

YEAR 11 iGCSE GEOGRAPHY

Paper 2 - Geography

Skills



REVISION GUIDE &
WORKBOOK



Geographical Skills

Key Terms: - p. 4

Basic Skills:

- (i) Labelling and Annotation - p.5
- (ii) Interpretation of Photographs (Aerial, Oblique and Satellite) - p.7

Cartographic Skills:

- (i) Atlas Maps - p.8
- (ii) Sketch Maps - p.10
- (iii) Ordnance Survey Maps - p.11
 - Compass Direction and Bearings - p.11
 - Measuring Distances - p.12
 - Symbols and Grid References - p.13
 - Physical and Human Features on OS maps - p.14
 - Relief and Gradient - p.15
 - Interpreting Cross-Sections - p.17
 - Site and Situation - p.19
 - Shape of settlements - p.20

Graphical Skills

- Bar Graphs, Histograms and Compound Bar-Charts - p.23
- Pyramid Chart - p.34
- Line Graphs and Compound Line Graphs - p. 37
- Isolines - p. 44
- Flow Lines / Flow Diagrams - p.47
- Pie-Charts / Pie Graphs - p.50
- Wind Rose/ Radial Diagrams - p.55
- Triangular Graphs - p.59
- Choropleth Maps - p.64
- Proportional Symbols - p.68
- Scatter Graphs - p.71
- Topological Diagrams / Maps - p.76

Identify, analyse and evaluate Geographical Questions, Hypotheses and Issues

Establish effective sequences of Enquiry / Investigation

Describe, analyse and interpret evidence

Draw and Justify conclusions from Evidence

Evaluate methods of data collection, presentation and analysis of evidence

Key Terms:

Aerial Photograph – a photographs taken directly from above – i.e. a ‘birds-eye view’

Altitude – height above sea level (in meters)

Annotate – an explanatory label

Aspect – the direction a place is facing.

Contours – lines which join places of equal height

Cross Section – these show the shape of the land in profile

Density – how closely packed something is – e.g. population density – number of people in an area; building density – number of buildings in a given area.

Dispersed settlement – where individual buildings are spread out around an area

Distribution – The way something is spread out – e.g. population distribution (e.g. unevenly spread, grouped together etc.)

Evaluation – discuss the strengths and weaknesses of something

GIS – A Geographical Information System – a layered digital system with a map as a base and layers of other information on top.

Hypothesis – a testable statement

Label – a simple descriptive point

Linear settlement – where buildings are located either side of a main road

Nucleated settlement – where buildings are grouped together (often at crossroads or around a village green).

Oblique aerial – a photograph taken from above but at an angle

Pattern – trends or regularities in something

Relief – the height and shape of land

Satellite image – a picture of the earth taken from space.

Scale – how much smaller something is than what it represents in real life – e.g. on a map (e.g. 1:50,000 – 1cm on the map is 50,000cm (500 metres) in real life.

Site – the land that the settlement is actually built on

Situation – the position of a settlement in relation to its surroundings

Topography – the shape and features of the earth’s surface

Trend – also described as a relationship or correlation between data – e.g. a positive trend/positive correlation (where one thing increases as another does).

BASIC SKILLS: (i) Labelling and Annotation

You must make sure you know the difference between labelling and annotation. You may be asked to **label** or **annotate** a sketch, photograph, map or diagram and you must make sure that you do not mix up the two command words.

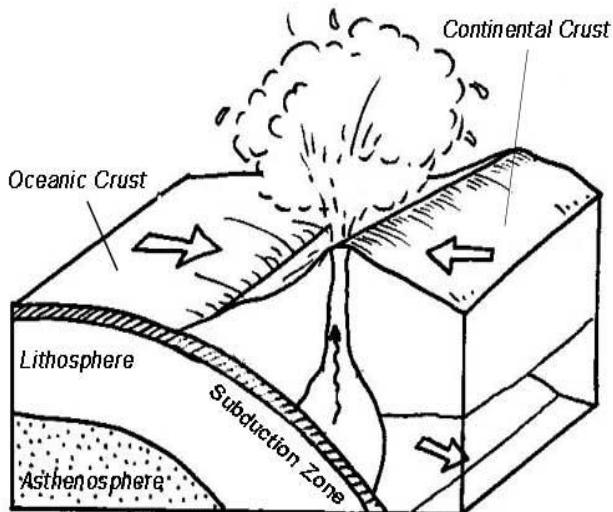
LABEL – this is a simple descriptive point – e.g. ocean trench; volcano

ANNOTATION – a more detailed description or explanatory point – e.g. ocean trench (long narrow canyon) formed where one plate is subducted under another

LABELLING AND ANNOTATING DIAGRAMS

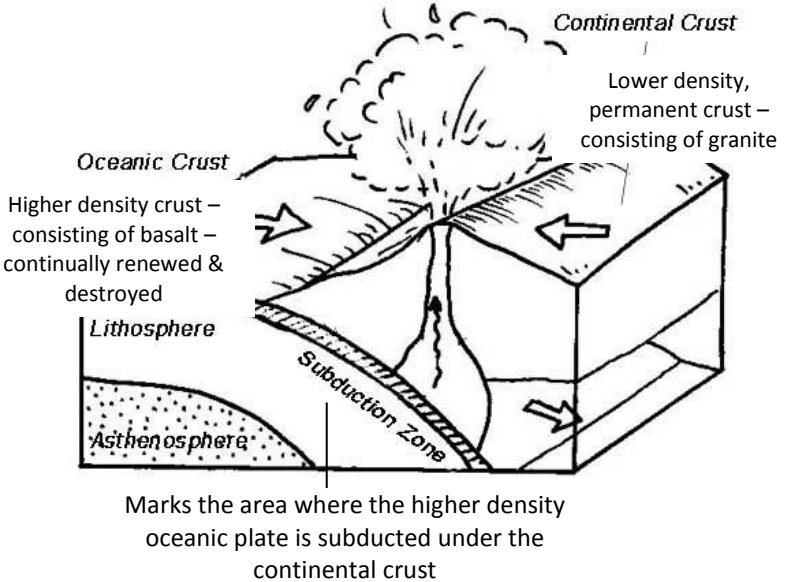
(i) Labelled diagram of a Destructive Boundary

DESTRUCTIVE / CONVERGENT BOUNDARY



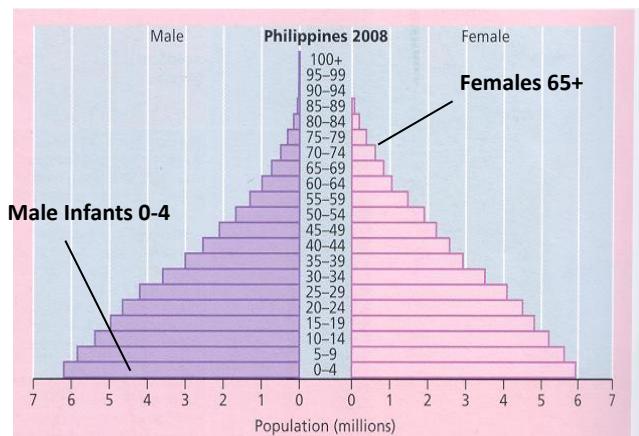
(ii) Annotated diagram of a Destructive Boundary

DESTRUCTIVE / CONVERGENT BOUNDARY

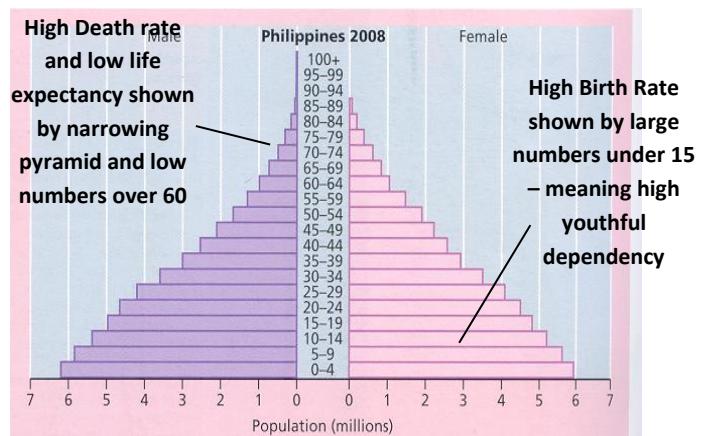


LABELLING AND ANNOTATING GRAPHS

(i) Labelled Population Pyramid

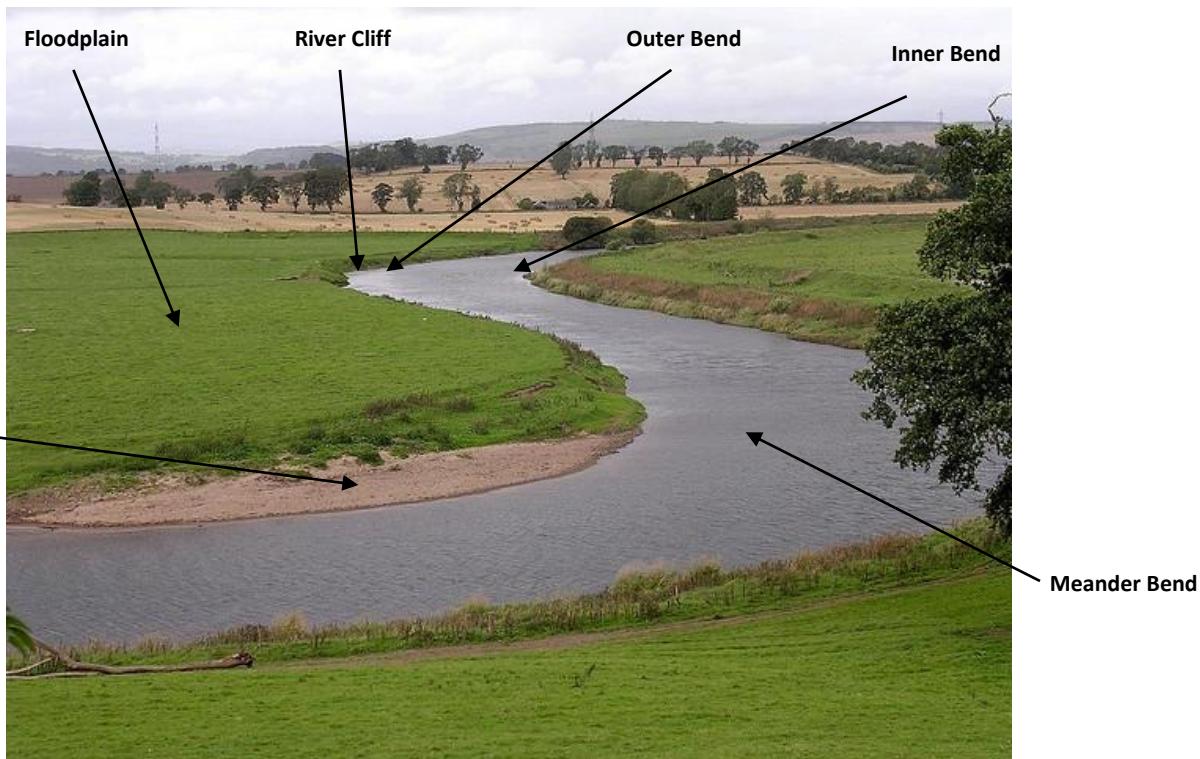


(ii) Annotated Population Pyramid



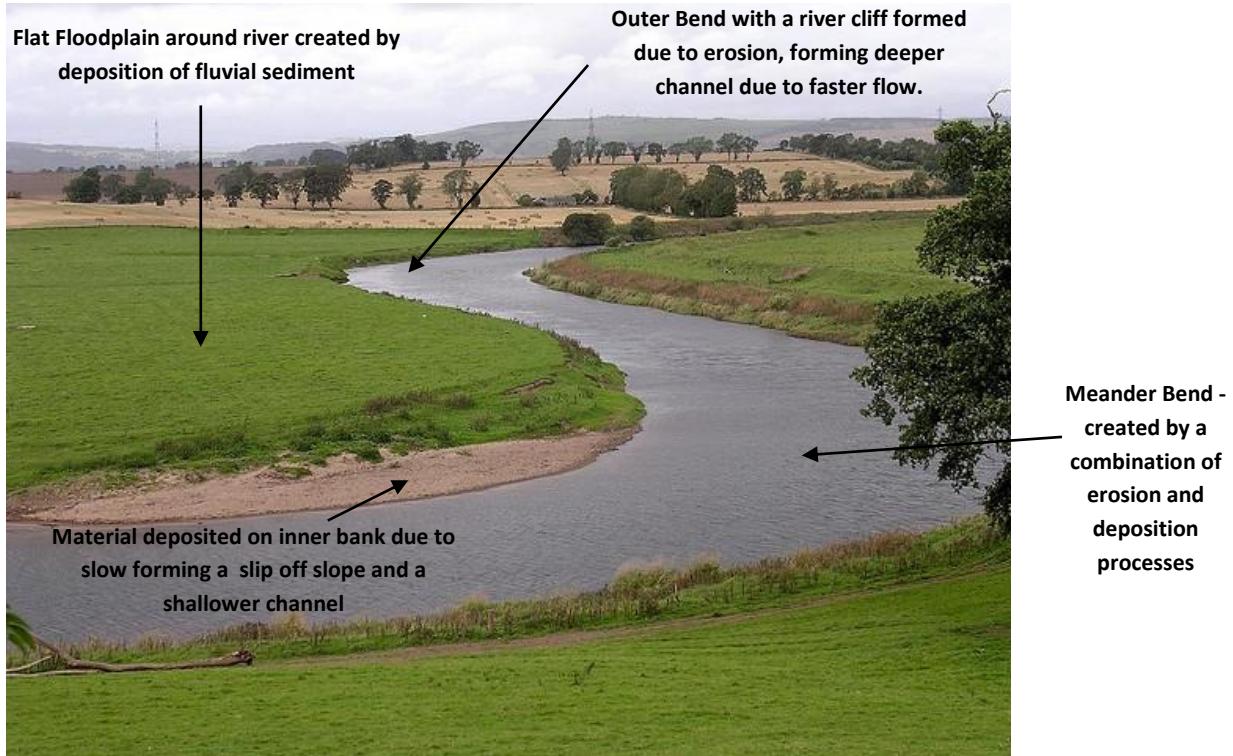
LABELLING AND ANNOTATING PHOTOGRAPHS

(i) Labelled Photograph of a River



Source: VVannet - River Isla <http://www.flickr.com/photos/sagt/4329799803/in/set-72157623225580777/>

(ii) Annotated Photograph of a River



Source: VVannet - River Isla <http://www.flickr.com/photos/sagt/4329799803/in/set-72157623225580777/>

BASIC SKILLS: (ii) Interpretation of Photographs

Satellite Images

These are images that are taken hundreds of miles away, from satellites in space. Some satellite photographs provide realistic photographic images of a place (such as those used in Google Earth), whilst others use infrared imagery, detecting heat patterns. Infrared pictures can help identify different types of land-use, as different surfaces appear in different colours. Infrared thermal imaging can also have application for other geographical purposes such as monitoring volcanoes and detecting rising magma.



Satellite Photo of the River Nile Source: Photo Credit - NASA

Vertical and Oblique Aerial Photographs.

Vertical aerial photographs are those taken looking straight-down – i.e. giving a ‘birds-eye view’ of a place

Oblique aerial photographs are those taken from an angle – so it possible to see more detail of the features.

YOU MUST KNOW THE DIFFERENCE BETWEEN VERTICAL & OBLIQUE PHOTOGRAPHS



Oblique View of Swanage Bay - Dorset
Copyright Sue Sieger (sue@qvideo.co.uk)



Vertical aerial view of Swanage Bay - Dorset
© 2011 Infoterra Ltd & Bluesky
Data SIO, NOAA, U.S. Navy, NOAA-GEBCO
© 2011 Esri All Rights Reserved
Google

Interpreting Aerial Photographs

If asked to describe or interpret what can be seen in an aerial photograph you should talk about both PHYSICAL FEATURES and HUMAN FEATURES.

Physical Features – include things such as relief, rivers etc.

Human Features – include type of land use, settlements etc.

See the word list on page 14 for ideas of key words to use in describing features.

CARTOGRAPHIC SKILLS: (i) *Atlas Maps*

You will be expected to be able to describe distribution and patterns of both human and physical features on a range of maps at a variety of scales.

How to describe patterns of human and physical features on a map

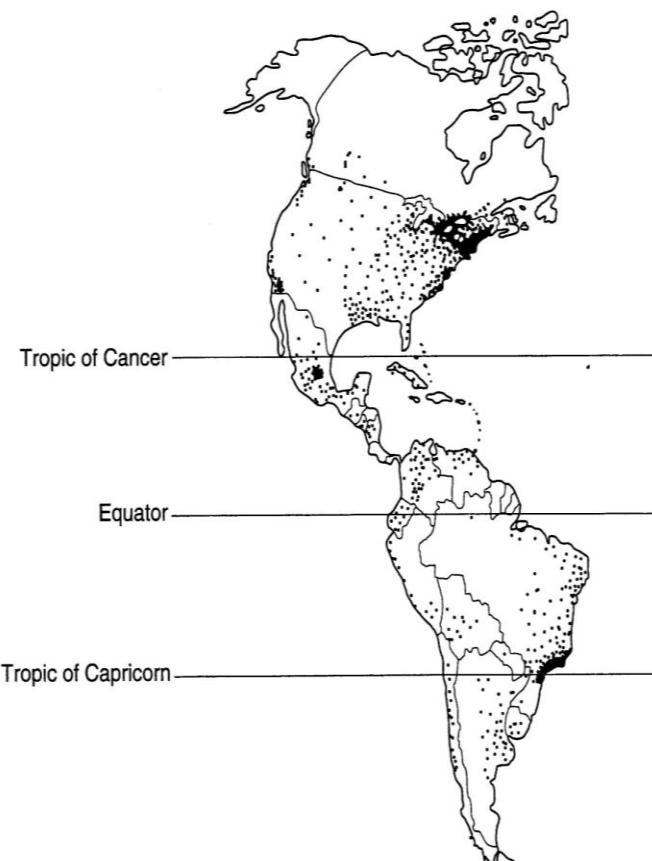
1. **General Statement of location** – identify locations of places on a map - north, east, south, west etc.
2. **Adding place specific detail** – use names of places e.g. found in the west of the UK close to the River Severn; around the equator
3. **Identify patterns** – concentration around.... densely populated.... unevenly spread, around coastlines etc.

Time to Practice!

Study the map below showing the distribution of population in North and South America.

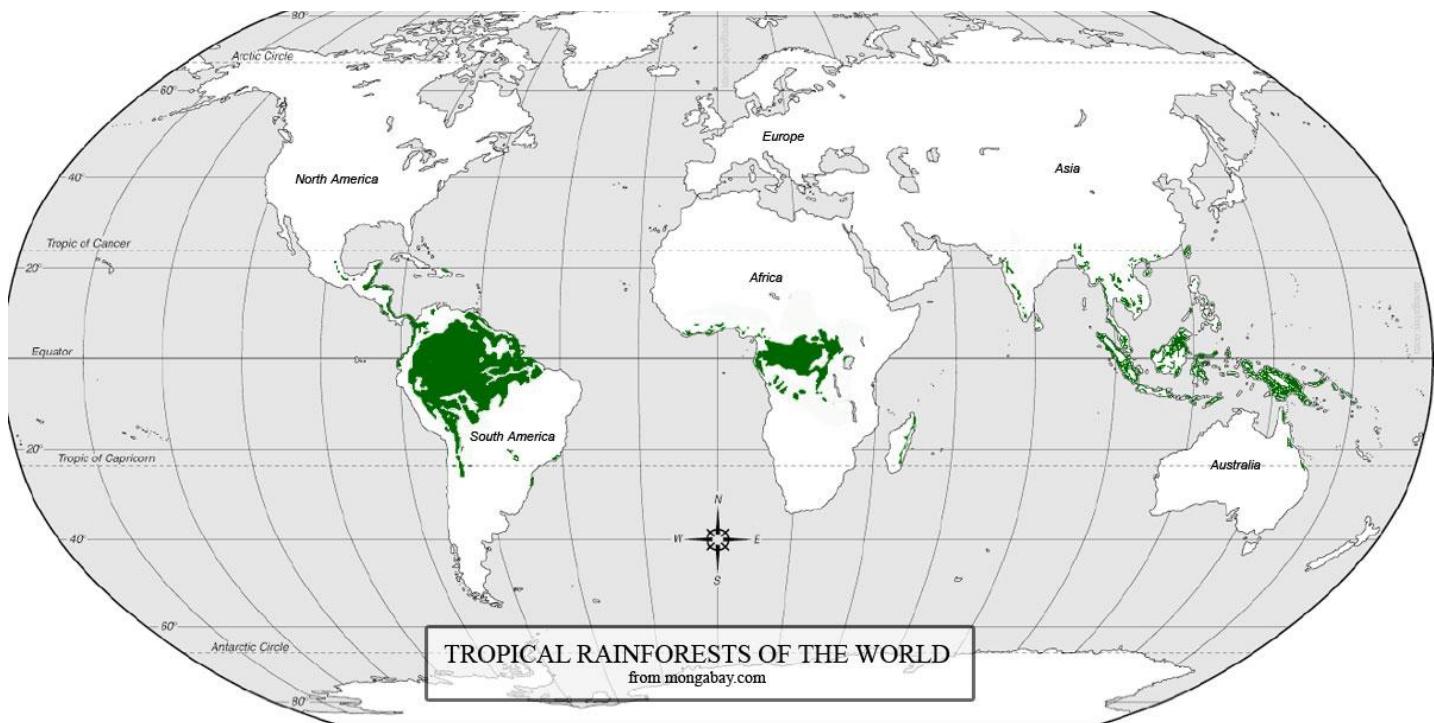
Qu. Describe the similarities and differences in population distribution in North and South America.

