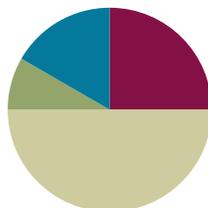


## Lesson 12

**Objective:** Ask and answer varied word problem types about a data set with three categories.

### Suggested Lesson Structure

■ Fluency Practice	(15 minutes)
■ Application Problem	(5 minutes)
■ Concept Development	(30 minutes)
■ Student Debrief	(10 minutes)
<b>Total Time</b>	<b>(60 minutes)</b>



### Fluency Practice (15 minutes)

- Addition with Cards **1.OA.6** (7 minutes)
- Get to 10 or 20 **1.OA.5** (3 minutes)
- Subtraction with Partners **1.OA.6** (5 minutes)

### Addition with Cards (7 minutes)

Materials: (S) Numeral cards 0–10 (Lesson 2 Fluency Template 2), counters (if needed)

Note: This review fluency activity strengthens students' ability to add within and across ten.

Students sit in partnerships. Students shuffle or mix their numeral cards. Each partner places her deck of cards face down. Each partner flips over two cards and adds her cards together. The partner with the greater total keeps the cards played by both players that round. For example Player A draws 4 and 5 and gives the total 9. Player B draws 9 and 4 and gives the total, 13. Since  $9 < 13$ , Player B keeps the cards. If the sums are equal, the cards are set aside, and the winner of the next round keeps the cards from both rounds. At the end of the game, the players will each be left with 1 card. They each flip their last card over and the player with the highest card says the sum and collects the cards. Students continue to play as time allows.



#### NOTES ON MULTIPLE MEANS FOR ACTION AND EXPRESSION:

When playing games with students, provide a variety of ways to respond. Oral fluency games should be adjusted for deaf and hearing impaired students. This can be done in many ways including showing the answer with fingers, using personal white boards to write answers, or using a visual signal or vibration.

**Get to 10 or 20 (3 minutes)**

Materials: (T) 20-bead Rekenrek

Note: Practice with getting to 10 or 20 reinforces strategically counting on, which enables students to solve addition problems by stopping at 10 and continuing to the desired number.

T: (Show 8 on the Rekenrek.) What number do you see?

S: 8.

T: Say the complete number sentence to get to 10.

S:  $8 + 2 = 10$ .

T: (Move two beads to make 10.) Good. (Show 18.) What number do you see?

S: 18.

T: Say the complete number sentence to get to 20.

S:  $18 + 2 = 20$ .

Add two beads to confirm, and then continue with other numbers within 20.

**Subtraction with Partners (5 minutes)**

Materials: (S) Personal white board

Note: This fluency activity reviews subtracting 7, 8, and 9 from teen numbers. Allow students who still require pictorial representations to draw 5-groups to solve.

Assign partners of equal ability. Partners assign each other a number from 11 to 17 (e.g., 12).

On their personal white boards, students write number sentences with 9, 8, and 7 as the subtrahend and solve them (e.g.,  $12 - 9 = 3$ ,  $12 - 8 = 4$ ,  $12 - 7 = 5$ ). Partners then exchange personal white boards and check each other’s work.

**Application Problem (5 minutes)**

Kingston’s class took a trip to the zoo. He collected data about his favorite African animals. He saw 2 lions, 11 gorillas, and 7 zebras. What might his table look like? Write one question your classmate can answer by looking at the table.

Note: Students may use any of the methods to organize data from the previous lessons. As they are working, circulate and notice how students are representing the data. Encourage them to line up their shapes and focus on organization. Remind students that they need to use the same symbol to represent the information throughout their table.

Representations should make counting and comparing data easy. During the Student Debrief, students share and answer their partner's question.

L    II  
 G    IIII IIII I  
 Z    IIII II  
 How many zebras and gorillas did he see?

### Concept Development (30 minutes)

Materials: (T) Chart with a three-column vertical graph entitled *Our Favorite Fruits*, chart with measuring rules (Lesson 7) (post on the side of the board), *Favorite Read Aloud Books* chart (Lesson 10)  
 (S) Sticky notes, personal white board

Distribute one sticky note at each student's seat. Have students sit in the meeting area in a semicircle formation.

T: (Post *Our Favorite Fruits* graph.) What are some of your favorite fruits?

