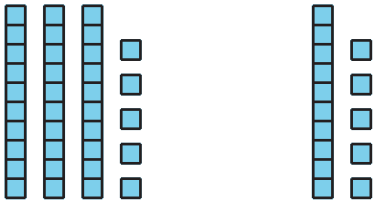
Warm-up

How Many Do You See: Base-Ten Diagram

How many do you see? How do you see them?







Activity 1

Fun at the Zoo

Some students sit on a bus. 34 more students get on the bus. Now there are 55 students. How many students were on the bus at first?

Activity 2

More Fun at the Zoo

Solve each story problem. Show your thinking.

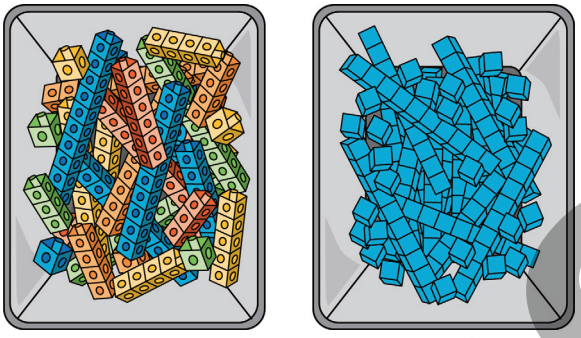
1. There are 65 students in the monkey house. 23 left to see the hippos. How many are still in the monkey house?

2. 58 students want to see the bears. 27 students want to see the lions. How many more students want to see the bears than the lions?

3. Some birds are in cages outside of the bird house. 34 birds are inside the bird house. There are 88 birds. How many birds are outside?

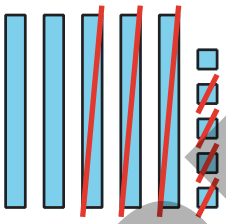
Section A Summary

We used addition and subtraction to find unknown values. We used different tools to show how to add and subtract 2-digit numbers.



We subtracted two 2-digit numbers by subtracting tens from tens and ones from ones.

55 – 34 =?



$50 - 30 = 20$

$5 - 4 = 1$

$20 + 1 = 21$

$55 - 34 = 21$

Addressing CA CCSSM 2.NBT.5, 2.OA.2; practicing MP2

Center Day 1

Let's play games to practice adding and subtracting.

Warm-up

Number Talk: Subtract 2 Digits

Find the value of each expression mentally.

- 6 – 3
- 66 – 3
- 66 – 30
- 66 – 33

Practice Problems

9 Problems

1 Pre-unit

There are 17 squirrels in a pine tree. There are 12 squirrels in an oak tree.

a. How many fewer squirrels are in the oak tree than the pine? Show your thinking using drawings, numbers, or words.

b. Write an equation for this situation.

2 Pre-unit

Find the number that makes each equation true.

a. $7 + 9 = \_\_\_\_\_$

b. $15 - 8 = \_\_\_\_\_$

c. $6 + \_\_\_\_\_ = 11$

d. $\_\_\_\_\_ - 4 = 13$

3 Pre-unit

There are some frogs in a pond. 5 more jump in. Now there are 11. How many frogs were in the pond at first? Show your thinking using drawings, numbers, or words.

4 from Unit 2, Lesson 1

train 1 

train 2 

a. How many connecting cubes are there altogether? Show your thinking using drawings, numbers, or words.

b. How many more in Train 1 than Train 2? Show your thinking using drawings, numbers, or words.

5 from Unit 2, Lesson 2

Find the number that makes each equation true. Show your thinking using drawings, numbers, or words.

a. $26 + 51 = \_\_\_\_\_$

b. $35 + \_\_\_\_\_ = 67$

6 from Unit 2, Lesson 3

There are 34 children in Mai's classroom. There are 21 children in Noah's. How many more children are in Mai's classroom than in Noah's? Show your thinking using drawings, numbers, or words.

Jada adds 3 different numbers between 1 and 9. She gets 20.

a. What could Jada's numbers be? Give 3 different examples.

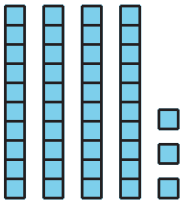
b. If Jada uses 6, what are the other 2 numbers? Explain your reasoning.

8 Exploration

a. Write 10 pairs of numbers that add together to make 100.

b. What patterns do you notice in your pairs of numbers?

Tyler represents addition using base-ten blocks. Here is how Tyler represented a sum.



a. How can Tyler's base-ten blocks help solve the equation $25 + \_\_\_\_\_ = 43$?

b. What other addition equations could Tyler's cubes show?

c. What could he do to make his answer clear?

Addressing CA CCSSM 2.NBT.5, 2.OA.2; practicing MP1

Subtract Your Way

Let's subtract 1-digit numbers from 2-digit numbers.

Warm-up

Number Talk: Subtract a Little More

Find the value of each expression mentally.

- 17 – 7
- 17 – 8
- 26 – 6
- 26 – 8

Activity 1

How Do You Find the Value?

Find the value of 82–9.

Show your thinking using objects, drawings, numbers, or words.

Activity 2

Subtract with Base-Ten Blocks

1. Diego starts with 5 tens and 5 ones. Show his blocks with base-ten blocks.

   How many does he have?

2. Diego takes away 2 tens.

   a. Draw a diagram to show what Diego does with his blocks.

   b. Write an equation.

