

Types of enquiry

- An enquiry is a question that you set out to prove or disprove.
- A hypothesis is very similar, though it is a statement rather than a question.

Both can be either physical or human in nature:

- Physical enquiries will look at natural landscapes, e.g. rivers or coasts
- Human enquiries will look at environments that are created by people, e.g. cities or tourist resorts.

Risk Assessments

Risk assessments help to understand the risk and avoid potentially dangerous situations, e.g. walking alongside fast-flowing streams or carrying expensive equipment through areas of high crime. A good risk assessment will also consider what to do if a difficult situation arises.

Sampling

The collection of data should also avoid bias and this is done through sampling techniques. There are three main types of sampling:

- Random sampling - selecting a person to interview or site to measure, at random. Random sampling is unbiased as particular people or places are not specifically selected.
- Systematic sampling - collecting data in an ordered or regular way, e.g. every 5 metres or every fifth person.
- Stratified sampling - dividing sampling into groups, e.g. three sites from each section of coastline, or five people from each age range. It is possible to combine stratified sampling with random and systematic sampling. Stratified random sampling - random samples are taken from within certain categories.

Stratified random sampling - random samples are taken from within certain categories.

Stratified systematic sampling - regular samples are taken from within certain categories.

Fieldwork Enquiries

Methodology

- Describes and justify the way that the data was collected.
- The description should be provided in lots of detail, so that someone else could repeat the study using the instructions.
- Justify means explaining why the techniques you chose were suitable and how they are linked to the enquiry question.
- State whether each data collection technique collects primary or secondary data.

Data Presentation

Different types of data

Data can either be:

- human - information about people, e.g. cities and tourism.
- physical - information about natural landscapes, e.g. rivers and coasts.
- primary - information that is collected first-hand, e.g. tallies, measurements and photographs.
- secondary - information that someone else has previously collected and made available, e.g. on the internet.

Numerical and statistical skills

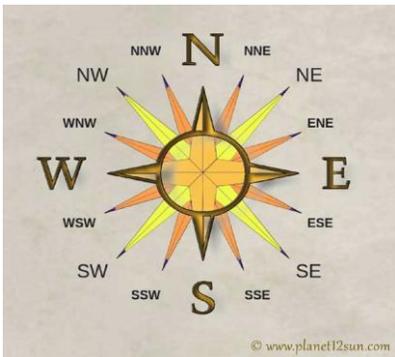
Processing data is manipulating it to make it more useful. There are many ways to process data, using:

- Ratios to show a relationship between two sets of data, and are shown as two numbers with a colon symbol in-between. Ratios would work well to illustrate, e.g. number of people per doctor.
- Proportions which similar to ratio, but are written slightly differently, e.g. 1 in 10. Proportions would be useful to illustrate, eg the number of tourists within an area.
- Averages, or measures of central tendency, are commonly taken in three different ways:
Mean - add the total of all values that have been collected and then divide by the number of values.
- Median - write out all of the numbers that have been collected in numerical order and find the middle number.
- Mode - the most commonly appearing value within the data.
- Percentages which can either show proportions or change over time. Percentages would be useful to illustrate, e.g. land use within an area.

It is important to think about how to justify why the data has been processed in a particular way.

<h1>Fieldwork Enquiries</h1>	

Direction



Latitude and Longitude

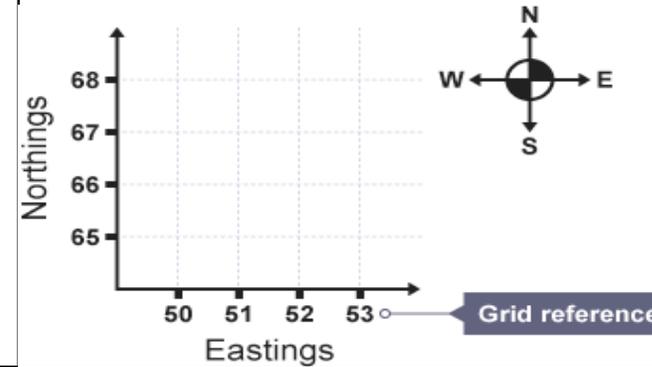
- Lines of latitude run from east to west. The Equator is a line of latitude that lies at 0°. Lines above this are shown as °N (north) and lines below this are shown as °S (south).
- Lines of longitude run from north to south. The Prime or Greenwich Meridian in London is a line of longitude at 0°. Lines to the right of this are shown as °E (east) and lines to the left of this are shown as °W (west).