S: (Responses may vary. Choose only three, or possibly four, categories from students' suggestions.)  
 Strawberries. → Watermelon. → Apples.

Fill in the three categories as students make suggestions. Have students go back to their seats, write their names on sticky notes, and come back to the meeting area with them.

T: My vote is for strawberry as my favorite fruit. I'm going to place my sticky note right beneath the line where it says *Strawberry*. (Model.) Who likes watermelon the best? (Choose a student to come up.) He's also going to place his sticky note right beneath the line where it says *Watermelon*. (Choose another student to come up and place her sticky note for *Apple*. Be sure to have these sticky notes aligned with each other.)

T: We need one more person who likes strawberries the most. (Have student come up.) When he places his sticky note, he's going to put it right beneath my sticky note so there are no gaps or overlap.

T: (Call up one third of the class to post their votes, encouraging them to avoid making gaps or overlaps between the sticky notes.) What do you notice about the rules for completing this chart with our votes on the sticky notes?

S: The rules are just like the rules for measuring! → We had to line up our endpoints when we first started! → We couldn't have any overlaps or gaps. → The sticky notes are the same size, the same length unit.

T: Excellent connections! Let's have the rest of our classmates complete the graph as they put up their votes following these rules.

T: Which fruit is the most popular in our class? Which fruit is the least popular? That means it has the fewest number of votes. How can you tell?

S: I counted. The fruit with the highest total is the most popular. → I just looked at the sticky notes. The longest strip of notes means the most votes. The shortest strip means the fewest number of votes. → This reminds me of measuring again! The one that used the most length units to measure is the longest one, and that is the most popular fruit!



#### NOTES ON MULTIPLE MEANS OF REPRESENTATION:

Students demonstrate a true understanding of math concepts when they can apply them in a variety of situations. Often students learn math concepts in an isolated fashion, and they do not see how to transfer their application to new situations. Celebrate student success when they make these connections.

- T: How many students voted for strawberries? Watermelon? Apples? (Record the number amount on the graph.) When we organize our data this way, it makes it easy for us to compare. We call this a **graph**. A graph lets us see the data easily. In this graph, it lines up our data just like when we measure lengths of different items, so we can easily compare.
- T: (Point to the corresponding parts of the graph.) Which received more votes, strawberries or watermelon?
- S: \_\_\_\_\_ (category) got more votes.
- T: Did you have to look at the numbers for each, or could you see it just by looking at the lengths of the bars made of notes?
- S: I just looked at the bar of notes. → The longer bar of notes has more.
- T: How many more students would \_\_\_\_\_ (category) need to have the same amount as \_\_\_\_\_ (category)? Tell your partner how you figured it out.
- S: I just counted the part that was longer, the part that was sticking out. → I used subtraction. → I used addition with a mystery number in the middle. → This reminds me of measuring again! We used all of these strategies when we tried to figure out which length was longer when we compared two things!
- T: You are right! So, how many more votes did \_\_\_\_\_ (category) receive than \_\_\_\_\_ (category)?
- T: (Using the same two categories as above, rephrase the question.) How many *fewer* votes did \_\_\_\_\_ (category) receive than \_\_\_\_\_ (category)?

Continue to ask *compare with difference unknown* problems and *put together with total unknown* problems presented by this graph. Ask students to write a number sentence on their personal white boards to show how they reached a solution. If time allows, use the *Favorite Read Aloud Books* chart from Lesson 10 to answer more *compare with difference unknown* problems. Students may work with their partners to answer each other's questions.

### Problem Set (10 minutes)

Students should do their personal best to complete the Problem Set within the allotted 10 minutes. For some classes, it may be appropriate to modify the assignment by specifying which problems they work on first.

### Student Debrief (10 minutes)

**Lesson Objective:** Ask and answer varied word problem types about a data set with three categories.

The Student Debrief is intended to invite reflection and active processing of the total lesson experience.

Invite students to review their solutions for the Problem Set. They should check work by comparing answers with a partner before going over answers as a class. Look for misconceptions or misunderstandings that can be addressed in the Debrief. Guide students in a conversation to debrief the Problem Set and process the lesson.

Any combination of the questions below may be used to lead the discussion.

