1. “What is your favorite color?” Survey the class to complete the tally chart below.

<table>
<thead>
<tr>
<th>Color</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>1111</td>
</tr>
<tr>
<td>Yellow</td>
<td>11</td>
</tr>
<tr>
<td>Red</td>
<td>1111 1</td>
</tr>
<tr>
<td>Blue</td>
<td>1111 11</td>
</tr>
<tr>
<td>Orange</td>
<td>11</td>
</tr>
</tbody>
</table>

2. Use the tally chart to answer the following questions.
   a. How many students chose orange as their favorite color? 3 students chose orange.
   b. How many students chose yellow as their favorite color? 2 students chose yellow.
   c. Which color did students choose the most? How many students chose it? Students chose blue the most. 7 students chose blue.
   d. Which color did students choose the least? How many students chose it? Students chose yellow the least. 2 students chose yellow.
   e. What is the difference between the number of students in (c) and (d)? Write a number sentence to show your thinking.
      \[ 7 - 2 = 5 \text{ students} \]
   f. Write an equation to show the total number of students surveyed on this chart.
      \[ \frac{4 + 2 + 6 + 7 + 3}{12 + 10} = 22 \text{ students were surveyed.} \]
3. Use the tally chart in Problem 1 to complete the picture graphs below.

<table>
<thead>
<tr>
<th></th>
<th>Favorite Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td><img src="image1" alt="Tally Chart" /></td>
</tr>
<tr>
<td>Yellow</td>
<td><img src="image2" alt="Tally Chart" /></td>
</tr>
<tr>
<td>Red</td>
<td><img src="image3" alt="Tally Chart" /></td>
</tr>
<tr>
<td>Blue</td>
<td><img src="image4" alt="Tally Chart" /></td>
</tr>
<tr>
<td>Orange</td>
<td><img src="image5" alt="Tally Chart" /></td>
</tr>
</tbody>
</table>

Each ❤ represents 1 student.

<table>
<thead>
<tr>
<th></th>
<th>Favorite Colors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td><img src="image6" alt="Tally Chart" /></td>
</tr>
<tr>
<td>Yellow</td>
<td><img src="image7" alt="Tally Chart" /></td>
</tr>
<tr>
<td>Red</td>
<td><img src="image8" alt="Tally Chart" /></td>
</tr>
<tr>
<td>Blue</td>
<td><img src="image9" alt="Tally Chart" /></td>
</tr>
<tr>
<td>Orange</td>
<td><img src="image10" alt="Tally Chart" /></td>
</tr>
</tbody>
</table>

Each ❤ represents 2 students.
4. Use the picture graph in Problem 3(b) to answer the following questions.

a. What does each ❤️ represent?

Each ❤️ represents 2 students.

b. Draw a picture and write a number sentence to show how to represent 3 students in your picture graph.

❤️ ❤️

2 + 1 = 3

❤️

2

1

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

7 x 2 = 14

It represents 14 students.

d. How many more ❤️ did you draw for the color that students chose the most than for the color that students chose the least? Write a number sentence to show the difference between the number of votes for the color that students chose the most and the color that students chose the least.

I drew 2 and a half more hearts for blue than for yellow.

7 - 2 = 5

5 more students chose blue than yellow.
1. Find the total number of stamps each student has. Draw tape diagrams with a unit size of 4 to show the number of stamps each student has. The first one has been done for you.

- Dana: 4 4 4 4
- Tanisha: 4 4
- Raquel: 4 4 4 4 4 4 4
- Anna: 4 4 4 4 4 4 4 4

Each □ represents 1 stamp.

2. Explain how you can create a vertical tape diagram to show this data.

I can create a vertical tape diagram by turning these tape diagrams. It shows the same data but in a different way.
3. Complete the vertical tape diagrams below using the data from Problem 1.

a.

```
Dana   Tanisha   Raquel   Anna
4   4   4   4
4   4   4   4
```

b.

```
Dana   Tanisha   Raquel   Anna
8   8   8   8
8   8   8   8
```

c. What is a good title for the vertical tape diagrams?
   
   A good title is Number of Stamps Collected.

d. How many total units of 4 are in the vertical tape diagram in Problem 3(a)?
   
   There are 20 total units of 4.

e. How many total units of 8 are in the vertical tape diagram in Problem 3(b)?
   
   There are 10 total units of 8.

f. Compare your answers to Problems (d) and (e). Why does the number of units change?
   
