

Name _____

Problem Solving • Organize Data

One way to show data is in a tally table. Another way to show data is in a frequency table. A **frequency table** uses numbers to record data.

Favorite Sport	
Sport	Tally
Soccer	
Baseball	
Football	

The students in Jake’s class voted for their favorite sport. How many more students chose soccer than chose baseball?

Read the Problem	Solve the Problem										
<p>What do I need to find?</p> <p>How many more students chose soccer than chose baseball?</p>	<p>Count the tally marks for each sport. Write the numbers in the frequency table.</p> <p>Think: = 1 vote = 5 votes</p> <p>Soccer has 1 and 4 , so write 9 in the frequency table.</p> <table border="1"> <thead> <tr> <th colspan="2">Favorite Sport</th> </tr> <tr> <th>Sport</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>Soccer</td> <td>9</td> </tr> <tr> <td>Baseball</td> <td>6</td> </tr> <tr> <td>Football</td> <td>4</td> </tr> </tbody> </table> <p>Subtract to find how many more students chose soccer than chose baseball.</p> $9 - 6 = 3$ <p>So, 3 more students chose soccer than chose baseball as their favorite sport.</p>	Favorite Sport		Sport	Number	Soccer	9	Baseball	6	Football	4
Favorite Sport											
Sport		Number									
Soccer	9										
Baseball	6										
Football	4										
<p>What information do I need to use?</p> <p>the data about favorite sports from the tally table</p>											
<p>How will I use the information?</p> <p>I will count the tally marks. Then I will write the number of tally marks for each sport in the frequency table.</p> <p>Next, I will subtract to compare the votes for soccer and the votes for baseball.</p>											

1. How many students chose football and baseball combined?

2. How many fewer students chose football than chose soccer?

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Find the Frequency

Mr. MacTavish’s class started to make tally tables and frequency tables. The students did not finish the tables before the end of the day. Use the clues and data given to complete each table.

- Clue:** A total of 21 students voted for their favorite yogurt topping.

Favorite Yogurt Topping	
Type	Tally
Sprinkles	
Nuts	
Fruit	

Favorite Yogurt Topping	
Type	
Sprinkles	
Nuts	
Fruit	6

- Clue:** The number of votes for summer is equal to 1 more than the sum of the votes for spring and fall together.

Favorite Season	
Season	Tally
Spring	
Summer	
Fall	
Winter	

Favorite Season	
	Number
	5
Summer	
Fall	5

- Stretch Your Thinking** What other clues could be used to find the missing data in Exercise 1? Write a different clue for the exercise.

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Use Picture Graphs

A **picture graph** shows information using small pictures or symbols.

A **key** tells what the symbol stands for.

A symbol can stand for more than 1.

Which state in the picture graph below has 9 national park areas?

The key for the picture graph shows that each  = 6 national park areas.

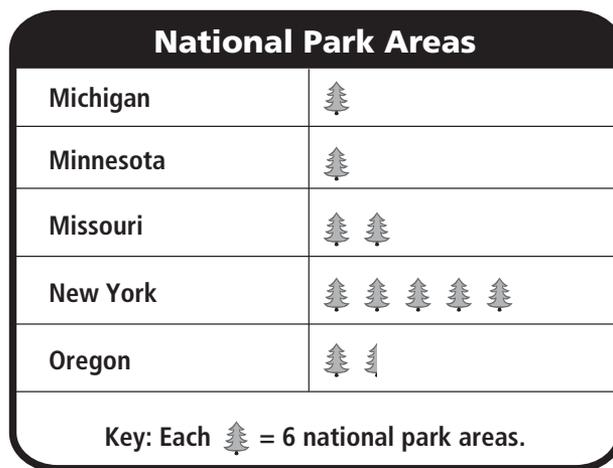
Count the number of  next to each state.

Oregon has one tree picture and half of a tree picture.

Think:

 = 6 park areas

 = 3 park areas



So, **Oregon** has 9 national park areas.

