

Homework Helpers

Grade 3 Module 6



G3-M6-Lesson 1

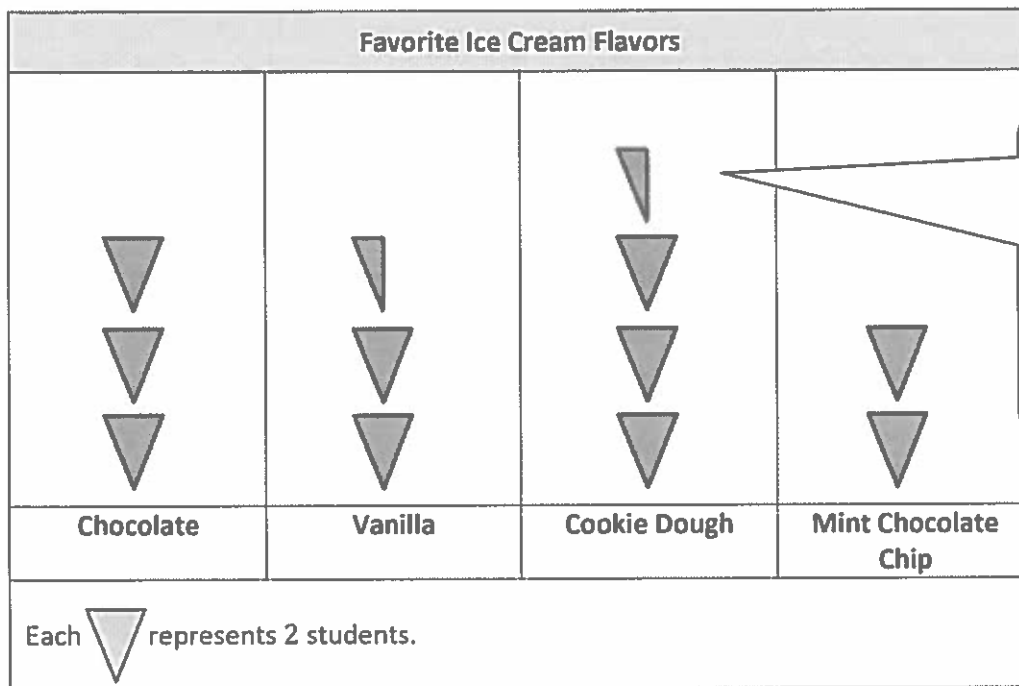
1. The tally chart below shows a survey of students' favorite ice cream flavors. Each tally mark represents 1 student.

Favorite Ice Cream Flavors	
Flavors	Number of Students
Chocolate	### /
Vanilla	###
Cookie Dough	### //
Mint Chocolate Chip	////

I can count the tally marks by fives and ones to find the total number of students.


The chart shows a total of 22 students.

2. Use the tally chart in Problem 1 to complete the picture graph below.



I can draw 3 whole symbols and one half symbol to represent the 7 students who picked cookie dough.

I can use the key to tell me what each symbol represents. Since each symbol represents 2 students, I can draw half a symbol to represent 1 student.

- a. What does each  represent?

Each  represents 2 students.

I can look at the key in the picture graph to find this information.

- b. How many students picked vanilla as their favorite ice cream flavor?

Five students picked vanilla as their favorite ice cream flavor.

I can look at the picture graph or the tally chart to figure out how many students picked vanilla. The picture graph shows 2 whole symbols and a half symbol, so that's 5 students.

- c. How many more students chose cookie dough than mint chocolate chip as their favorite ice cream flavor?

$$7 - 4 = 3$$

Three more students chose cookie dough than mint chocolate chip.

I can find the total for each flavor and subtract to find the difference.


- d. How many students does  represent? Write a number sentence to show how you know.

$$3 \times 2 = 6$$

$$6 + 1 = 7$$

It represents 7 students.

I can multiply 3×2 because there are 3 whole symbols, and each symbol stands for 2 students. Then, I can add 1 more because there is a half symbol, which represents 1 student.

- e. How many more  did you draw for chocolate than for mint chocolate chip? Write a number sentence to show how many more students chose chocolate than mint chocolate chip.

$$6 - 4 = 2$$

I drew 1 more symbol for chocolate than for mint chocolate chip.

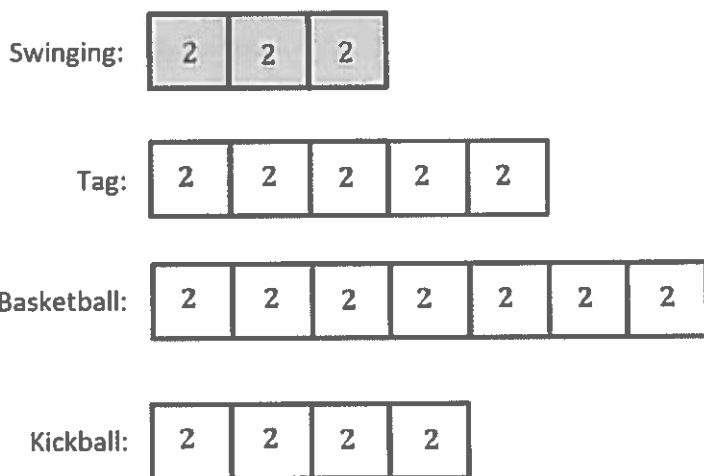
I can subtract to find the difference between the number of students who picked each flavor. The difference is 2 students. Since each symbol represents 2 students, that means I drew 1 more symbol for chocolate than for mint chocolate chip. I could also find the answer by looking at the chart and recognizing that 3 symbols for chocolate is 1 more than the 2 symbols I drew for mint chocolate chip.