The total number of units is less in (e) because the size of the unit in the vertical tape diagram in Problem 3(b) is greater.

g. Mattaeus looks at the vertical tape diagram in 3(b) and finds the total number of Anna and Raquel’s stamps by writing the equation, 7 × 8 = 56. Explain his thinking.
   
   Mattaeus counted the number of units for Anna and Raquel, which is 7 and multiplied that by the value of each unit, 8.
3. Complete the vertical tape diagrams below using the data from Problem 1.

a. 

b. 

Dana  Tanisha  Raquel  Anna  Dana  Tanisha  Raquel  Anna

4  4  4  4  8  8  8  8

4  4  4  4  8  8  8  8

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

A good title is Number of Stamps Collected.

d. How many total units of 4 are in the vertical tape diagram in Problem 3(a)?

There are 20 total units of 4.

e. How many total units of 8 are in the vertical tape diagram in Problem 3(b)?

There are 10 total units of 8.

f. Compare your answers to Problems (d) and (e). Why does the number of units change?

The total number of units is less in (e) because the size of the unit in the vertical tape diagram in Problem 3(b) is greater.

g. Mattaeus looks at the vertical tape diagram in 3(b) and finds the total number of Anna and Raquel's stamps by writing the equation, \(7 \times 8 = 56\). Explain his thinking.

Mattaeus counted the number of units for Anna and Raquel, which is 7 and multiplied that by the value of each unit, 8.
1. This table shows the number of students in each class.

<table>
<thead>
<tr>
<th>Class</th>
<th>Number of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baking</td>
<td>9</td>
</tr>
<tr>
<td>Sports</td>
<td>16</td>
</tr>
<tr>
<td>Chorus</td>
<td>13</td>
</tr>
<tr>
<td>Drama</td>
<td>18</td>
</tr>
</tbody>
</table>

Use the table to color the bar graph. The first one has been done for you.

- a. What is the value of each square in the bar graph? Each square is 2.

- b. Write a number sentence to find how many total students are enrolled in classes.
\[
\begin{align*}
9 + 16 + 13 + 18 &= 20 + 20 + 11 + 5 \\
5 + 20 + 12 + 20 &= 56
\end{align*}
\]
There are 56 students enrolled in classes.

- c. How many fewer students are in Sports than in Chorus and Baking combined? Write a number sentence to show your thinking.
\[
13 + 9 = 22
\]
There are 6 fewer students in Sports than in Chorus and Baking combined.

engage ny
2. This bar graph shows Kyle’s savings from February to June. Use a straight edge to help you read the graph.

Kyle’s Savings

<table>
<thead>
<tr>
<th>Month</th>
<th>Amount in dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>February</td>
<td>$30</td>
</tr>
<tr>
<td>March</td>
<td>$46</td>
</tr>
<tr>
<td>April</td>
<td>$23</td>
</tr>
<tr>
<td>May</td>
<td>$34</td>
</tr>
<tr>
<td>June</td>
<td>$40</td>
</tr>
</tbody>
</table>

a. How much did Kyle save in May? He saved $34 in May.

b. In which months did Kyle save less than $35? February, April, and May.

c. How much more did Kyle save in June than April? Write a number sentence to show your thinking.
   \[ 40 - 23 = 17 \]

d. The money Kyle saved in April was half the money he saved in March.

3. Complete the table below to show the same data given in the bar graph in problem 2.

<table>
<thead>
<tr>
<th>Months</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount in dollars saved</td>
<td>$30</td>
<td>$46</td>
<td>$23</td>
<td>$34</td>
<td>$40</td>
</tr>
</tbody>
</table>
4. This bar graph shows the number of minutes Charlotte read from Monday through Friday.

Charlotte's Reading Minutes

<table>
<thead>
<tr>
<th>Day</th>
<th>Number of minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
</tr>
</tbody>
</table>

5. Use the graph's lines as a ruler to draw in the intervals on the number line shown above. Then plot and label a point for each day on the number line.

6. Use the graph or number line to answer the following questions.

a. What days did Charlotte read the same amount of minutes? How many minutes did Charlotte read on these days?
   Charlotte read for 50 minutes on Monday, Tuesday, and Thursday.

b. How many more minutes did Charlotte read on Wednesday than on Friday?
   55 - 25 = 30 Charlotte read 30 more minutes on Wednesday than on Friday.
1. The chart below shows the number of magazines sold by each student.