Distance and Scale

- Large-scale maps - 1:1,250, 1:2,500 and 1:10,000. Features appear larger on the map. This may be used for individual towns and cities.
- Small-scale - 1:25,000, 1:50,000 and 1:100,000. Features appear smaller on the map. This may be used to show larger areas or regions.

Grid References

- The lines across the bottom of the map are called eastings as they travel towards the east.
- The lines up the side of the map are called northings as they travel towards the north.



Cartographic Skills

Map Symbols

GENERAL FEATURES

+	Place of worship
Current or former place of worship	<ul style="list-style-type: none"> with tower with spire, minaret or dome
[Orange rectangle]	Building; important building
[Checkered rectangle]	Glasshouse
[Red triangle]	Youth hostel
[Pink square]	Bunkhouse/camping barn/other hostel
[Red bus icon]	Bus or coach station
[Lighthouse icon]	Lighthouse; disused lighthouse; beacon
[Blue triangle]	Triangulation pillar; mast
[Windmill icon]	Windmill, with or without sails
[Wind pump icon]	Wind pump; wind turbine
[Pylon icon]	Electricity transmission line
[Slopes icon]	Slopes

[Gravel pit icon]	Gravel pit	[Sand pit icon]	Sand pit
[Other pit icon]	Other pit or quarry	[Landfill site icon]	Landfill site or slag/spoil heap
BP/BS	Boundary post/stone		
CG	Cattle grid		
CH	Clubhouse		
FB	Footbridge		
MP; MS	Milepost; milestone		
Mon	Monument		
PO	Post office		
Pol Sta	Police station		
Sch	School		
TH	Town hall		
NTL	Normal tidal limit		
-W; Spr	Well; spring		

Four-figure grid references

Four-figure grid references locate a place or object within a grid square. Four-figure grid references are found as follows:

- First, write the eastings number of the bottom left corner of the square (eastings are found along the bottom of the map). The number will have two digits e.g. 13.
- Then, write the northings number of the bottom left corner of the square (northings are found along the side of the map). The number will consist of another two digits giving a total of four, hence the name four figure grid reference.

Six-figure grid references

Six-figure grid references locate a place or object within a specific part of a grid square.

Six-figure grid references are found as follows:

- Write the four figure eastings number, but then add a third number to show how many tenths of the way across the grid square the place or object lies.
- Write the four figure northings number, but then add a third number to show how many tenths of the way up the grid square the place or object lies.

Direction

Latitude and Longitude

Distance and Scale

- Large-scale maps –
- Small-scale –

Grid References

- The lines across the bottom of the map are called
- The lines up the side of the map are called

Cartographic Skills

Map Symbols

Four-figure grid references

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Six-figure grid references

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Contours and spot heights

- On a map, height is shown in metres above sea level.
- Spot heights show the height of a particular point on the map.

Contour lines

- Contour lines are added to a map to show height and gradient.
- On OS maps they are shown as thin orange or brown lines, some of which have the land height written on them.
- The lines join areas of equal height:
- Contour lines that are close together show land that increases or decreases in height quickly. This is steep land.
- Contour lines that are far apart show land that increases or decreases in height slowly. This land is gently sloping.

We can use contour lines to create cross-section diagrams of landscapes. This helps to match contour lines on the map to landscape features in real life, e.g. hills, valleys and spurs of land.

Photographs

- Photographs can be taken from different locations:
- Ground photographs – these can be taken during fieldwork, using a camera or mobile device. They need to be annotated to show any features.
- Aerial photographs – these are usually taken from an aeroplane. They cover a wider area than ground photographs so they are useful in showing spatial patterns.
- Satellite images – these are high-resolution photographs taken from satellites in space. They show a very wide area, but in less detail than close-up images.

Annotating maps and photographs

- Annotations are detailed labels with an explanation of what is shown.
- They are important because they allow us to interpret and compare maps and photographs.
- Annotations can focus on physical and human features and they usually include key terms.