3. Then Diego takes away 8 ones.

   a. Draw a diagram to show what Diego does with his blocks.

   b. Write a new equation.

Addressing CA CCSSM 2.NBT.5; practicing MP3 and MP8

Compare Methods for Subtraction

Let's compare ways to subtract.

Warm-up

True or False: How Many Tens? How Many Ones?

Decide if each statement is true or false. Be prepared to explain your reasoning.

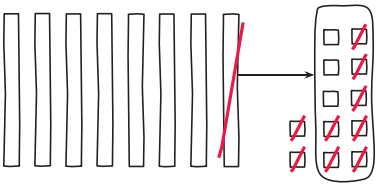
- $64 = 60 + 4$
- $64 = 50 + 14$
- $64 = 30 + 24$

Activity 1

Different Ways to Decompose

Diego and Elena draw base-ten diagrams to decompose a ten.

Diego's diagram:



Elena's diagram:

1. Compare the base-ten diagrams.

   a. How are the diagrams alike?

   b. How are they different?

2. Tyler used equations to show his thinking.

$82 - 9$

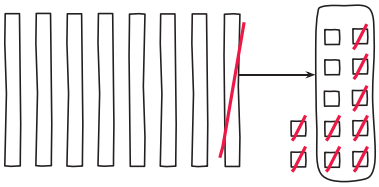
$82 = 70 + 12$

$12 - 9 = 3$

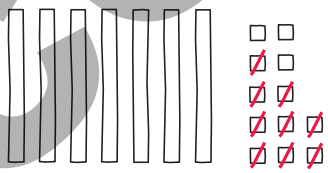
$70 + 3 = 73$

Diego says Tyler's work matches his diagram.
Elena says it matches her diagram.

Diego's diagram:



Elena's diagram:



Do you agree with Diego or Elena? Explain your reasoning.

Unit 2, Lesson 7

Addressing CA CCSSM 2.NBT.5, 2.NBT.6, 2.NBT.9; building towards 2.NBT.5; practicing MP3

Subtract 2 Digits

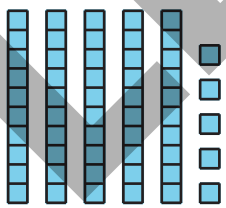
Let's subtract two-digit numbers.

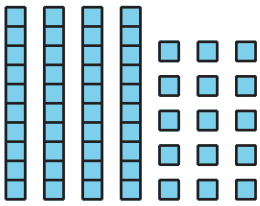
Sec B

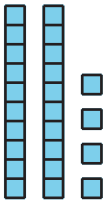
Warm-up

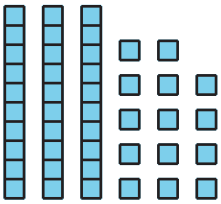
How Many Do You See: Compose a Ten

How many do you see? How do you see them?









Activity 1

What's the Difference?

Find the value of each difference. Show your thinking using objects, drawings, numbers, or words.

1. 46 – 28 = _____

2. 93 – 54 = _____

Activity 2

Use Blocks to Take Away

1. Choose a player card. Mix up the other cards. Put them facedown.
   Player name: _____

2. Represent your starting number. Use base-ten blocks.
   Starting number: _____

3. Take turns picking cards. Read your card to the group.

4. Listen for your player's name. Use blocks to show the change.

5. Write an equation.

6. Write an equation to show the new number.

   Equation 1: _____

   Equation 2: _____

My player now has _____ tens and _____ ones.

Ending number: _____

Share this number with your group.

7. Write an equation to show the sum of the ending numbers in your group.

Addressing CA CCSSM 2.NBT.5, 2.NBT.9; practicing MP3 and MP7

Different Ways to Decompose

Let's compare different ways to subtract.

Warm-up

Number Talk: Multiples of 10

Find the value of each expression mentally.

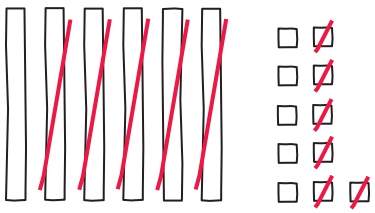
- 18 + 10 + 10
- 18 + 20 + 10
- 38 – 20
- 48 – 30

Activity 1

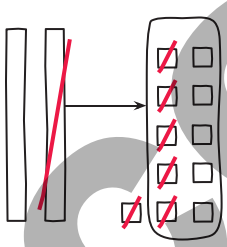
Aren't You Missing Something?

Lin and Clare make base-ten diagrams. They find the value of 71 – 56.

Lin



Clare



1. What do you notice about their work? What do you wonder?

2. Lin and Clare write equations to show their thinking. Which group of equations matches Lin's work? Which group matches Clare's work? Explain your reasoning.

A

$71 - 50 = 21$

$21 = 10 + 11$

$11 - 6 = 5$

$10 + 5 = 15$

B

$71 = 60 + 11$

$11 - 6 = 5$

$60 - 50 = 10$

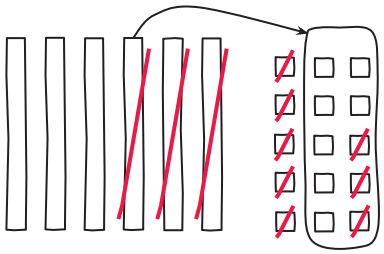
$10 + 5 = 15$

3. How are Lin's and Clare's methods alike? How are they different?

Activity 2

Different Ways to Decompose

Andre finds the value of 65 – 28. He makes a base-ten diagram and writes equations to show his thinking.