The distribution of population in North and South America



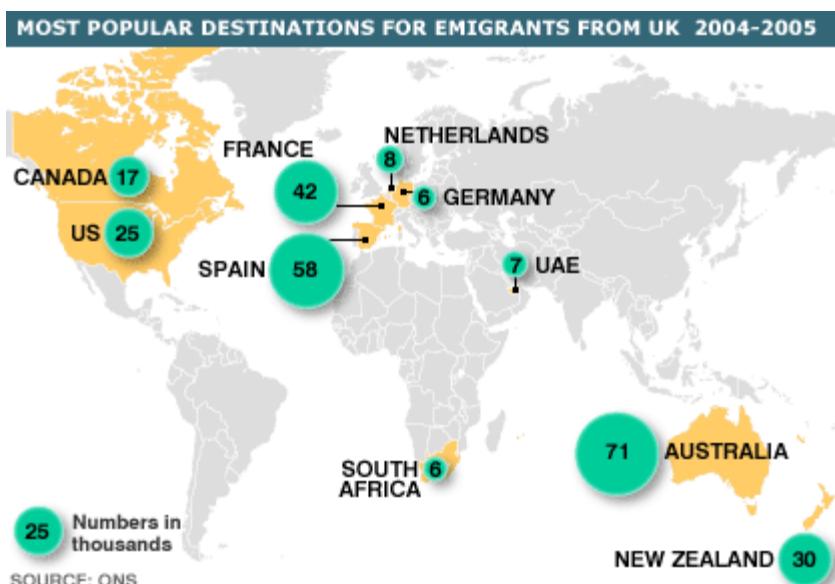
1 dot represents 500 000 inhabitants

Study the map below showing the global distribution of Tropical Rainforests.



Qu. Describe the distribution of the world's Tropical Rainforests.

Qu. Describe the pattern of most popular emigration destinations from the UK between 2004-2006



Source: <http://news.bbc.co.uk/1/hi/uk/6958220.stm>

CARTOGRAPHIC SKILLS: (ii) Sketches from Photographs & Sketch Maps



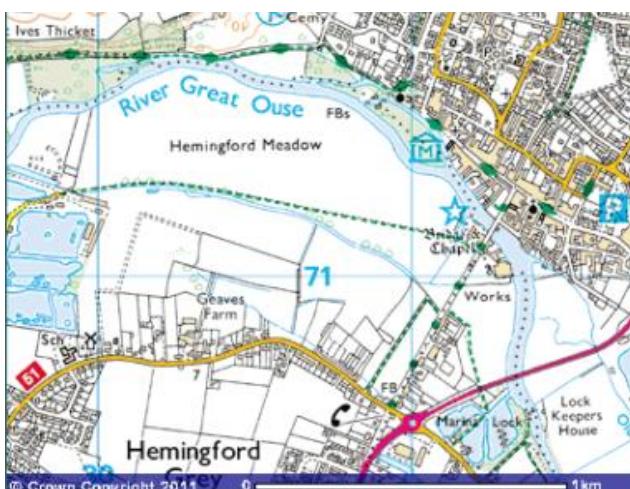
Sketches from Photographs

Drawing geographical sketches from photographs is an important skill. You don't have to be an excellent artist – you just need to be able to identify and sketch key features.

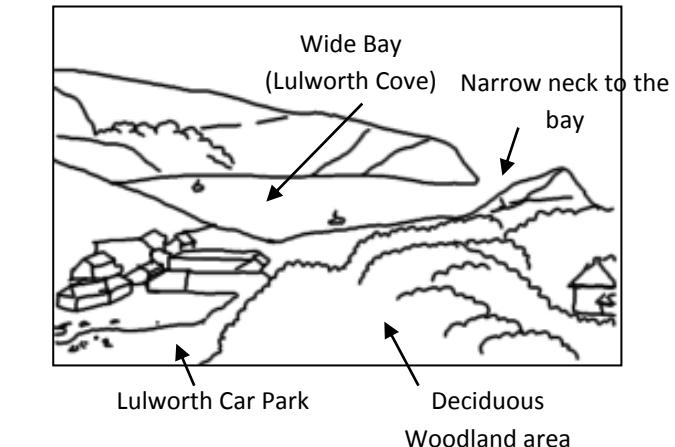
Exam Expectations: In an exam you may be given a part finished sketch and asked to complete it. To make a sketch useful you will then be expected to add appropriate labels and annotations.

Instructions for Drawing Sketches from Photos

- draw a simple box frame to the appropriate size & divide frame into four quarters with lightly drawn guidelines ;
- draw in lines for major features to show the shape of the landscape – e.g. hills, coastlines etc. & features like rivers.
- now add more minor features like woodlands, settlements etc. Remember don't try and over complicate the sketch by making it too detailed.
- add appropriate labels & annotations



Reproduced from Ordnance Survey map data by permission of Ordnance Survey, © Crown copyright.



Sketch Maps

As with sketches from photographs, when constructing a sketch map you are only creating a simplified representation of the original map, you are NOT recreating the detail from the original map.

Exam Expectations: You may be asked to draw a sketch map to show a particular feature. – read the command words in the question to ensure you do exactly what is required.

Instructions for Drawing Sketch Maps

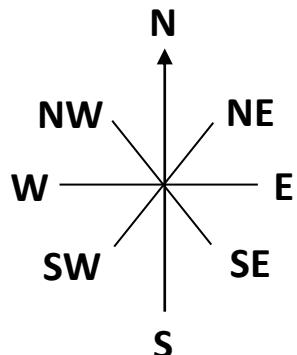
- draw simple box frame and add the grid lines which will help act as guidelines.
- draw any features which are relevant to the question asked and any which you think will help your map make more sense (e.g. road networks, major settlements etc.)
- again, you are not expected to add all the detail – a sketch map should simplify reality
- appropriate labels and annotations should be added
- Remember in exams – you will only use pencil/black pen.



CARTOGRAPHIC SKILLS: (iii) Ordnance Survey Maps

DIRECTION

You must be able to describe the position of places in relation to other places using direction. You may also be asked to interpret oblique photographs by using OS maps to give the direction in which a camera was facing when it took the picture. You need to learn your 8 point compass.



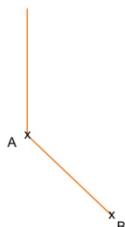
How to calculate a bearing using a protractor:

Bearings can be given in degrees or converted to a compass direction. For example North is 0° , South is 180° , South West is 225° and North West is 315° .

STEP 1

Measuring bearings...

Find the bearing of B from A.

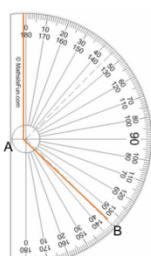


- Mark the North line on at A (if there isn't a North line draw one in)
- Draw the line connecting A to B.
- Measure the angle clockwise from the North line to B

STEP 2

Measuring bearings...

Find the bearing of B from A.



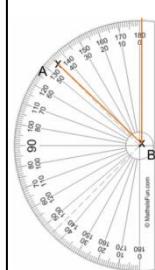
- Place your protractor over the north line with 0° at the top.
- Give the answer as a three-figure bearing

The bearing of B from A is 135° .

ALTERNATIVE

Measuring bearings...

Find the bearing of A from B.

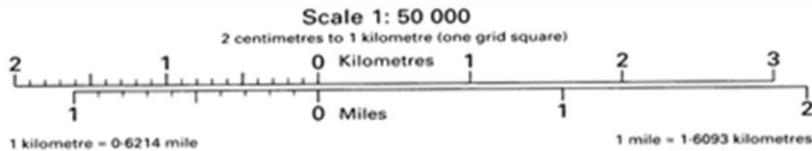


- Place your protractor over the north line with 0° at the bottom.
- Because you are measuring clockwise you need to measure the exterior angle.
- The angle has gone past 180° so you will need to add your measurement to 180°

SCALE

Scale is the link between real life distances and those on a map. Scale can be given in three different ways:

1. As a statement: e.g. 1cm stand for $\frac{1}{2}$ km
2. As a ratio – e.g. 1:50,000 (this means that 1cm on the map is equal to 50,000 cm or 500m ($\frac{1}{2}$ km) on a map)
3. Or as a scale bar (most common on OS maps), given at the base.



If measuring distances you must remember when using the scale to start at the 0 (the left part of the scale bar is divided into sub-units to make it easier to measure part of a km).

(i) DIRECT DISTANCE (as the crow flies)

Measures the direct distance between two points.

- Mark the positions of the two places on the edge of a piece of paper
- Place this edge under the scale bar and read off the correct number of whole and part kilometres (remember to start at 0!)



(ii) ACTUAL DISTANCE (Indirect)

Choose a straight edged piece of paper, mark one of the places on the edge and gradually work along the route, using a pen to pivot the paper and keep it in place to follow the route until meet the second place (mark this with a pen). You can then use the scale bar to work out the distance.



EXAM TIP – REMEMBER, when measuring distances:

1. Do NOT use a ruler – this is a major source of errors
2. Be accurate – do NOT round up or down!
3. On a 1:50,000 OS map – 2cm = 1km – so one grid square = 1km^2

ESTIMATING AREA

You may be asked to estimate area from a map, remember on a 1:50,000 map, 1 grid square = 1km². Therefore if you are estimating the area of woodland which only takes up approx 3/4 of the square you would estimate the area to be 0.75km².

SYMBOLS

You must make sure you make good use of a key on a map, particularly if you are asked to describe physical / human features of an area, or for example, the site and situation of a place.

In an exam you will be provided with a key, but it is useful to know and learn some of the most often used symbols. Some examples are given in the table below.

Symbol	Feature	Symbol	Feature	Symbol	Feature
	Coniferous Woodland		Car Park / Park and Ride		Picnic Site
	Camp Site / Caravan Site		Marsh or Salting		Bus Stop
	Golf Course		Public House		Place of worship with a tower

GRID REFERENCES

You must be able to both GIVE and FIND 4 and 6 figure grid references.

4 figure grid references - these enable you to locate an individual square on a map

How would you give the four figure grid reference of the square with the marsh in?

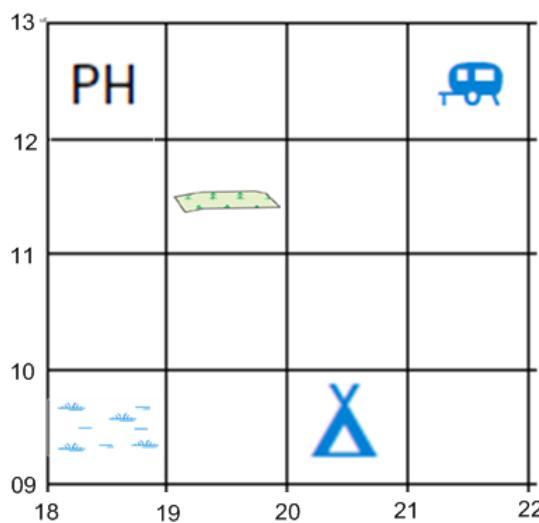
- 1) Give the number of the line to the left of the square which is 18
- 2) Give the number of the line to the bottom of the square which is 09

Now put the two numbers together to give the four figure grid reference: _____

So what is the 4 figure grid reference for:-

(i) Campsite _____ (ii) Pub _____

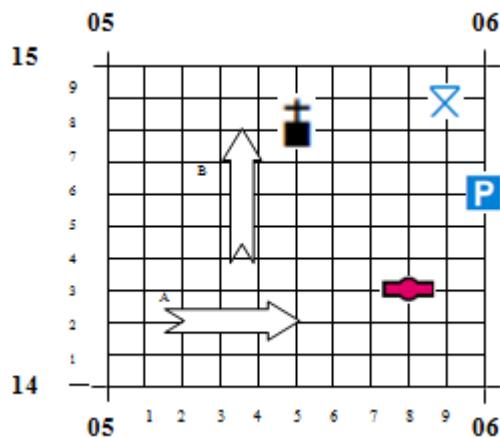
(iii) Woodland _____ (iv) caravan site _____



6 figure grid references - these enable you to pinpoint an exact location within a grid

REMEMBER - if you are asked to give a 6 figure grid reference for a building such as a farm or school - the grid reference you give should be for the centre of the building (not for its label!)

Six figure grid references are simply an extension of four figure grid references. The four figure grid reference tells us which grid square to look in, a six figure grid reference tells us precisely where within that grid square to look.



How would we give the six-figure grid reference for the church with a spire, located within this grid square?

Firstly - what is the 4 figure grid reference for this square? (remember give the number of the line to the left and then number of the line immediately below the square) _____

You need to imagine that the square is divided into tenths (along the bottom and up the side).

1. Go 'along the corridor' (follow arrow A), how many tenths along the square is the church? ___, add this number to the first two figures of your four figure grid reference. 0 5 ___

2. Now go 'up the stairs' (follow arrow B), how many tenths up the square is the church? ___, add this number to the second two figures of your four figure grid reference 1 4 ___

3. Now put the two halves together to give the six figure grid reference for the church with the tower which should be written **055148.**

So what is the six figure grid reference for the:

Bus Station _____

Picnic Site _____

Car Park _____

Describing Physical and Human Features on OS maps

You need to be able to recognise and describe physical and human features on a map, the table below gives examples of things you should be able to talk about.

DESCRIBING FEATURES ON MAPS					
Relief	Drainage	Vegetation	Communications	Land-use	Settlement
- Contour patterns (see below)	- Number of rivers	- Woodland location, amount,	- Types (A Road, Motorway etc.)	- Settlement	Site - Height, slope, landforms, water supply
- Landforms	- Direction of flow	type (use key)	- Direction	- Vegetation	Situation - relate site to relief and drainage and other settlements
- Steepness of Slopes	- Width	- Landforms followed or avoided	- Communications (roads)	- Industrial	- e.g. North or River, 50km west of... etc.
- Heights (Max, lowest etc.)	- Straight or winding	- Rough pasture (location, amount)	- Influence of settlement	- Recreational	Shape - linear, dispersed and nucleated
- Valleys (shape, gradient)	- Tributaries			- Agricultural	
	- Human influence (e.g. straightening)			- Residential	
	- Lakes and Marsh				

When identifying physical features on a map you should be able to name and identify landform features and describe the relief of the land.

Remember relief of the land refers to the height and shape of the land. On OS maps, relief is shown by contour lines, spot heights and triangulation pillars.

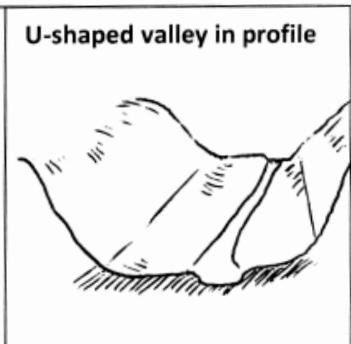
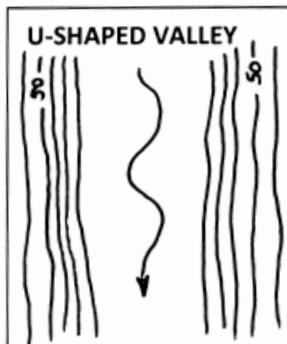
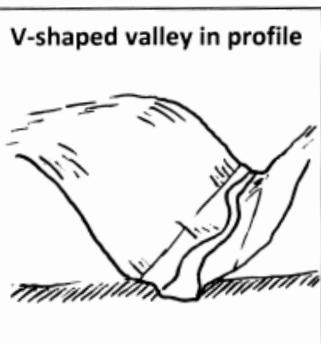
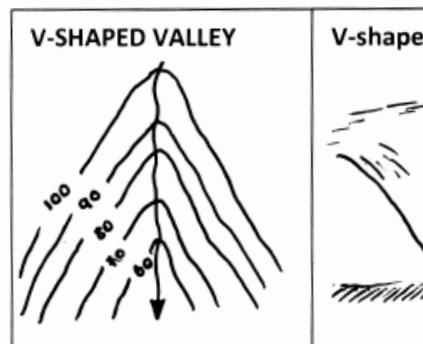
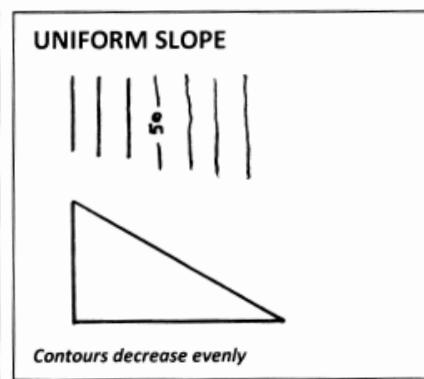
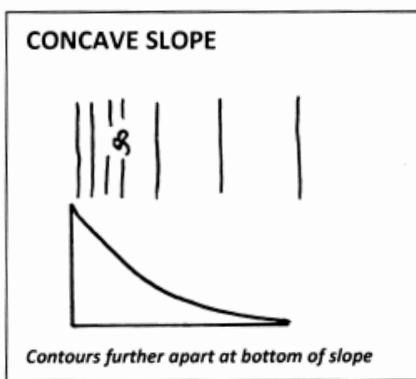
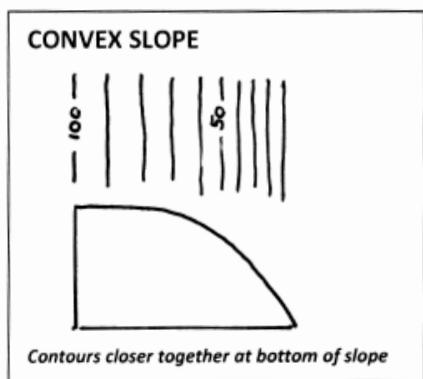
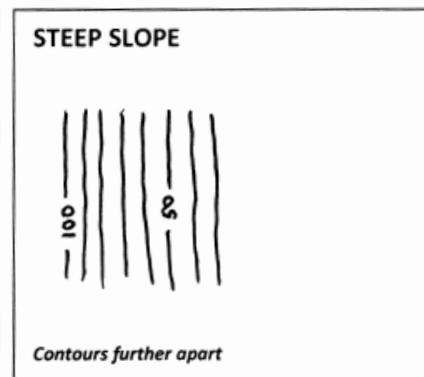
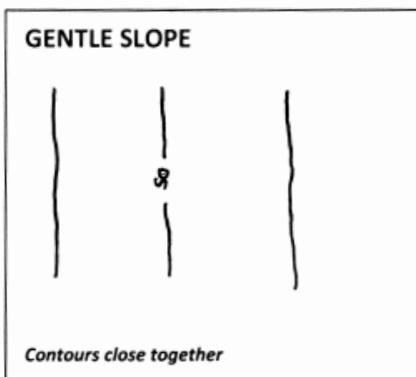
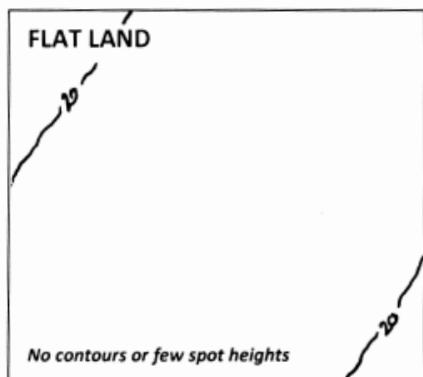
INTERPRETING CONTOUR LINES - REMEMBER:

The closer together the contour lines - the **STEEPER** the slope (i.e. height of land changes quickly)

The further apart the contour lines - the **FLATTER** the slope (i.e. height of land changes very slowly)

You should be able to identify key and describe relief landforms from distinctive contour patterns.

The main features that you would be expected to recognise are:



Calculating Gradient

You should be able to calculate the gradient of the land using a very simple formula:

$$\frac{\text{vertical interval (difference in height)}}{\text{horizontal equivalent (horizontal distance)}}$$

Example:

Refer to the OS map of Salisbury on page 22. Find the spot height at grid reference 092301 (88 metres) and the spot height at 105301 (53 metres). The distance between these two points is 1300 metres. Therefore the formula is

$$\frac{35}{1300} = 0.027$$

This could also be expressed as a ratio: 1: 0.027. This means for every 1 metre you move horizontally you move 0.027 metres vertically.

If you want to convert your answer in to percentage then you just multiply it by 100. Therefore $0.027 \times 100 = 2.7\%$

Practice

Go back to the map on page 22. Find the spot heights at 112336 and 163314. Calculate the gradient between these two points. Express it in all three formats:

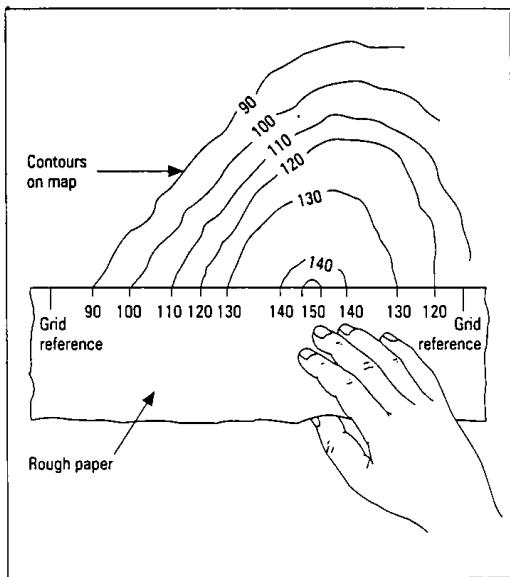
Drawing and Interpreting Cross Sections

A cross-section shows the variations in relief along a chosen grid line.

EXAM TIP: In an exam situation....