G3-M6-Lesson 2

1. Lenny surveys third graders to find out their favorite recess activities. The results are in the table below.

Favorite Recess Activities	
Recess Activity	Number of Student Votes
Swinging	6
Tag	10
Basketball	14
Kickball	8

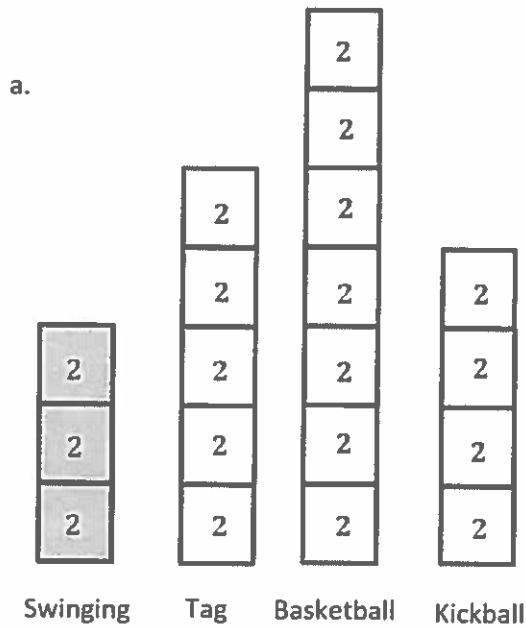
Draw units of 2 to complete the tape diagrams to show the total votes for each recess activity. The first one has been done for you.



I can do my best to draw all of my units the same size because they all represent the same thing, 2 students. I can also make sure to line up each tape diagram with the one above it.

When I make my units the same size and line up my tape diagrams, it makes it easy to compare the number of votes for each activity. I can easily see that most third graders picked basketball as their favorite recess activity.

2. Complete the vertical tape diagrams below using the data from Problem 1.



I can rotate my tape diagrams from Problem 1 to create vertical tape diagrams. I still need to make sure my units are the same size and that the tape diagrams are lined up with each other.

b. What is a good title for the vertical tape diagrams?

A good title for the vertical tape diagrams is Favorite Recess Activities.

I can use the title from the table in Problem 1 as the title for the vertical tape diagrams because they both show the same information, just in different ways.

c. Write a multiplication sentence to show the total number of votes for basketball.

$$7 \times 2 = 14$$

There are 7 units of 2 for basketball, so I can represent the total with the multiplication sentence $7 \times 2 = 14$.

d. If the tape diagrams in Problem 1 were made with units of 1, how would your multiplication sentence in Problem 2(c) change?

If my tape diagrams were made with units of 1 instead of 2, the multiplication sentence for Problem 2(c) would be $14 \times 1 = 14$ because there would be 14 units of 1.

Since the value of each unit is less, I need a greater number of units to represent the same total.

