

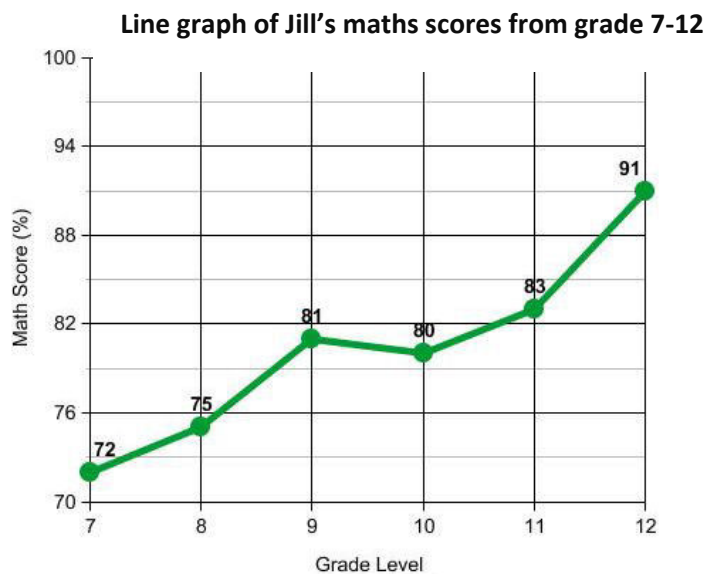
Graphs

Introduction

We are going to learn how to analyse and how to draw four different types of graphs: line graphs, bar graphs, histograms and pie graphs. Graphs are an important tool in maths, science and biology to communicate information.

Analysing graphs

Line graph 1



What does this graph show us? You may be asked to DESCRIBE the graph or to EXPLAIN the graph.

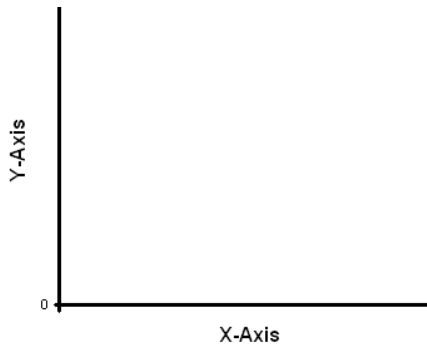
When you are asked to describe the graph, you need to explain what is happening on the graph.

So describe the graph above:

In some instances, it will also be important to EXPLAIN the graph. When you are asked to explain the graph, you need to say WHY it's happening. This is not really relevant to the graph above, but we will look at another example below where it is relevant.

In every graph that is drawn with an x-axis and a y-axis there is an independent variable and a dependent variable.

The x-axis is horizontal and depicts the independent variable. The y-axis is vertical and depicts the dependent variable.



The independent variable is the variable that the graph is showing that does not depend on anything else. The dependent variable is the variable that the graph is showing that depends on the independent variable.

In the example above, what is the independent variable and what is the dependent variable?

The maths score **DEPENDS** on the grade, therefore it is the dependent variable. The grade that the students are in **DOES NOT DEPEND** on the maths score, therefore it is the independent variable.

In a graph that shows plant height over time, what is the independent variable and what is the dependent variable?

This is because time does not depend on the plants growing, and plant height will change with time, so it depends on time.

In a graph that shows how the density of water changes with temperature, what is the independent variable and what is the dependent variable?

