SUM IT UP

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.

1 Continuous Line Graphs

Discrete Data and Continuous Data

- A set of discrete data can include only certain values. For example, a set of data that describes the value of Canadian coins in people's pockets can include the values 70¢, 10¢, and 5¢, but it can't include the values 1¢ and 2¢, since the smallest Canadian coin is a nickel.

A set of data that describes the number of people riding bicycles can include the values 3, 4, or 5, but a value of 3.8 would not make sense.

- A set of continuous data can include any value between a minimum and a maximum. For example, a child can be 1 m tall, 2 m tall, or any height between those two, such as 1.14 m tall or 1.783 m tall.

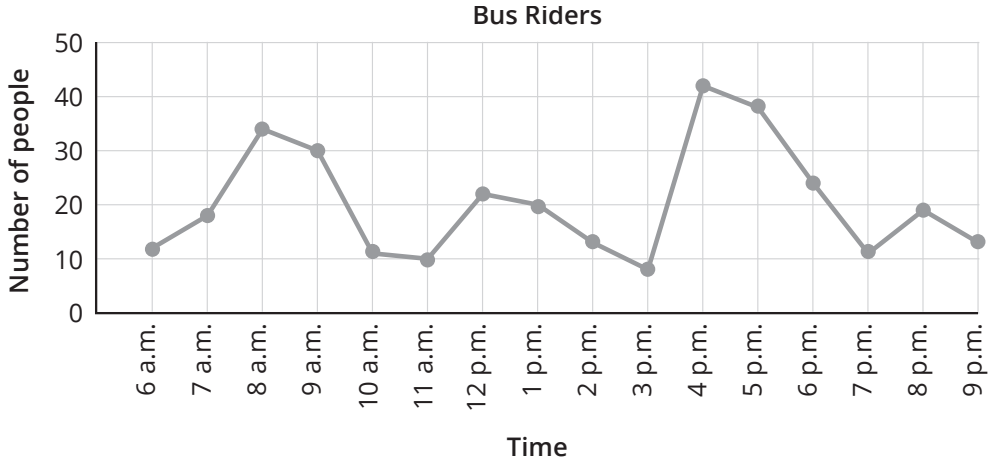
You can pour 1 mL of water into a glass, 200 mL, or any amount between those two, such as 60 mL or 142.3 mL.

- Often the context can help you decide whether to treat a set of data as continuous or discrete. For example, while the number of people in a car is discrete because only a few values are possible, you might consider the population of a country to be continuous because although you can include only values that are whole numbers, so many different values are possible.

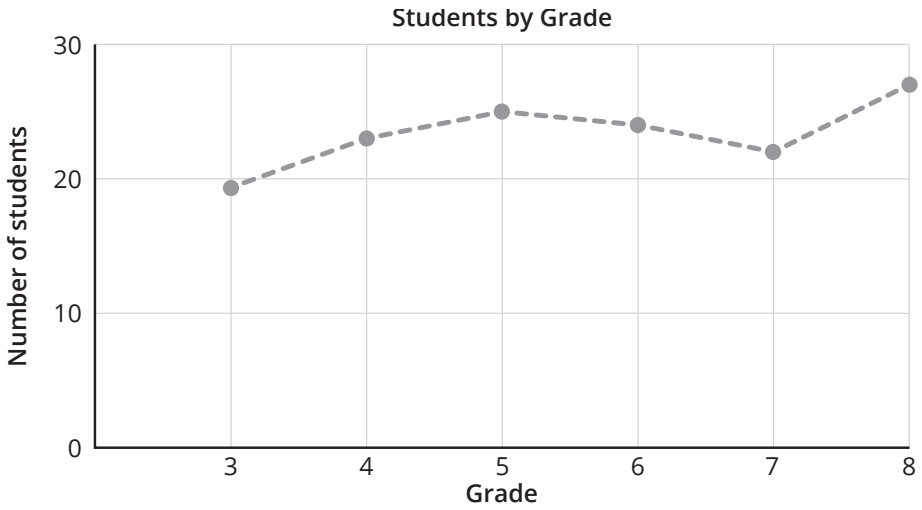
What Is a Broken-Line Graph?

Different people have different definitions of a broken-line graph.

- Some people say that a broken-line graph includes points that show a relationship between two sets of data and connects the points with straight line segments.



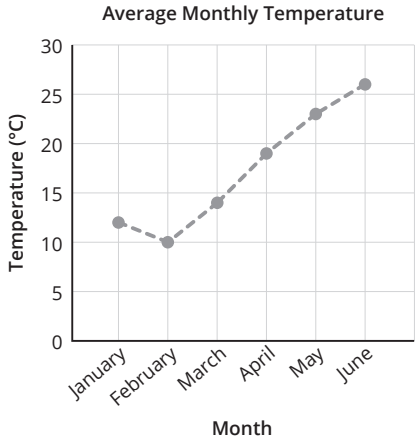
- Other sources, including the Ontario mathematics curriculum, focus on the idea that a broken-line graph shows a relationship between one set of continuous data and one set of discrete data. The discrete data is usually shown on the horizontal axis.



Many broken-line graphs, like this one, use a dashed line to show that at least one set of data is discrete. In this case, we have used a broken-line graph because it wouldn't make sense to ask, for example, how many students there are in between Grade 3 and Grade 4. The dashed line between the grades on this graph shows a trend, but does not indicate that there are data values between the grades.