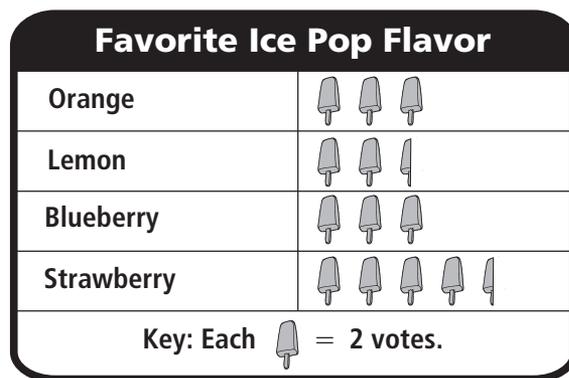
Use the Favorite Ice Pop Flavor picture graph for 1–4.

1. How many people chose orange?

2. How many people chose lemon?

3. How many fewer people chose lemon than chose strawberry?

4. How many people in all were surveyed?



Name _____

Using Picture Keys

The key shows how many each picture stands for.

KEY			
 = 3	 = 5	 = 7	 = 8

Use the key to complete the addition sentence.



$$3 + 3 + 8 + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$$



$$\underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$$



$$\underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$$



$$\underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$$

5. **Stretch Your Thinking** Draw four different combinations of pictures that represent a sum of 20.

Name _____

Make Picture Graphs

Use the data in this table to make a picture graph.

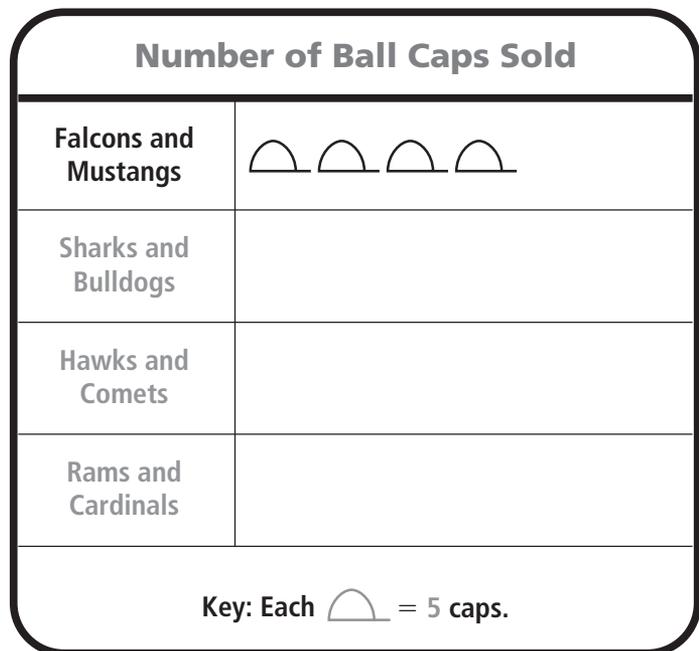
Number of Ball Caps Sold	
Basketball Game	Caps
Falcons and Mustangs	20
Sharks and Bulldogs	30
Hawks and Comets	5
Rams and Cardinals	15

Step 1 Write the title.

Step 2 Write the names of the games.

Step 3 Decide what number each picture will represent. You can count by fives to find the number of caps sold, so let each  represent 5 caps.

Step 4 Draw one cap for every 5 caps sold during each game. There were 20 caps sold during the Falcons and Mustangs game. Count to 20 by fives. 5, 10, 15, 20. So, 4 caps should be drawn. Draw the caps for the rest of the games.



Use your picture graph above for 1–3.

1. During which game were the most ball caps sold?

2. How many pictures would you draw if 45 ball caps were sold in a game?

3. During which two games were a total of 25 caps sold?

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Picture-Perfect Pizza

Harrison surveyed 26 students about their favorite pizza topping. Complete the table at the right.

Favorite Pizza Topping	
Pizza Topping	Number of Students
Pepperoni	
Sausage	5
Mushrooms	6
Olives	7

Key:	

1. Use the data in the table to make a picture graph.
2. Which topping did most students choose?

3. How many more students chose olives than chose sausage as their favorite topping?

4. How many fewer students chose pepperoni than chose sausage and mushrooms combined?

5. **Write Math** Suppose two students were absent the day the survey was taken. When they returned to school, both students chose mushrooms as their favorite topping. How would the graph change?

