

Data, Graphs and Line Plots: math lesson, Grade 2 – download the PDF

Every day you can ask a question and count the answers. Which pet do most of your classmates like best? Which game do your friends pick at recess? When you collect the answers and show them in a neat way, you can see the story hidden in the numbers. In this chapter you will use four tools: tally charts, picture graphs, bar graphs, and line plots.

1. What is data?

D Data

Data is information we collect, such as counts or measurements. A **category** is a group we sort the data into, like dog, cat, fish, or bird. A **survey** is a question we ask many people so we can collect data.

Suppose you ask your class, “Which pet do you like best: a dog, a cat, a fish, or a bird?” Each answer is one piece of data. Every student picks exactly one category, so nobody is counted twice. In Grade 2 we usually sort data into **up to four categories**. That keeps the graph easy to read.

Every good graph or chart has a **title** that tells what it is about, and labels that tell what each row, bar, or number means. Always read the title first!

2. Tally charts

A tally chart is the quickest way to record answers while you are asking. For every answer you draw one mark. After four straight marks, the fifth mark is a slash across them. This makes a group of five, so counting is easy.

Dog	
Cat	
Fish	
Bird	

M How to count tally marks

1. Count each full group of five by fives: 5, 10, 15, and so on.
2. Then count the single lines that are left over, one at a time.
3. Write the total number next to the row.

E Example 1: counting the dogs

The dog row has 2 full groups of five and 2 single lines. Count by fives: 5, 10. Then add the lines: 11, 12. So 12 students picked dog: $5 + 5 + 2 = 12$.

⚠ Careful!

A group of five is not “5 lines plus 1 slash.” It is 4 lines and 1 slash, and the whole group is worth 5. Do not count the slash as an extra mark.

3. Picture graphs

A picture graph uses small pictures or symbols to show data. Each row is one category. The **key** tells you how many things one symbol stands for. Sometimes one symbol stands for 1, and sometimes it stands for 2 or more.



E

Example 2: using the key

The key says each circle is 2 pumpkins. The orange row has 5 circles. Skip count by 2: 2, 4, 6, 8, 10. So there are 10 orange pumpkins. The white row has 2 circles, so $2 + 2 = 4$ white pumpkins.

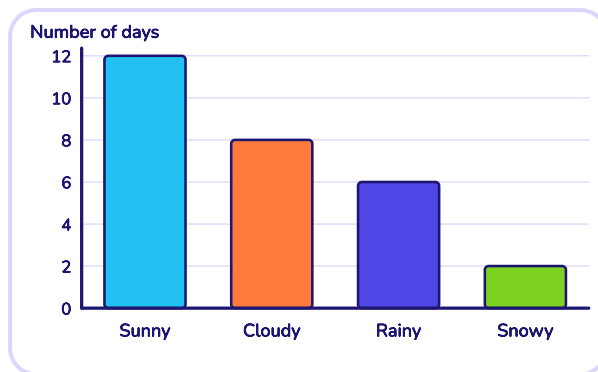
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Zyro's tip

On my home planet we read the key before anything else. If the key changes, the whole graph changes! Always look at it first.

4. Bar graphs and scales

A bar graph shows each category as a bar. The taller the bar, the greater the number. Along the side is the **scale**, the numbers that tell you how much each line is worth. A scale can count by 1s, 2s, 5s, or 10s. Check how the scale counts before you read a bar.



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How to read a bar

1. Find the top of the bar.
2. Follow the line straight across to the numbers on the side.
3. If the top is halfway between two numbers, the value is the odd number in the middle.

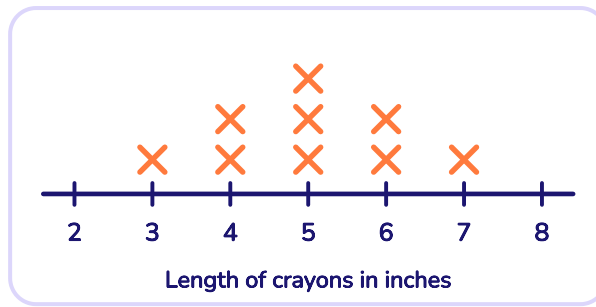
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Example 3: reading a bar graph

The sunny bar reaches the line marked 12, so there were 12 sunny days. The rainy bar reaches 6. How many more sunny days than rainy days? Subtract: $12 - 6 = 6$. There were 6 more sunny days.

5. Line plots

A line plot shows measurements on a number line. Each **X** is one piece of data, for example one crayon. We put the X above its length. When two items have the same length, we stack the X marks.



E Example 4: reading a line plot

There are 3 X marks above the 5, so 3 crayons are 5 inches long. Count all the X marks: $1 + 2 + 3 + 2 + 1 = 9$, so we measured 9 crayons. The longest crayon is 7 inches and the shortest is 3 inches. The difference is $7 - 3 = 4$ inches.

D Line plot

A line plot is a graph with a number line and X marks. Each X is one measurement. The tallest stack shows the length that happens the most.

6. Reading a graph to answer questions

Graphs help us answer questions. Look for key words:

- **Most** or **greatest**: find the longest bar, the longest row, or the tallest stack.
- **Least** or **fewest**: find the shortest.
- **Total** or **all together**: add all the categories.
- **How many more** or **how many fewer**: subtract.

In the tally chart of favorite pets, the dog row is the longest, so dog is the favorite. To find the total number of students, add all four rows: $12 + 7 + 5 + 9 = 33$. So 33 students answered the survey.

7. Comparing categories

To compare two categories, find the number for each one and then subtract the smaller number from the larger number. The answer tells how many more or how many fewer.

E Example 5: how many more?

In the pet chart, 7 students chose cat and 5 chose fish. Compare: $7 - 5 = 2$. Two more students chose cat than fish, or two fewer chose fish than cat.

A Careful!

The tallest bar is not the answer to “how many.” It only tells you which category is greatest. Read the number on the scale, and remember to look at what the key or scale counts by.

8. Collecting your own data

P Plan for a survey

1. Ask a clear question with up to four choices.
2. Ask each person once and make one tally mark in the right row.
3. Count the marks and write the totals.
4. Draw a picture graph, bar graph, or line plot.
5. Add a title and labels, then ask questions about your graph.

Use a picture graph when you want a fun, easy-to-count picture, a bar graph when the numbers are large, and a line plot when you measure things in inches, feet, centimeters, or meters. Check your work: the numbers in the graph should add up to the number of people you asked.

Key takeaways

- Data is information we collect, and we sort it into categories (up to four in Grade 2).
- A tally chart uses groups of five: four lines and one slash.
- Read the key of a picture graph, and the scale of a bar graph, before you answer.
- On a line plot, each X is one measurement.
- Add to find a total, and subtract to find how many more or fewer.



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