1. Do you think Andre's method is more like Clare's or Lin's method? Explain your reasoning.

2. Find the value of each difference. Show your thinking using drawings, numbers, or words.

   a. 34 – 18

   b. 82 – 37

   c. 71 – 53

Addressing CA CCSSM 2.NBT.5; building towards 2.NBT.5; practicing MP2, MP3, MP6, MP7

Add and Subtract within 100

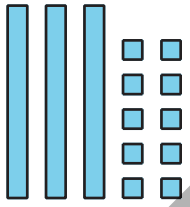
Let's find the difference in our own way.

Warm-up

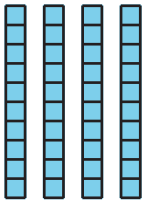
Which Three Go Together: Tens and Ones

Which 3 go together?

A

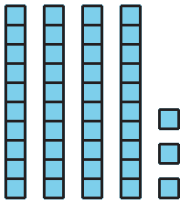


B



C

D



Activity 1

Card Sort: Sort and Find the Value

Your teacher will give you a set of cards that show expressions and diagrams.

1. Match each expression to a diagram. Be ready to explain your reasoning.

2. Choose 1 addition expression. Find the value of the sum.

3. Choose 1 subtraction expression. Find value of the difference.

Activity 2

Add or Subtract

Find the value of each expression. Show your thinking using objects, drawings, numbers, or words.

1. $27 + 47$

2. $55 - 27$

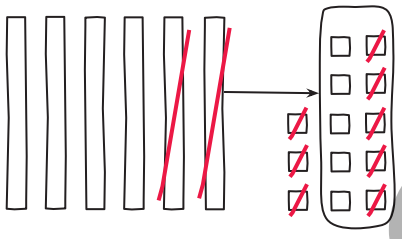
3. $36 + 38$

4. $82 - 39$

Section B Summary

We added two-digit numbers. We **composed** 1 ten by putting 10 ones together. We also subtracted two-digit numbers. We **decomposed** 1 ten by breaking it apart into 10 ones. We used base-ten blocks and base-ten diagrams to show our thinking.

63 – 18



Addressing CA CCSSM 2.NBT.5, 2.NBT.9; building towards 2.NBT.5; practicing MP1

Center Day 2

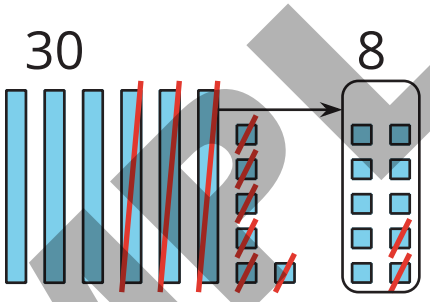
Let's play games to practice adding and subtracting.

Warm-up

Notice and Wonder: Compare the Representations

What do you notice? What do you wonder?

A.



B.

$66 - 28$

$66 = 50 + 16$

$16 - 8 = 8$

$50 - 20 = 30$

$30 + 8 = 38$

$66 - 28 = 38$

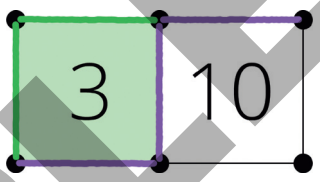
Activity 2

Centers: Choice Time

Choose a center.

Target Numbers

Capture Squares



Five in a Row

Practice Problems

7 Problems

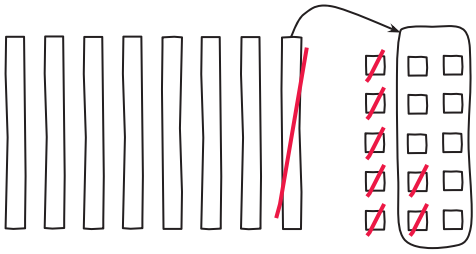
1 from Unit 2, Lesson 5

Find the value of each difference. Show your thinking using drawings, numbers, or words.

a. 60 – 5

b. 76 – 9

Here is Mai's work with a subtraction expression.



a. What subtraction expression does her diagram show?

b. What is the value of the expression?

c. Use Mai's method. Find the value of 51 – 9.

3 from Unit 2, Lesson 7

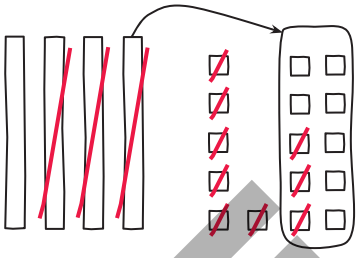
Find the value of 55− 39. Show your thinking using objects, drawings, numbers, or words.

4 from Unit 2, Lesson 8

Here is how Clare found the value of 46 – 29.

46 – 20 = 26
26 – 6 = 20
20 – 3 = 17
46 – 29 = 17

Here is how Han found the value of 46 – 29.



How are Han's and Clare's calculations the same?

How are they different?

5 from Unit 2, Lesson 9

Find the value of each expression. Show your thinking using drawings, numbers, or words.

a. $35 + 57$

b. $81 - 43$

Here is Han's method for finding the value of 73 – 58.

$58 + 2 = 60$
$60 + 10 = 70$
$70 + 3 = 73$
$2 + 10 + 3 = 15$

a. Show each step of Han's work. Use base-ten blocks.

b. Why does Han's method work? Explain your reasoning.