- You may be asked to INTERPET / ANNOTATE features on a cross-section

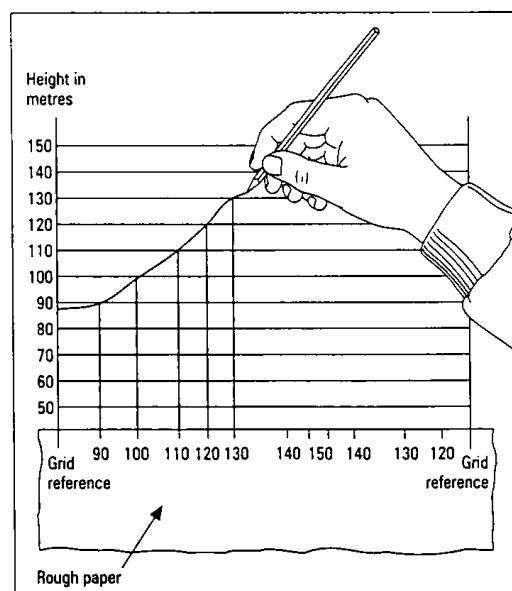
▼ A How to take contour readings from the map



Source: Geography in Action 1 (1995, Heinemann)

1. Place the straight edge of a piece of paper. Lay it along the grid line for which you are drawing the cross section (sometimes in an exam this is indicated with a line – X – Y). Mark the starting and ending point on your paper.
2. Ensure that you have a sharp pencil and mark the position of each contour line which touches the paper with a small line. REMEMBER – you must note down the height of the contour! (as in diagram A) (if the line passes through a spot height or triangulation pillar – this should also be marked down)

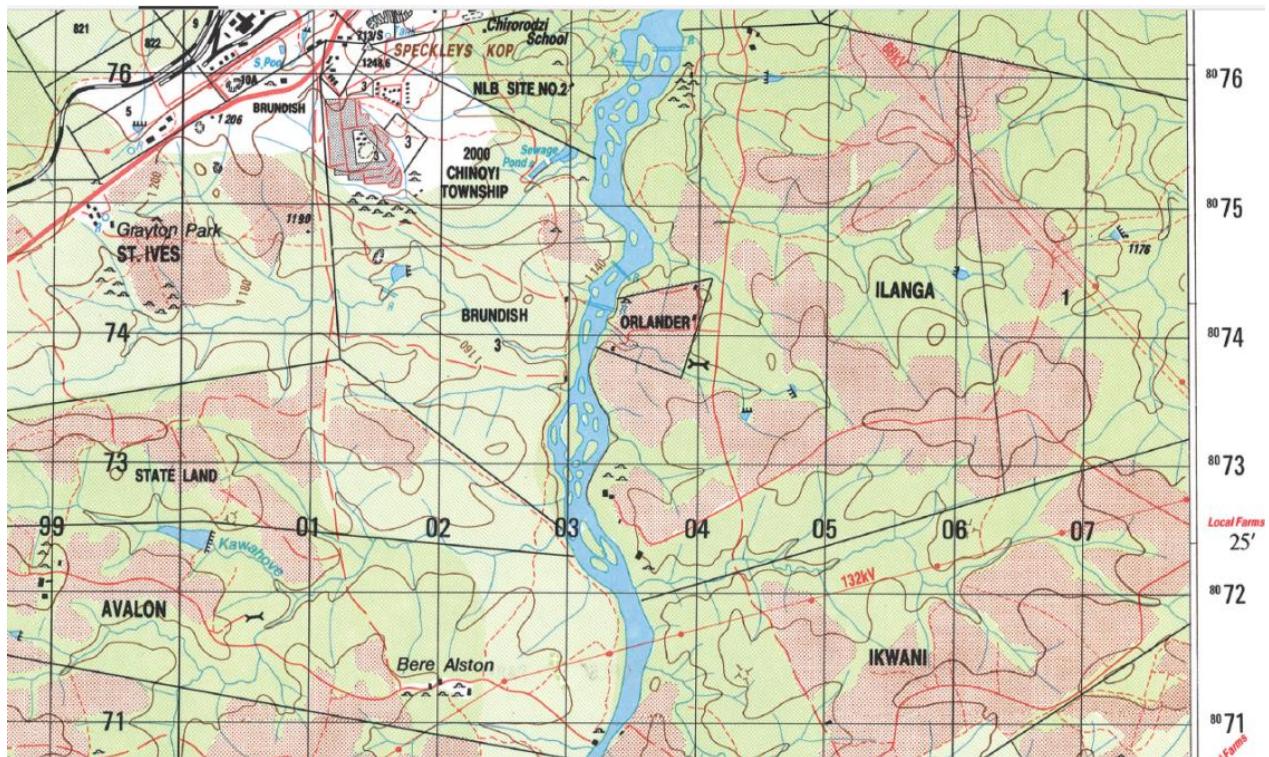
▼ B How to mark the contours on to your cross-section



Source: Geography in Action 1 (1995, Heinemann)

3. When all contour lines touching the paper have been marked on remove the paper and lay it out along the base of the given cross-section outline.
4. Mark the points on the graph at the correct heights with a cross (as shown in diagram B)
5. When all points have been plotted, join up the crosses with a smooth line. Do NOT use a ruler to join up your points, because you are drawing the shape of the landscape which will never be straight!

PRACTICE QUESTIONS: Interpreting Cross Sections



(c) Fig. 2 is cross section of the river valley along northing 75 from 010750 to 060750.

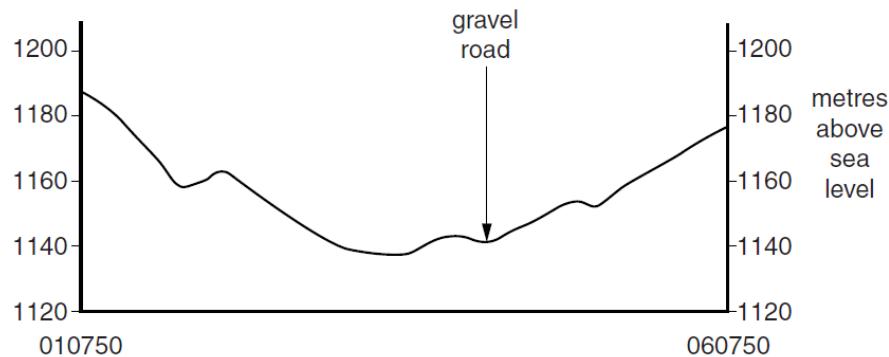


Fig. 2

On Fig. 2, using labelled arrows, mark the positions of:

- (i) the flood plain of the river; [1]
- (ii) a group of huts; [1]
- (iii) a track. [1]

EXAM TIP: In an exam situation....

- Copy a technique which has already been started. In this example there is an arrow with the label at the top, you should do the same.

Describing site, situation and shape of settlements

Site of a Settlement

This describes the land on which a settlement has been built and includes both human and physical features.

When describing site in an exam, remember:

S - Slope - slope / relief of the land

H - Height above sea level

A - Aspect - way the slope faces

W - Water Supply

L - Land (i.e. that settlement is built on - fertile land, floodplain)

Situation of a Settlement

Situation refers to the location of a place in relation to its surrounding physical and human features. When thinking about what to talk about when describing situation, remember:

P - Places (nearby settlements)

A - Accessibility

R - Relief (near hills etc.)

C - Communications (e.g. roads / rivers)

There are a number of physical and human factors which have affected both the site and situation of settlements. For ideas for things to include when describing the site of a place - think about:

FACTOR	Explanation of site features	PHYSICAL / HUMAN
Defence	Settlements are often found on high ground overlooking surrounding areas, or within a large meander bend, giving protection to a settlement on 3 sides - these sites were chosen for defence purposes.	Physical Factors
Communication	Areas with low bridging points led to growth of settlements (e.g. Oxford, Cambridge etc.) allowing a river to be 'forded' or 'bridged'. Other favourable sites are in the gaps through hills (gap towns) or where valleys meet. Positions close to the coast are also favoured for settlement for communication and trade.	Physical / Human Factors
Water Supply	Settlements close to rivers, lakes or springs are known as wet-point sites. Spring-Line settlement - where settlements have developed along springs at base of a hill. Dry Point-sites - where settlements have been built on slightly higher area of land surrounded by marshland.	Physical Factors
Aspect & Shelter	South-facing slopes have more shelter from cold winds and receive more sun in northern hemisphere - therefore more settlements found on south-facing slopes.	Physical Factors
Resources	Early settlements grew up close to quarries and areas of woodland for resources.	Human factors

EXAM TIP

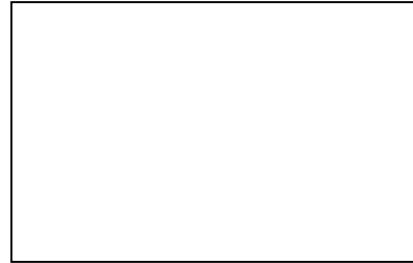
- Make sure for the exam you are able to describe and suggest explanations for the site and situation of a settlement.
- You may be asked to draw a sketch map showing a settlement & annotate to explain its site.

DESCRIBING SETTLEMENT SHAPE

You may also be asked in an exam to use an OS map to describe the shape of a settlement.

There are 3 main shapes you should be able to identify: (in the boxes draw a sketch of each settlement shape)

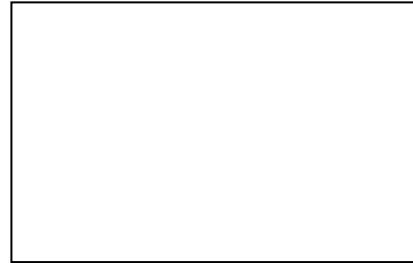
NUCLEATED SETTLEMENTS - these are settlements where buildings are clustered around a central point, often a cross roads or around a village green.



LINEAR SETTLEMENTS - these are often settlements with buildings either side of a main road or along a stretch of coastline



DISPESERD SETTLEMENTS - have no obvious clustering of buildings with buildings spread out over an area.



Example Questions & Answers on Site and Situation

The following refer to the Salisbury OS map extract on the next page.

Describe the situation of Wilton (4 marks)

Wilton is situated on the A36(T), approximately 4kms WNW of Salisbury. It is north of the River Nadder and south of the railway line. It is located ENE of Burcombe and NW of Netherhampton and SSE of South Newton.

Describe the site of Wilton (0931) (4 marks)

Wilton is 68 metres above sea level, located on the north bank of the River Nadder and is located on the flat bottom of the river valley.

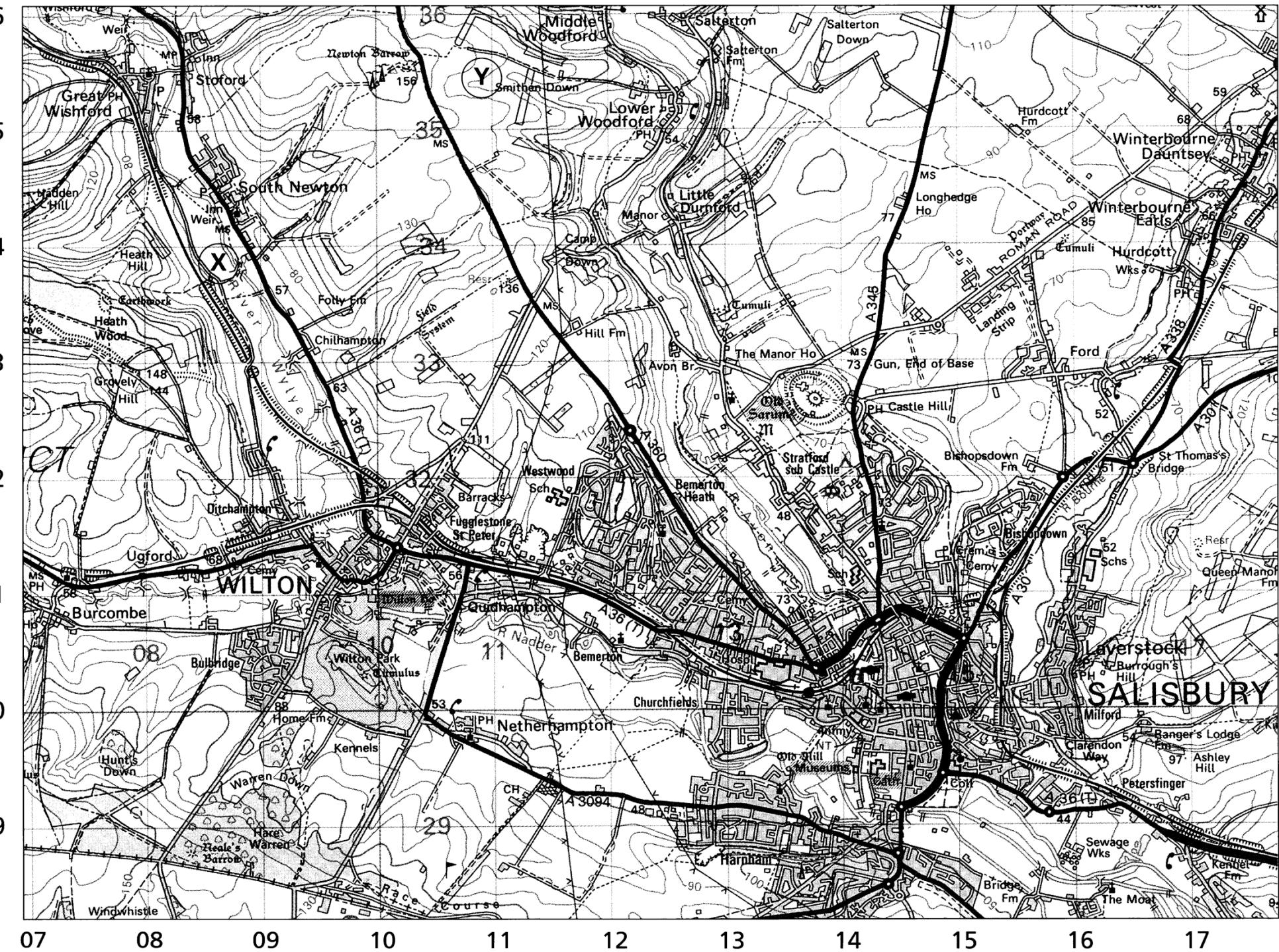
Describe the differences in land-use between grid squares 1528 and 1531 (5 marks)

In grid square 1528 there is a sewage works (159077) and a lot of agricultural land-use with a farm (Bridge Farm 156072) and a farm track with bridge over the river (157075). In contrast to this, the land-use in grid square 1531 is more built up, with mainly residential land-use, including a settlement called Bishopdown, with housing arranged in crescents (e.g. 153317) and cul de sacs (i.e. 153316) and communications including a road (A30) and a railway line running parallel to this. There is also a crematorium and cemetery at 153314.

Describe the differences in relief around the villages of Great Wishford (in the NW corner of the map) and Winterbourne Dauntsey (in the NE corner of the map) (5 marks)

Great Wishford sits in the valley bottom of the River Wylye. The valley runs in a NNW-SSE direction. To the west of the village the valley side rises with a steep east facing slope. The contour lines rise from 70m above sea level to 140m above sea level, a rise of approximately 70m over a distance of 1km. To the east, the west facing valley side rises steeply to 150m at Newton Barrow (with a trig point of 156m above sea level). Compare to this, the relief around Winterbourne Dauntsey is much flatter with a gently sloping gradient rising from 60-68 metres above sea level.

▲ Figure 14 An Ordnance Survey map of the area around Salisbury. Scale 1:50 000



GRAPHICAL SKILLS: (i) Bar Graphs

BAR GRAPHS

These are one of the simplest data presentation techniques. They are used to display discrete data in separate columns (i.e. categories are unordered – can be arranged by size, alphabetically etc.)

Example – number of different accommodation types

How to construct a Bar Graph

Select appropriate layout (if lots of bars – landscape is best, but if large range of data, portrait is best).

1. Choose an appropriate scale for the x and y axis (for the y axis make sure this allows for the highest value to be plotted).
2. Draw each bar to the correct value
3. It is usual to have a gap between each of the bars.
4. Clearly label both axes and add a title
5. Colour in each bar a different colour (as discrete data) and ensure that you add a key.

Advantages

- Can easily compare two or three data sets
- Values can be estimated at a glance
- Summarises large data sets in a visual form

Disadvantages

- Can only be used with discrete data

- (d) Look at Figure 4b. It is a graph showing the percentage of the population in urban areas in three different years.

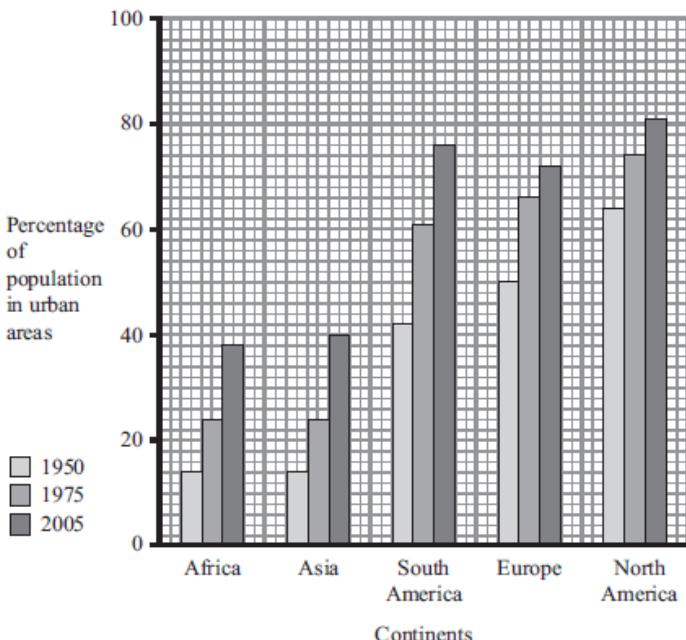


Figure 4b

- (i) What percentage of the population was in urban areas in Africa in 1950?

..... (1)

- (ii) Which continent had the greatest percentage of the population in urban areas in 1975?

- (iii) Europe and North America contain mainly MEDCs. Africa, Asia and South America contain mainly LEDCs. Between 1950 and 2005 was the increase in the percentage of the populations in urban areas greater in LEDCs or MEDCs?

..... (1)

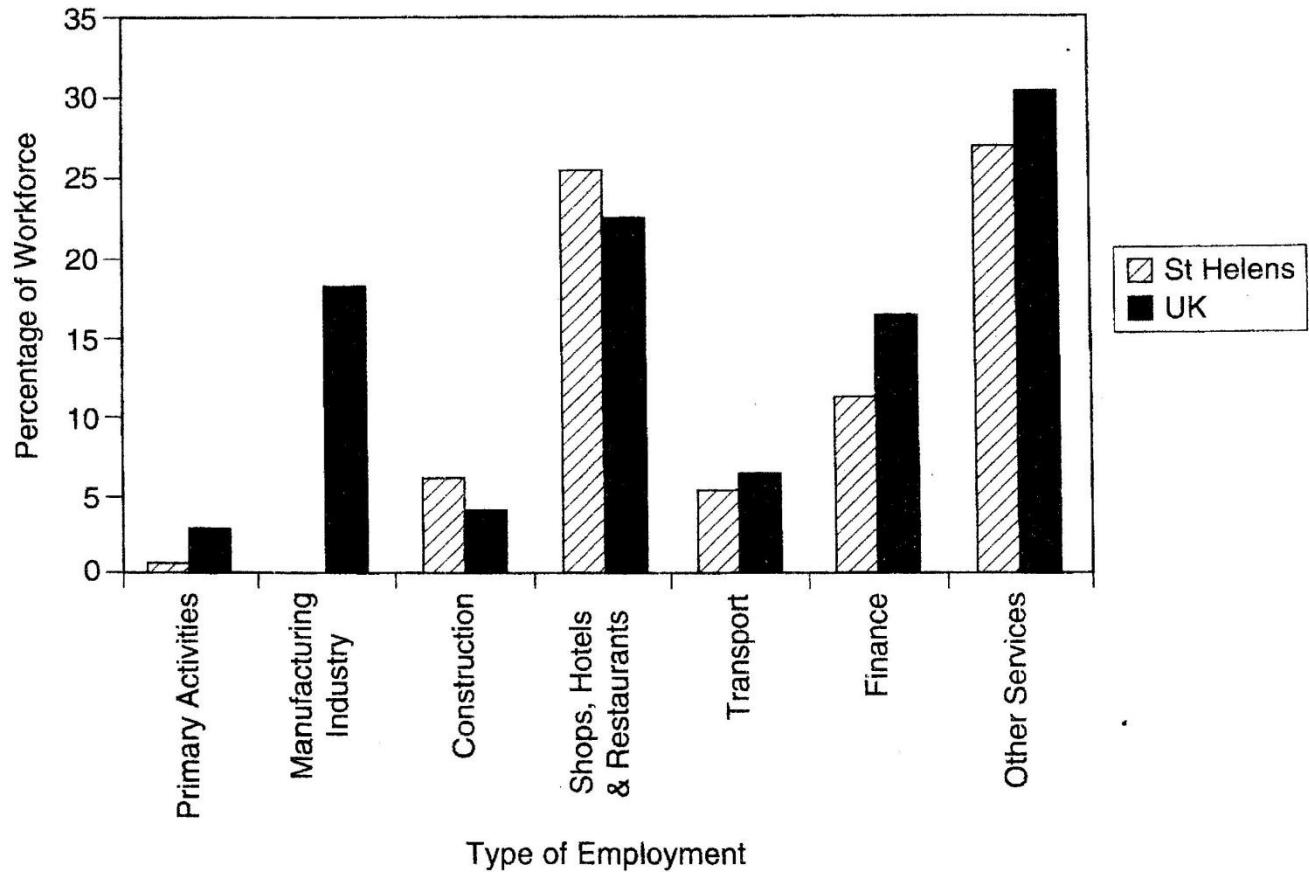
- (iv) Explain your answer to part (iii).

.....
.....
..... (2)

EXAM TIP
DISCRETE DATA is that which has values / observations which are distinct and separate, i.e. they can be counted (1,2,3,...). Examples include gender (male, female); blood group (O, A, B, AB).

PRACTICE QUESTIONS: Bar Graphs

Fig. 2a Employment structure in St. Helens and the UK



Adapted from: St. Helens Metropolitan Borough Council Census of Employment, 1993

i. Complete the graph using the following information:

"25% of the workforce of St Helens is employed in manufacturing industry"

ii. How important is employment in manufacturing industry in St Helens compared with the UK as a whole, you should support your answer with figures.