Cartographic Skills

Other maps

There are other types of map that provide a representation of the landscape.

Sketch maps

- Sketch maps are simple drawings of the landscape. They show things that are sometimes hidden in photographs or maps, e.g. the impact of tourists on a landscape.
- Sketch maps may be shown as a bird's-eye view or as a drawing of the horizon. They can be drawn whilst on fieldwork or from a photograph. It is useful to annotate sketch maps or include a photograph alongside it.

Geology maps

The British Geological Survey (BGS) create detailed maps of the rocks found below Great Britain.

- British geology
- Great Britain lies over a variety of rock types. These rocks formed at different times under different environmental conditions. For example, mudstone is a sedimentary rock that formed over 200 million years ago when the UK was a desert.
 - Rocks determine the shape of the land and also the soil type and drainage. For example, soils that form over chalk rock are alkaline and dry. Certain crops prefer these conditions, e.g. asparagus crops will grow in alkaline soils and they have deep roots so they survive dry conditions.
 - It is not easy to work out what type of rock lies below ground, except in areas where the soil and vegetation is very thin, e.g. mountains. This is why geological maps are useful.

What do geological maps look like?

- Geological maps are colourful. Each different rock type is shown using a colour and/or a number. The network of roads and settlements is shown as a faint layer beneath these colours.
- Geological maps also show major faults, which are cracks in the rock, and major thrusts, where rock has been forced upwards. Faults are shown as a solid black line and thrusts are shown as alternative dashes and dots.

Contours and spot heights

Contour lines

We can use contour lines to create cross-section diagrams of landscapes. This helps to match contour lines on the map to landscape features in real life, e.g. hills, valleys and spurs of land.

Photographs

Annotating maps and photographs

Cartographic Skills

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Sketch maps

Geology maps

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British geology

What do geological maps look like?

Line graphs, bar charts and histograms

Line Graphs

- Line graphs show how data changes over time or space.
- The x-axis shows time or distance.
- E.g. A line graph could be used to show the changes in a country's employment structure over time.

Bar charts

- Bar charts show grouped data as rectangular bars, e.g. the number of tourists visiting a resort each month.
- Divided bar charts split up each rectangular bar to break the information down further.
- A divided bar chart could be used to show the age breakdown of tourists visiting a resort.

Pie charts

- Pie charts show percentages as a circle divided into segments.
- A pie chart could be used to show how students travel to school.
- Each piece of data is shown as a proportion of 360, because there are 360 degrees in a circle. If 25 out of 100 students travel to school by car, the angle is worked out using the calculation: $(25 \div 100) \times 360 = 90$ degrees.

Scatter graphs

- Scatter graphs show relationships between two sets of data.
- Points are located using the x and y-axis.
- Sometimes these points are arranged in a pattern.
- A scatter graph could be used to show how literacy is related to GDP.

Graphical Skills

Population Pyramids

- Population pyramids are bar charts that show how many people of different ages are living in a place or country.
- Population pyramids show the bars arranged sideways, rather than upwards.
- The x-axis shows the number of people, the y-axis shows their ages.
- The bars on the left show the number of males and the bars on the right show the number of females.

Bar charts and line graphs can be combined.

- Climate graphs are an example of this.
- The x-axis shows the months of the year and there are two y-axes to show average temperature and total rainfall.
- The temperature is shown as a line and the rainfall as bars

Histograms

- Histograms are similar to bar charts, but they show frequencies rather than groups of data.
- A histogram could be used to show frequencies of earthquakes of each magnitude on the Richter scale.

Showing patterns and relationships in the data

- A line of best fit helps to show correlations, or patterns within the data.
- The line of best fit runs through the middle of a collection of points on the graph, ideally with an equal number of points on either side of the line.
- A strong correlation is when the points are very close to the line of best fit.
- A weak correlation is when the points are far away from the line of best fit.
- A positive correlation is when an increase in one factor is mirrored by an increase in another (the line of best fit goes from the bottom left to the top right).
- A negative correlation is when an increase in one factor is mirrored by a decrease in another (the line of best fit goes from the top left to the bottom right).