<table>
<thead>
<tr>
<th>Student</th>
<th>Ben</th>
<th>Rachel</th>
<th>Jeff</th>
<th>Stanley</th>
<th>Debbie</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magazines Sold</td>
<td>300</td>
<td>250</td>
<td>100</td>
<td>450</td>
<td>600</td>
</tr>
</tbody>
</table>

a. Use the chart to draw a bar graph below. Create an appropriate scale for the graph.

b. Explain why you chose the scale for the graph.

I chose to have the scale go by hundreds because all the numbers go by hundreds or halfway between hundreds.

c. How many fewer magazines did Debbie sell than Ben and Stanley combined?

Ben and Stanley: $300 + 450 = 750$

$750 - 600 = 150$  Debbie sold 150 fewer magazines than Ben and Stanley combined.
2. The bar graph shows the number of visitors to a carnival from Monday through Friday.

<table>
<thead>
<tr>
<th>Day</th>
<th>Number of Visitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>300</td>
</tr>
<tr>
<td>Tuesday</td>
<td>350</td>
</tr>
<tr>
<td>Wednesday</td>
<td>400</td>
</tr>
<tr>
<td>Thursday</td>
<td>250</td>
</tr>
<tr>
<td>Friday</td>
<td>500</td>
</tr>
</tbody>
</table>

a. How many fewer visitors were there on the least busy day than on the busiest day?

least busy: 190 visitors  
busiest: 430 visitors  
\[ \frac{430 - 190}{240} \]  
There were 240 fewer visitors.

b. How many more people attended the fair on Monday and Tuesday combined than on Thursday and Friday combined?

Monday & Tuesday: \[ 340 + 300 = 640 \]  
Thursday & Friday: \[ 190 + 370 = 560 \]  
\[ 640 - 560 = 80 \]  
The difference is 80 people.
1. Use the rulers you made to measure different classmates’ straws to the nearest inch, $\frac{1}{2}$ inch and $\frac{3}{4}$ inch. Record the measurements in the chart below. Draw a star next to measurements that are exact.

<table>
<thead>
<tr>
<th>Straw Owner</th>
<th>Measured to the nearest inch</th>
<th>Measured to the nearest $\frac{1}{2}$ inch</th>
<th>Measured to the nearest $\frac{3}{4}$ inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>My straw</td>
<td>3</td>
<td>$2\frac{1}{2}$ *</td>
<td>2$\frac{3}{4}$ or 2$\frac{1}{2}$ *</td>
</tr>
<tr>
<td>Catherine</td>
<td>4</td>
<td>4</td>
<td>3$\frac{3}{4}$</td>
</tr>
<tr>
<td>Doug</td>
<td>2</td>
<td>2</td>
<td>2$\frac{1}{4}$</td>
</tr>
<tr>
<td>Eva</td>
<td>4</td>
<td>4$\frac{1}{2}$ *</td>
<td>4$\frac{3}{4}$ *</td>
</tr>
<tr>
<td>Aaron</td>
<td>3$\frac{3}{4}$</td>
<td>3$\frac{3}{4}$</td>
<td>3$\frac{3}{4}$</td>
</tr>
<tr>
<td>Karen</td>
<td>1 *</td>
<td>1 *</td>
<td>1 *</td>
</tr>
<tr>
<td>Philip</td>
<td>6</td>
<td>5$\frac{1}{2}$</td>
<td>5$\frac{3}{4}$</td>
</tr>
</tbody>
</table>

a) Karen’s straw is the shortest straw I measured. It measures __1__ inches.

b) Philip’s straw is the longest straw I measured. It measures __5$\frac{3}{4}$__ inches.

c) Choose a straw from your chart that was most accurately measured with the $\frac{3}{4}$ inch ruler. How do you know the $\frac{3}{4}$ inch ruler is the most accurate for measuring this straw?

Eva’s straw was most accurately measured with the $\frac{3}{4}$ inch ruler. Measuring to the nearest inch and half inch only gave close estimates, while the quarter inch gave the exact measurement.
2. Jenna marks a 5-inch paper strip into equal parts as shown below.

![Paper Strip](image)

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.

1 whole inch is equal to $\frac{2}{4}$ half-inches.

1 whole inch is equal to $\frac{4}{4}$ quarter-inches.

$\frac{1}{2}$ inch is equal to $\frac{2}{4}$ quarter-inches.

c) Describe how Jenna could use this paper strip to measure an object that is longer than 5 inches.

Jenna could mark the first 5 inches. Then she can place the paper strip on top to measure the rest of the object. Then Jenna will need to add the measurements together.

3. Sari says her pencil measures 8 half-inches. Bart disagrees and says it measures 4 inches. Explain to Bart why the two measurements are the same in the space below. Use words, pictures or numbers.