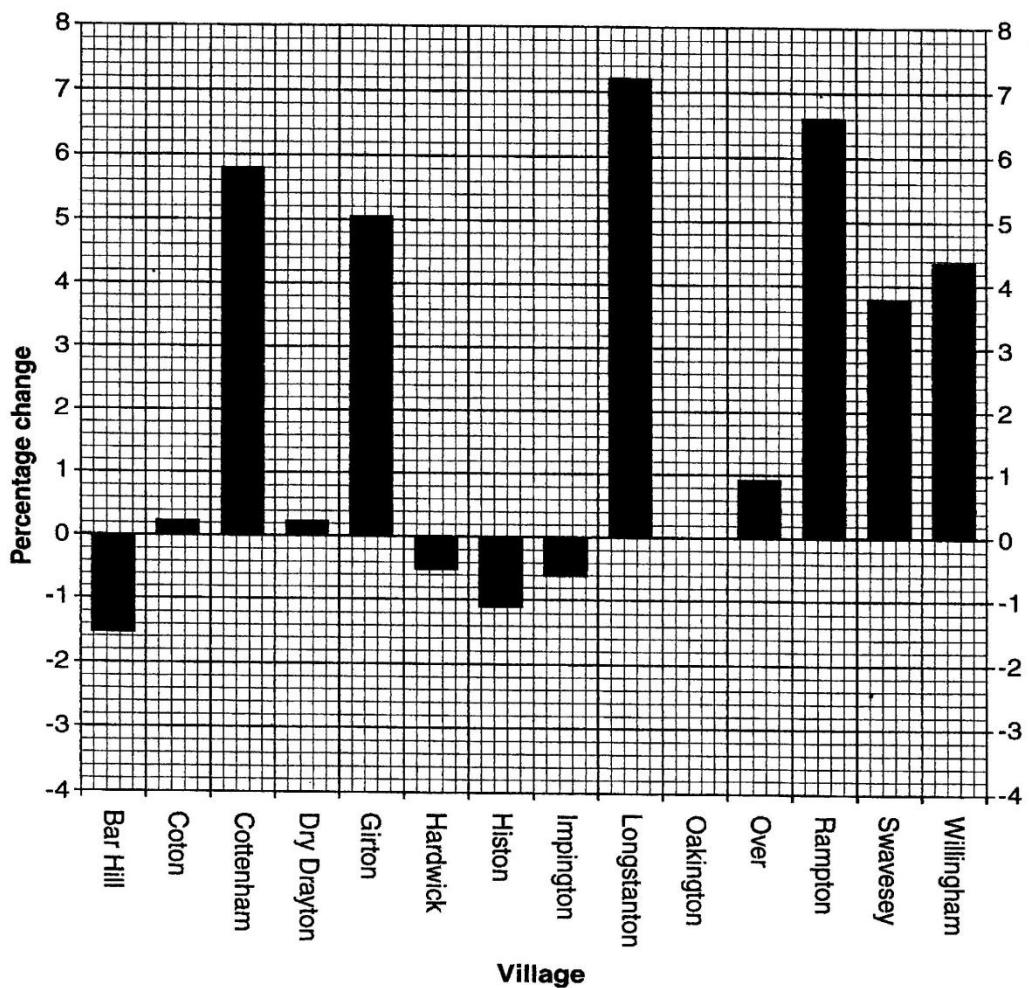


Fig. 1 Population change in selected villages between 2001–2004

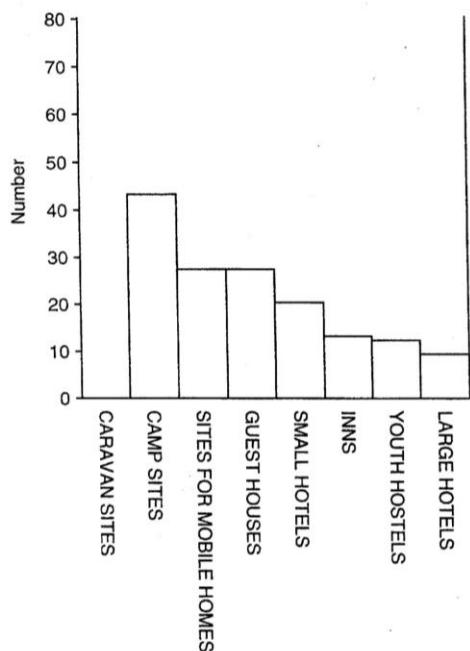
(i) The population of Oakington fell by 3.1% between 2001 and 2004 – plot this information on Figure 1.

(ii) Compare the change in population between Swavesey and Hardwick between 2001 and 2004. Use figures to support your answer.

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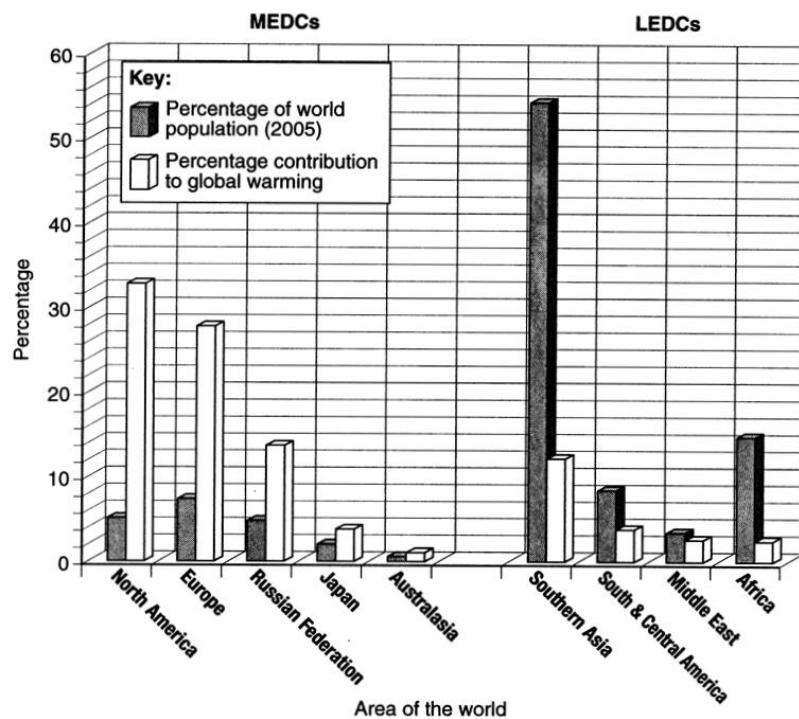
Fig. 1a Accommodation in the Peak District National Park

Complete the graph by adding a bar for Caravan Sites - there are 75 caravan sites in the Peak District National Park



Study the graph below. Compare the % share of world population and contribution to global warming between North American and Southern Asia. Refer to figures in your answer. (2 marks)

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GRAPHICAL SKILLS: (ii) Histograms & Compound Bar Graphs

HISTOGRAMS

HISTOGRAMS are also drawn as bars, however they are used to show *CONTINUOUS DATA*. Therefore in a histogram bars are drawn touching each other

EXAM TIP

Continuous data is information that can be measured on a continuum or scale. You can count, order and measure continuous data

Example – Pedestrian Flow changes over a continuous timescale.

How to construct a Histogram

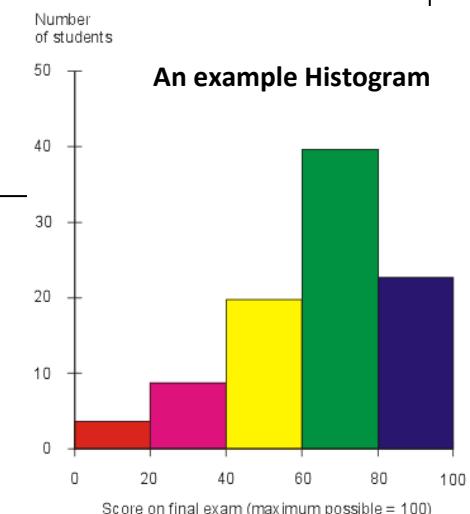
1. Decide on an appropriate scale for the x-axis and y-axis for the bars (it is important that the bars are of equal width and as it is continuous data there should be no gap between bars).
2. Draw each of the bars to the correct value
3. The bars should be coloured in the same colour (as continuous data)
4. Remember to label axes and put a title on your graph.

Advantages

- Can compare data to the normal distribution and identify if data is skewed

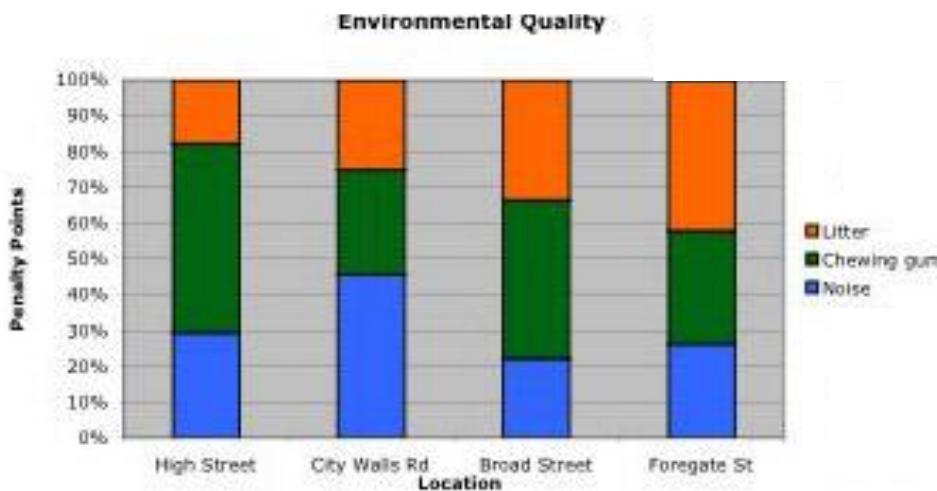
Disadvantages:

- Can only be used with continuous data



COMPOUND BAR GRAPHS

In this technique, subdivision of bars is used to show relative % of a sub-component.



How to construct a Compound Bar Graph

Bars can be drawn either an equal distance apart or joined

An appropriate scale is required for the axes showing the % variable

An appropriate width is required for the bars (each bar should be the same)

Bars should be divided into the correct % and individual subdivisions coloured and a key added.

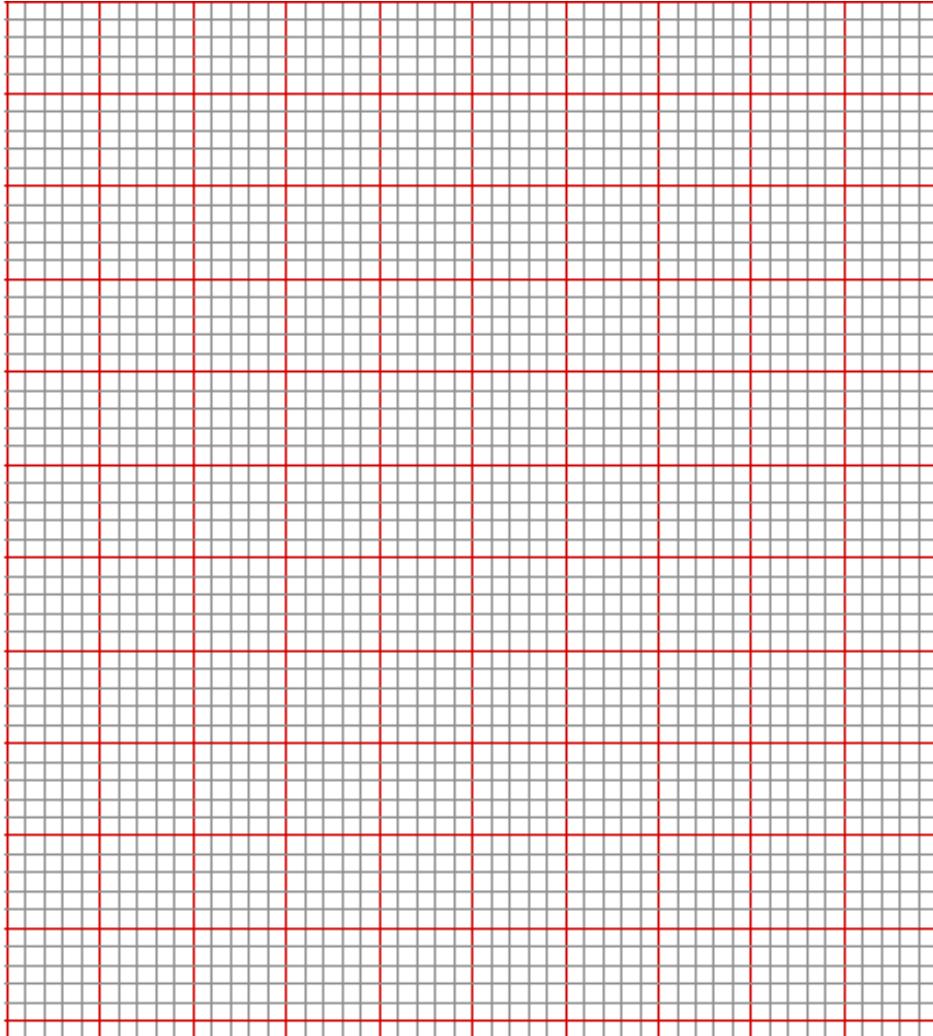
A clear title and axes labels should be added.

PRACTICE QUESTIONS: Compound Bar Graphs

Differences in Water consumption between Europe, Africa and the USA

	Domestic Use %	Industrial Use %	Agricultural Use %
Europe	13	54	33
Africa	8	7	85
USA	14	45	41

1. Using the % figures for water consumption, construct 3 compound bar charts to show the differences between water consumption in Europe, Africa and the USA.
(include a title and label axis)



2. Suggest 3 reasons for the differences shown on your graphs.

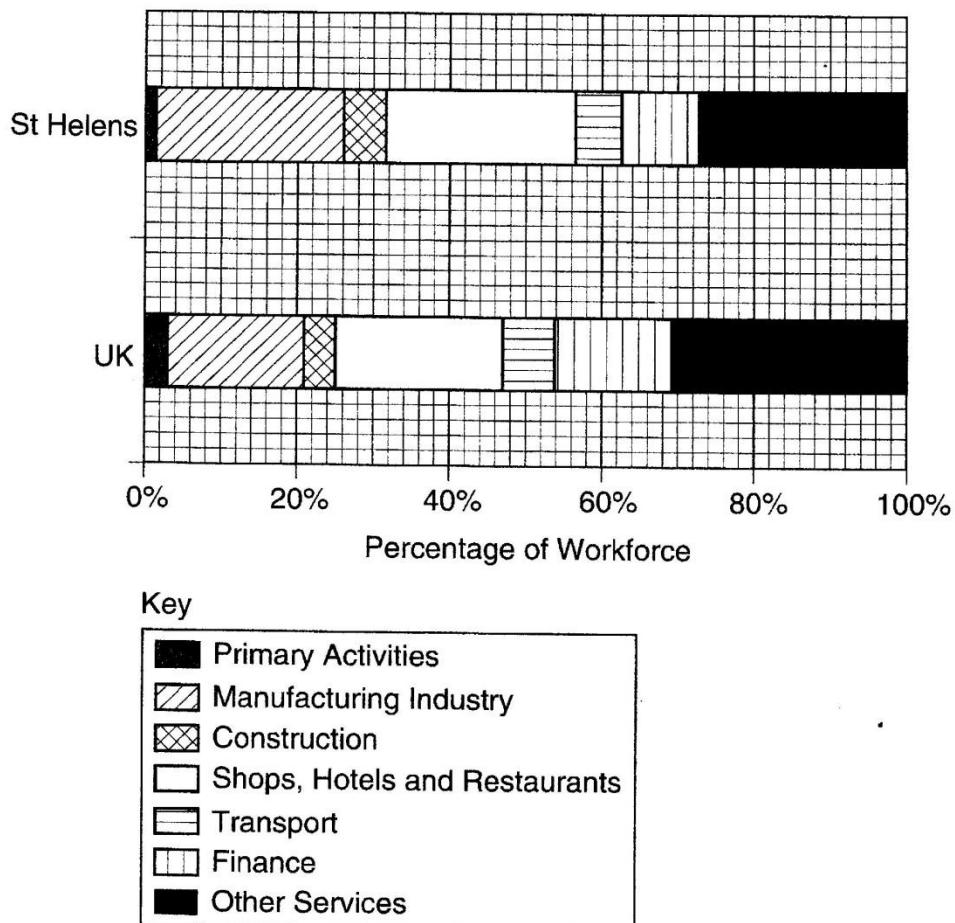
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Fig. 2a Employment structure in St Helens and the UK



(i) What % of the workforce of St Helens is employed in shops, hotels and restaurants?

(ii) Identify a major difference between the employment structure of St Helens and the UK as a whole.

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**Divided bars to show percentage housing ownership
in Arboretum, St Peters, and Warndon**

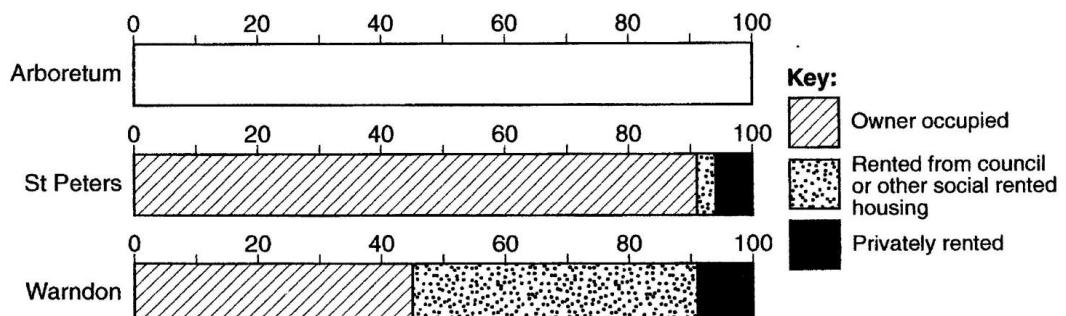


Fig. 1a

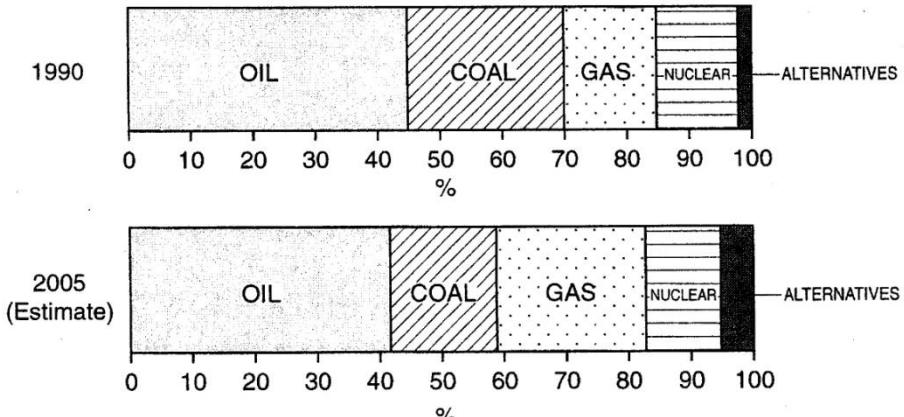
Complete Fig. 1a using the following information about housing ownership in Arboretum.

Owner occupied	70%
Rented from council or other social rented housing	10%
Privately rented	20%

[1]

The divided bars above show % housing ownership in 3 residential areas. Using the information below the graphs, complete the bar to show housing ownership in Arboretum.

Fig. 2b Types of energy used in Europe in 1990 and 2005 (estimates)



Describe the main changes in the use of energy shown in the diagram above. (3)

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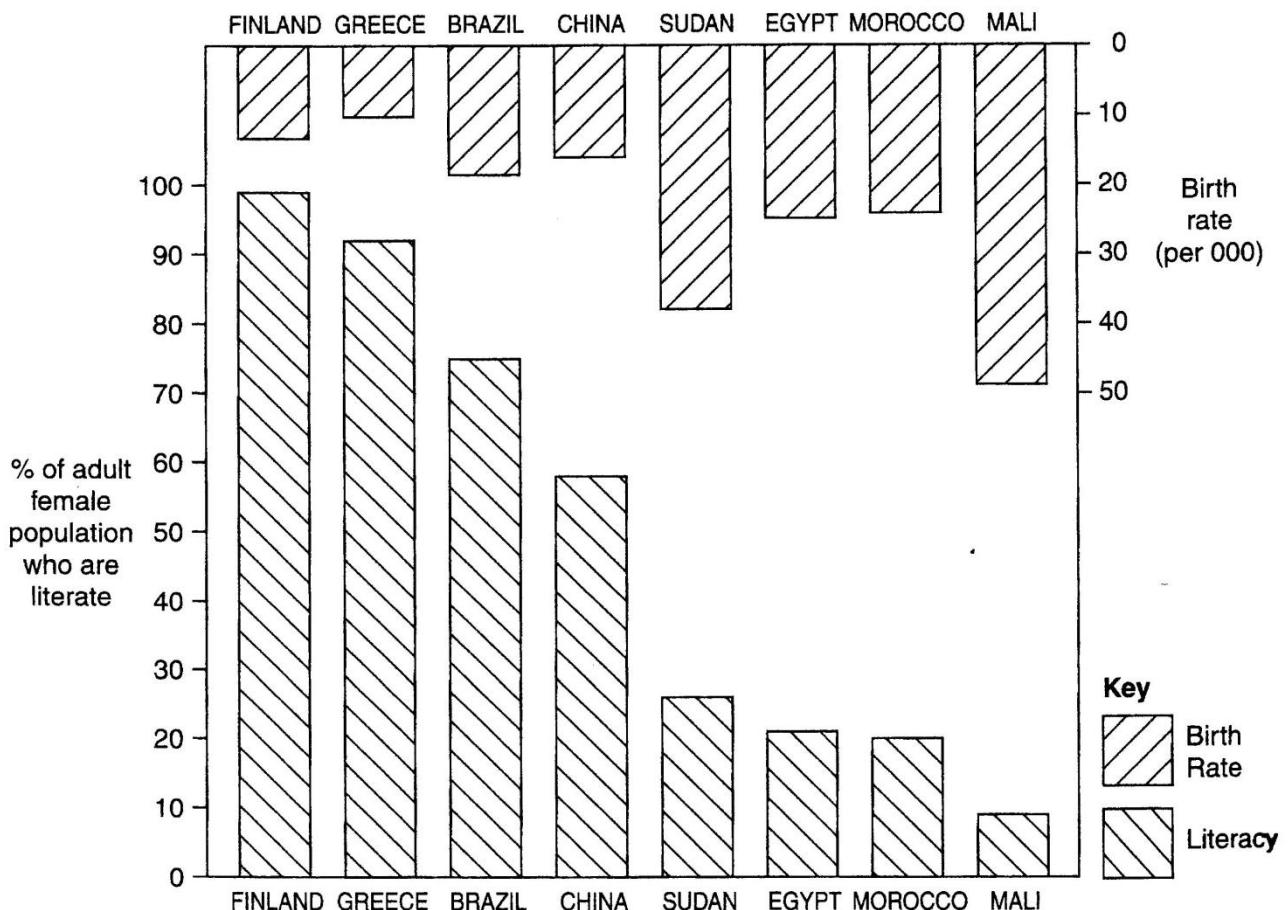


Fig. 3 Birth rates and levels of adult female literacy in eight countries

To what extent is there a link between birth rate and the literacy level of the countries shown in the graph above? (3 marks)

.....