7 Exploration

Here is Jada's method for finding the value of 73 – 58.

73 – 60 = 13
13 + 2 =15

a. Why does Jada's method work? Explain your reasoning.

b. Use Jada's method. Find the value of 85 – 49.

Unit 2, Lesson 11

Addressing CA CCSSM 2.NBT.5, 2.OA.1; building towards 2.OA.1; practicing MP1

How Do You Solve Story Problems?

Let's solve story problems.

Sec C

Warm-up

What Do You Know about Story Problems?

What do you know about story problems?

Activity 1

How Many Seeds?

1. Diego gathers 42 orange seeds. Jada gathers 16 apple seeds. How many more seeds does Diego gather than Jada? Show your thinking using drawings, numbers, or words.

Activity 2

The Seeds of Greatness

Solve each story problem. Show your thinking using drawings, numbers, or words.

1. Lin has 31 sunflower seeds. She gives 15 to Priya. How many seeds does Lin have now?

2. Noah makes a design with yellow and blue corn seeds. He uses 37 seeds in all. He uses 28 yellow seeds. How many blue seeds does he use?

3. Elena gathers 50 pumpkin seeds. Andre collects 23 fewer pumpkin seeds than her. How many seeds does Andre collect?

Unit 2, Lesson 12

Addressing CA CCSSM 2.NBT.5, 2.OA.1; building towards 2.OA.1; practicing MP1, MP2, MP4, MP7

Story Problems and Diagrams

Let's make sense of diagrams and solve story problems.

Warm-up

Sec C

Notice and Wonder: Mancala

What do you notice? What do you wonder?

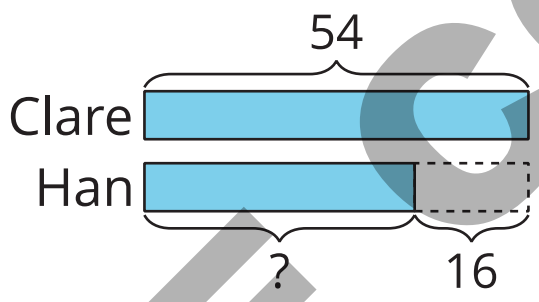
Activity 1

Interpret the Diagram

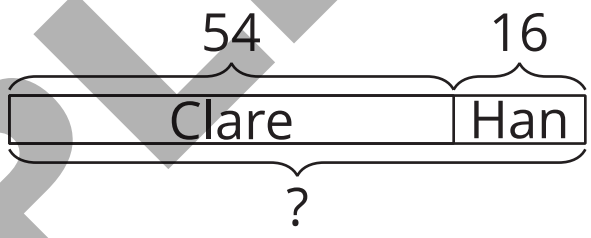
Circle the matching diagram for each story. Then explain your match to your partner.

1. Clare captures 54 seeds. Han captures 16 fewer seeds than her. How many seeds does Han capture?

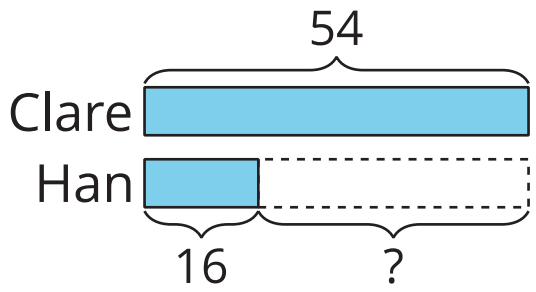
A



B

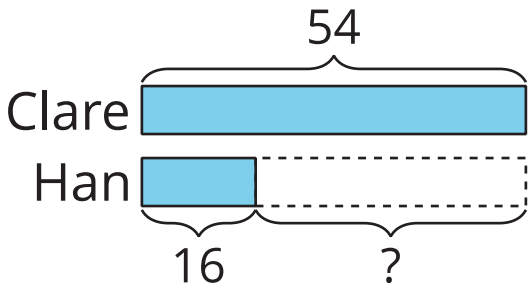


C



2. Clare has 54 seeds on her side of the board. Han has 16 seeds on his. How many seeds are on the board?

A



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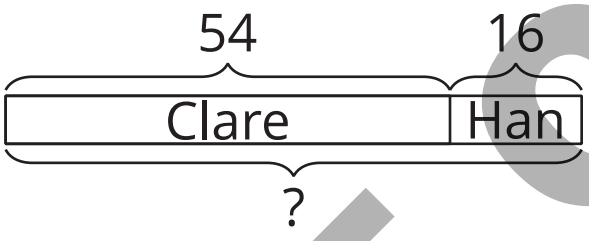
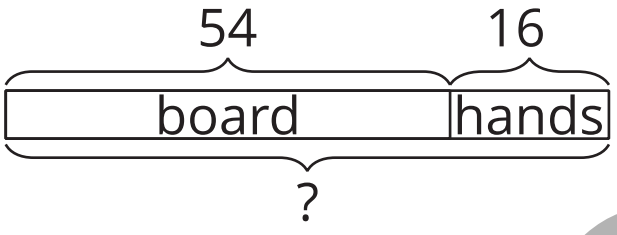


3. Clare has 54 seeds. She holds 16 in her hand. The rest are on the game board. How many of her seeds are on the game board?