![Pencil](image)

Since 2 half-inches equal to 1 inch, we know that 8 half-inches is equal to 4 inches.

$8 \div 2 = 4$
1. Coach Harris measures the heights of the children on his 3rd grade basketball team in inches. The heights are shown on the line plot below.

Heights of Children on 3rd Grade Basketball Team

<table>
<thead>
<tr>
<th>Height in Inches</th>
<th>X = 1 child</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td></td>
</tr>
<tr>
<td>51(\frac{1}{2})</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td>X</td>
</tr>
<tr>
<td>52(\frac{1}{2})</td>
<td>X</td>
</tr>
<tr>
<td>53</td>
<td>X X</td>
</tr>
<tr>
<td>53(\frac{1}{2})</td>
<td>X X</td>
</tr>
<tr>
<td>54</td>
<td>1</td>
</tr>
<tr>
<td>54(\frac{1}{2})</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td></td>
</tr>
</tbody>
</table>

a. How many children are on the team? How do you know?
   There are 15 children on the team. I know because I counted the x's.

b. How many children are less than 53 inches tall?
   Six children are less than 53 inches tall.

c. Coach Harris says that the most common height for the children on his team is 53\(\frac{1}{2}\) inches. Is he right? Explain your answer.
   No, he's not right. There are 2 most common heights, 52 inches and 53\(\frac{1}{2}\) inches because they both have the most children, 3.

d. Coach Harris says that the player who does the tip-off in the beginning of the game has to be at least 54 inches tall. How many children could do the tip-off?
   Four children could do the tip-off.
2. Miss Vernier’s class is studying caterpillars. The lengths of the caterpillars in centimeters are shown in the line plot below.

Lengths of Caterpillars

Length in Centimeters

\[ X = 1 \text{ caterpillar} \]

a. How many caterpillars did the class measure? How do you know?

The class measured 30 caterpillars. I know because I counted the x’s.

b. Cara says that there are more caterpillars \( 3\frac{3}{4} \) centimeters long than caterpillars that are \( 3\frac{1}{4} \) and \( 4\frac{1}{4} \) centimeters long combined. Is she right? Explain your answer.

6 caterpillars are \( 3\frac{3}{4} \) cm

\( 4 + 4 = 8 \) caterpillars that are \( 3\frac{1}{4} \) and \( 4\frac{1}{4} \) cm

No, she’s wrong because there are more caterpillars that are \( 3\frac{3}{4} \) and \( 4\frac{1}{4} \) cm long than \( 3\frac{1}{4} \) cm.

c. Madeline finds a caterpillar hiding under a leaf. She measures it and it is \( 4\frac{3}{4} \) centimeters long. Plot the length of the caterpillar on the line plot.
1. Mrs. Weisse’s class grows beans for a science experiment. The students measure the heights of their bean plants to the nearest $\frac{1}{4}$ inch and record the measurements as shown below.

<table>
<thead>
<tr>
<th>Heights of Bean Plants (in inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2\frac{1}{4}$ ✓</td>
</tr>
<tr>
<td>$1\frac{3}{4}$ ✓</td>
</tr>
<tr>
<td>2 ✓</td>
</tr>
<tr>
<td>$2\frac{1}{2}$ ✓</td>
</tr>
</tbody>
</table>

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

Title: **Heights of Bean Plants**

Label: **Inches**

$x = 1$ bean plant
b. How many bean plants are at least $2\frac{3}{4}$ inches tall?

14 bean plants are at least $2\frac{3}{4}$ inches tall.

c. How many bean plants are taller than $2\frac{3}{4}$ inches?

6 bean plants are taller than $2\frac{3}{4}$ inches.

d. What is the most frequent measurement? How many bean plants were plotted for this measurement?

The most frequent measurement is $1\frac{3}{4}$ inches.

4 bean plants were plotted for that measurement.

e. George says that most of the bean plants are at least 3 inches tall. Is he right? Explain your answer.

George is not right. Only 6 bean plants are at least 3 inches tall. 14 bean plants are shorter than 3 inches. 14 is more than 6.

f. Savannah was absent the day the class measured the height of their bean plants. She measures hers when she returns to school, and it is $2\frac{2}{4}$ inches tall. Can Savannah plot the height of her bean plant on the class line plot? Why or why not?

Yes, Savannah can plot the height of her bean plant. $2\frac{2}{4}$ is the same as $2\frac{1}{2}$, so she can draw an 'x' at $2\frac{1}{2}$ inches.
1. Delilah stops under a Silver Maple Tree and collects leaves. At home, she measures the widths of the leaves to the nearest $\frac{1}{4}$ inch and records the measurements as shown below.