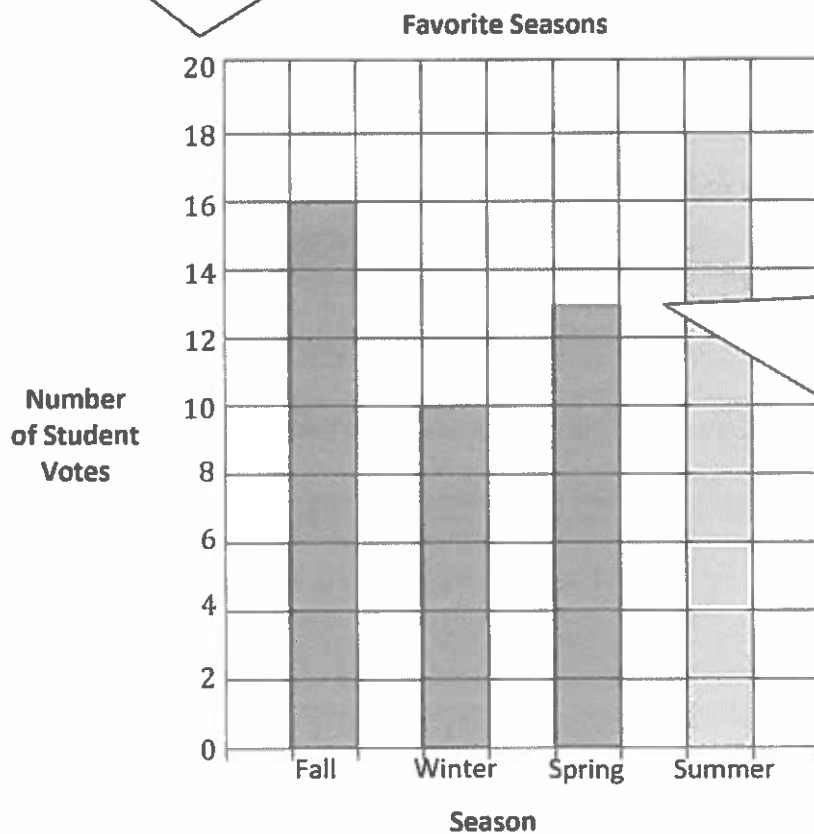
G3-M6-Lesson 3

1. This table shows the favorite seasons of third graders.

Favorite Seasons	
Season	Number of Student Votes
Fall	16
Winter	10
Spring	13
Summer	?

Use the table to color the bar graph.

The scale on the graph tells me that each square in the grid represents 2 students. To represent the number of students who picked fall, I can color 8 squares in the grid because $8 \times 2 = 16$.



I can represent the number of students who picked spring by coloring 6 whole squares and a half square in the grid. Since each square represents 2 students, I can color half a square to represent 1 student.

$$6 \times 2 = 12$$

$$12 + 1 = 13$$

- a. How many students voted for summer?

18 students voted for summer.

I can count by two on the bar graph to figure out how many students voted for summer.

- b. How many more students voted for fall than for spring? Write a number sentence to show your thinking.

$$16 - 13 = 3$$

I can subtract the number of students who voted for spring from the number of students who voted for fall.

3 more students voted for fall than for spring.

- c. Which combination of seasons gets more votes, fall and winter together or spring and summer together? Show your work.

Fall and winter: $16 + 10 = 26$

Spring and summer: $13 + 18 = 31$

The combination of spring and summer together gets more votes than fall and winter together.

I can add the votes for fall and winter to figure out how many students voted for those two seasons. Then I can do the same thing for spring and summer. I can compare the totals to figure out which combination of seasons gets more votes.

- d. How many third graders voted in all? Show your work.

$$16 + 10 + 13 + 18$$

$$\begin{array}{r} \vee \\ 26 + 13 + 18 \end{array}$$

$$\begin{array}{r} \vee \\ 39 + 18 \\ \circlearrowleft \quad \nearrow \\ 1 \quad 17 \end{array}$$

$$39 + 1 = 40$$

$$40 + 17 = 57$$

I can add the votes for all 4 seasons to find the total number of third graders who voted. Or, I can add the totals of fall and winter and spring and summer from Problem 1(c).

$$26 + 31 = 57$$

Either way, I get the same answer!

57 third graders voted in all.

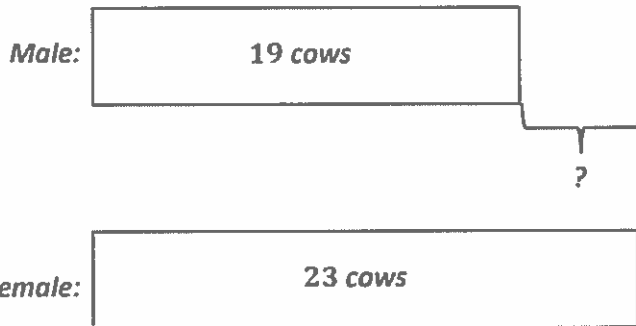
G3-M6-Lesson 4

1. Farmer Brown collects the data below about the cows on his farm.

Cows in South Field		Cows in North Field	
Male		Male	
Female		Female	
= 2 cows		= 2 cows	

The key tells me that each circle represents 2 cows. That means that half a circle represents 1 cow.

a. How many fewer male cows does Farmer Brown have than female cows?



I can draw tape diagrams to represent the number of male cows and female cows in the south and north fields. My tape diagrams help me see that I can subtract 19 from 23 to solve.

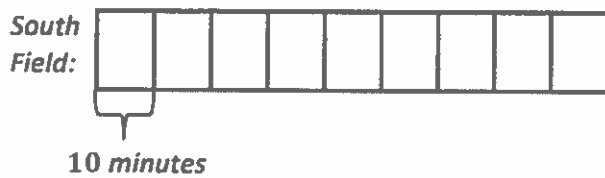
$$23 - 19 = ?$$

$$24 - 20 = 4$$

I can use compensation to subtract. When I add 1 to each number, I have a much easier problem to solve!

Farmer Brown has 4 fewer male cows than female cows.

- b. It takes Farmer Brown 10 minutes to milk each female cow. How many minutes does he spend milking all of the female cows?