Line graphs, bar charts and histograms

Line Graphs

Bar charts

Pie charts

Scatter graphs

Graphical Skills

Population Pyramids

Bar charts and line graphs can be combined.

Histograms

Showing patterns and relationships in the data

Proportional symbols and pictograms

Proportional Symbols

- Proportional symbols can be added to maps or graphs to show information about different places.
- A graph used to plot life expectancy against income for each country can also show population size.
- Each country is shown as a circle where the size of the circle is proportional to the population of the country, i.e. the bigger the circle, the bigger the population of that country.

Pictograms

- Pictograms are like bar charts, but they use small pictures or icons to show data instead of bars.
- Pictograms could be used to show the weather conditions experienced in a particular place over a period of time.

Mapping techniques

- Some data is easier to understand when it is shown on a map. This is especially true of spatial data, where the spread of the information is important.

Choropleth maps

- Choropleth maps show interval data (data that is linked, rather than data from different categories) as colours.
- They are shaded in using one colour, where the darker shades represent high numbers and the lighter shades represent low numbers.
- A choropleth map needs a key to explain what the different shades mean.
- Population density can be shown using a choropleth map.

Graphical Skills

Cross sections and Radial Graphs

Cross Sections

- Cross sections are line graphs that show a sideways view of a landscape.
- They can show features such as hills and valleys, or depths, such as the depth of a river.
- Cross sections of hills use contour lines to determine the height of the land.
- Cross sections of river depths are drawn using negative numbers so that the line graph looks like depth, rather than height.

Radial/radar graphs

- Radial/radar graphs are sometimes called rose charts.
- They have a central point from which data radiates outwards.
- This data can be plotted as points along a line, where all points are joined up to form a shape.
- It could also be plotted as segments along a line.
- Wind speed and direction is often shown as a radial graph.
- Radial graphs can show lots of different data and do not have to involve compass points.

Isoline maps, dot maps and Desire and flow lines

- Isoline maps show lines that join up areas or values that are equal.
- Atmospheric pressure is shown using an isoline map.
- The areas of equal pressure are joined using a line, which helps people to see the position of high and low-pressure systems.

Dot maps

- Dot maps show information as individual dots on a map.
- Each dot might represent more than one of something.
- Dot maps are often used to show population distribution.

Desire lines and flow lines

- Desire and flow line maps show movements from one place to another:
- Flow lines show the exact path of movement
- Desire lines show a general direction of movement
- Movements are shown as lines. Thick lines show high amounts of movement and thin lines show low amounts.
- Trade or migration patterns are often shown using desire or flow lines.

Proportional symbols and pictograms

Proportional Symbols

Pictograms

Mapping techniques

Choropleth maps

Graphical Skills

Cross sections and Radial Graphs

Cross Sections

Radial/radar graphs

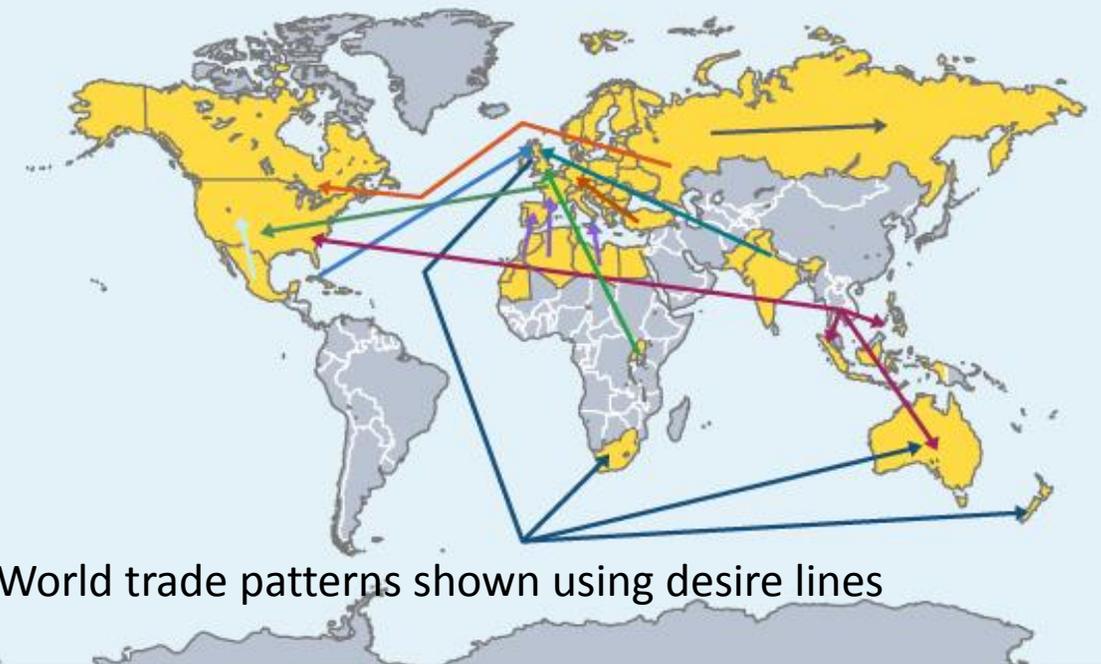
Isoline maps, dot maps and Desire and flow lines