- What are some strategies to figure out how many more or fewer votes a category received compared to the other?
- How are tables and **graphs** similar? How are they different? (Tables and graphs both organize information. With a graph, the information can be compared in a way similar to how length units can be compared.)
- How are the graphs that are used with Problems 3 and 5 different? How are they similar?
- How is measuring objects similar to creating graphs like these to compare information about different categories?
- How does a graph that is created properly help you see and understand information better? Did you follow these rules when you made your graph for Problem 1?
- Look at your Application Problem. What question did you come up with about your table? Share with your partner, and answer each other's question.

### Exit Ticket (3 minutes)

After the Student Debrief, instruct students to complete the Exit Ticket. A review of their work will help with assessing students' understanding of the concepts that were presented in today's lesson and planning more effectively for future lessons. The questions may be read aloud to the students.

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 12 Problem Set 1•3

Name Marie Date \_\_\_\_\_

Use squares with no gaps or overlaps to organize the data from the picture. Line up your squares carefully.

**Favorite Ice Cream Flavor** □ = 1 student

Flavors	Number of Students
vanilla	
chocolate	

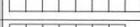
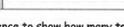


1. How many more students liked chocolate than liked vanilla? 2 students

2. How many total students were asked about their favorite ice cream flavor? 16 students

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**Ties on Shoes** □ = 1 student

Types of Shoe Ties	Number of Students
Velcro	
laces	
no ties	

3. Write a number sentence to show how many total students were asked about their shoes. 5 + 8 + 7 = 20

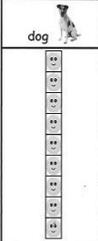
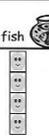
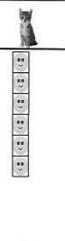
4. Write a number sentence to show how many fewer students have Velcro on their shoes than laces. 8 - 5 = 3

**EUREKA MATH** Lesson 12: Ask and answer varied word problem types about a data set with three categories. Date: 4/7/15 **engage<sup>ny</sup>** 29

NYS COMMON CORE MATHEMATICS CURRICULUM Lesson 12 Problem Set 1•3

Each student in the class added a sticky note to show his or her favorite kind of pet. Use the graph to answer the questions.

**Favorite Pet** □ = 1 student

	dog 	fish 	cat 
Number of Students			

5. How many students chose dogs or cats as their favorite pet? 15 students

6. How many more students chose dogs as their favorite pet than cats? 3 students

7. How many more students chose cats than fish? 2 students

**EUREKA MATH** Lesson 12: Ask and answer varied word problem types about a data set with three categories. Date: 4/7/15 **engage<sup>ny</sup>** 30

Name \_\_\_\_\_

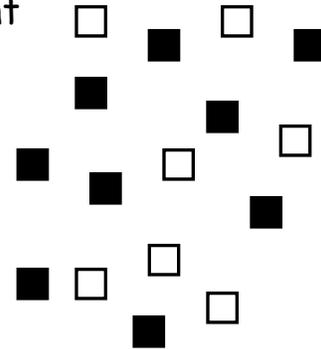
Date \_\_\_\_\_

Use squares with no gaps or overlaps to organize the data from the picture. Line up your **squares** carefully.