What is the birth rate in Sudan? (per 1000) (1 mark)

What is the birth rate in Mali? (per 1000) (1 mark)

What % of the adult female population in Brazil are literate? % (1 mark)

What % of the adult female population in Egypt are literate? % (1 mark)

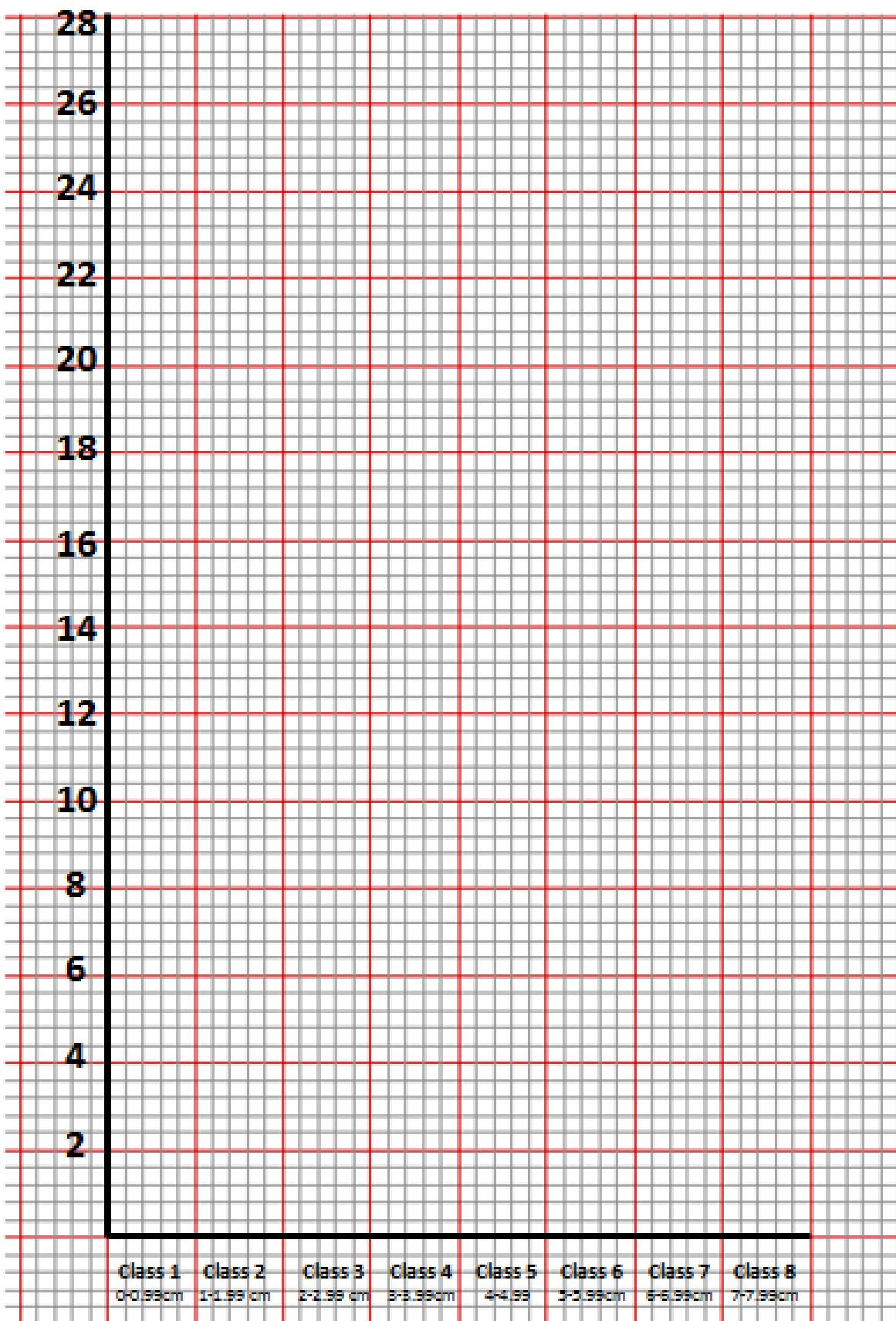
PRACTICE QUESTIONS: Histograms

The data below is from a beach survey in which a student took 100 samples of beach material and measured the size of the long axis.

	Class 1 0-0.99	Class 2 1-1.99	Class 3 2-2.99	Class 4 3-3.99	Class 5 4-4.99	Class 6 5-5.99	Class 7 6-6.99	Class 8 7-7.99
Frequency	3	8	18	19	27	16	7	2

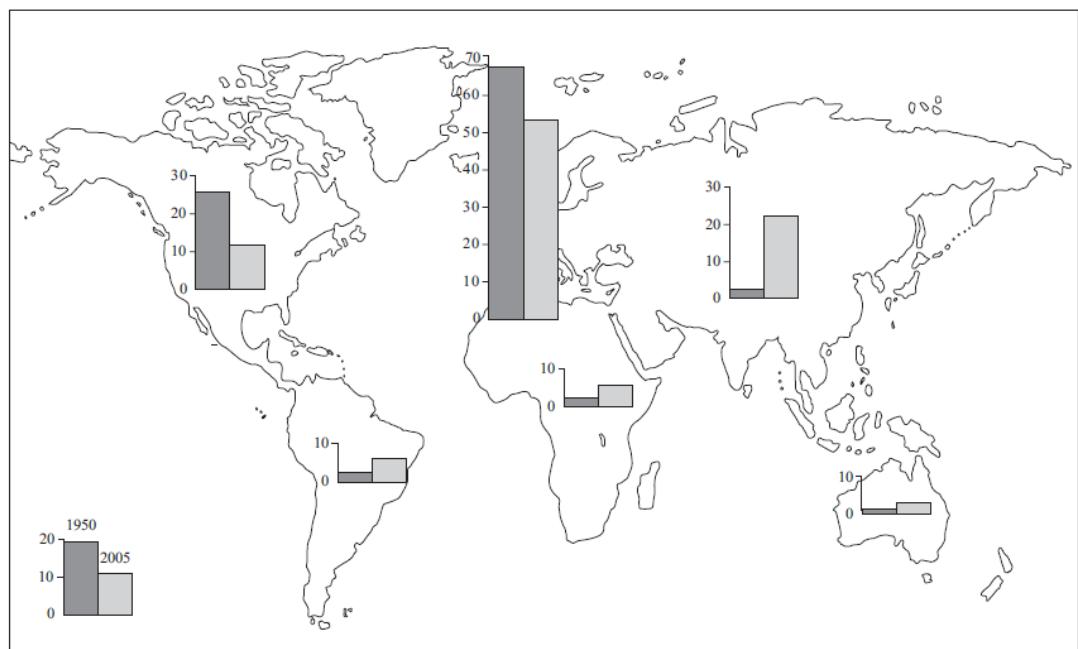
1. Using the data, draw a histogram on the graph paper over the page.
 2. Add a title and label your axis.
 3. Describe the graph

4. What are the advantages of this technique



GRAPHICAL SKILLS: *Located Bar Chart*

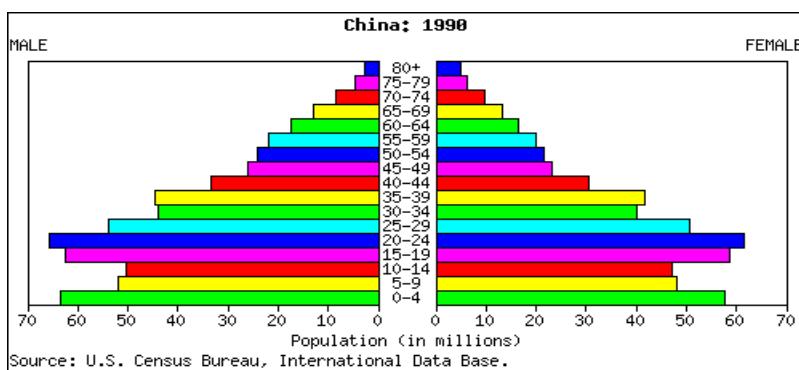
Located bar charts are drawn at an appropriate place on the map. The big advantage of these is that they help to give spatial relevance to the data. The example opposite shows changes in international tourists between 1950 and 2005.



GRAPHICAL SKILLS: (ii) *Pyramid Chart*

Pyramid charts are commonly used to show population structure – these charts are known as **POPULATION PYRAMIDS** and they allow you to compare the number or % in different age groups and the balance between males and females.

However, pyramid graphs can also be used to show any continuous data which can be split into two – e.g. pedestrian counts in two different directions.



How to construct a Pyramid Chart

- Decide on an appropriate scale for the x and y axis
- Draw your x-axis and then draw a vertical line to divide it into two halves – e.g. for population pyramids – the left half for males and the right half for females
- For population pyramids the x-axis usually shows the % in each age group and the y axis age bands (commonly 5 yr age bands)
- Draw each bar to the correct value (bars must be same width and no gaps between)
- Add a title and label the axes

Advantages

- Population pyramids make it easy to identify differences in population in a particular age group – or differences between males and females

Disadvantages

- pyramid charts can only be used with continuous data

PRACTICE QUESTIONS: Pyramid Charts / Population Pyramids

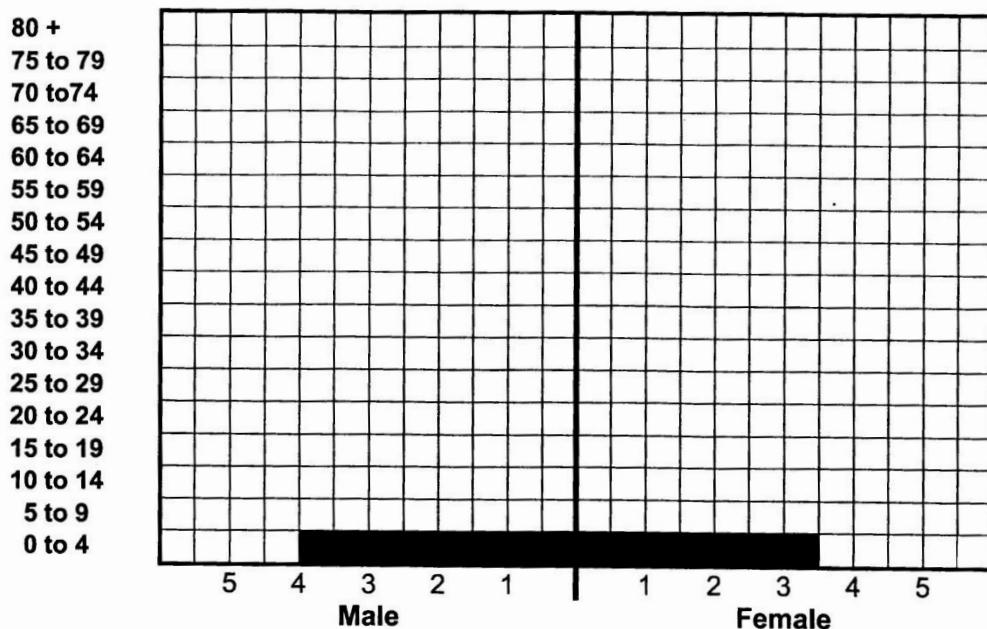
1. Using the data from the table, complete the population pyramid for China in 2000.

2. Describe the shape of the pyramid (you should use data in your answer)

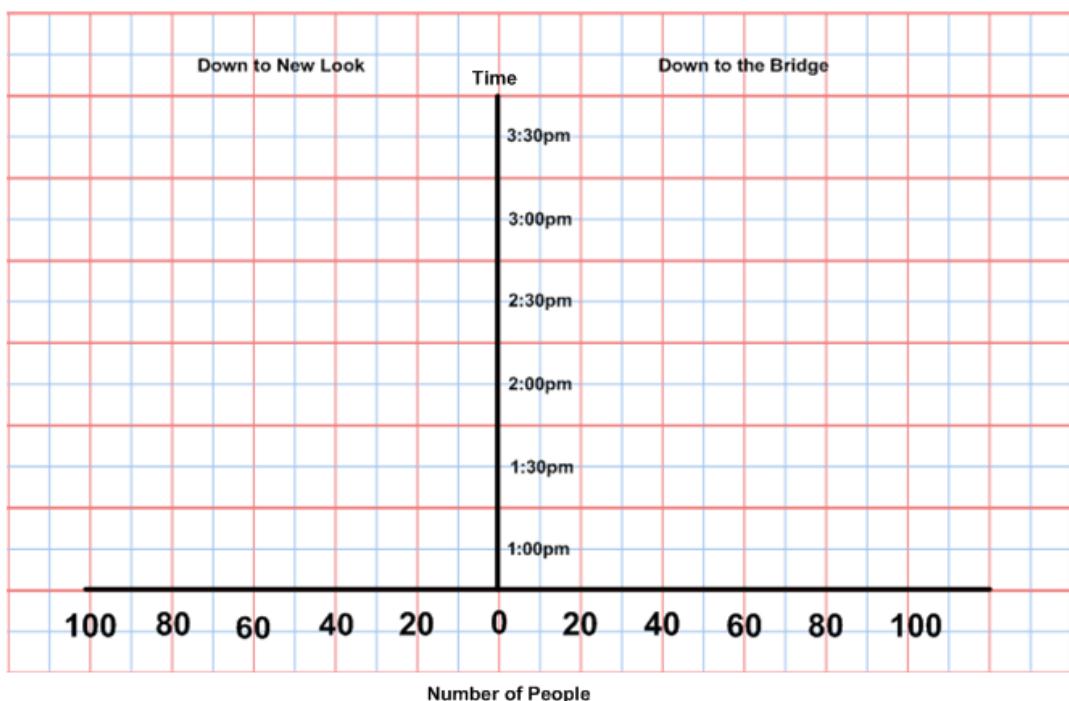
CHINA'S POPULATION STRUCTURE 2000

Age Cohort	% Males	% Females
0-4	4.0	3.6
5-9	4.2	3.8
10-14	4.8	4.4
15-19	4.1	3.8
20-24	3.9	3.7
25-29	4.9	4.6
30-34	5.1	4.8
35-39	4.3	4.0
40-44	3.4	3.2
45-49	3.4	3.3
50-54	2.5	2.3
55-59	1.9	1.8
60-64	1.7	1.6
65-69	1.4	1.4
70-74	0.9	1.0
75-79	0.5	0.7
80+	0.3	0.5

Figure 2: Population Pyramid for China in 2000:



Complete the Pyramid chart using the data in the table to show the pedestrian count completed outside the Townrow Department Store on Bridge Street in June 2010.



Time	1.00	1.30	2.00	2.30	3.00	3.30
Down to New Look (Pedestrian Count)	25	30	40	35	30	35
Down to the Bridge (Pedestrian Count)	10	15	20	10	10	5

State a graphical technique other than pyramids that could be used to display pedestrian flows.

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Justify your choice of the technique you have suggested.

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GRAPHICAL SKILLS: (iv) Line Graphs and Compound Line Graphs

Line graphs are often used to show changes over time and can be used to show how one variable changes in relation to another variable (they variables must be linked).

Examples: Change in population over time; Traffic Counts / Pedestrian Counts over a time period; Changes in temperature over a year.

How to construct a Line Graph

- The independent variable is plotted on the x-axis (horizontal) (e.g. time), whilst the dependent variable is plotted on the y-axis (vertical) (e.g. Population)
- An appropriate scale needs to be decided for both the x and the y axis which will be determined by the range of values.
- The values should then be plotted using a dot or cross to mark where the x and y values meet
- A ruler should then be used to join the crosses.
- If several pieces of dependent data are being marked on, the lines can be colour coded & a key added – this can allow comparisons – e.g. differences in traffic flow on different days
- A title should be added and axes labelled.

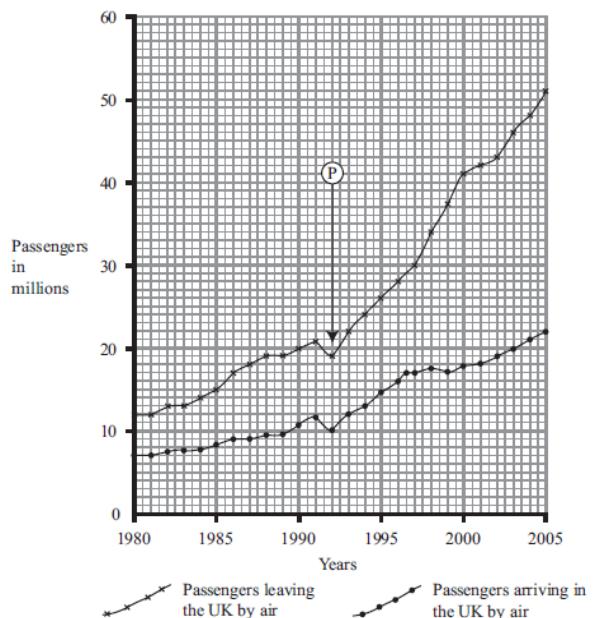
Advantages

- possible to show two sets of data on the same graph
- Good for showing absolute changes in data

Disadvantages

- some times when comparing two sets of data, different scales make it difficult to compare actual change (log graphs may be needed)

(c) Look at Figure 3b. It is a graph showing the number of passengers arriving in and leaving the UK by air between 1980 and 2005.



Compound Line graph show the individual parts of a total and enable comparisons to be made.

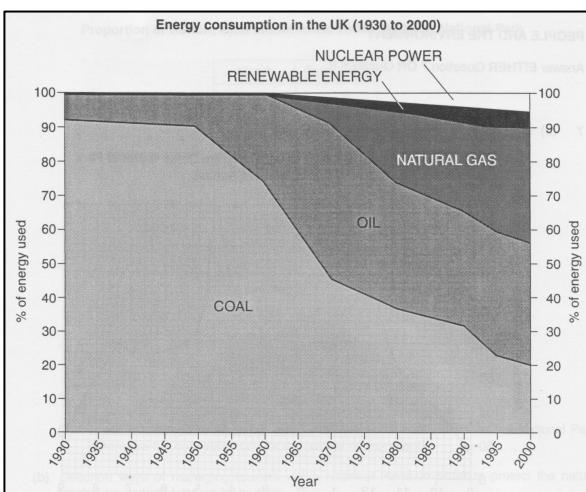
Example: Changes in type of energy use over time; Changes in destination of UK exports over time.

Advantages

- very good for making sense of what can seem to be a complicated set of statistics enabling comparisons to be made.

Disadvantages

- can be difficult & time consuming to construct.



How to construct a Compound Line Graph

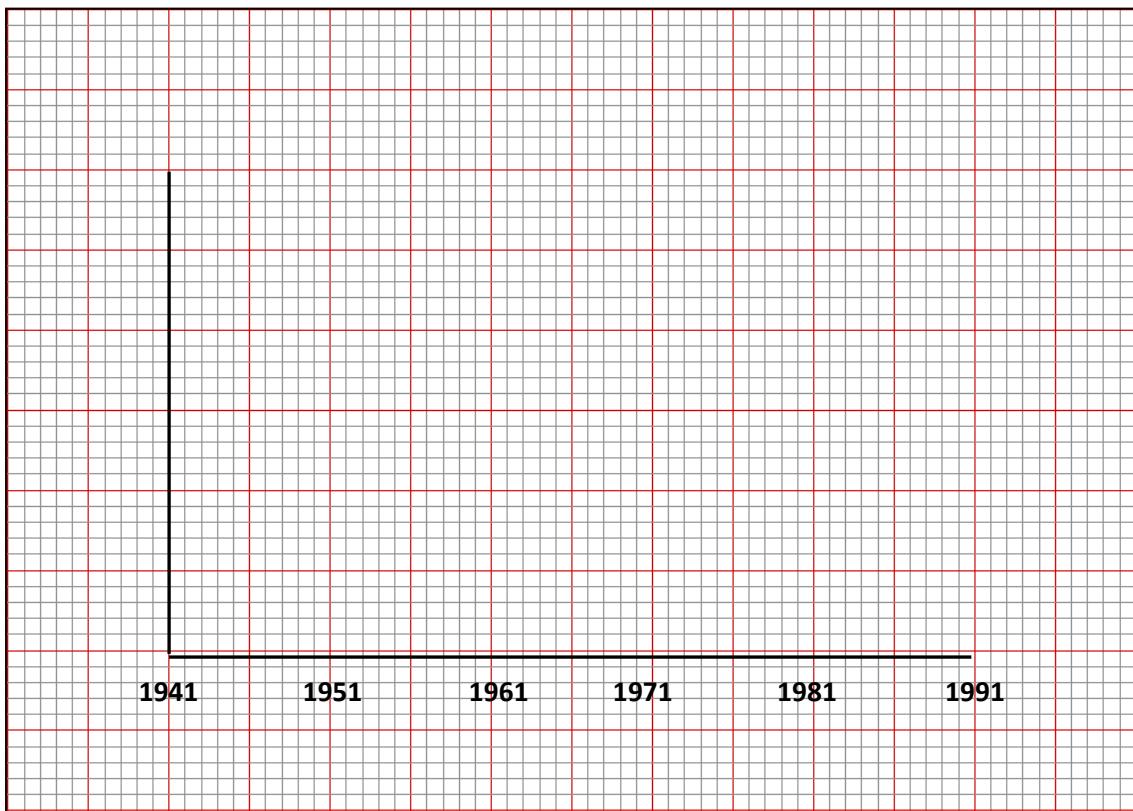
- The independent variable is plotted on the x-axis (horizontal) (e.g. time), whilst the dependent variable is plotted on the y-axis (vertical) (e.g. Population)
- Plot the data and draw the line for the first set of statistics
- Plot the data and draw the line for the second set of statistics – but remember to add the total to the first set.
- Continue as above with the remaining data
- Shade in between the lines in different colours for each section and add a key
- Label axes and add a title

PRACTICE QUESTIONS: Line Graphs

1. Simple Line Graphs

(a) Plot the statistics in Figure 1.13 to show population growth in East Anglia as a line graph. Add a title and label your axis (you need to select an appropriate scale for the y axis).

Year	1941	1951	1961	1971	1981	1991
Population (Millions)	1.2	1.4	1.6	1.8	2	2.2



(b) Describe what your graph shows.

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(c) State another technique which could be used to display this data.