A



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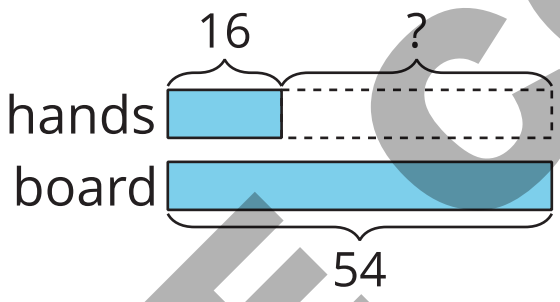

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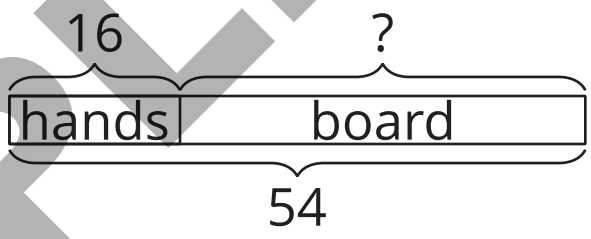
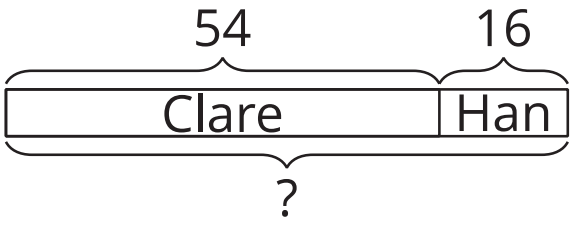


4. There are 54 seeds on the game board. Some seeds are on Han's side. 16 seeds are on Clare's side. How many seeds are on Han's side?

Choose the 2 matching diagrams.

A



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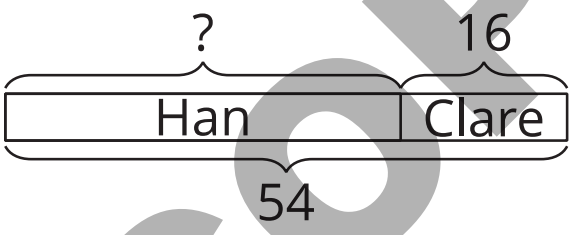
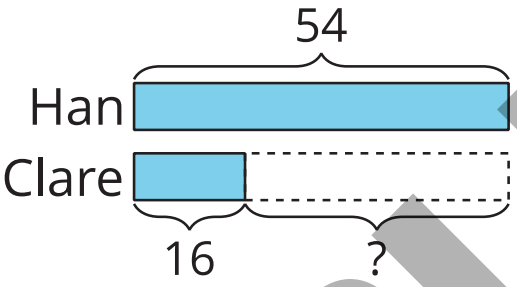


C



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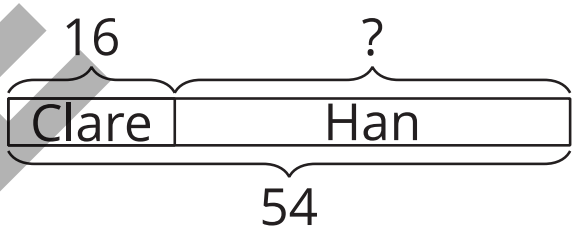


Activity 2

Card Sort: Story Problems and Diagrams

Your teacher will give you a set of cards that show story problems and diagrams.

1. Match each story problem to a diagram. Be ready to explain your reasoning.

2. Choose 2 story problems. Solve them. Show your thinking using drawings, numbers, or words.

Addressing CA CCSSM 2.NBT.5, 2.OA.1; building towards 2.OA.1; practicing MP2, MP4, MP7

Story Problems and Equations

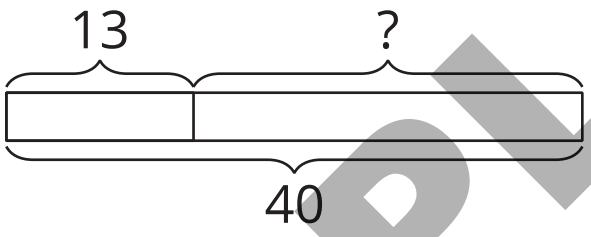
Let's make sense of equations and solve story problems.

Warm-up

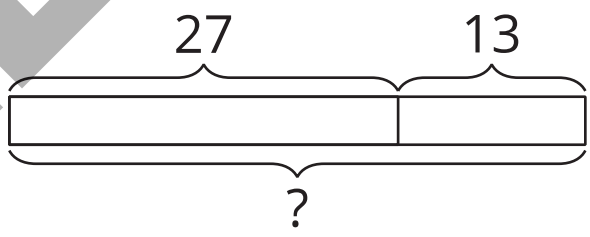
Which Three Go Together: Diagrams

Which 3 go together?

A



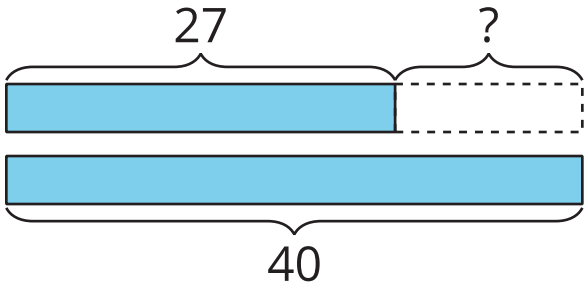
B



C

$27 + \_\_\_\_ = 40$

D



Activity 1

Card Sort: Story Problems and Equations

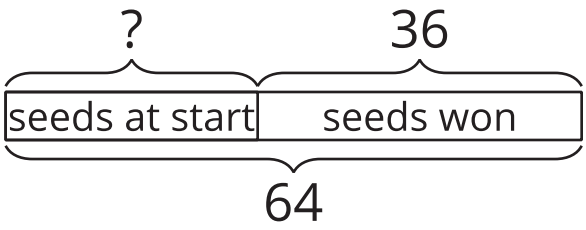
Your teacher will give you a set of cards that show story problems and equations.