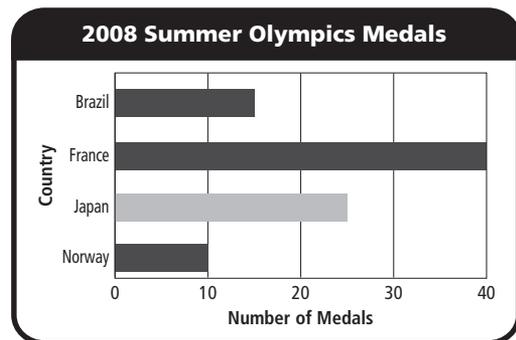
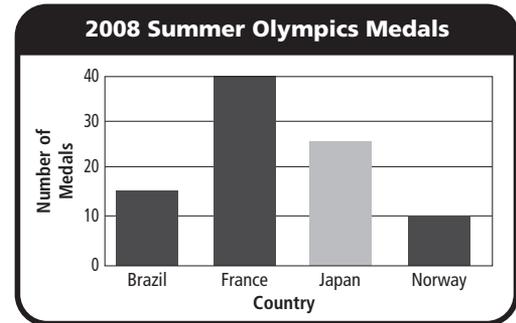
Name _____

Use Bar Graphs

How many Olympic medals did Norway win in the 2008 Summer Olympics?

- Both bar graphs show the same data about Olympic medals. The top graph is a **vertical bar graph**. The bottom graph is a **horizontal bar graph**.
- Find Norway on the vertical bar graph and follow the bar to its end. Then follow the end across to the scale to find the number of medals.
10 medals.
- Find Norway on the horizontal bar graph and follow the bar to its end. Then follow the end down to the scale to find the number of medals.
10 medals.

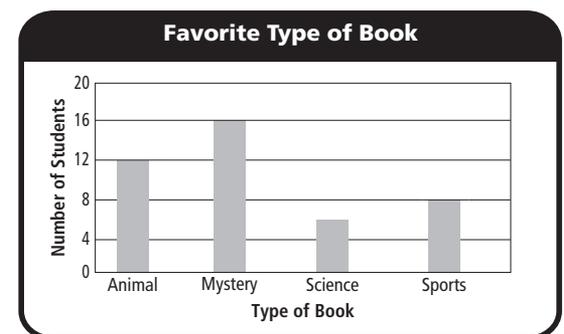
So, Norway won **10** medals.



Use the Favorite Type of Book bar graph for 1–4.

1. Which type of book did the most students choose?

2. Which type of book received 4 fewer votes than mystery?



3. Did more students choose books about mystery or books about science and sports together?

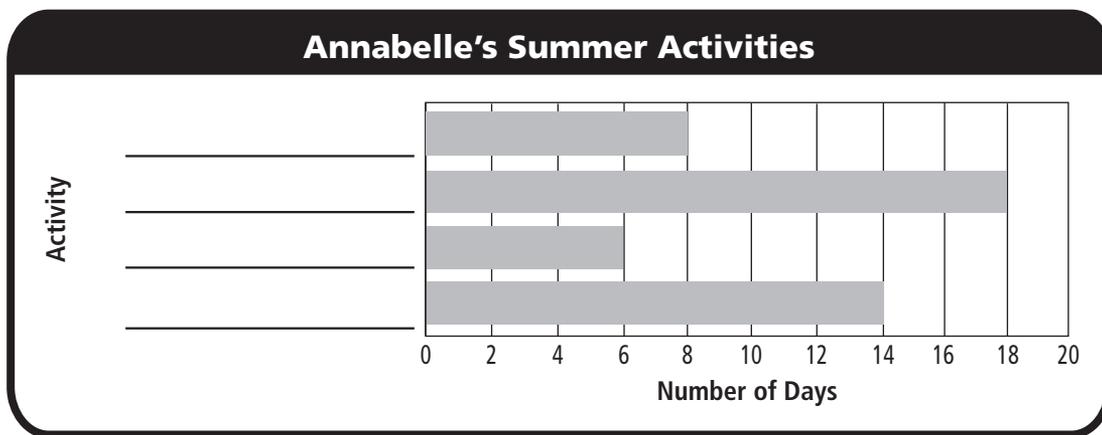
4. How many students in all answered the survey?