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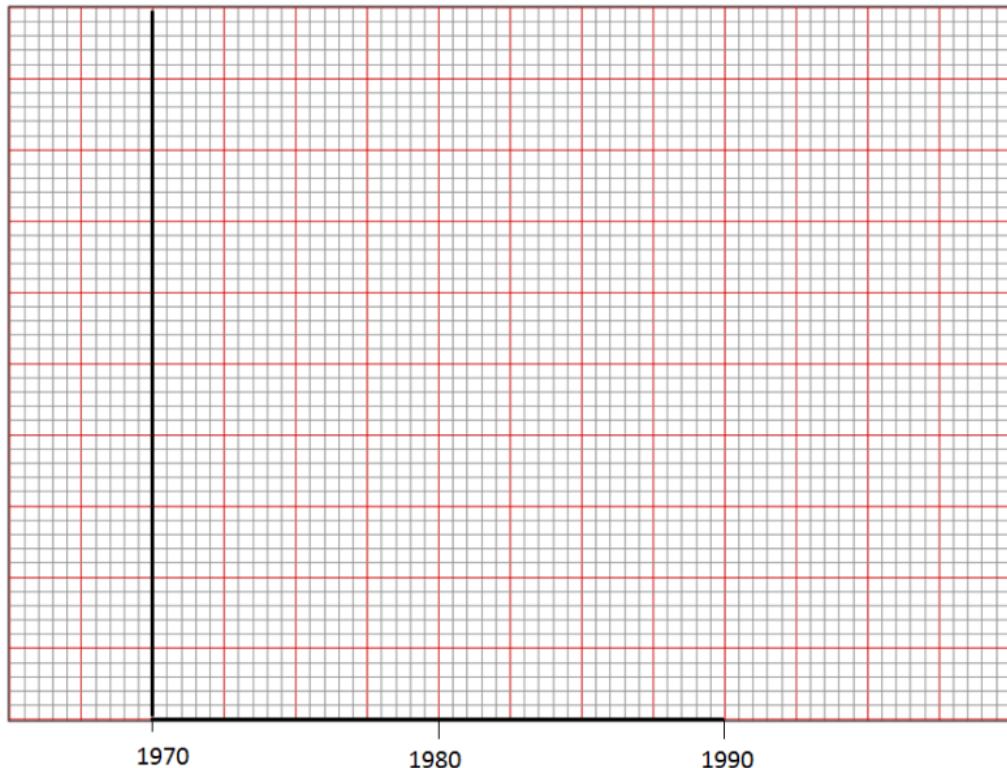
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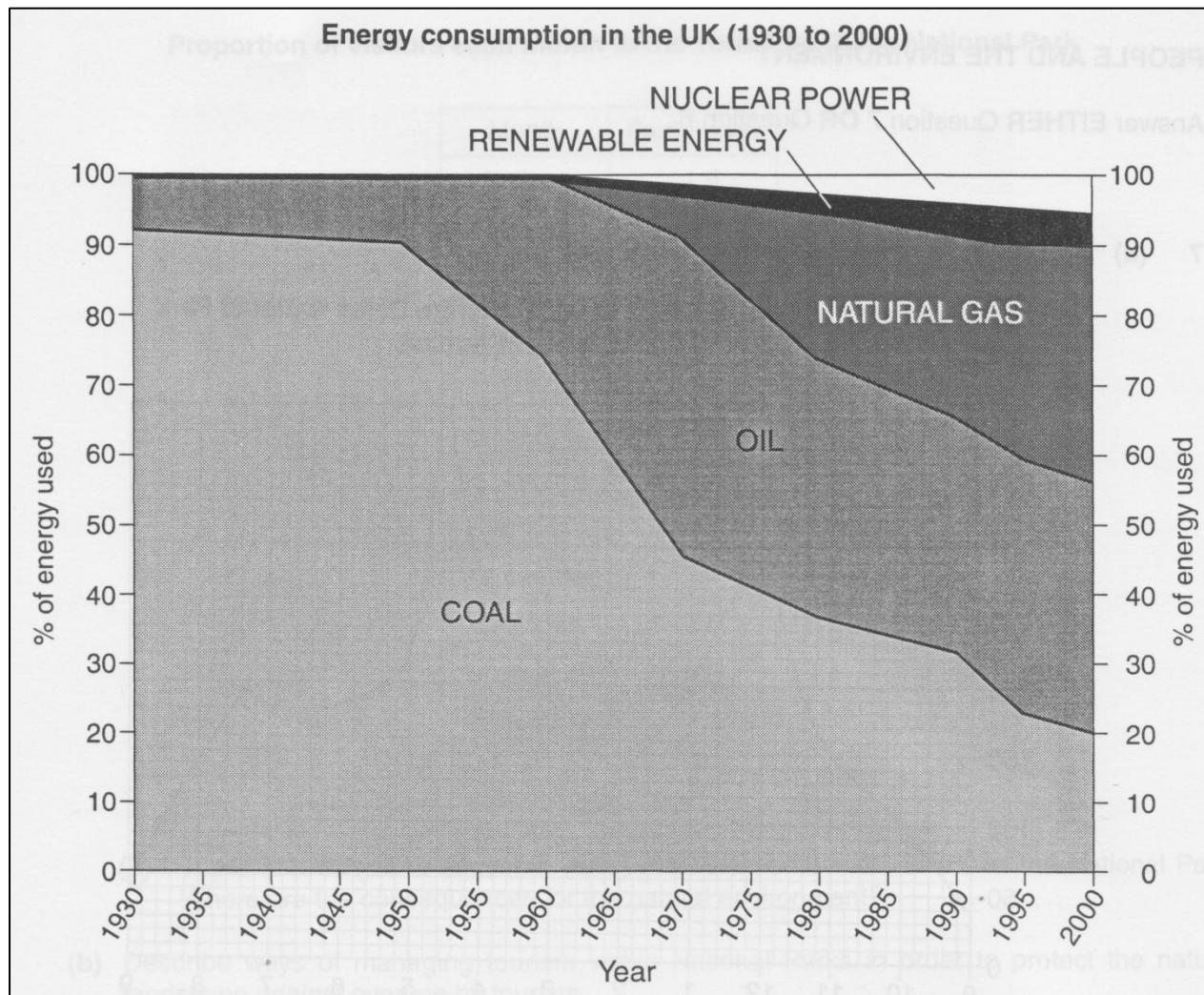
2. Compound Line Graphs

The table below provides data showing the world production of cereal crops.

	1970	1980	1990
Wheat	300 000	400 000	600 000
Rice	300 000	400 000	500 000
Maize	300 000	400 000	500000

(a) Plot the statistics on the graph outline below to produce a compound line graph. (add an appropriate title, scale for y axis & label axis)





Describe two major changes in energy consumption which took place between 1930 and 1960 (2 marks)

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What % of the energy used in 1930 was coal?

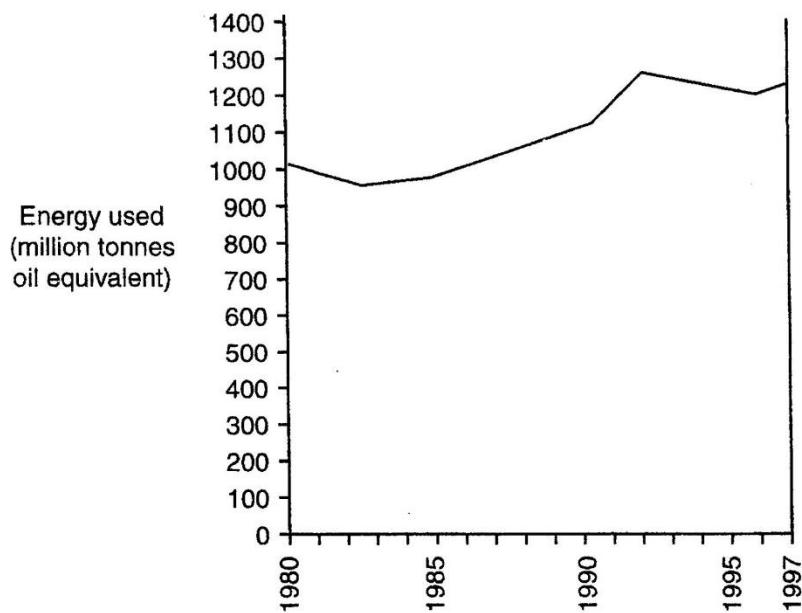
What % of the energy used in 2000 was nuclear power?

What % of the energy used in 1990 was Natural Gas?

What % of the energy used in 2000 was Oil?

PRACTICE QUESTIONS: Line Graphs

Fig. 2a Energy used in Europe



How much energy was used in 1997?

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Describe the changes in the amount of energy used between 1980 and 1997.

Support your answer with dates and figures.

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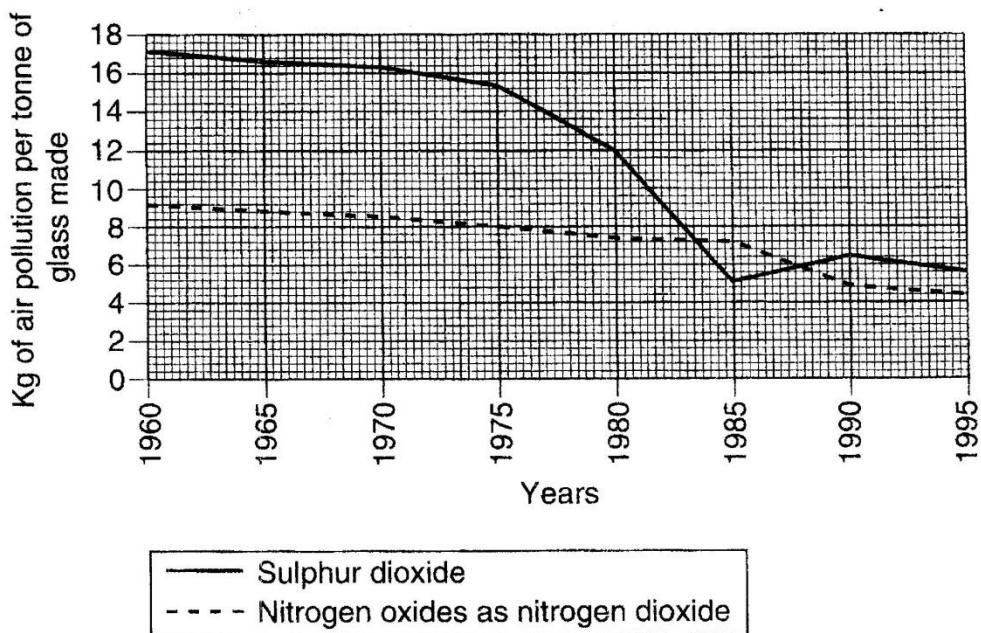
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Fig. 2d Air pollution from the glass making industry in St. Helens



Acknowledgement: Reprinted with permission from Pilkington plc and St Helens Council.

Which gas was the main cause of air pollution between 1960 and 1983? (1)

.....

How many kilograms of nitrogen dioxide were produced for every tonne of glass made in 1975? (1)

Since 1965 the glass making industry has tried to reduce air pollution. Use evidence from Fig 2.d to describe how successful it has been (3)

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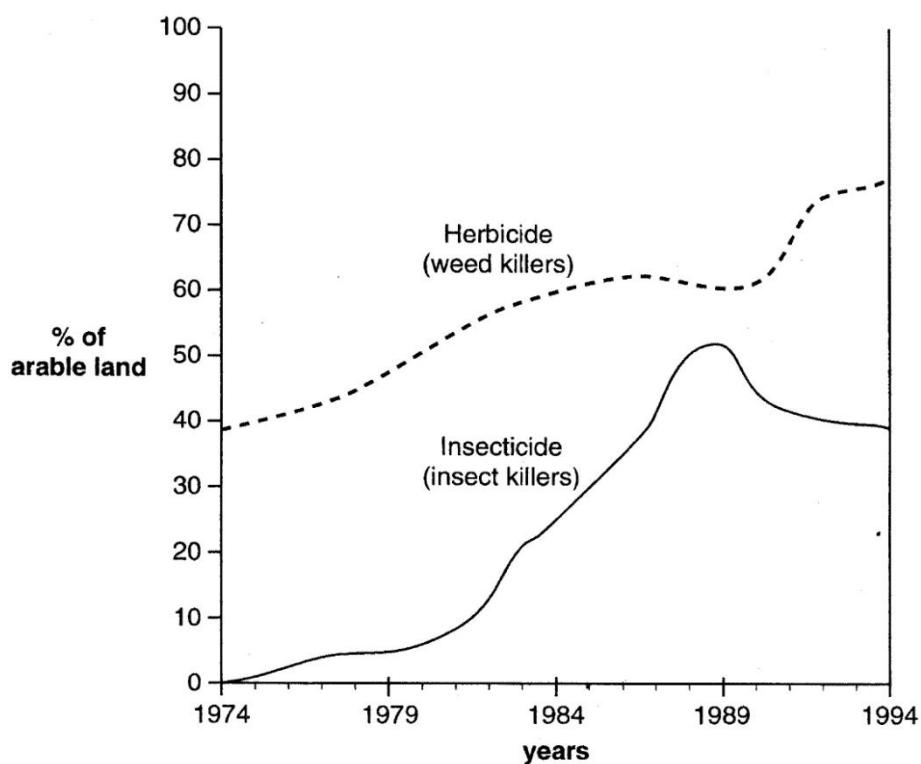
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Fig. 2e Percentage of arable land in England and Wales sprayed with herbicides and pesticides (1974 to 1994)



Describe the changes in the amount of insecticides used in England and Wales between 1974 and 1994. Your answer should be supported with dates and figures (5)

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GRAPHICAL SKILLS: (v) Isolines

Isolines join places of equal value and shows the distribution of a variable over an area – e.g. variations in height over an area, or variations in rainfall over an area.

Examples of Isolines

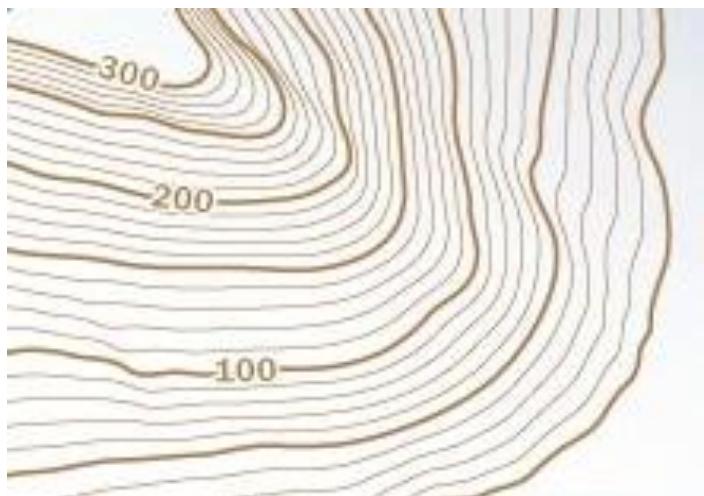
Contour Lines – these join places of equal height.

Isohyets – these lines join places of equal rainfall

Isochrones – lines joining places which are of equal time distance from an area (e.g. equal time distance from a shopping centre)

Isobars – lines joining places of equal air pressure

Isovels – join places of equal velocity in a river



Source: <http://adventure.howstuffworks.com/outdoor-activities/hiking/how-to-read-a-topographic-map2.htm>

An extract showing contour lines – with a contour interval of 10m

How to construct an Isoline Map

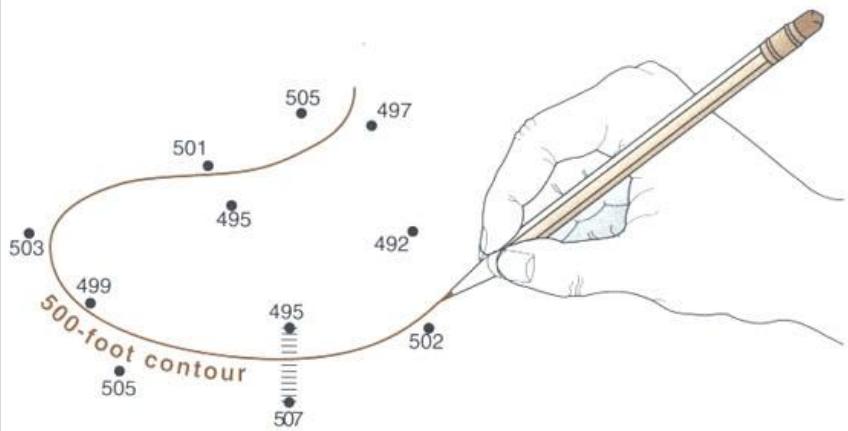
- The data should be plotted on to a map of the area as dots with the value written next to it
- The interval used between isolines needs to be chosen carefully – too wide an interval and it will not show much, too small and the map will be cluttered
- Isolines are then drawn to join places of equal value (by joining the dots) – remember the lines **MUST NOT** cross each other and the lines **MUST NOT** join places of higher or lower value – only those equal in value!
- The space between the isolines is often left blank – however it can be shaded – if this is the case a key must be provided and the colour should become darker as the value increases.

Advantages

- good for showing gradual changes over space
- Avoids the abrupt changes shown on choropleth maps.

Disadvantages

- requires a large amount of data for accurate drawing
- unsuitable for showing discontinuous / patchy distributions



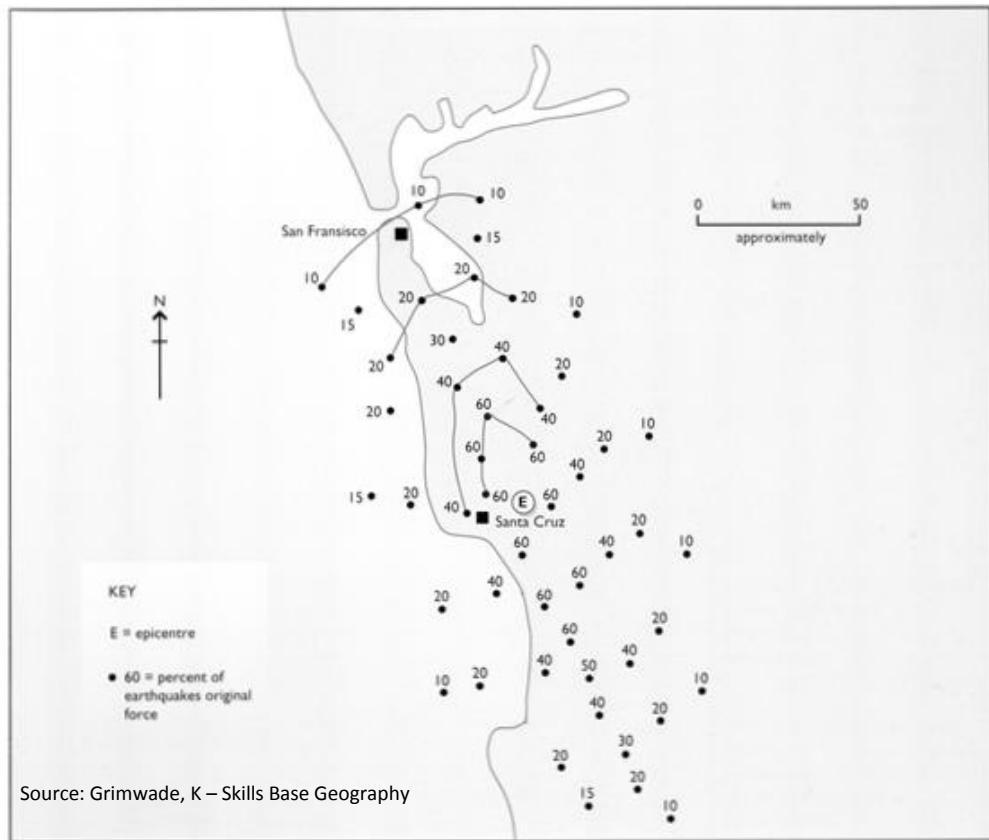
<http://depthome.brooklyn.cuny.edu/geology/core332/maps2.htm>

PRACTICE QUESTIONS: Isolines

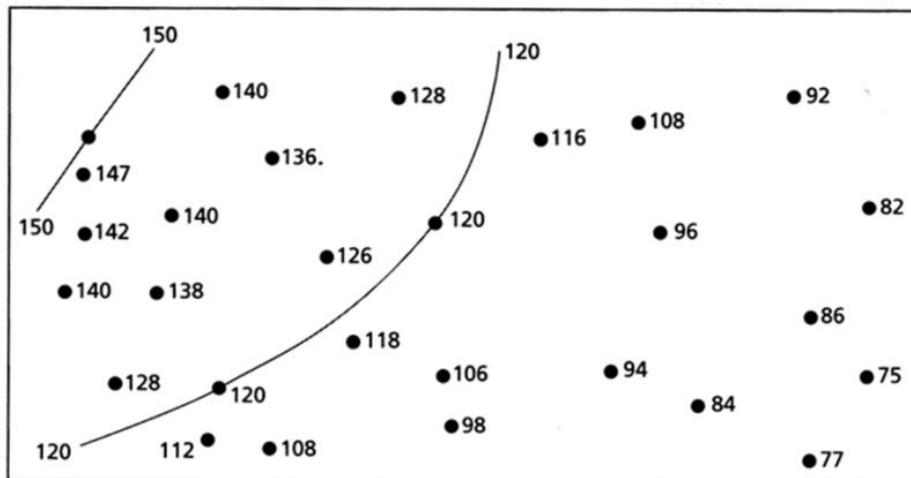
Activity 1: The map below shows how the energy from the 1989 earthquake varied with distance from the epicentre of the earthquake.

