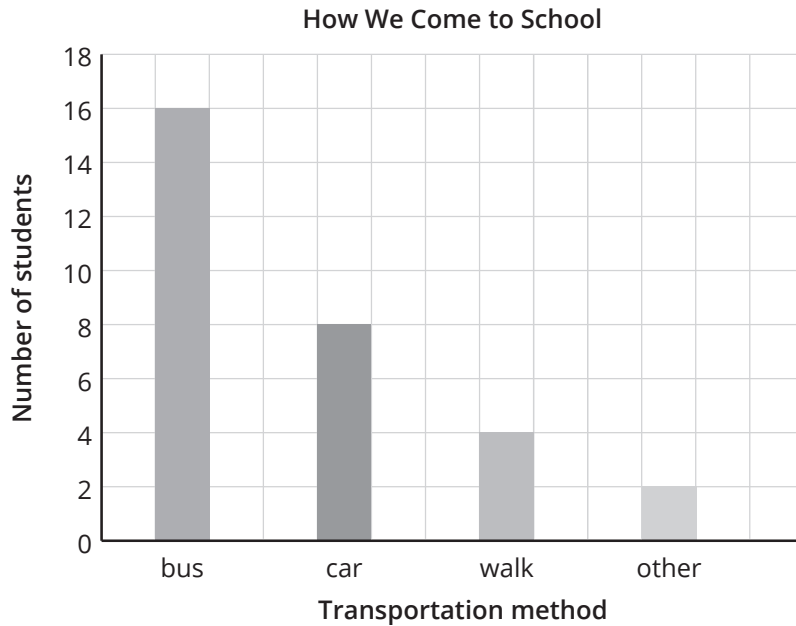


Dear parent or guardian: This is a summary of the key ideas your child is learning in mathematics. You can use this summary as background as you support your child's work.

3 Effect of Scale on a Graph

What Is a Scale?

The scale on a graph tells you how much of each quantity there is. For example, on this bar graph, the horizontal axis shows transportation categories. The scale on the vertical axis helps you see how many students use each type of transportation.



The scale on this graph is 2, since each square represents 2 people.

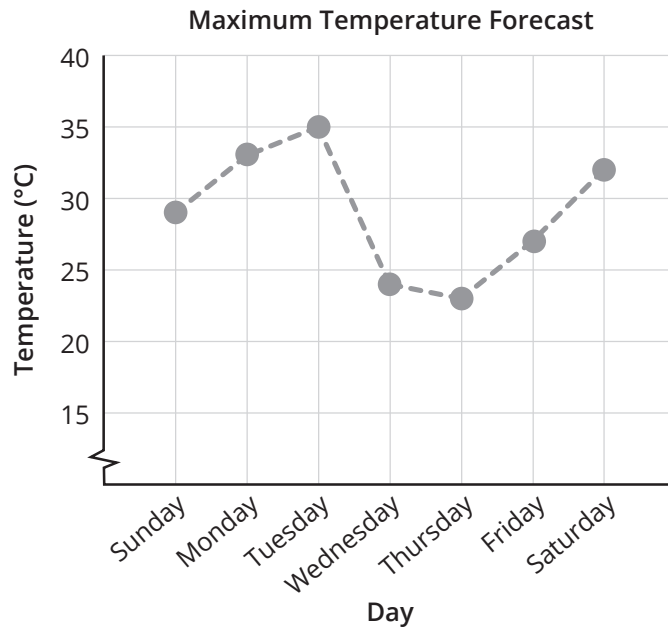
Pictographs, bar graphs, double bar graphs, broken-line graphs, and continuous line graphs all use scales. The scale on some graphs is 1.

Stem-and-leaf plots do not use scales.

How Can You Choose a Scale?

Often the size of the data values affects the scale you choose.

- If some data values are very high, you might choose a larger scale so that your graph will not be too tall or too wide. For example, if data values are 7, 32, and 87, a scale of 10 might make sense.
- If all data values are low, a scale of 1 or 2 might make sense.
- If most of the data values are close to multiples of 5 (for example, 10, 25, and 36), you might choose a scale of 5. That way, you can read the values for more pieces of data accurately.
- If all data values are high, you might decide to leave part of the vertical or horizontal axis off your graph. If you do this, always draw a jagged line on the axis to indicate where the axis is incomplete.

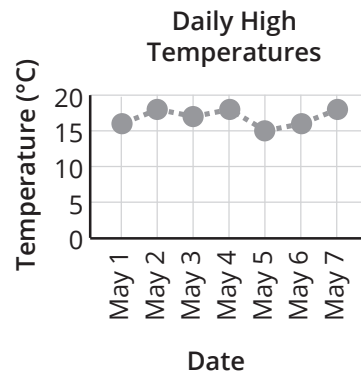
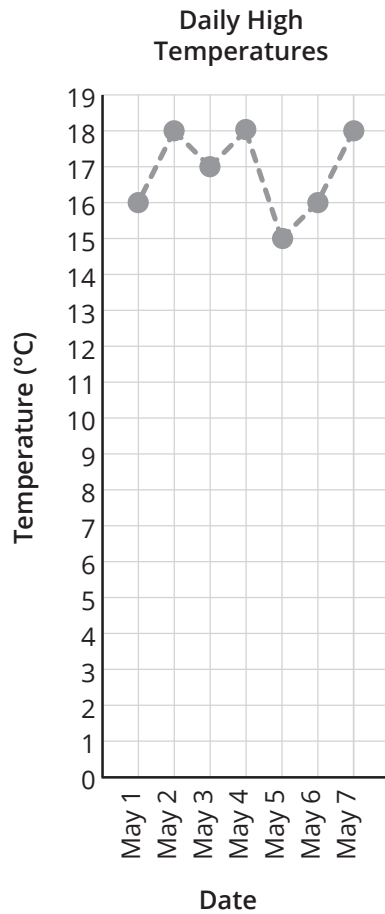


The jagged line near zero on the vertical axis of this graph indicates that the graph does not show the entire vertical axis. This allows the graph to fit in a smaller space.

How Does Changing the Scale Affect the Impression a Graph Gives?

If two graphs are drawn on grid paper with the same-sized grid, the graph with the smaller scale will make the differences between data values seem greater. The graph with the larger scale will make the differences between data values seem smaller.

Consider, for example, the daily high temperatures one week. In the broken-line graph on the left, the vertical axis scale is 1. In the broken-line graph on the right, the vertical axis scale is 5. The differences look more extreme when the scale is 1, even though the two graphs show the same data.



Definitions

axis: (plural: axes) a horizontal or vertical reference line on a graph

bar graph: a graph that uses horizontal or vertical bars to display discrete categories of data

broken-line graph: a graph created by plotting points and joining them with dotted line segments; one axis represents discrete data, such as grade at school, and the other axis can represent continuous data, such as the time spent doing homework

continuous line graph: a graph created by plotting points and joining them with a line; both axes represent continuous data, such as time and distance

double bar graph: a type of bar graph used to compare two sets of data that have been organized into categories

pictograph: a graph that uses a symbol to show the number of items in each category

scale (on a graph): a sequence of numbers along the axis of a graph used to determine the value of each bar in a bar graph or the position of each point in a line graph; also the repeated increase in those numbers: a graph with an axis marked 5, 10, 15, 20, ... has a scale of 5

stem-and-leaf plot: a data display where all the numbers in a set of data are placed in order and organized by place value