Dot maps

Desire lines and flow lines

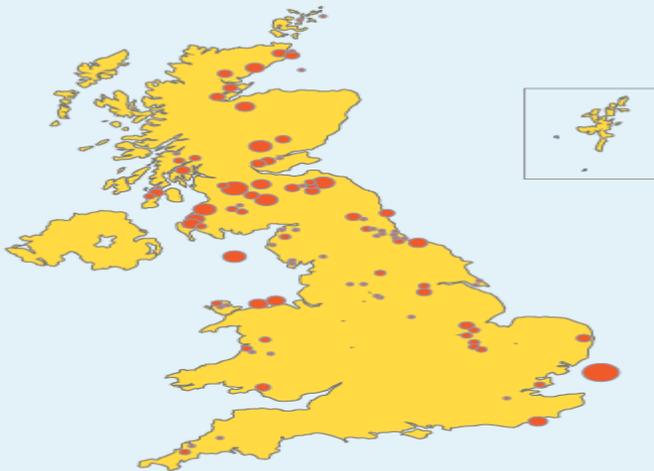
Proportional symbols

- Proportional symbols can be added to a map to show differences between places.
- The same symbol appears larger or smaller, depending on how something changes.
- Proportional symbols on maps could be used to show the number of wind farms within a country.

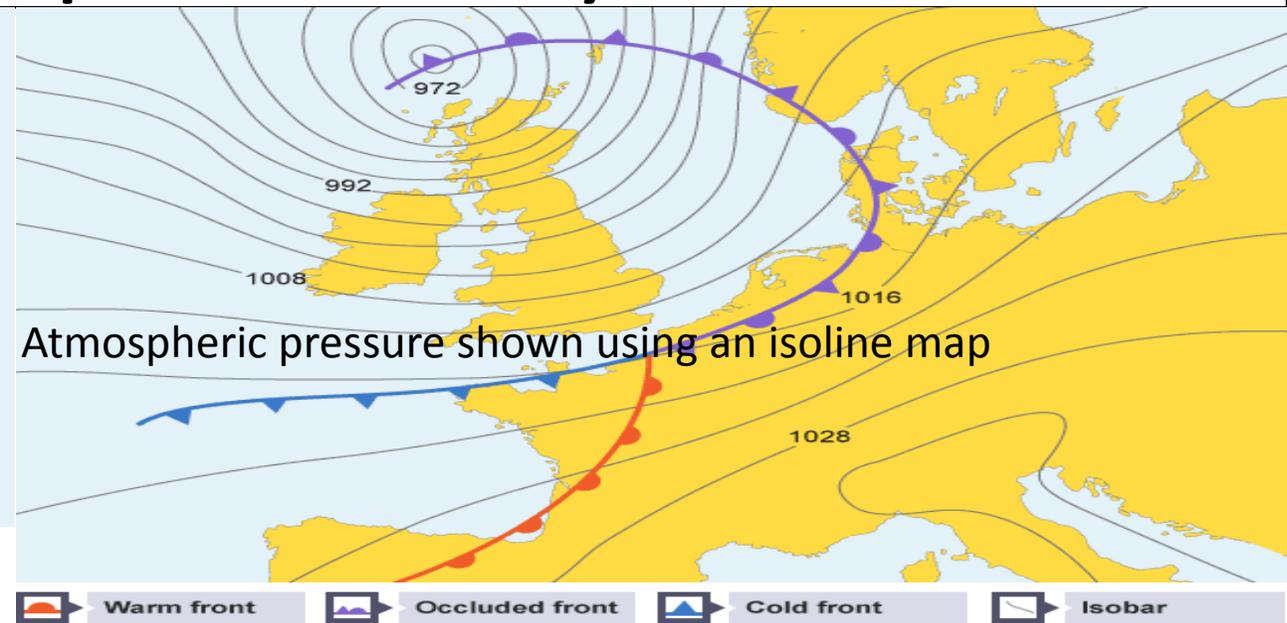
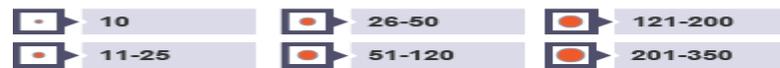