1. Match each story problem to an equation. Be ready to explain your reasoning.

2. Choose 2 story problems. Solve them. Show your thinking using drawings, numbers, or words.

Activity 2

Represent and Solve Story Problems



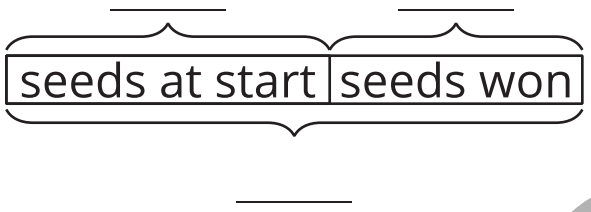
1. Lin plays a game with seeds. She starts with some seeds. Then she wins 36 more. Now she has 64 seeds. How many seeds did Lin have at first?

   a. Write an equation. Use a ? for the unknown value.

   b. Solve the equation. Show your thinking using drawings, numbers, or words.

2. Andre started a game with 32 seeds. Then he wins more. Now he has 57 seeds. How many seeds did Andre win?

   a. Label the diagram to represent the story.

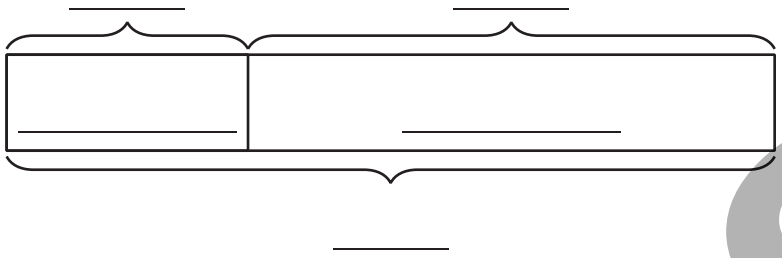


   b. Write an equation. Use a ? for the unknown value.

   c. Solve the equation. Show your thinking using drawings, numbers, or words.

3. Diego gathers 22 seeds from yellow flowers. He gathers 48 seeds from blue flowers. How many seeds does he gather in all?

   a. Label the diagram to represent the story.



   b. Write an equation. Use a ? for the unknown value.

   c. Solve the equation. Show your thinking using drawings, numbers, or words.

4. Noah and Kiran gather 92 pumpkin seeds. Noah gathers 53. How many seeds did Kiran gather?

   a. Draw a diagram to represent the story.

   b. Write an equation. Use a ? for the unknown value.

   c. Solve the equation. Show your thinking using drawings, numbers, or words.

Addressing CA CCSSM 2.NBT.5, 2.OA.1; practicing MP2 and MP3

Solve It Your Way

Let's solve story problems and share our thinking with others.

Warm-up

Number Talk: Multiple Addends

Find the value of each expression mentally.

- 5 + 9 + 5
- 25 + 9 + 5
- 25 + 15 + 19
- 25 + 30 + 15 + 19

Activity 1

Put It All Together

1. Andre gathers seeds. He has 25 sunflower seeds and 17 squash seeds. How many seeds does he have? Show your thinking using drawings, numbers, and words.

2. Andre gathers more seeds. He has 35 cucumber seeds. How many seeds does Andre have in all? Show your thinking using drawings, numbers, and words.

3. Compare your thinking with your partner.

Activity 2

Make Sense of 2 Steps

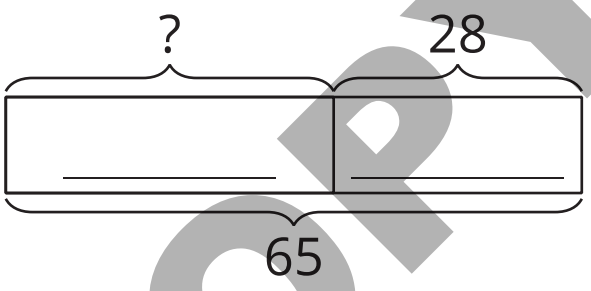
Priya and Tyler play a game with seeds. Priya starts with 22 seeds. She captures 7 seeds in the first round. Then she captures 18 more seeds in the second round. How many seeds does she have now?

Solve the problem in any way that makes sense to you. Show your thinking using drawings, numbers, or words.

Section C Summary

We solved many kinds of story problems. We used diagrams and equations to make sense of problems.

Jada starts with some seeds. Then she wins 28 seeds from Elena. Now she has 65 seeds. How many seeds did she have at the start?



$? + 28 = 65$

We shared how to make sense of story problems and how to solve them.

Unit 2, Lesson 15

Addressing CA CCSSM 2.NBT.5, 2.OA.1; practicing MP6

Does My Estimation Make Sense?

Let's decide if estimates make sense.

Warm-up

True or False: Is It Equal?

Decide if each statement is true or false. Be prepared to explain your reasoning.

- $32 - 21 = 50$

- $43 + 48 = 50$

- $24 + 29 = 50$

Activity 1

Make an Estimate

1. There are 54 apple seeds in a bag. Then 32 more seeds are placed into the bag.

   Mai estimates that there are about 80 seeds now. Does her estimate make sense? Explain your reasoning.