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Summer Bar Graph

Annabelle tells about her summer by using a bar graph. She shows the number of days she spent doing each activity, but forgets to write the activities! Use the clues below to help Annabelle complete her bar graph.

- Annabelle spent the least amount of time babysitting.
- Annabelle did not take an art class.
- Annabelle spent 4 fewer days at camp than she did volunteering.
- Annabelle spent 2 more days at the beach than she did babysitting.



5.  **Write Math** Which clue was the least helpful? **Explain.**

6. **Stretch Your Thinking** Do you think the graph tells what Annabelle did every day in the summer? **Explain.**

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Make Bar Graphs

Use data in a table to make a bar graph.

Step 1 Write the title for the bar graph.

Step 2 Label the side and the bottom.

Step 3 Write the names of the sports.

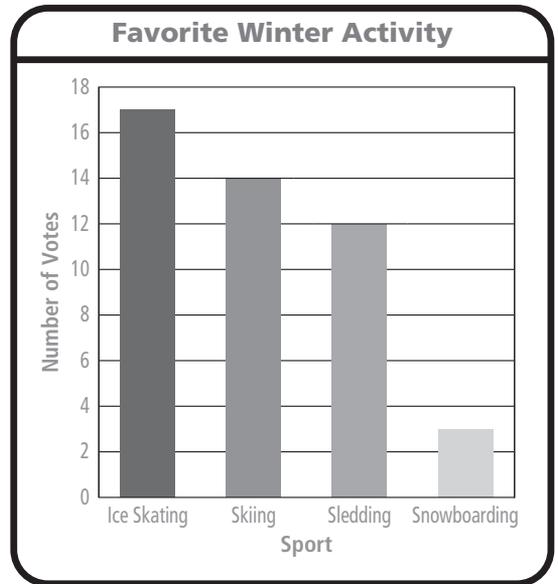
Step 4 Choose a scale for your graph.

- The scale must be able to show the least number, **3**, and the greatest number, **17**.
- The numbers must be equally spaced. Start with 0 and count by twos until you reach **18**.

Step 5 Draw the bar for ice skating.
The bar will end halfway between **16** and **18** at **17**.

Step 6 Then use the results in the table to draw the rest of the bars.

Favorite Winter Activity	
Sport	Number of Votes
Ice Skating	17
Skiing	14
Sledding	12
Snowboarding	3



Use the results in the table to make a bar graph.

Favorite Summer Sport	
Sport	Number of Votes
Swimming	15
Inline Skating	10
Cycling	20