I can draw tape diagrams to model the problem. Each unit in the tape diagrams represents the 10 minutes it takes to milk 1 cow.

$$23 \times 10 = ?$$

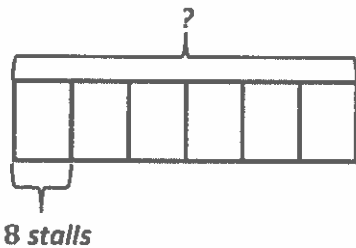
$$(20 \times 10) + (3 \times 10) =$$

$$200 + 30 = 230$$

I can see in my tape diagrams that there are 23 units of 10, which I can represent with 23×10 . I can use the break apart and distribute strategy to solve. Or I can find the total minutes for the cows in each field and then add.

Farmer Brown spends 230 minutes milking all of the female cows.

- c. Farmer Brown's barn has 6 rows of stalls with 8 stalls in each row. How many empty stalls will there be when all the cows are in the barn?



I can draw a tape diagram to model the rows of stalls in the barn. I can multiply to find the total number of stalls.

$$6 \times 8 = 48$$

$$23 + 19 = ?$$

22 1

$$19 + 1 = 20$$

$$20 + 22 = 42$$

I know there are 19 male cows and 23 female cows from my work in Problem 1(a). I can add to find the total number of cows, 42. Then, I can subtract the number of cows from the number of stalls to solve for the number of empty stalls.

$$48 - 42 = 6$$

There are 6 empty stalls when all of the cows are in the barn.

G3-M6-Lesson 5

1. Samantha measures 3 crayons to the nearest inch, $\frac{1}{2}$ inch, and $\frac{1}{4}$ inch. She records the measurements in the chart below.

Crayon (color)	Measured to the Nearest Inch	Measured to the Nearest $\frac{1}{2}$ Inch	Measured to the Nearest $\frac{1}{4}$ Inch
Orange	4	$4\frac{1}{2}$	$4\frac{3}{4}$
Pink	2	$2\frac{1}{2}$	$2\frac{1}{2}$
Blue	6	6	$5\frac{3}{4}$

- a. Which crayon is the longest? blue

It measures $5\frac{3}{4}$ inches.

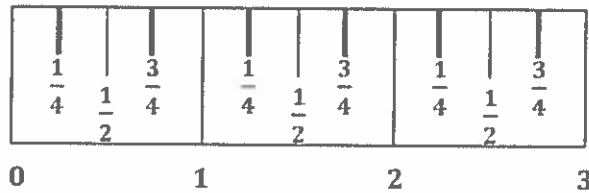
The blue crayon was measured 3 times, but the most precise measurement is $5\frac{3}{4}$ inches.

- b. Look carefully at Samantha's data. Which crayon most likely needs to be measured again? Explain how you know.

The orange crayon most likely needs to be measured again. Samantha recorded 4 inches as the measurement to the nearest inch and $4\frac{3}{4}$ inches as the measurement to the nearest $\frac{1}{4}$ inch. Those measurements don't make sense. If the crayon really measures close to $4\frac{3}{4}$ inches, then the measurement to the nearest inch would be 5 inches, not 4 inches.

$4\frac{3}{4}$ inches is only $\frac{1}{4}$ inch away from 5 inches. It doesn't make sense for the same crayon to have measurements of $4\frac{3}{4}$ inches and 4 inches.

2. Evelyn marks a 3-inch paper strip into equal parts as shown below.



I can start at the edge of the paper strip and label it 0 inches. Then I can label the rest of the whole inches. I can label the mark halfway between each whole inch as $\frac{1}{2}$ inch.

- a. Label the whole and half inches on the paper strip.
- b. Estimate to draw the $\frac{1}{4}$ inch marks on the paper strip. Then, fill in the blanks below.

2 inches are equal to 4 half inches.

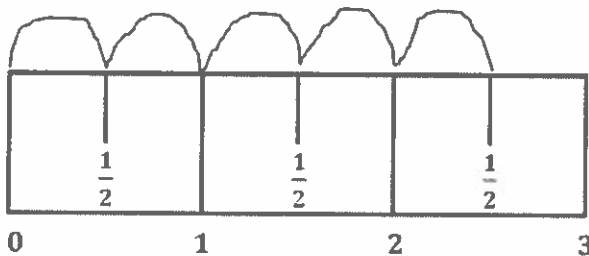
2 inches are equal to 8 quarter inches.

2 half inches are equal to 4 quarter inches.

4 quarter inches are equal to 2 half inches.

I can estimate to partition each $\frac{1}{2}$ inch into 2 equal parts to mark and label the $\frac{1}{4}$ inches. Then I can use the strip to help me fill in the blanks.

3. Samantha says her pink crayon measures $2\frac{1}{2}$ inches. Daniel says that's the same as 5 half inches. Explain how they are both correct.