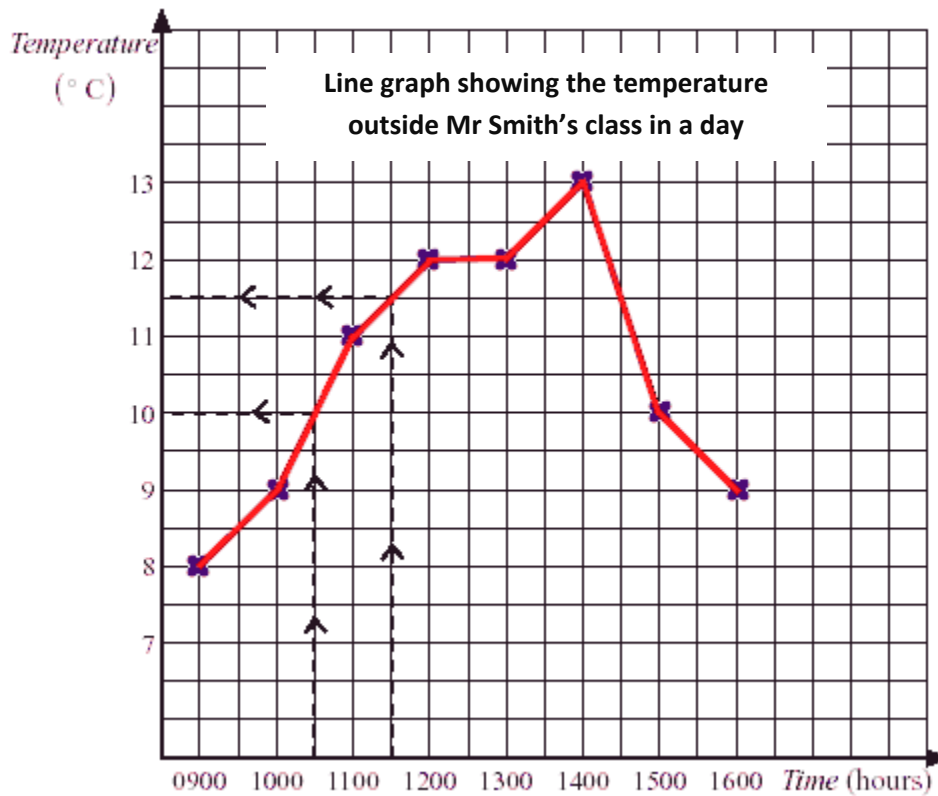
This is because temperature does not depend on the density of the water, and the water density will change with temperature, so it depends on temperature.

Line graph 2

Mr Smith recorded the temperature outside his classroom every hour during one school day. His results are listed in the following table:

Time	0900	1000	1100	1200	1300	1400	1500	1600
Temperature ($^{\circ}\text{C}$)	8	9	11	12	12	13	10	9

He decided to plot a line graph to represent the data. Line graphs are useful for showing how things change over time.



Describe the graph:

What is the independent variable and what is the dependent variable? Explain.

Based on the graph:

What is the temperature outside the classroom at 10:30? _____

What is the temperature at 11:30? _____

What is the temperature at 13:00? _____

What is the temperature at 13:30? _____

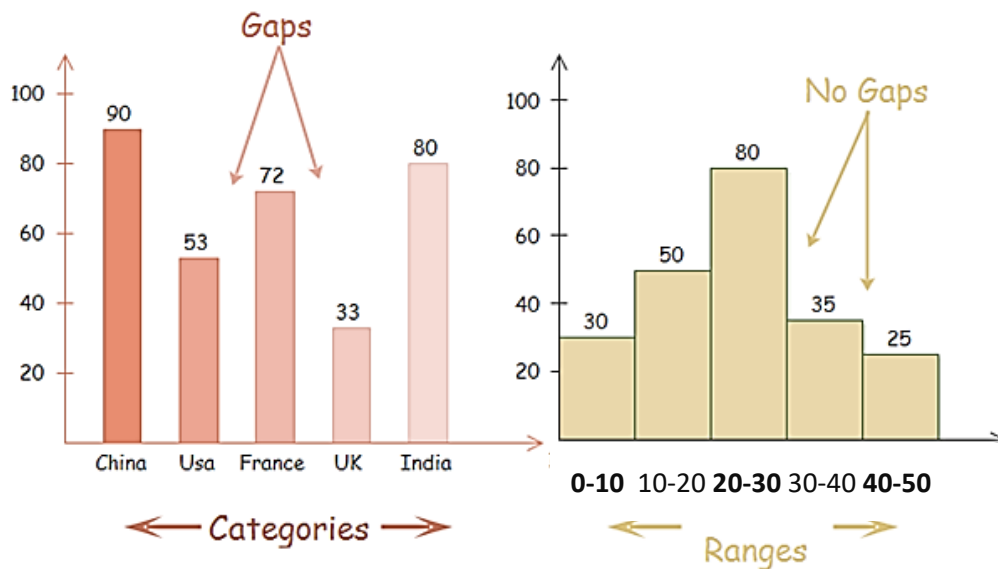
When the temperature is 8°C, what time is it? _____

When the temperature is 10°C, what time is it? _____

Now let's try to explain the graph:

Bar graphs and histograms

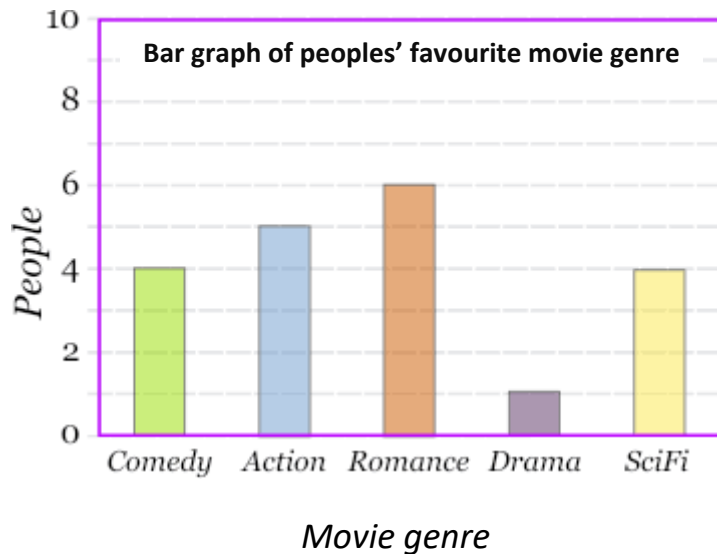
Bar graphs and histograms are useful for grouping information. The difference between a bar graph and a histogram is that a bar graph represents categories and there are gaps between the bars. A histogram shows a continuous range of numbers and there are no gaps between the bars. This is shown below:



Bar graph

Histogram. Think of the word – it sounds like story. It's continuous

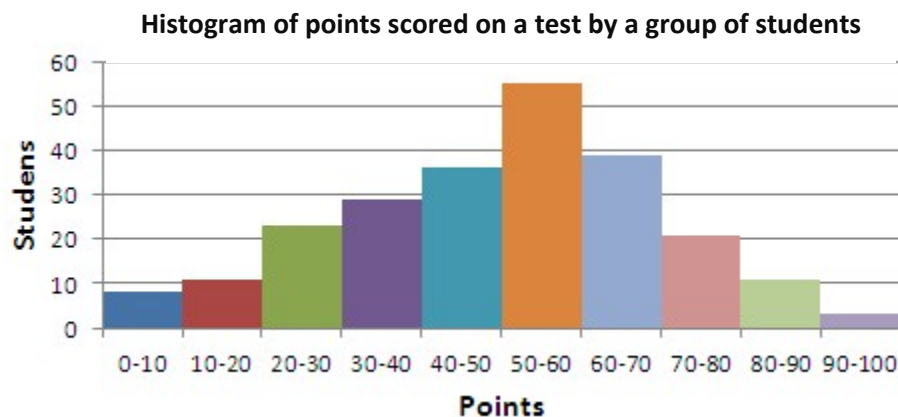
In a bar graph and a histogram, we put the categories/groups on the x axis. The categories/ groups are always the independent variable.
Look at the bar graph below:



Describe the graph:

How any people in total are there in the sample? _____

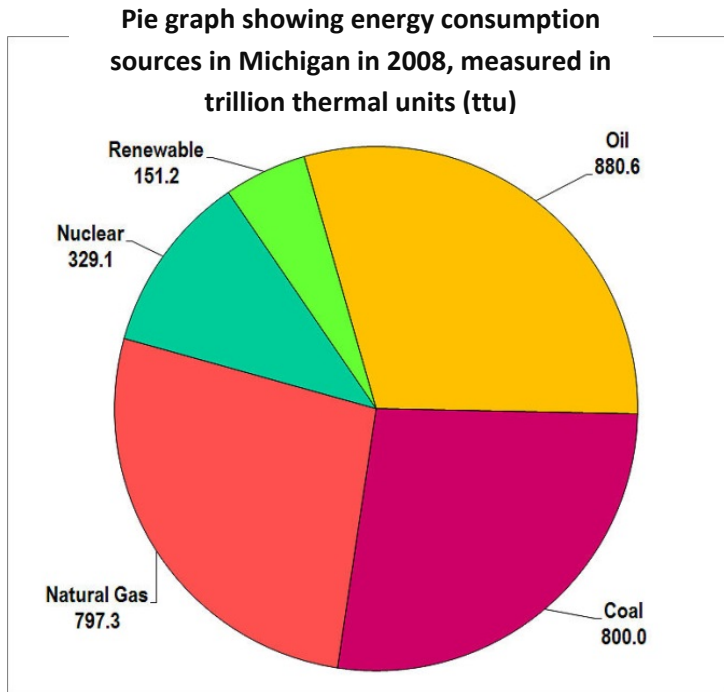
Look at the histogram below:



Describe the graph:

Pie graph

A pie graph (also known as a pie chart) also groups information, like a bar graph or a histogram, but it's represented like a pie with slices.



Describe the graph:

Note that every graph has a **title**. You need to mention what type of graph it is and explain in brief what the graph is showing. Go back to the graphs above and note the titles.