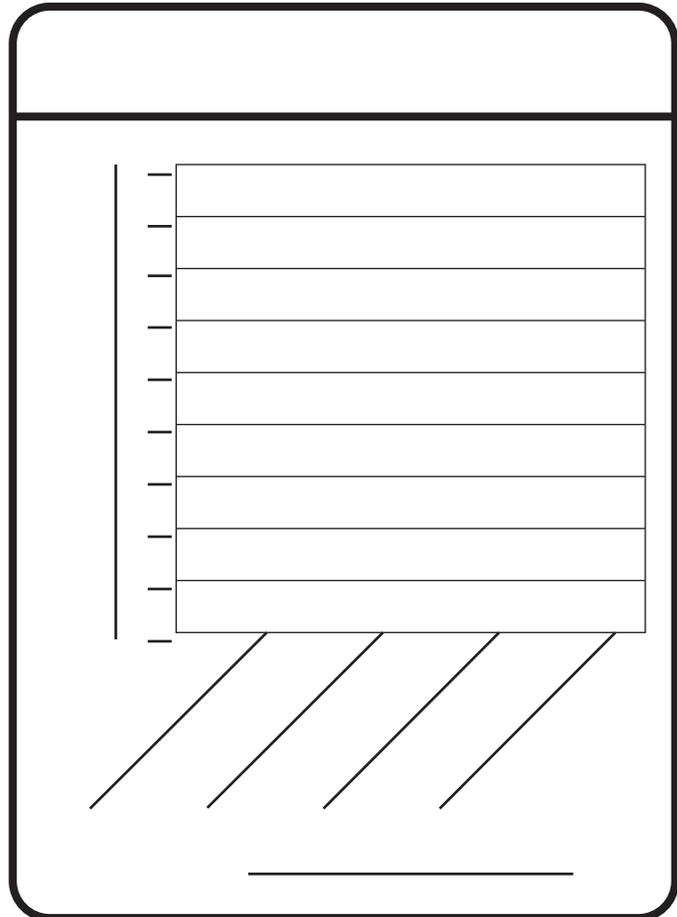
Name _____

Field Trip Survey

Ms. Klein surveyed some students to find where they wanted to go for a field trip. She gave them four choices and recorded the results in a table.

1. Make a bar graph to show the results of the survey.

Field Trip Choices	
Location	Number of Students
Art Museum	15
Science Center	21
Computer Museum	12
Zoo	24



2. How many students in all were surveyed?

3. Which location was chosen twice as often as computer museum?

4. Which location was chosen more than the computer museum but less than the science center?

5. **Write Math** How would the graph change if 6 more students answered the survey and all chose the art museum?

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Solve Problems Using Data

You can use a model or write a number sentence to help you answer questions about data.

The bar graph shows the different ways students use the computer center after school. How many more students use the computer center for projects than for games?

One Way Use a model.

Find the bar for projects. The bar ends at 12. So, **12** students use the computer center for projects.

Find the bar for games. The bar ends halfway between 4 and 6. So, **5** students use the computer center for games. Count back along the scale from 12 to 5 to find the difference. The difference is 7 students.

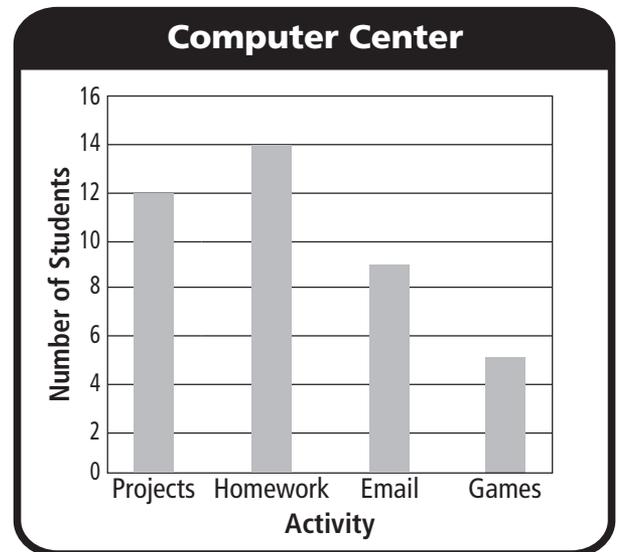
Another Way Write a number sentence.

Subtract to compare the number of students.

Think: There are 12 students who work on projects. There are 5 students who play games.

$$12 - 5 = 7$$

So, **7** more students use the computer center for projects than for games.



Use the Computer Center bar graph for 1–3.

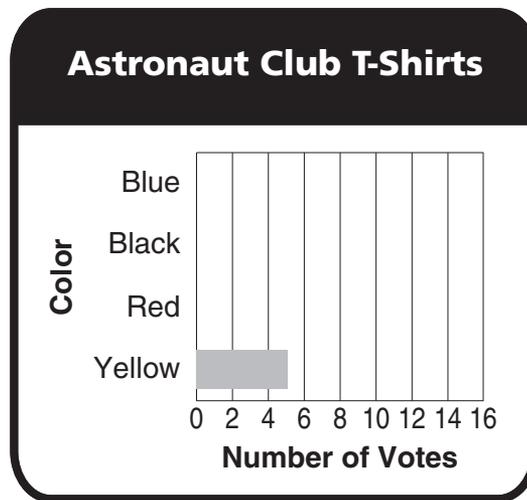
- How many more students use the computer center for homework than for email? _____ more students
- How many fewer students use the computer center for games than for homework? _____ fewer students
- Do more students use the computer center for projects or for email and games combined? **Explain.** _____

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Bar Graph Problems

Sydney needs to complete the bar graph, but she lost her frequency table with the data.