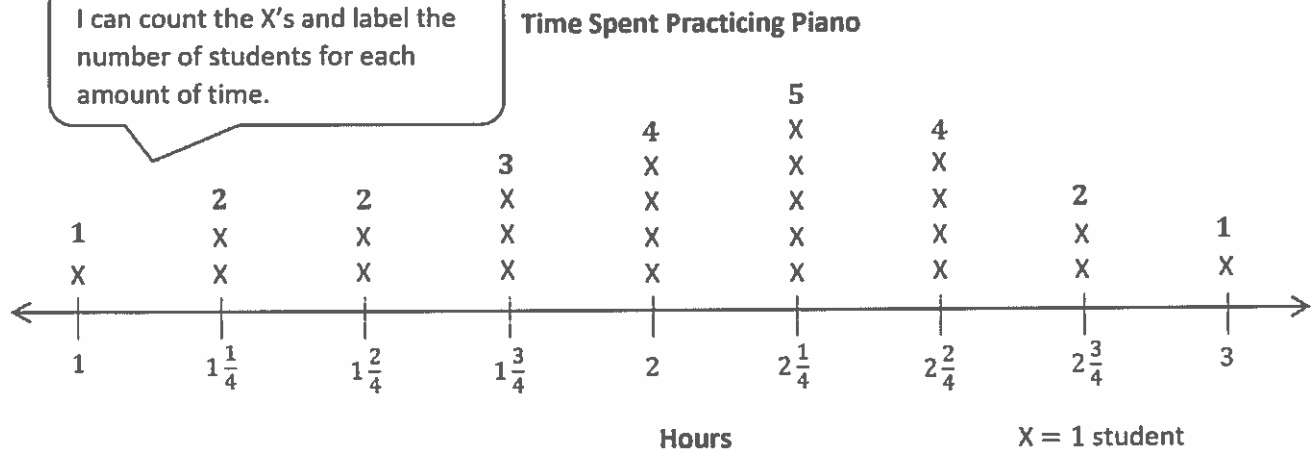
I can see in my drawing that there are 5 half inches in $2\frac{1}{2}$ inches.

They are both correct because there are 2 half inches in each inch, so $2\frac{1}{2}$ inches is equal to 5 half inches.

G3-M6-Lesson 6

Mr. Jackson records the amount of time his piano students spend practicing in one week. The times are shown on the line plot below.

I can count the X's and label the number of students for each amount of time.



- a. How many students practiced for 2 hours?

4 students practiced for 2 hours.

I can look at the labels I put on the line plot after counting to easily answer this question.

- b. How many students take piano lessons from Mr. Jackson? How do you know?

24 students take lessons from Mr. Jackson. I know because I counted all of the X's on the line plot.

I can count the X's, or I can add all of the numbers that I labeled on the line plot.
 $1 + 2 + 2 + 3 + 4 + 5 + 4 + 2 + 1 = 24$

- c. How many students practiced for more than $2\frac{2}{4}$ hours?

3 students practiced for more than $2\frac{2}{4}$ hours.

Since it says more than $2\frac{2}{4}$ hours, I can just count the X's for $2\frac{3}{4}$ hours and 3 hours.

- d. Mr. Jackson says that for students to participate in the recital, they must practice for at least 2 hours. How many students can participate in the recital?

16 students can participate in the recital.

I can count the X's for the times that are equal to or more than 2 hours because the problems says, "at least 2 hours."

- e. Mr. Jackson notices that the 3 most frequent times spent practicing are 2 hours, $2\frac{1}{4}$ hours, and $2\frac{2}{4}$ hours. Do you agree? Explain your answer.

Yes, I agree. 4 students practiced for both 2 hours and $2\frac{2}{4}$ hours, and 5 students practiced for $2\frac{1}{4}$ hours. These numbers of students, 4 and 5, are the most for any of the times practiced.

I know that "most frequent times" means the times that most students spend practicing.

- f. Mr. Jackson says that the most common time spent practicing is 10 quarter hours. Is he right? Why or why not?

No, he's not right. The most common time spent practicing is $2\frac{1}{4}$ hours. Since there are 4 quarter hours in each hour, there are 9 quarter hours in $2\frac{1}{4}$ hours.

$$2 \times 4 = 8$$

$$8 + 1 = 9$$

I know that the most common time spent practicing is $2\frac{1}{4}$ hours. I find the number of quarter hours in $2\frac{1}{4}$ hours first by multiplying 2×4 because there are 2 hours, and each hour is made up of 4 quarter hours. Then I can add $8 + 1$ because there is 1 more quarter hour in the time $2\frac{1}{4}$ hours. That makes 9 quarter hours.