World trade patterns shown using desire lines

Graphical Skills-Proportional Symbols



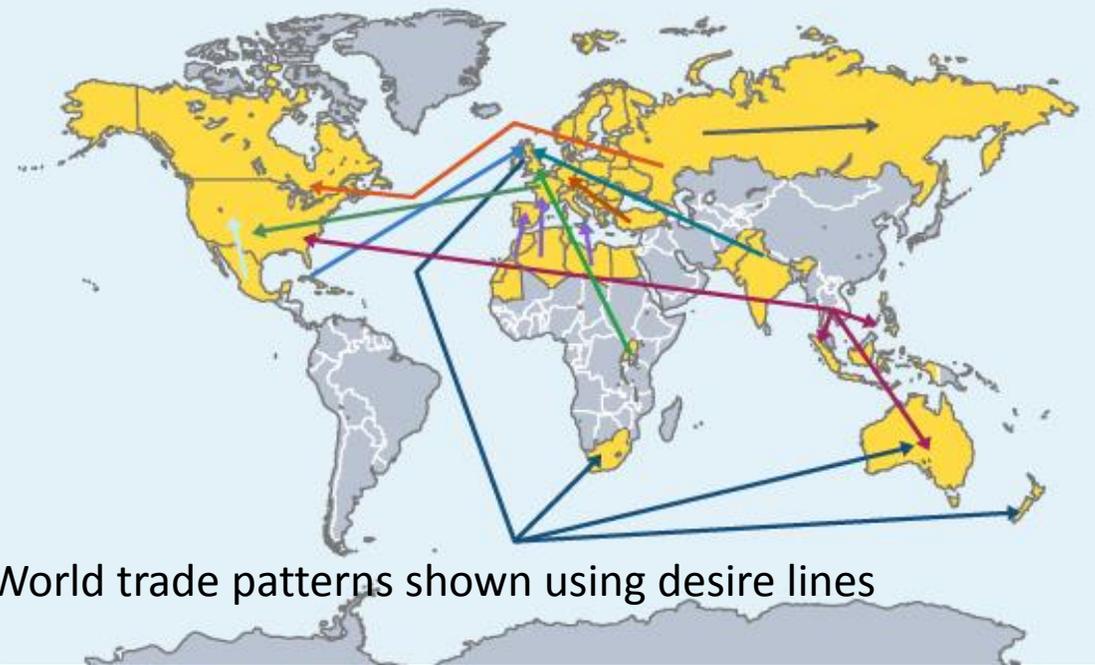
Wind energy generation (MW)