Use the clues about the data to draw each bar on the graph.



- The number of students who chose red T-shirts is double the number of students who chose yellow T-shirts. How many students chose red T-shirts?

_____ students
- The number of students who chose black T-shirts is equal to the number of students who chose red and yellow T-shirts combined. How many students chose black T-shirts?

_____ students
- There were 7 fewer students who chose blue T-shirts than chose black T-shirts. How many students chose blue T-shirts?

_____ students

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Use and Make Line Plots

A **line plot** uses marks to record each piece of data above a number line.

Louise measured the heights of tomato plants in her garden. She recorded the height of each plant.

How many tomato plants are there?

Each **X** stands for 1 **plant**.

Count all the **Xs**. There are **19** in all.

This tells the total number of **plants**.

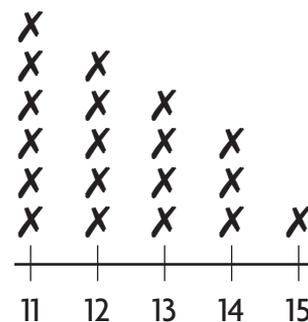
How many plants are taller than 13 inches?

Add the number of **Xs** for 14 and 15.

3 plants are 14 inches tall. 1 plant is 15 inches tall.

$$3 + 1 = 4$$

So, **4 plants** are taller than 13 inches.



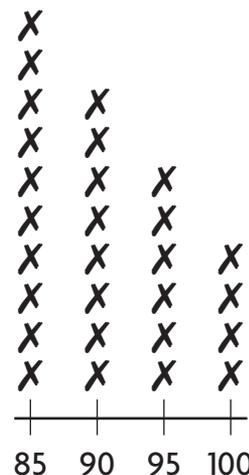
Heights of Tomato Plants (inches)

Use the Spelling Test Scores line plot for 1–3.

1. Which test score did the most students receive?

2. How many more students scored 90 than 100?

3. How many students in all took the spelling test?

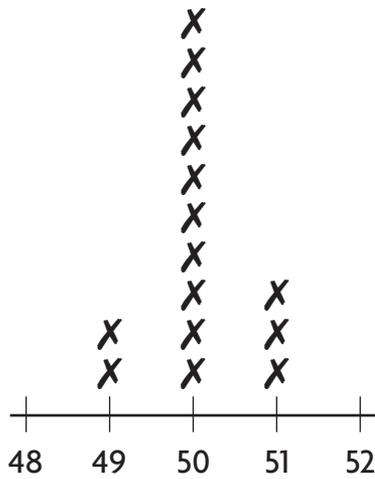


Spelling Test Scores

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The Plot Thickens!

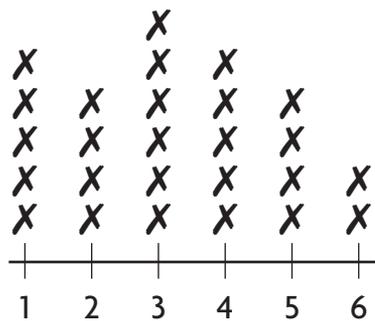
Use the line plot below for 1–2.



- Jack forgot to write the title for this line plot. **Explain** why the line plot probably does not show ages of third graders.

- Write a title that makes sense for the line plot. **Explain** why you think it makes sense.

Use the line plot below for 3–5.



**Number of Books Read
over Summer Break**

- How many students read 5 or more books?

- How many students read the greatest number of books?

- Write Math** Tell how you can use the data in the line plot to find the number of students who read over summer break.