Favorite Ice Cream Flavor □ = 1 student

Number of Students

Flavors	□ vanilla	
	■ chocolate	



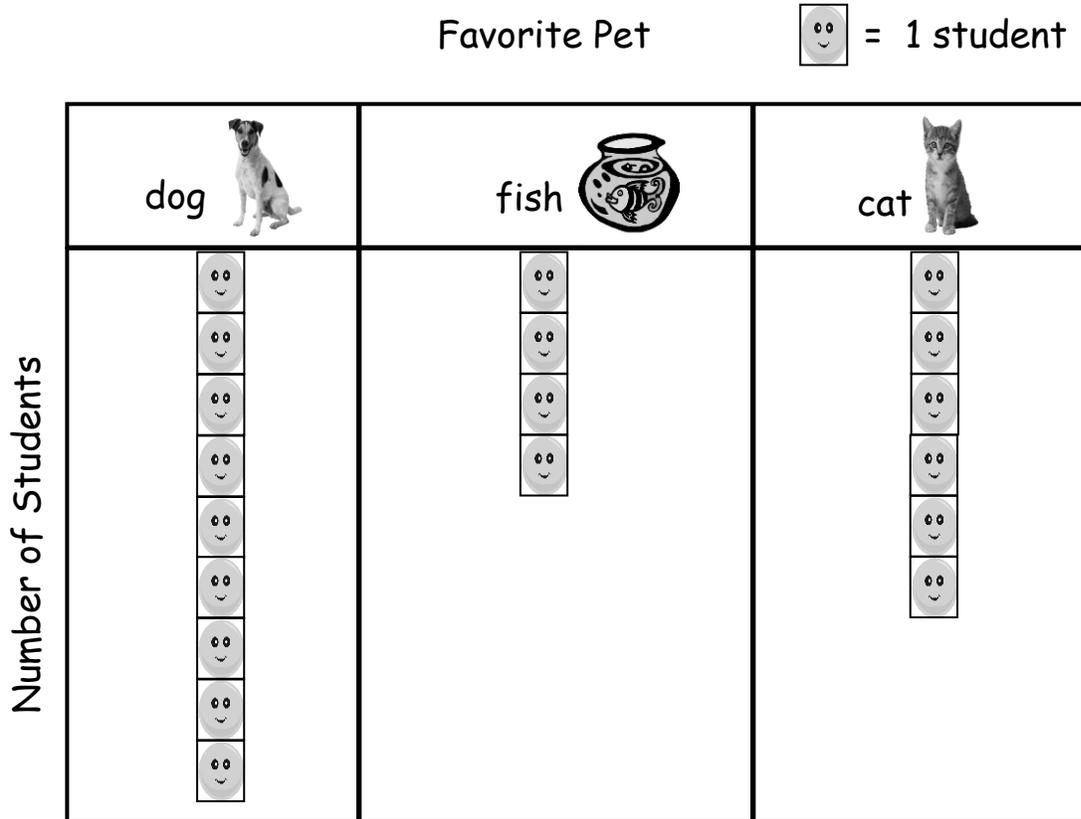
- How many **more** students liked chocolate than liked vanilla? \_\_\_\_\_ students
- How many **total** students were asked about their favorite ice cream flavor?  
\_\_\_\_\_ students

Ties on Shoes Number of Students □ = 1 student

Types of Shoe Ties	Velcro	□ □ □ □ □
	laces	□ □ □ □ □ □ □ □
	no ties	□ □ □ □ □ □ □

- Write a number sentence to show how many **total** students were asked about their shoes.  
\_\_\_\_\_
- Write a number sentence to show how many **fewer** students have Velcro on their shoes than laces.  
\_\_\_\_\_

Each student in the class added a sticky note to show his or her favorite kind of pet. Use the graph to answer the questions.



5. How many students chose dogs or cats as their favorite pet?

\_\_\_\_\_ students

6. How many more students chose dogs as their favorite pet than cats?

\_\_\_\_\_ students

7. How many more students chose cats than fish?

\_\_\_\_\_ students

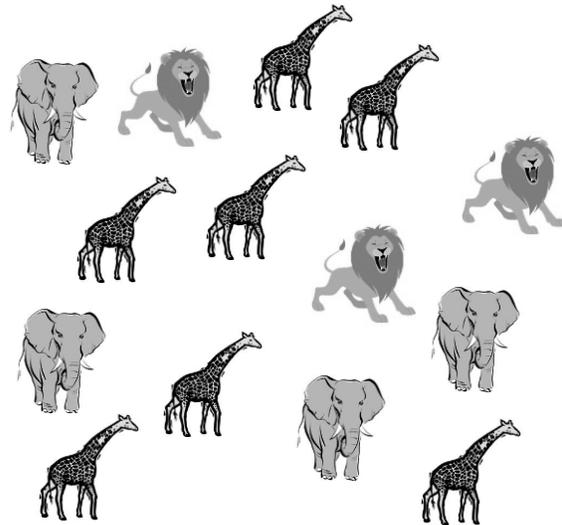
Name \_\_\_\_\_

Date \_\_\_\_\_

Use squares with no gaps or overlaps to organize the data from the pictures.  
Line up your **squares** carefully.

Favorite Animals at the Zoo

		Number of Students
Zoo Animals	giraffe	
	elephant	
	lion	



Each picture represents 1 student's vote.

- Write a number sentence to show how many **total** students were asked about their favorite animal at the zoo.

\_\_\_\_\_

- Write a number sentence to show how many **fewer** students like elephants than like giraffes.