- (i) Draw onto the diagram below the 60, 40, 20 and 10% isolines (each has been started for you)

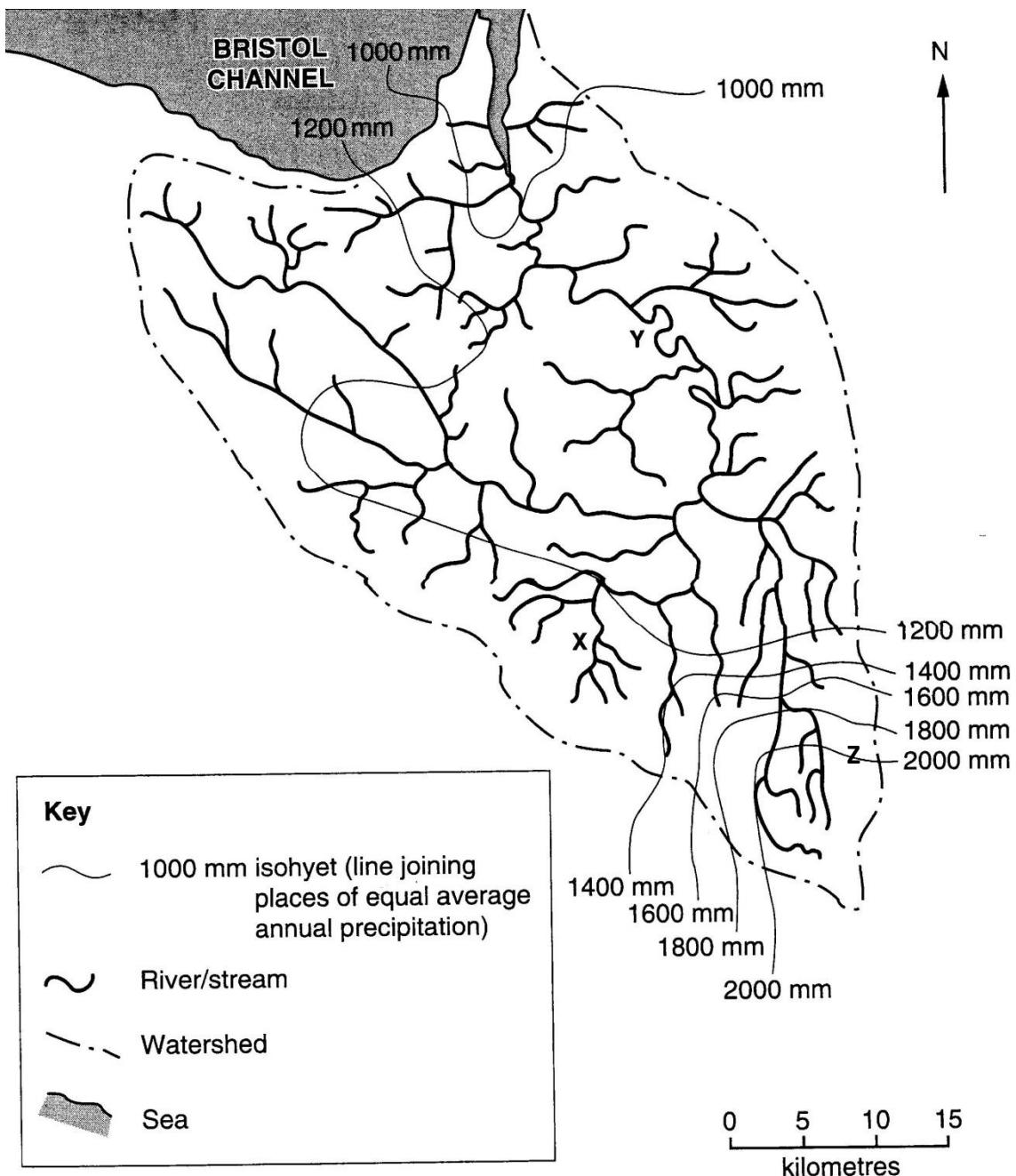
- (ii) Describe the pattern your completed map shows.



Activity 2: The diagram below shows spot heights. Isolines which are used to join places of equal height are known as contour lines. Complete the diagram below by plotting the following contour lines: 140, 130, 110, 100, 90, 80 and 70.



Source: Geographical Skills – Warren, S. (2010)



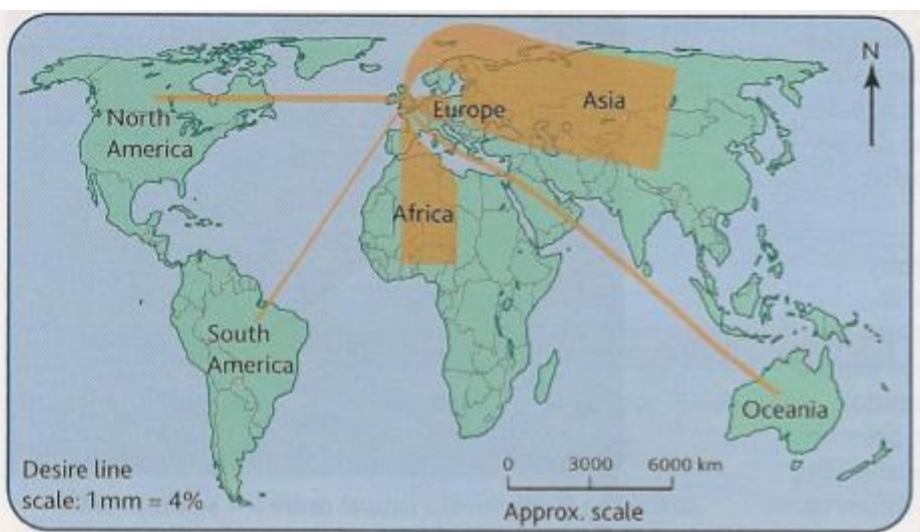
What is the average annual precipitation at X? mm

What is the average annual precipitation at Y? mm

What is the average annual precipitation at Z? mm

GRAPHICAL SKILLS: (vi) Flow Lines

These show movement between places. These lines can be used to show direction and movement, with the direction of the line representing the direction of the flow and the thickness of the line representing the volume of flow.



A desire line map showing the origin of migrants into the UK from around the world in 2006

Examples:

Pedestrian flows around a CBD

Traffic flows between a major service settlement & surrounding villages

Migration to or from the UK.

How to construct an Isoline Map

Example – Migration to the UK from the rest of Europe

1. Draw or find a base map which shows UK and the rest of Europe.
2. Identify and name the countries from which migrants are coming to
3. Look at the range of the values of the migration and decide upon an appropriate scale for the width of the arrows – make sure the scale isn't too large so the flow lines don't dominate the map.
4. Draw the flow lines between the country of origin of the migrants and the UK – the tail of the arrow should be in the country where the flow began and the nose of the arrow should point towards the UK
5. Remember to add a scale, title & shade the arrow to make them clearer

(In other forms of flow line maps, if for example you are plotting pedestrian counts which reflects movement from two directions – draw two arrow heads – one for each direction.)

Advantage

- good for showing flows of movement between places
- Gives strong visual impression of both volume of movement and direction of movement

Disadvantages

- parts of the map can get very crowded (particularly near to the destination)

Suggest one reasons why a flow diagram is a good way of representing data (1 mark)

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PRACTICE QUESTIONS – FLOW LINES

Use the statistics below to draw a flow line map on the blank outline on the next page to show the UK's trade with its 'top four' trading partners. The scale has been worked out for you and is given in the key.

The UK's top four trading partners 2010

Trading Partner	Exports (Billions)	Imports (Billions)
USA	34	28
Germany	24	38
France	18	20
China	6	22

Describe what your map shows about the UK's trade. (3 marks)

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Evaluate the use of Flow line maps as a data presentation technique (4 marks)

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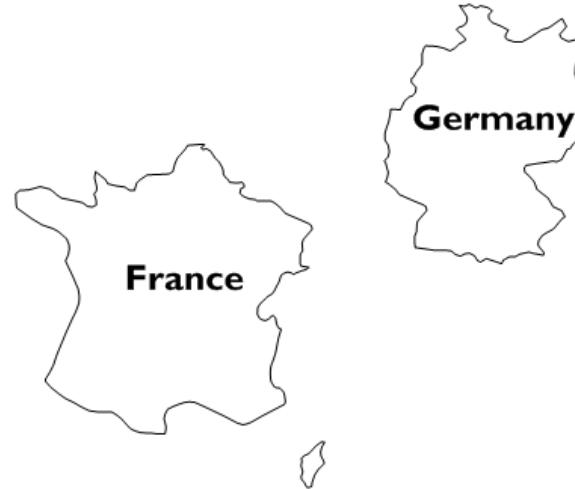
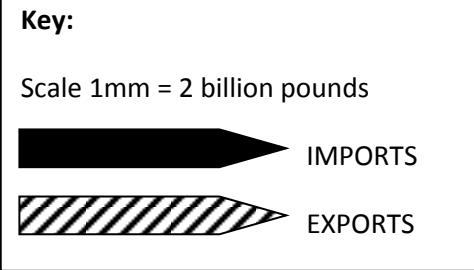
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A Flow line map showing imports and exports of the UK's top four trading partners



GRAPHICAL SKILLS: (vii) Pie-Charts

It shows the employment structure of Cumbria for 1951 and 2001.

Pie charts (also known as pie diagrams) or divided circles are graphical techniques which can be used to show a quantity which can be divided into segments.

How to construct a pie chart:

1. Ensure data is converted into a %. To do this simply divide the segment value by the overall value and then multiply by 100
2. Convert % into degrees – as there are 360 degrees in a circle, simply multiply your % by 3.6 to turn it into number of degrees.
3. Using a compass draw a circle and mark the centre (no set rule for size – if showing 5-6 categories, a radius of 6cm, if comparing 2 pie charts next to each other – a radius of 4cm)
4. Begin by drawing a line from the centre of the circle to the top.
5. Mark on each segment **in order of size** (largest to smallest) using a protractor to calculate the degrees and construct the segments
6. Use different shading / colour for each sector and add a key
7. Ensure your pie chart has been given a title.

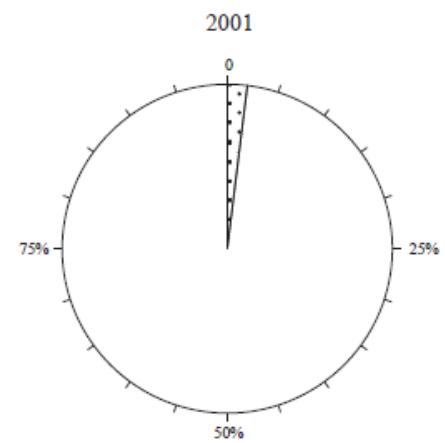
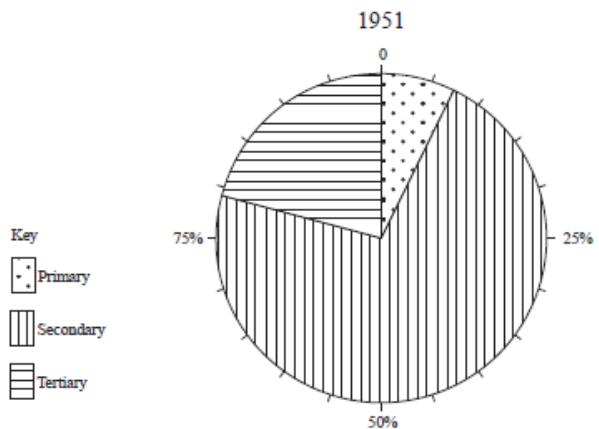


Figure 3a

- (i) Complete the pie chart for 2001 using the data in the table.

year	primary %	secondary %	tertiary %
2001	2	23	75

(2)

Advantages of Pie Diagrams

- Visually very clear
- Shows % total for each category and provides an easy comparison
- A commonly used technique so easy to understand
- The size of the circle can be made proportional to the total quantity being represented

Disadvantages of Pie Diagrams

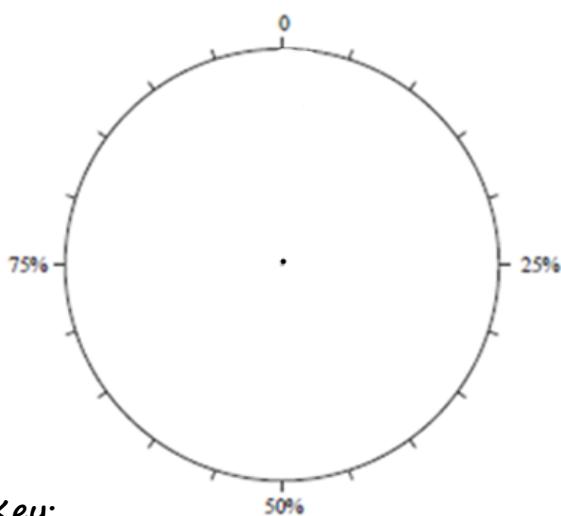
- Don't provide exact numerical data
- Hard to compare 2 data sets
- Best for 3-6 categories otherwise this becomes hard to read
- Can only be used with discrete data

1. In the space below construct two pie diagrams. One showing employment structure in rural areas in 1991 and one for 2006.

Table 1. Employment in Rural Areas

Type of Employment	1991 (%)	2006 (%)
Primary	10	2
Secondary	30	18
Tertiary	60	80

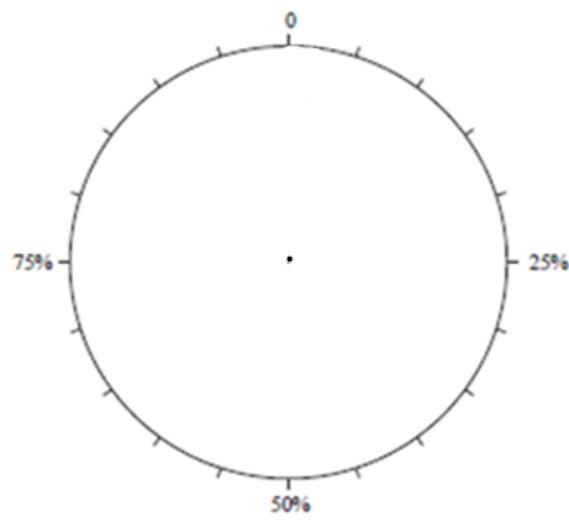
Rural Employment in 1991



Key:

Primary	
Secondary	
Tertiary	

Rural Employment in 2006



2. Suggest and justify another graphical technique which could be used to show this information.

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PRACTICE QUESTIONS: Pie Diagrams

Practice Question 1a.

Construct a pie-chart to show the following Traffic Count Data for Market Hill, St Ives.

Cars	Motorbikes	Vans	Buses	Total Vehicles
100	25	20	10	155

A pie diagram to show Traffic Count for Market Hill, St Ives.

Key:

Practice Question 1b.

Construct a pie-chart to show the following data for global water consumption

Domestic Use	Industrial Use	Agricultural Use
11%	20%	69%

Key:

Practice Question 2

Fig. 2b Types of Energy used in Europe in 1990

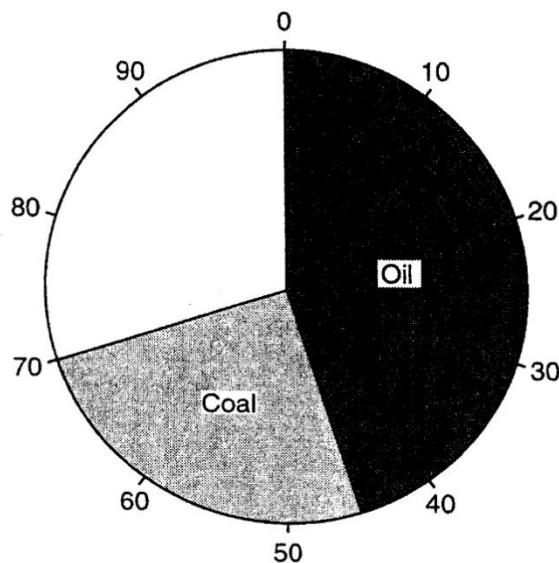


Fig. 2c Types of Energy expected to be used in Europe in 2005

Type of Energy	Percentage
Oil	42
Coal	17
Gas	24
Nuclear	12
Alternatives	5

2a. What type of energy was used most in 1990?

2b. In 1990 what % of Europe's energy was obtained from coal?%

2c. Use Figs 2b and 2c. to describe what is likely to happen to the percentage of coal used between 1990 and 2005.

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2d. Which two types of energy were predicted to increase in importance between 1990 and 2005?

1.

2.

Complete the pie chart below using the following information about car ownership in the residential area of Aboretum.

No car/van	30%
1 car/van	50%
2 or more cars / vans	20%

Pie charts to show percentage car ownership per household in Arboretum, St Peters and Warndon

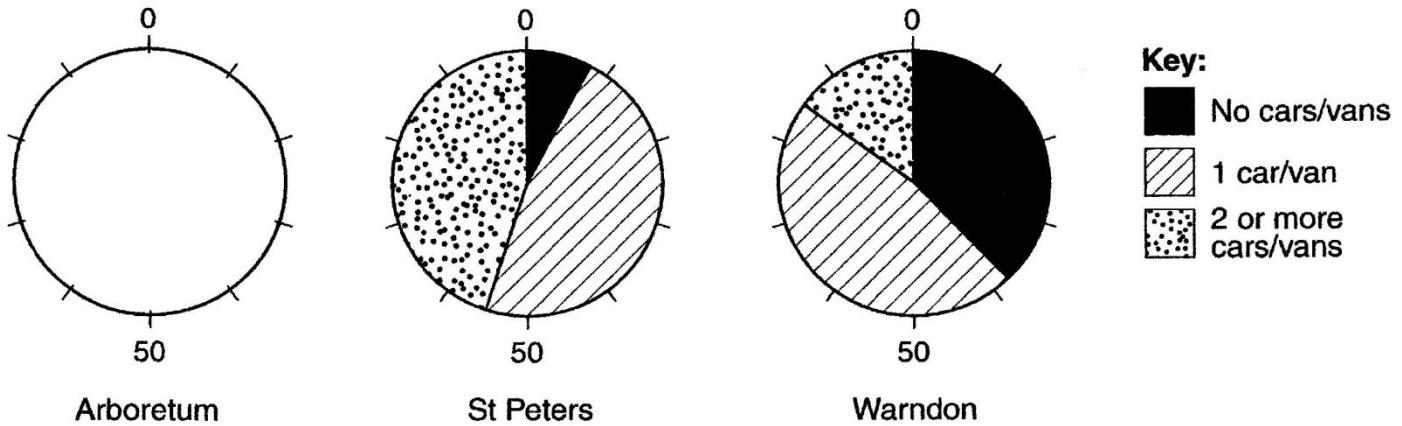


Fig. 1b

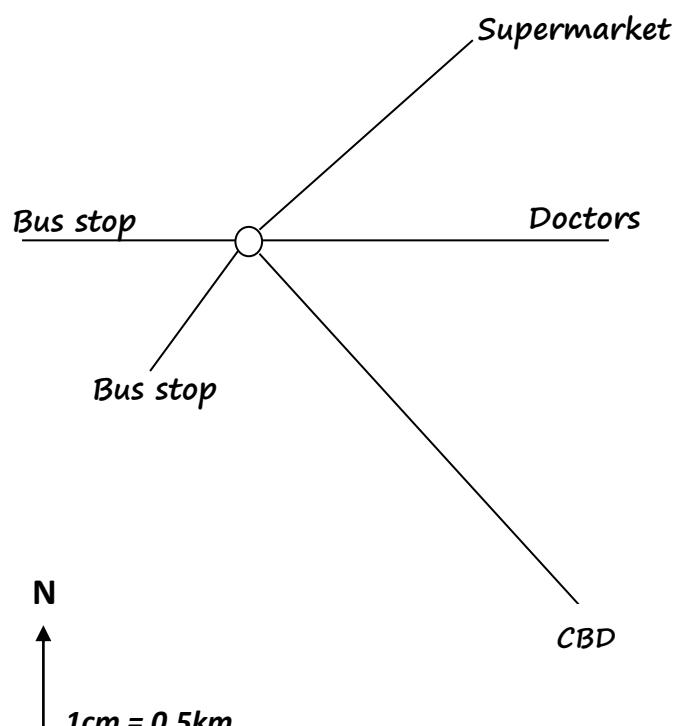
GRAPHICAL SKILLS: (viii) Wind Rose / Radial Diagrams

Wind Rose / Radial Diagrams can be put to good use for showing a variety of data, for example:

- Source and volume of migrants coming to the UK from other countries
- Volume and origin of tourists visiting the UK from the 5 top tourist generating countries.
- Distance and origin of people using a particular service.

How to construct a Wind Rose/Radial Diagrams (Desire Lines)

- * ensure that you know the total number of people or distance (as appropriate) coming from each direction and work out a scale appropriate for the values in the data (e.g. 1cm = 1 person or 1cm = 0.5km etc.)
- * establish the central point from which the lines (rays) will begin.
- * Draw lines from the centre of the diagram in the correct direction of the flow or service, using the scale which you have decided upon
- * ensure a clear North arrow has been added
- * The individual lines (rays) should be colour coded and a key provided or the lines labelled
- * a clear title must be added to your graph.



Advantages of Wind Rose / Radial Diagrams

- can show the direction as well as volume of a movement (if both width and length of line to scale)
- easy to calculate volume of movement / people from length of rays and use of the key
- provides ability to gain spatial awareness of the data being presented.

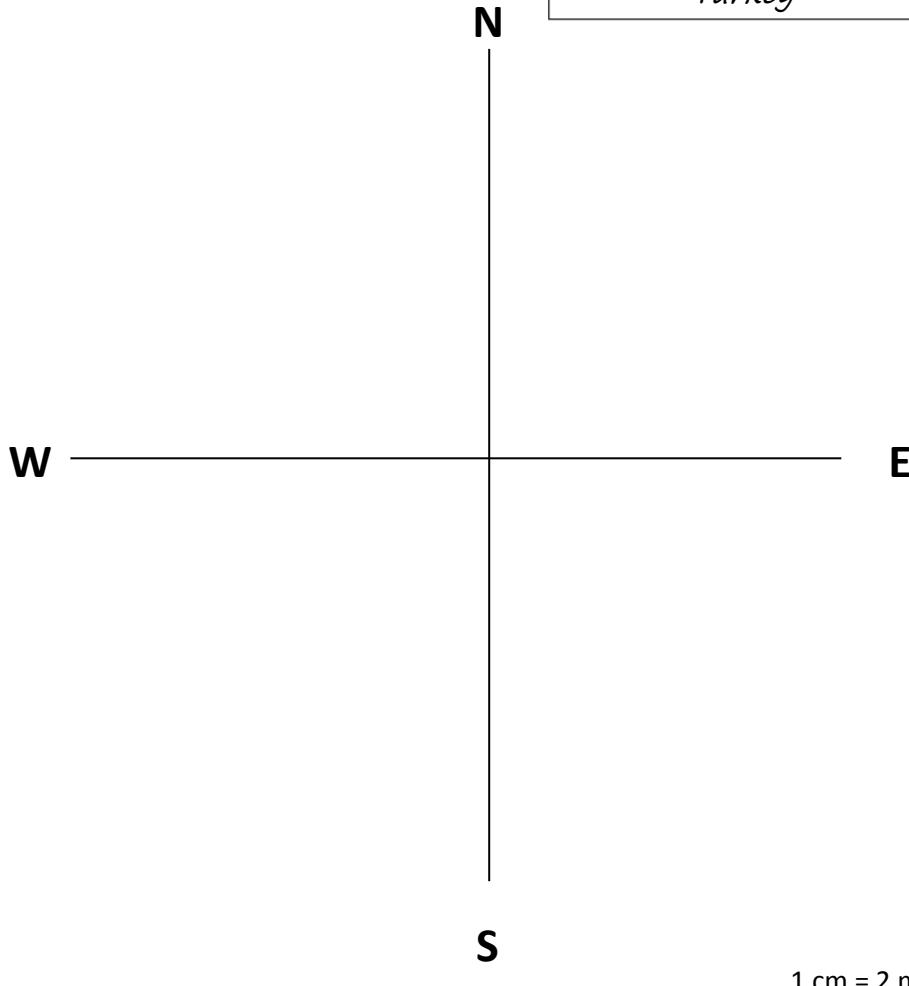
Disadvantages of Wind Rose / Radial Diagrams

- If width used to show volume of a movement, where there are large amount of data to be plotted from a central area - it can be more difficult to interpret due to overlaps.