<table>
<thead>
<tr>
<th>Widths of Leaves (in inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5\frac{3}{4}$</td>
</tr>
<tr>
<td>$6\frac{1}{2}$</td>
</tr>
<tr>
<td>$6\frac{1}{4}$</td>
</tr>
<tr>
<td>$6\frac{1}{2}$</td>
</tr>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

a) Use the data to draw a line plot below.

```
Widths of leaves

X X X X X
X X X X X
X X X X X
X X X X X
X X X X X

Inches

$5\frac{1}{2}$ $6\frac{3}{4}$
```

X = 1 leaf
b) Explain the steps you took to create the line plot. What did you do first? Next?

First I found the smallest and largest measurement on the table to find where to start and end my number line.

Then I marked and labeled my scale.

Finally I started recording the data, and I had to be careful not to miss any of the numbers. I put check marks next to the numbers after I plotted them on the line.

c) How many more leaves were 6 inches wide than $6 \frac{1}{2}$ inches wide?

\[
\begin{align*}
8 - 6'' \\
4 - 6 \frac{1}{2}'' \\
8 - 4 = 4 \\
4 \text{ more leaves were 6 inches wide than } 6 \frac{1}{2} \text{ inches wide.}
\end{align*}
\]

d) Find the 3 most frequent measurements on the line plot. What does this tell you about the widths of Silver Maple Tree leaves?

The 3 most frequent measurements on the line plot are $5 \frac{3}{4}$ inches, 6 inches, and $6 \frac{1}{4}$ inches. This tells me that most of Silver Maple Tree leaves are between $5 \frac{3}{4}$ and $6 \frac{1}{4}$ inches wide.
1. Four children went apple picking. The chart shows the number of apples each child picked.

<table>
<thead>
<tr>
<th>Name</th>
<th>Number of Apples Picked</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stewart</td>
<td>16</td>
</tr>
<tr>
<td>Roxanne</td>
<td>24</td>
</tr>
<tr>
<td>Trisha</td>
<td>12</td>
</tr>
<tr>
<td>Philip</td>
<td>20</td>
</tr>
</tbody>
</table>

Total: 72

a) Find the number of apples Roxanne picked to complete the chart.

\[ 16 + 12 + 20 = 48 \]

b) Create a picture graph below using the data in the table.
2. Use the chart or graph to answer the following questions.

b) How many more apples did Stewart and Roxanne pick than Philip and Trisha?

Stewart and Roxanne: \[16 + 24 = 40\]
\[10 \div 6 = 30\]

Philip and Trisha: \[12 + 20 = 32\]
40 - 32 = 8
Stewart and Roxanne picked 8 more apples than Philip and Trisha.

c) Trisha and Stewart combine their apples to make apples pies. Each pie takes 7 apples. How many pies can they make?

Trisha and Stewart: \[12 + 16 = 28\]

\[28 \div 7 = 4\]
They can make 4 pies.

3. Ms. Pacho’s science class measured the lengths of blades of grass to the nearest \(\frac{1}{4}\) inch from their school field. The lengths are shown below.

<table>
<thead>
<tr>
<th>Lengths of Blades of Grass in Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 (\frac{1}{4}) (\checkmark)</td>
</tr>
<tr>
<td>2 (\frac{3}{4}) (\checkmark)</td>
</tr>
<tr>
<td>3 (\checkmark)</td>
</tr>
<tr>
<td>3 (\frac{1}{4}) (\checkmark)</td>
</tr>
</tbody>
</table>
a) Make a line plot of the grass data. Explain your choice of scale.

Inches

I chose fourths for my scale because I looked at all of the lengths and saw fourths was a common unit.

b) How many blades of grass were measured? Explain how you know.

24 blades of grass were measured. I know because I multiplied the number of rows of data in the chart times the columns.

c) What was the length measured most frequently on the line plot? How many blades of grass had this length?

The length measured most frequently is 2\(\frac{3}{4}\) inches. Six blades of grass had this length.

d) How many more blades of grass measured 2\(\frac{3}{4}\) inches than both 3\(\frac{3}{4}\) inches and 2 inches combined?

\[3\frac{3}{4} + 2 = 3 + 1 = 4\]

\[6 - 4 = 2\]

Two more blades of grass measured 2\(\frac{3}{4}\) inches than both 3\(\frac{3}{4}\) and 2 inches combined.