2. Decide if each estimate makes sense. Explain your reasoning to your partner.

   There are 82 corn seeds in a bag. Kiran uses 28 for his art project. How many seeds are left in the bag?

   a. about 100 seeds
      Does it make sense?

   b. about 60 seeds
      Does it make sense?

   c. about 50 seeds
      Does it make sense?

Activity 2

Does It Make Sense?

Are the estimates for each problem too high, too low, or about right? Create your own estimates for the last problem. Show your thinking using objects, drawings, numbers, or words.

1. Tyler starts a game with 54 seeds. Lin captures 25 of his seeds. How many seeds does Tyler have now?

   about 60 seeds
   about 80 seeds
   about 30 seeds
   about 8 seeds

too low	about right	too high

2. Jada collects 24 apple seeds and 42 orange seeds. Then she collects 21 sunflower seeds. How many seeds does she have in all?

about 80 seeds

about 40 seeds

about 120 seeds

about 50 seeds

too low	about right	too high

3. Diego starts a game with 25 seeds. He captures 24 seeds. Then he captures 27 more. How many seeds does Diego have now?

Record an estimate that would be "too high," "too low," and "about right."

too low	about right	too high

Addressing CA CCSSM 2.NBT.5, 2.OA.1; practicing MP1 and MP6

Center Day 3

Let's use diagrams to make and solve our own story problems.

Warm-up

Number Talk: Subtract Multiples of 10

Find the value of each expression mentally.

- 25 – 10
- 35 – 10
- 35 – 20
- 35 – 19

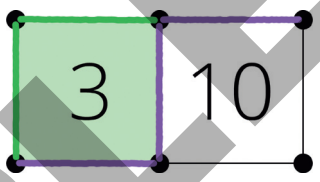
Activity 2

Centers: Choice Time

Choose a center.

Target Numbers

Capture Squares



Five in a Row

Unit 2, Lesson 17

Addressing CA CCSSM 2.NBT.5, 2.NBT.6, 2.OA.1; building towards 2.OA.1; practicing MP4

Our Store's Inventory

Let's think about how to run a store.

Warm-up

Notice and Wonder: The Shopping Basket

What do you notice? What do you wonder?

Activity 1

100 Items

1. Choose 3 items to sell at your store. Write the names of the items in the first row.
2. At the beginning of each day, you have:
    - 100 items
    - Fewer than 10 of 1 of the items.
    - More than 10 of the other 2 items.

    Fill in the second row. How much of each item do you start with?

names	item 1:	item 2:	item 3:
amount at the beginning of the day			
sales activity			
amount at the end of the day			

Activity 2

Buyers and Sellers

1. Take turns rolling a number cube. Each person rolls 3 times. Record each roll.
    - Roll 1: _____
    - Roll 2: _____
    - Roll 3: _____

2. Buyers: Create a 1-digit or 2-digit number using the digits you rolled. These numbers represent how many of each item to buy.

3. Sellers: Change the total number of items sold on your inventory sheet after a sale. Record the change next to “sales activity.”

Activity 3

Sales Reports

1. Fill out the inventory sheet with the information from your sales.

	item 1	item 2	item 3	total
starting amount				
number of items sold				
number of items left				
restock amount				

2. What do you notice about the number of items you sold? What do you notice about the restock amount?

Practice Problems

6 Problems

1 from Unit 2, Lesson 11

There are some comic books on a shelf.
Mai puts 18 more on the shelf.
Now there are 47 in all.
How many comic books were on the shelf at first?

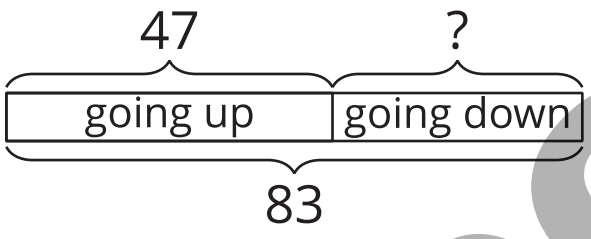
a. Draw a diagram representing the comic books.

b. How many comic books are on the shelf now? Show your thinking using drawings, numbers, or words.

2 from Unit 2, Lesson 12

There are 83 people on the stairs. 47 of them go up, and some come down.

a. Why does the tape diagram match the story?



b. How many people come down the stairs? Explain or show your reasoning.

3 from Unit 2, Lesson 13

Lin reads 25 pages of a book. Clare is reading the same book. Lin reads 19 fewer pages of the book than Clare. How many pages did Clare read?

a. Draw a diagram to represent the pages Lin and Clare read.

b. Write an equation. Use a ? for the unknown value.

c. Solve the problem. Explain your reasoning.

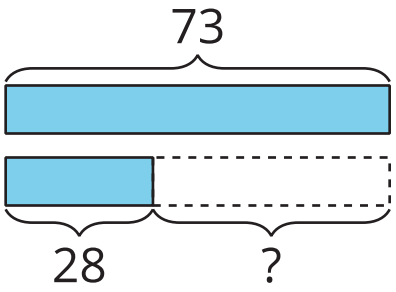
4 from Unit 2, Lesson 14

a. 42 people swim in a lake. Then 25 more people go in to swim. How many people swim in all?

b. 18 more people go into the lake to swim. How many people swim now?