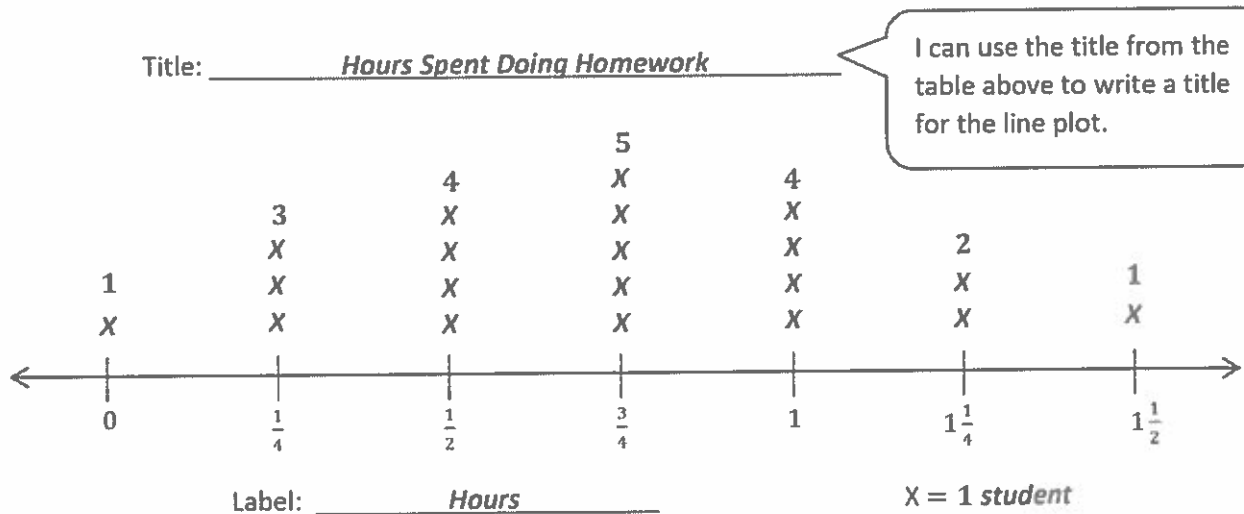
G3-M6-Lesson 7

1. The table below shows the amount of time students in Mrs. Bishop’s class spent doing homework on Monday night.

Hours Spent Doing Homework				
$1\frac{1}{4}$ ✓	$\frac{3}{4}$ ✓	$\frac{1}{4}$ ✓	$\frac{1}{2}$ ✓	$1\frac{1}{2}$ ✓
$\frac{3}{4}$ ✓	1 ✓	$\frac{3}{4}$ ✓	1 ✓	$\frac{1}{2}$ ✓
0 ✓	$\frac{1}{2}$ ✓	$\frac{3}{4}$ ✓	$\frac{1}{2}$ ✓	$\frac{3}{4}$ ✓
1 ✓	$\frac{1}{4}$ ✓	$\frac{1}{4}$ ✓	1 ✓	$1\frac{1}{4}$ ✓

I can draw a checkmark next to each time after I plot it. That way, I can be sure to plot each time only once.

- a. Use the data to complete the line plot below.



I can use the title from the table above to write a title for the line plot.

- b. How many students spent $\frac{1}{2}$ hour doing their homework?

4 students spent $\frac{1}{2}$ hour doing their homework.

I can count the X's for $\frac{1}{2}$ hour to answer this question.

- c. How many students spent less than 1 hour doing their homework?

13 students spent less than 1 hour doing their homework.

I can count the X's for 0 hours, $\frac{1}{4}$ hour, $\frac{1}{2}$ hour, and $\frac{3}{4}$ hours because these times are all less than 1 hour.

- d. How many students in Mrs. Bishop's class spent time doing homework on Monday night? How do you know?

19 students in Mrs. Bishop's class spent time doing homework on Monday night. I know because I counted all of the X's except the X for 0 hours because that student didn't spend any time doing homework Monday night.

This problem was a little tricky because usually for a problem like this I can just count all of the X's. I can't count all of the X's this time because 1 student spent 0 hours doing homework on Monday night.

- e. Kathleen says most students spent at least 1 hour doing their homework. Is she correct? Explain your thinking.

No, Kathleen is not correct. 7 students spent at least 1 hour doing their homework, but 13 students spent less than 1 hour doing their homework. Kathleen could say that most students spent less than 1 hour doing their homework.

I can count the X's for 1 hour, $1\frac{1}{4}$ hours, and $1\frac{1}{2}$ hours to figure out how many students spent at least 1 hour doing their homework. I can look at my answer to Problem 1(c) to see how many students spent less than 1 hour doing their homework.