When Would You Use a Broken-Line Graph?

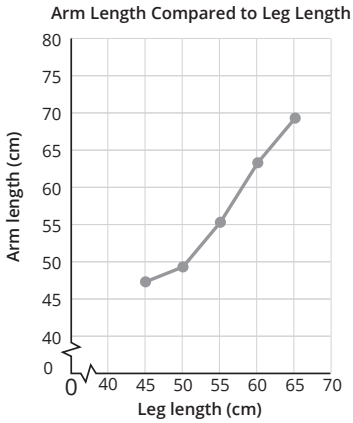
- You can use a broken-line graph to show a relationship between a set of continuous data and a set of discrete data. For example, you might use a broken-line graph to show the relationship between the months of the year (discrete) and the average high temperature (continuous), as shown below.



Even though temperature is continuous, the months of the year are discrete. (There is no month between January and February.) The dashed line segment between the data points on this graph shows a trend, but it does not indicate that there are data values between the months.

When Would You Use a Continuous Line Graph?

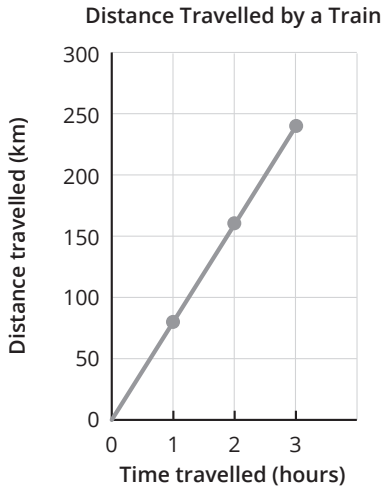
- You can use a continuous line graph to show a relationship between two sets of continuous data.



This continuous line graph compares the length of people's arms to the length of their legs. Both arm length and leg length are continuous sets of data. You can imagine a length in between any two lengths. (The jagged marks on the axes of this graph show that a part of each axis has been omitted to make the graph a more manageable size.)

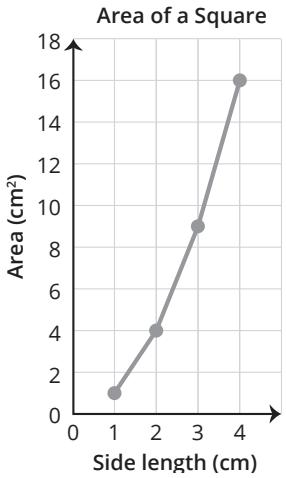
When Would You Use a Continuous Line Graph? (continued)

- A continuous line graph can be a straight line.



This continuous line graph compares time and distance travelled for a train travelling at a constant speed. It is a straight and continuous line.

- A continuous line graph can also be a curve.



This continuous line graph compares the areas of squares to their side lengths.

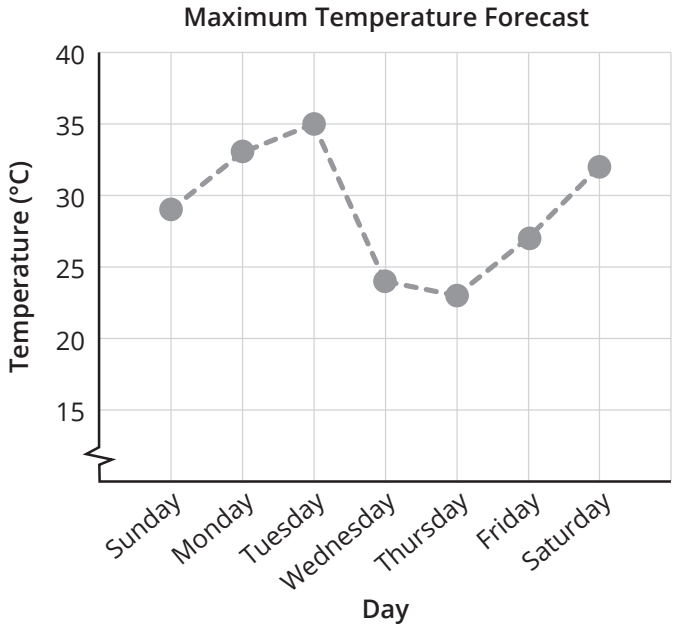
Notes

- For many students (and for some knowledgeable adults), the distinction between a broken-line graph and a continuous line graph is a difficult one to make. The best test might be to think about how meaningful a dot on the graph between plotted points would be.

  For example, on a graph of temperature at different times during the day, a dot anywhere on the graph makes sense because time is continuous and so is temperature; there is a temperature at every time throughout the day. But on a graph of average precipitation for each month of the year, a dot between months makes less sense because the value for each month is based on an average, so there cannot be a value between the points. While a continuous line graph isn't appropriate to display this precipitation data, a broken-line graph is.

  You can think of a broken-line graph as points that might have remained separate but have been linked to show trends.

- If the data values you want to graph are all very large, it can be awkward to graph them on a vertical axis starting at 0. You might decide to leave part of the vertical axis off your graph. If you do this, always indicate that the axis is incomplete by drawing a jagged line on it near the origin.



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

Definitions

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 data: data with values that can be represented on a number line or a graph axis; continuous data are usually measured rather than counted; for example, children's heights are continuous but the grades children are in at school are not

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

discrete data: data that can have only certain fixed values; discrete data are usually counted rather than measured, for example, the grade children are in at school is discrete, but the children's heights are not