\_\_\_\_\_

Name \_\_\_\_\_

Date \_\_\_\_\_

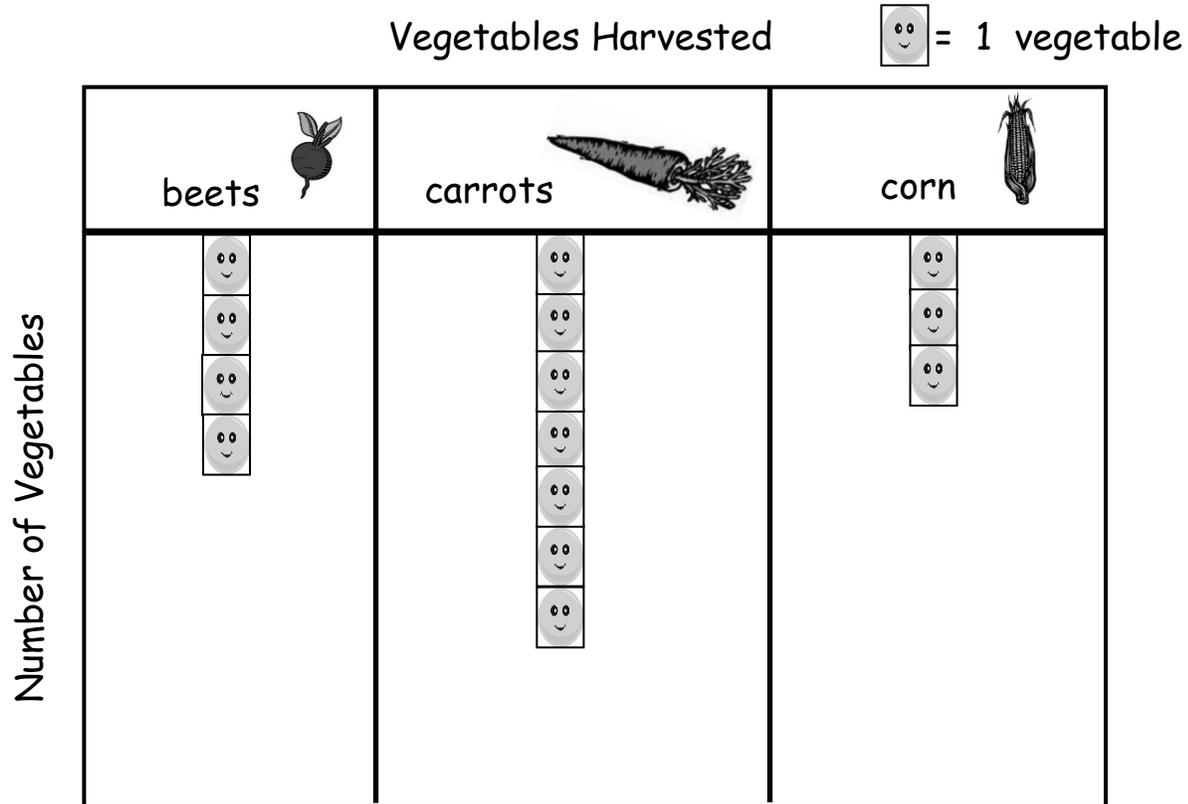
The class has 18 students. On Friday, 9 students wore sneakers, 6 students wore sandals, and 3 students wore boots. Use squares with no gaps or overlaps to organize the data. Line up your **squares** carefully.

Shoes Worn on Friday      Number of Students       = 1 student

Shoes		
		
		

- How many more students wore sneakers than sandals? \_\_\_\_\_ students
- Write a number sentence to tell how many students were asked about their shoes on Friday.  
\_\_\_\_\_
- Write a number sentence to show how many fewer students wore boots than sneakers.  
\_\_\_\_\_

Our school garden has been growing for two months. The graph below shows the numbers of each vegetable that have been harvested so far.



4. How many total vegetables were harvested?  
\_\_\_\_\_ vegetables
  
5. Which vegetable has been harvested the most?  
\_\_\_\_\_
  
6. How many more beets were harvested than corn?  
\_\_\_\_\_ more beets than corn
  
7. How many more beets would need to be harvested to have the same amount as the number of carrots harvested?  
\_\_\_\_\_