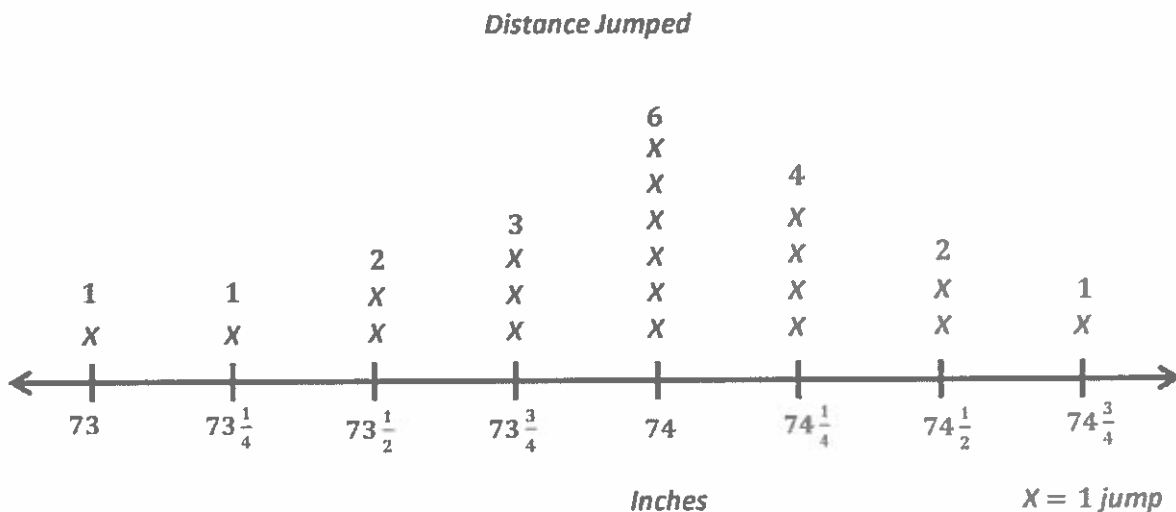
G3-M6-Lesson 8

Samuel is training his frog to compete in the frog-jumping contest at the county fair. The table below shows the distances that Samuel’s frog jumped during his training time.

Distance Jumped (in Inches)				
$73\frac{3}{4}$ ✓	74 ✓	$74\frac{1}{4}$ ✓	74 ✓	$73\frac{1}{2}$ ✓
$74\frac{1}{2}$ ✓	$74\frac{1}{4}$ ✓	$74\frac{1}{2}$ ✓	$73\frac{3}{4}$ ✓	74 ✓
$73\frac{1}{4}$ ✓	$74\frac{3}{4}$ ✓	73 ✓	$74\frac{1}{4}$ ✓	$73\frac{1}{2}$ ✓
74 ✓	$73\frac{3}{4}$ ✓	74 ✓	74 ✓	$74\frac{1}{4}$ ✓

I can circle the shortest and longest distances to find the endpoints for my line plot.

a. Use the data to create a line plot below.



- b. Explain the steps you took to create the line plot.

I found the endpoints by finding the shortest and longest distances, 73 inches and $74\frac{3}{4}$ inches. Then I figured out what interval I should use on my line plot by finding the smallest unit, $\frac{1}{4}$ inch. I marked the endpoints and partitioned and labeled quarter-inch intervals. Then I recorded the data by drawing X's above each measurement. I wrote a title, made a key, and labeled the measurements as Inches.

I can count by quarter inches from 73 inches to $74\frac{3}{4}$ inches to figure out how many quarter-inch intervals I need on my line plot.

- c. How many more times did Samuel's frog jump $74\frac{1}{4}$ inches than $73\frac{1}{2}$ inches?

$$4 - 2 = 2$$

I can subtract the number of times the frog jumped $73\frac{1}{2}$ inches from the number of times the frog jumped $74\frac{1}{4}$ inches.

Samuel's frog jumped $74\frac{1}{4}$ inches 2 more times than it jumped $73\frac{1}{2}$ inches.

- d. Find the three most frequent measurements on the line plot. What does this tell you about the distance of most of the frog's jumps?

The three most frequent measurements on the line plot are $73\frac{3}{4}$ inches, 74 inches, and $74\frac{1}{4}$ inches. This tells me that most of the frog's jumps were between $73\frac{3}{4}$ inches and $74\frac{1}{4}$ inches.

I can prove this is true by subtracting the number of times the frog jumped $73\frac{3}{4}$ inches, 74 inches, or $74\frac{1}{4}$ inches from the total number of times the frog jumped.