Atmospheric pressure shown using an isoline map

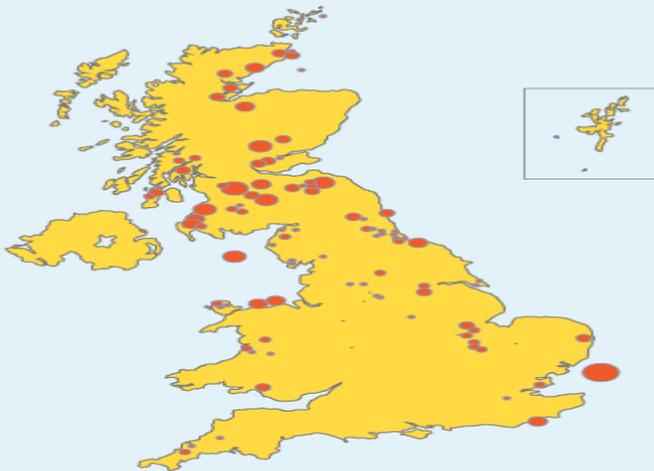


Proportional symbols

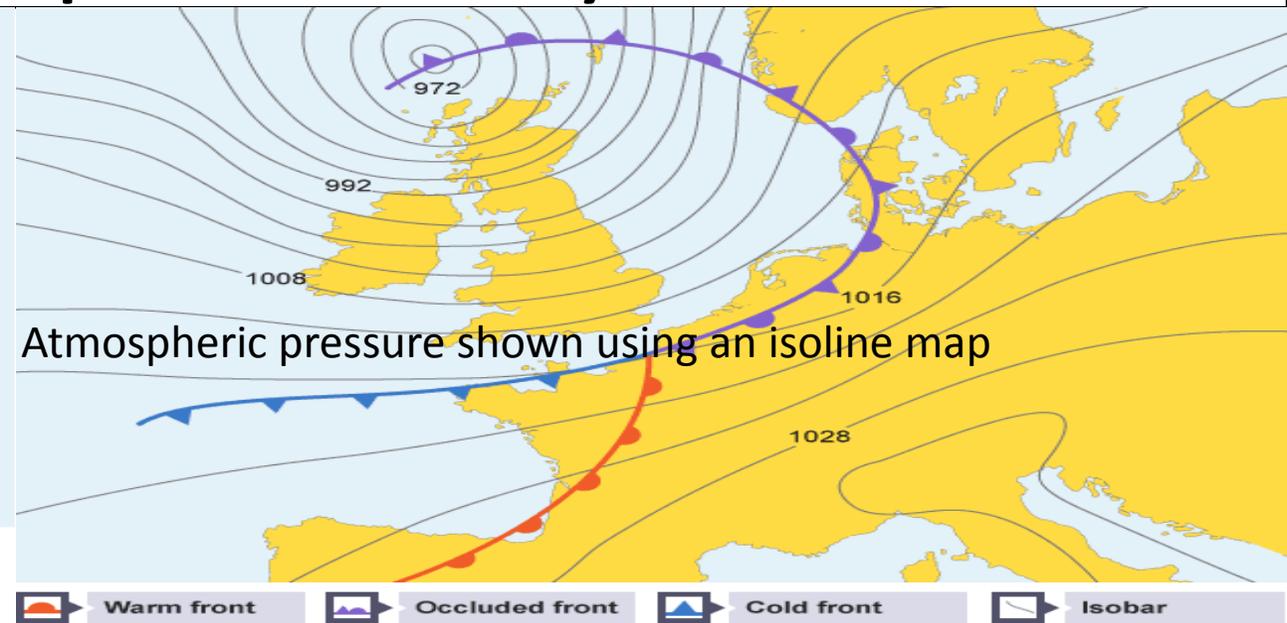
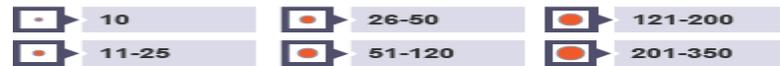


World trade patterns shown using desire lines

Graphical Skills-Proportional Symbols



Wind energy generation (MW)



Atmospheric pressure shown using an isoline map



Measures of data

Median

- This is the middle value in a list of numbers.
- This is found by ordering the numbers in numerical order and looking for the middle number.

Calculating percentage increase

Method:

- Work out the difference between the two numbers being compared.
- Divide the increase by the original number and multiply the answer by 100.

Calculating percentage decrease

Method:

- Work out the difference between the two numbers being compared.
- Divide the decrease by the original number and multiply the answer by 100.

Fieldwork

- Fieldwork involves the collection of information or data.
- Quantitative data usually consists of factual information that can be counted and used in fieldwork.
- Qualitative data is more opinion-based, but is still useful for geographical investigations.