5 Exploration

Here is a tape diagram.



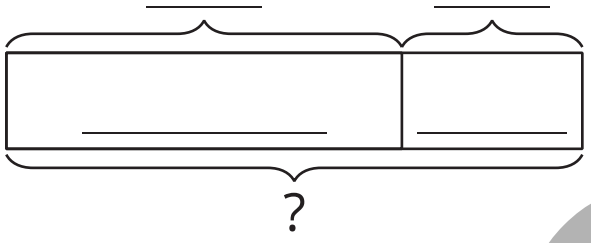
a. Write a story problem this tape diagram could represent.

b. Label the tape diagram to match your story.

c. Solve your story problem.

6 Exploration

a. Write a story problem this tape diagram could represent.



b. Fill in the tape diagram with the information from your story.

c. Solve your story problem.

Glossary

- bar graph
  A way to show data using the height or length of rectangles to represent how many in each group or category.

- compose
  To put a number or shape together using its parts.

  Examples:
  Compose 1 ten from 10 ones.
  Compose 14 from 1 ten and 4 ones.
  Compose 1 rectangle from two triangles.

- data
  A collection of facts, such as numbers, measurements, or observations.

  Examples:
  the color of each pencil in a box
  the number of pencils sold each day
  the length of each pencil in a box

- decompose
  To break apart a number or shape into its parts.

  Examples:
  Decompose 1 ten into 10 ones.
  Decompose 14 into 1 ten and 4 ones.
  Decompose 1 rectangle into 2 triangles.

- picture graph
  A way to show data using pictures or symbols to represent how many in each group or category.

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Unit 2: Adding and Subtracting within 100

Lesson Grade2.2.C12

Bao (game). *Wikipedia, The Free Encyclopedia.* Retrieved from https://en.wikipedia.org/wiki/Bao_(game)

Lesson Grade2.2.C12

Mancala. *Wikipedia, The Free Encyclopedia.* Retrieved from https://en.wikipedia.org/wiki/Mancala

Lesson Grade2.2.C12

Oware. *Wikipedia, The Free Encyclopedia.* Retrieved from https://en.wikipedia.org/wiki/Oware

Notes

Notes

Notes

California Common Core State Standards for Mathematics (CA CCSSM) Reference

2.G: Grade 2 – Geometry

Reason with shapes and their attributes.

2.G.1

Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Sizes are compared directly or visually, not compared by measuring. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

2.G.2

Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

2.G.3

Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves, thirds, half of, a third of,* etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.

2.MD: Grade 2 – Measurement and Data

Measure and estimate lengths in standard units.

2.MD.1

Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

2.MD.2

Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

2.MD.3

Estimate lengths using units of inches, feet, centimeters, and meters.

2.MD.4

Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.

Relate addition and subtraction to length.

2.MD.5

Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same

units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.

2.MD.6

Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.

Work with time and money.

2.MD.7

Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. Know relationships of time (e.g., minutes in an hour, days in a month, weeks in a year). CA

2.MD.8

Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?

Represent and interpret data.

2.MD.10

Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve

simple put-together, take-apart, and compare problems See Glossary, Table 1. using information presented in a bar graph.

2.MD.9

Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked offinwhole-numberunits.

2.NBT: Grade 2 – Number and Operations in Base Ten

Understand place value.

2.NBT.1

Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:

2.NBT.1a

100 can be thought of as a bundle of ten tens—called a "hundred."

2.NBT.1b

The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

2.NBT.2

Count within 1000; skip-count by 5s, 10s, and 100s.

2.NBT.3

Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

2.NBT.4

Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Use place value understanding and properties of operations to add and subtract.

2.NBT.5

Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

2.NBT.6

Add up to four two-digit numbers using strategies based on place value and properties of operations.

2.NBT.7

Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition

and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

2.NBT.7.1

Use estimation strategies to make reasonable estimates in problem solving. CA

2.NBT.8

Mentally add 10 or 100 to a given number 100-900, and mentally subtract 10 or 100 from a given number 100-900.

2.NBT.9

Explain why addition and subtraction strategies work, using place value and the properties of operations. Explanations may be supported by drawings or objects.

2.OA: Grade 2 – Operations and Algebraic Thinking

Represent and solve problems involving addition and subtraction.

2.OA.1

Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of

adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. See Glossary, Table 1.

Add and subtract within 20.

2.OA.2

Fluently add and subtract within 20 using mental strategies. See standard 1.OA.6 for a list of mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

Work with equal groups of objects to gain foundations for multiplication.

2.OA.3

Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

2.OA.4

Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

California Common Core State Standards for Mathematics Standards for Mathematical Practice

These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

MP1. Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous

problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

MP2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the

representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

MP3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is

flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen to or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

- Students build proofs by induction and proofs by contradiction. CA 3.1 (for higher mathematics only).

MP4. Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these

may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

MP5. Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and

compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

MP6. Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

MP7. Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a

collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered $7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$, older students can see the 14 as 2×7 and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

MP8. Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $(y - 2)/(x - 1) = 3$.

Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)(x^2 + x + 1)$, and $(x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Connecting the Mathematical Practices to the Standards for Mathematical Content

The Standards for Mathematical Practice describe ways in which developing student practitioners of the discipline of mathematics increasingly ought to engage with the subject matter as they grow in mathematical maturity and expertise throughout the elementary, middle and high school years. Designers of curricula, assessments, and professional development should all attend to the need to connect the mathematical practices to mathematical content in mathematics instruction.