$$20 - 13 = 7$$

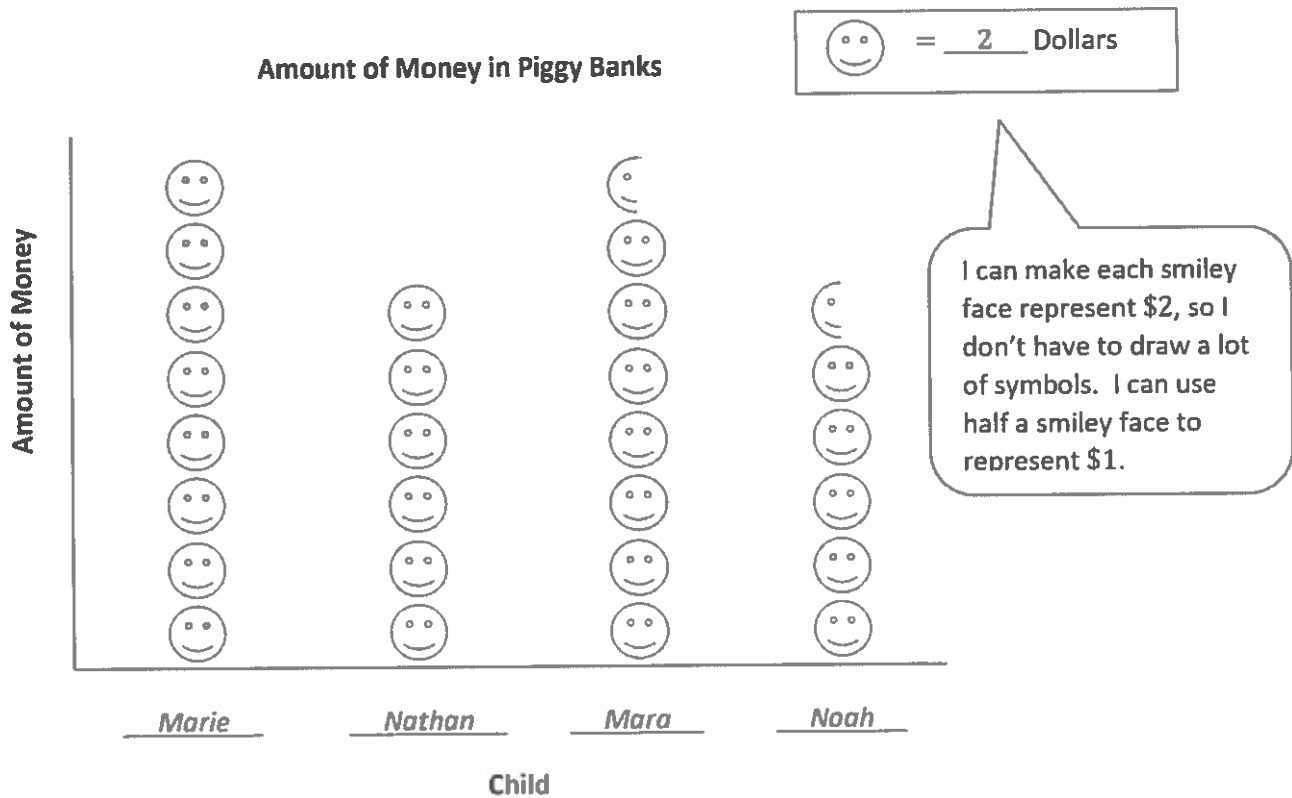
Thirteen of the frog's jumps were between $73\frac{3}{4}$ inches and $74\frac{1}{4}$ inches. Seven of the jumps were not part of the three most frequent measurements.

G3-M6-Lesson 9

1. The table below shows the amount of money Mrs. Mack’s children have in their piggy banks.

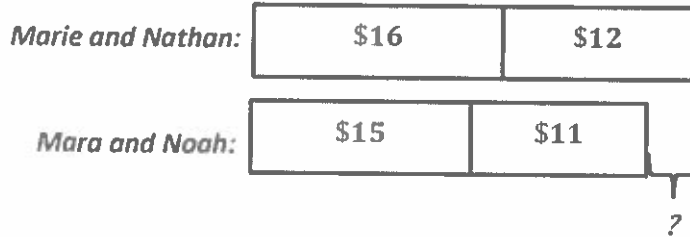
Child	Amount of Money
Marie	\$16
Nathan	\$12
Mara	\$15
Noah	\$11

Create a picture graph below using the data in the table.



2. Use the table or graph to answer the following questions.

a. How much more money do Marie and Nathan have together than Mara and Noah have together?

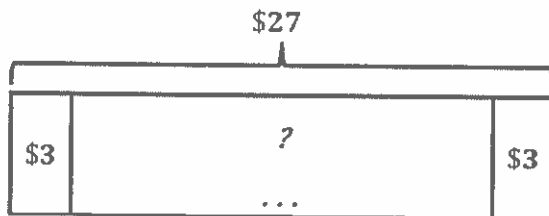


I can find the total amounts of money for Marie and Nathan and Mara and Noah, and then I can subtract.

$\$28 - \$26 = \$2$ *Marie and Nathan have \$2 more than Mara and Noah.*

b. Marie and Noah combine their money to buy packs of baseball cards. Each pack of baseball cards costs \$3. How many packs of baseball cards can they buy?

$\$16 + \$11 = \$27$



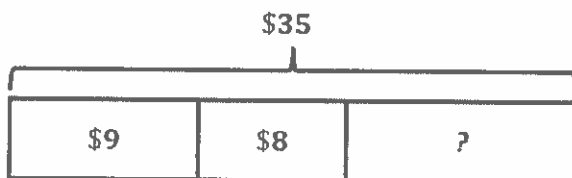
I can add to find the total amount of money Marie and Noah have. Then I can divide that amount by \$3 to figure out how many packs of baseball cards they can buy.

$\$27 \div \$3 = 9$

Marie and Noah can buy 9 packs of baseball cards.

c. Mara gets \$20 for her birthday. She combines her birthday money with the money in her piggy bank to buy a book for \$9 and a bouquet of flowers for her mom. She puts the \$8 that she has left back in her piggy bank. How much does the bouquet of flowers cost?

$\$20 + \$15 = \$35$



$\$9 + \$8 = \$17$

	2	15
\$	9	8
-	9	8
\$	1	7
\$	1	8

I can add the amount of money Mara spends on a book and the amount of money she puts back in her piggy bank. Then, I can subtract that amount from her total amount of money.

The bouquet of flowers costs \$18.