Data can either be:

- primary - information that you collect yourself, e.g. tallies, measurements and photographs
- secondary - information that someone else has previously collected and made available, e.g. on the internet

Numeracy Skills

Percentiles

- Percentiles and quartiles are both ways of dividing data into smaller parts.
- Whereas quartiles divide a set of data into 4 equal parts, percentiles divide the set of data into 100 equal parts.

Interpolation

- An interpolate trend is when a value is found within the data set, using the line of best fit.
- The value was not originally plotted, but can be read off the line of best fit.
- Interpolation is drawing an imaginary line up to the line of best fit, then drawing another imaginary line along the other axis to find a value.

Extrapolation

- An extrapolate trend is when a value is found outside of the data set.
- Extrapolation may provide uncertain results as it is based on extending the line of best fit beyond a known set of data.
- Extrapolation is extending the line of best fit beyond the observed data, and using that to find a value.

Quantitative data

Quantitative data usually consists of factual information that can be counted and used in fieldwork.

Types of quantitative data:

- Nominal data - these are numbers that appear as categories, e.g. 1 = yes and 2 = no.
- Ordinal data - these numbers have an order, e.g. the rank order of cities by population size. It is known that city 1 is more populated than city 2 and 3, but it is not known how many more people there are, as the spacing between each city is not equal.
- Interval data - these numbers are similar to ordinal, but the difference between each number is equal, e.g. temperature is measured in degrees centigrade.
- Ratio data - this is when there is a relationship between two sets of numbers, e.g. number of people per doctor.

Measures of data

Median

Calculating percentage increase

Method:

Calculating percentage decrease

Method:

Fieldwork

Data can either be:

Numeracy Skills

Percentiles

Interpolation

Extrapolation

Types of quantitative data

Types of qualitative data

Qualitative data can take many forms. Some common types are:

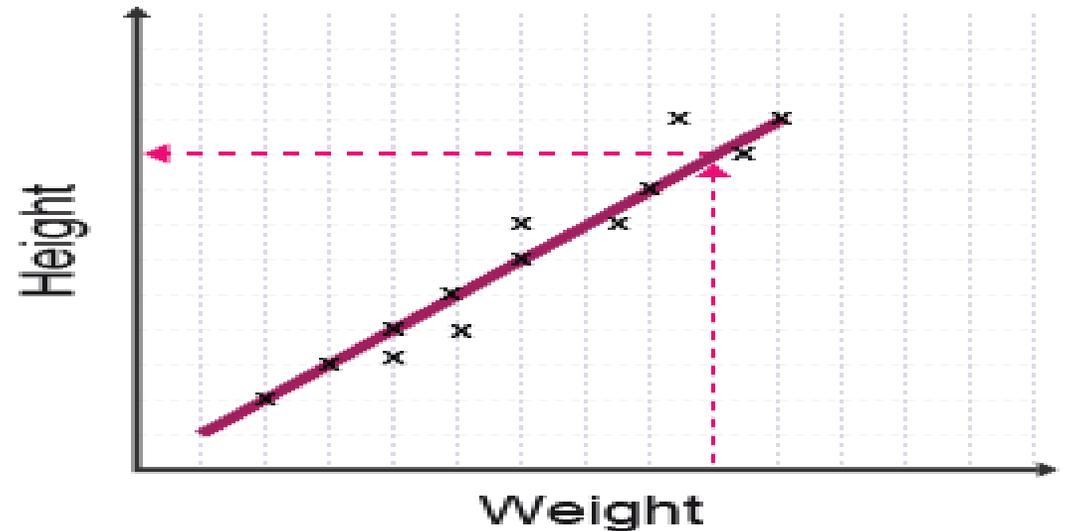
- Questionnaires - this is when people are asked what they think. Questionnaires are good at finding out opinions, but they may be less accurate when looking for facts.
- Field sketches and photographs - this is when a snapshot of a landscape is taken, either with a camera or by drawing. Field sketches and photographs provide a good reminder of what a place is like.
- Maps - these can be either hand-drawn or sourced from somewhere like the internet. Maps give spatial information about places. Satellite images and GIS maps are types of map that can be used for fieldwork.

A field sketch



Numeracy Skills

Litter counts are quantitative data



Types of qualitative data

Qualitative data can take many forms. Some common types are:

A field sketch



Numeracy Skills

Litter counts are quantitative data