PRACTICE QUESTIONS: Wind Rose / Radial Diagrams

The data in the table below is showing the top ten overseas tourist destinations from the UK. Using the data, construct a ray diagram on the outline provided. (Hint: arrows should be drawn in the direction to where the country is located.)

<i>Top Ten overseas tourist destinations from the UK</i>	<i>Number of British Tourist visits (millions)</i>
Spain	14.0
France	11.0
USA	4.0
Irish Republic	3.9
Italy	3.5
Germany	3.0
Portugal	2.4
Greece	2.1
Netherlands	2.0
Turkey	2.0



1. Describe the pattern shown

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2. What are the advantages of this technique for showing this data?

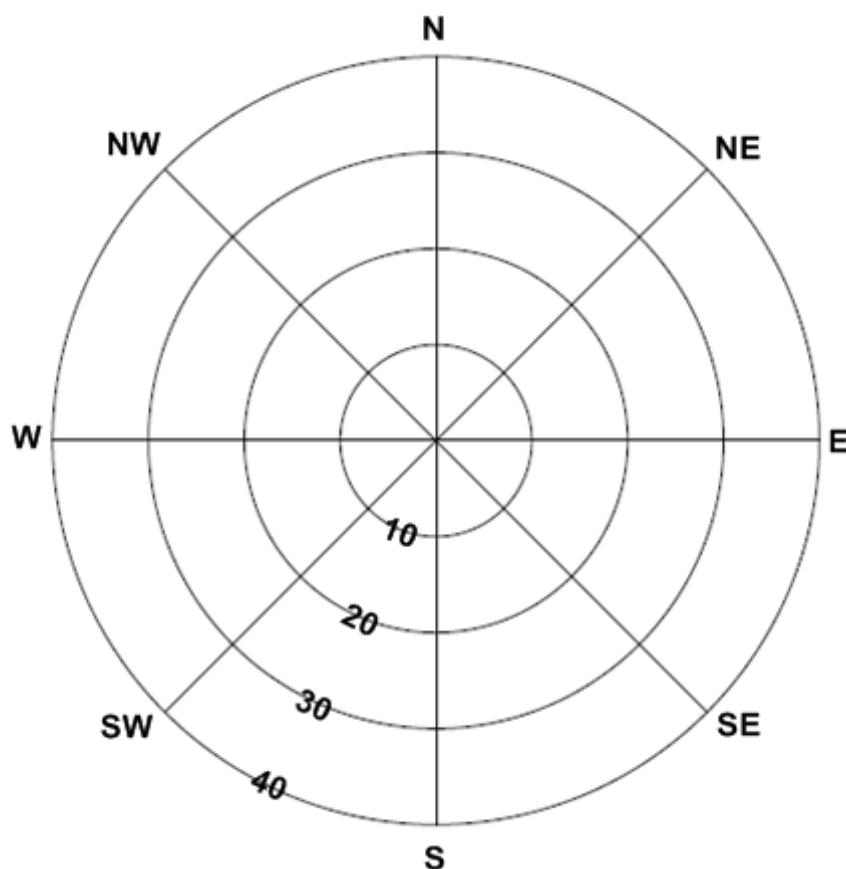
3. What other technique could be used to display this information?

5. A GCSE student studying glaciation has carried out fieldwork in the Lake District and has identified and recorded the direction that glacial corries face in the Lake District.

Using the data from the table, create a polar graph to show the orientation of corries.

Corrie Orientation in the Lake District

Direction Facing	N	NE	E	SE	S	SW	W	NW
Frequency (No of Corries)	18	40	20	12	0	0	0	8



Using your graph, describe the orientation of glaciers in the Lake District. (2 marks)

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GRAPHICAL SKILLS: (ix) Triangular Graphs

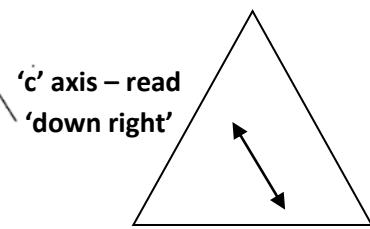
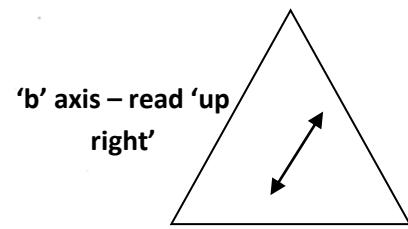
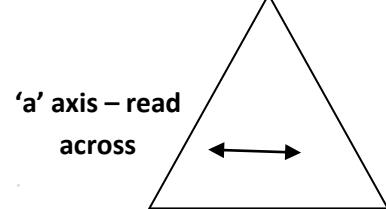
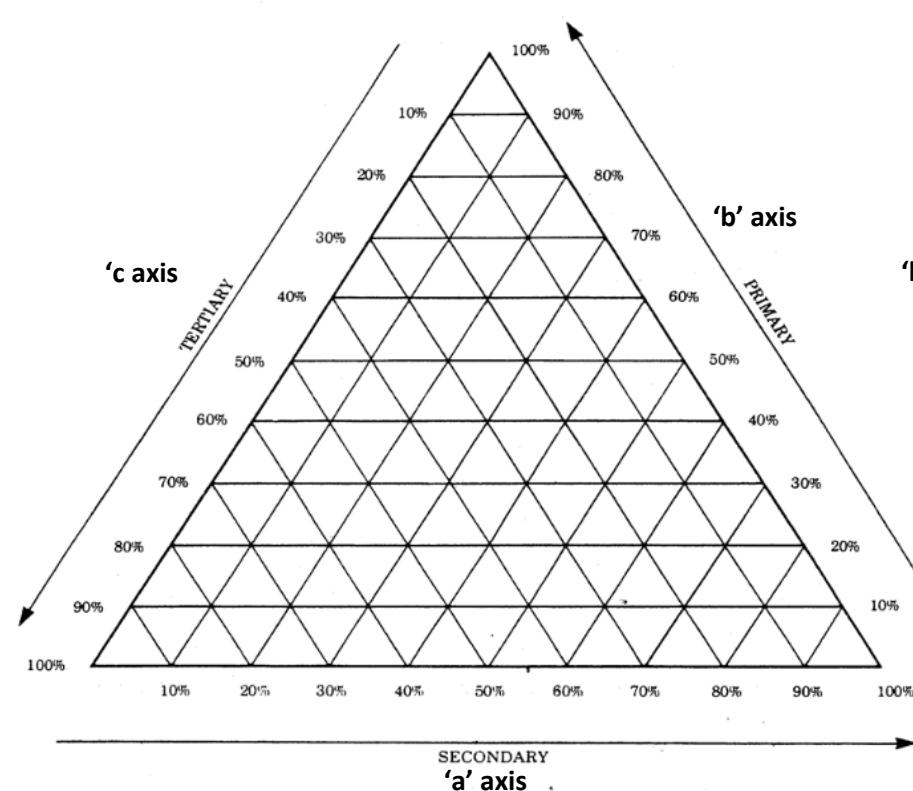
Triangular graphs provide a fast and reliable way of classifying a large amount of data for a data set which has 3 parts and is in % adding up to 100%

Examples:

Employment Structure – showing % working in primary, secondary & tertiary industry;

Land Use of an area – showing % arable, grass and other

Soil Texture – showing % sand, % clay and % loam



Advantages

- a large number of data can be shown on one graph
- groups can easily be identified
- it is a sophisticated technique as it displays information about several variables.
- dominant characteristics can be shown
- it is possible to draw up classifications

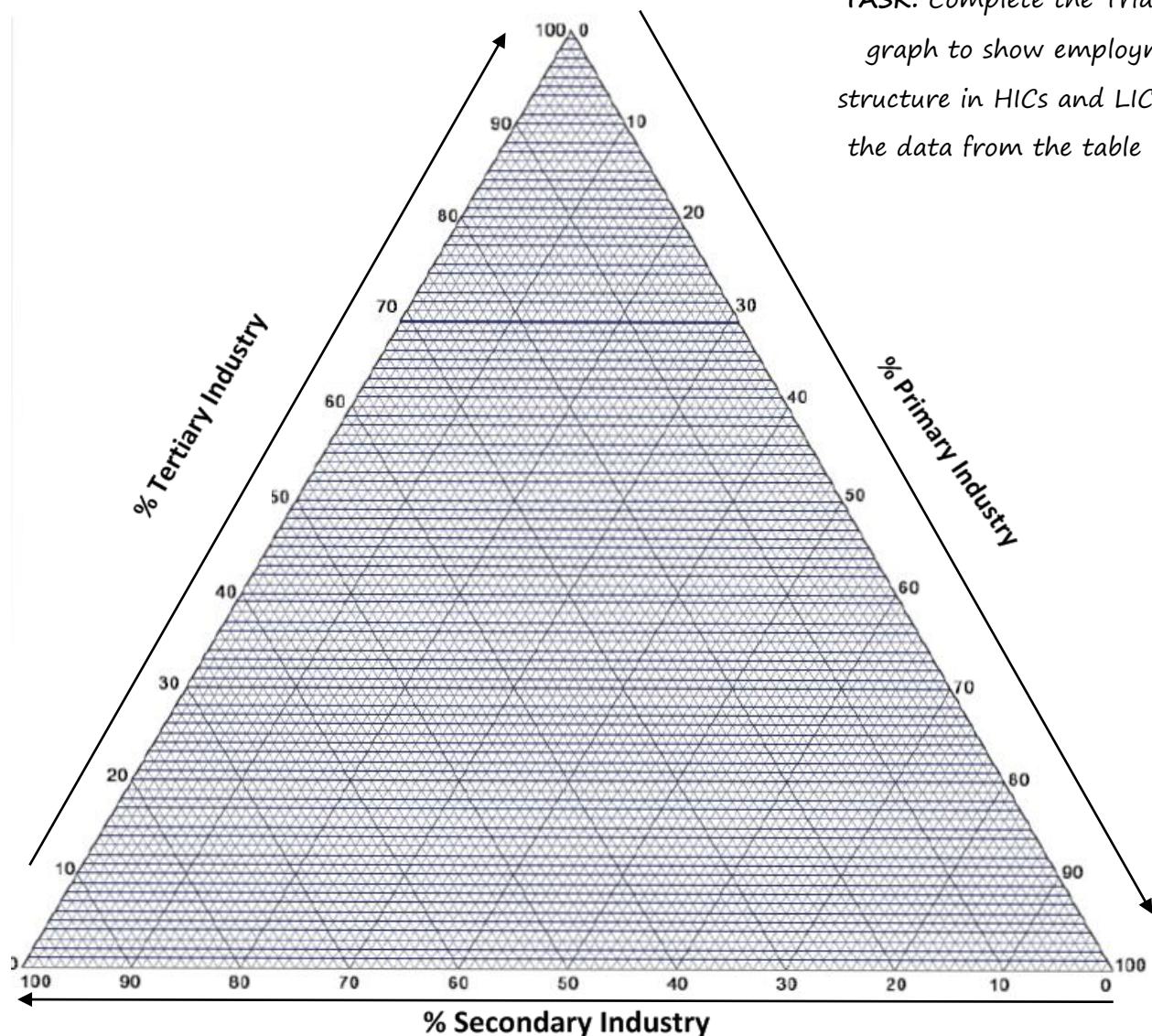
Disadvantages

- can be difficult & time consuming to construct.
- can only be used for data with 3 components given in % form and which adds up to 100%

How to construct a Triangular graph

- There are three axes on a triangular graph, each of which will represent 100% in 10% intervals.
- At each 10% interval, lines are constructed at 60° for the values to be plotted.
- The data is then plotted onto the graph – depending on the variable and the axis on which it is based (see the arrow guides on the diagram opposite)
- Label the three axes and add an appropriate title.

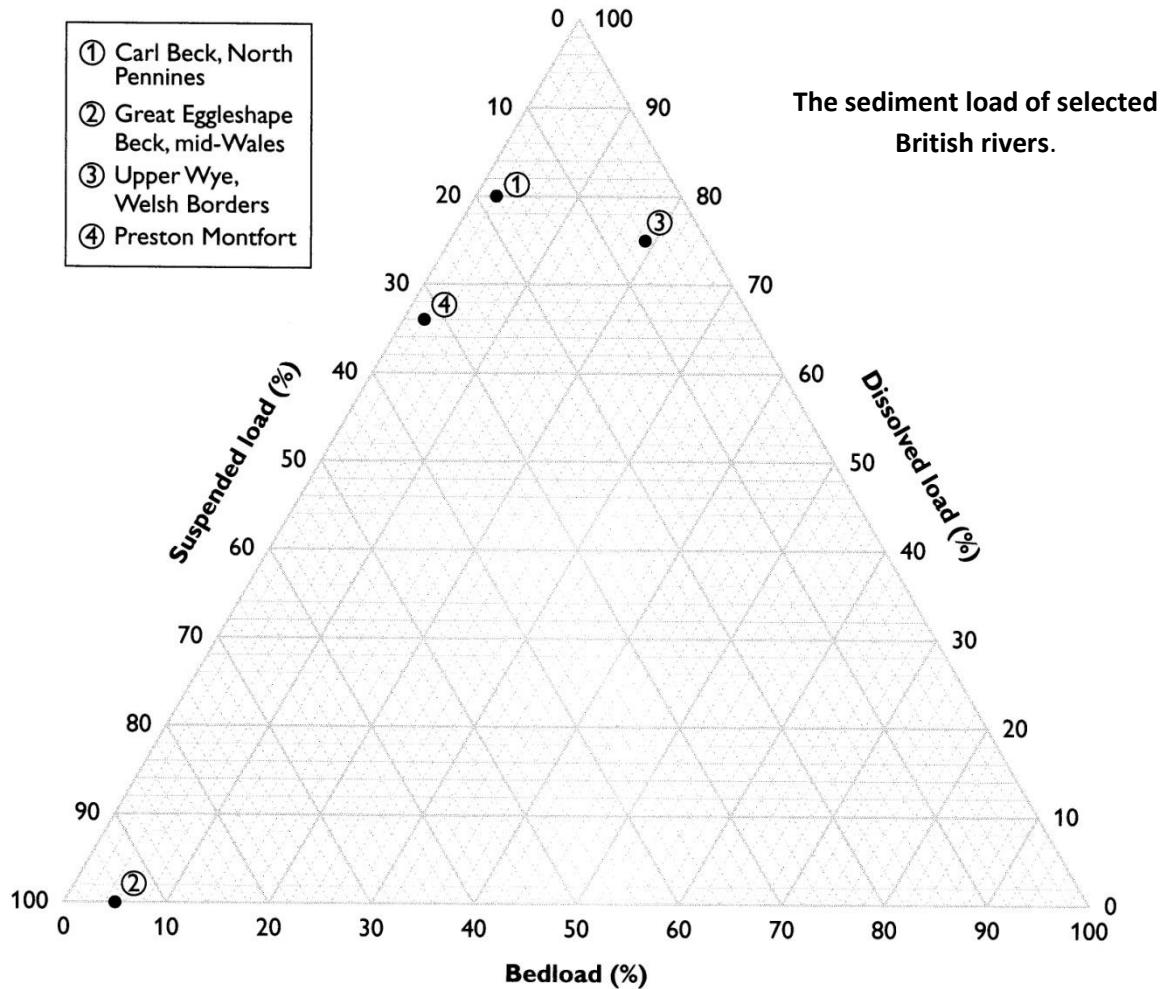
PRACTICE QUESTIONS: Triangular Graphs



TASK: Complete the Triangular graph to show employment structure in HICs and LICs using the data from the table below.

	% Primary	% Secondary	% Tertiary
HICs			
UK	2	20	78
USA	3	18	79
Japan	7	24	69
Italy	9	20	71
France	7	20	73
LICs			
India	62	11	27
Brazil	29	16	55
China	73	14	13
Peru	35	12	53
Nigeria	45	24	31

PRACTICE QUESTIONS: Triangular Graphs



RIVER	Dissolved Load	Suspended Load	Bedload
Carl Beck			
Great Egglesshape			
Upper Wye			
Preston Montfort			
River Farlow	50	46	4

- (i) Use the triangular graph above to read off the % values for dissolved load, suspended load and bedload for Carl Beck, Great Egglesshape, Upper Wye and Preston Montfort rivers. Write the % in the table above.
- (ii) Complete the graph by adding the data for the River Farlow (already given in the table above)
- (iii) What are the advantages of using triangular graphs to represent data?

(iv) What are the disadvantages of using triangular graphs?

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(v) Suggest two alternative ways of presenting the data given above

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(vi) For one of the alternatives you have suggested evaluate how useful it would be to show this data in comparison to a triangular graph.

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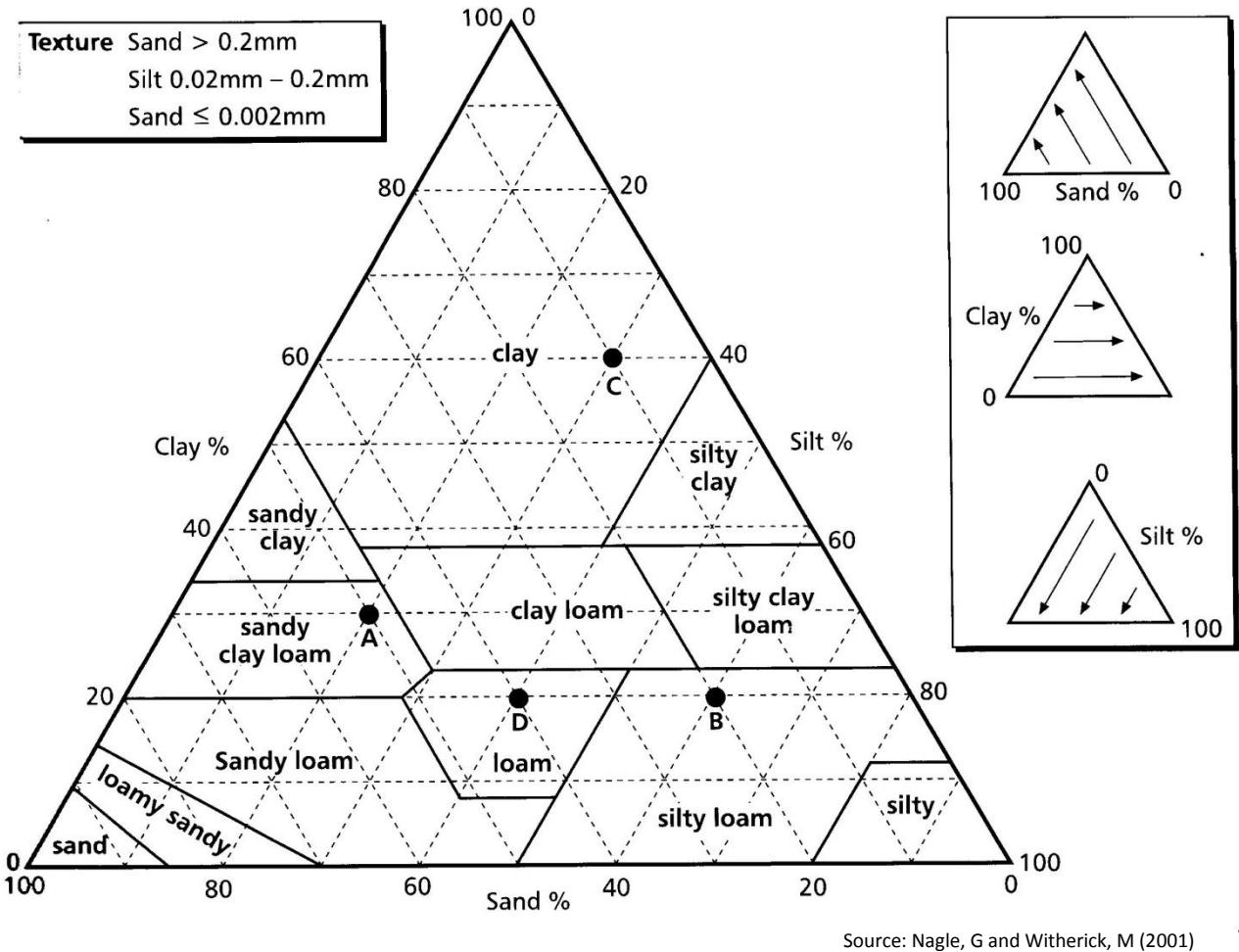
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The triangular graph above shows soil texture and the % sand, % silt and % clay in a variety of soil samples.

Using the graph, read off the 3 values for each of the soils A, B, C and D to show their relative sand, silt and clay proportions.

	SOIL A	SOIL B	SOIL C	SOIL D
Sand				
Clay				
Silt				

GRAPHICAL SKILLS: (x) Choropleth Maps

Choropleth Maps show relative density per area. These maps are shaded according to a pre-arranged range, with each colour representing a particular range of values

Choosing 'Ranges' of data to be mapped:

Data should be arranged in ascending or descending order, enabling you to see the range of results and identify any particular groups. Between 4-6 groupings are ideal and no more than 8, below four means little data is shown, whilst more than six can be hard to interpret as it becomes difficult to tell between the shades

Examples: average annual precipitation; average GNP for countries across the world; population density.

How to construct a Choropleth Map

- Locate an appropriate base map for the study area for which data is being mapped.
- Select the groups to be mapped – start by finding the range of values and devise a shading scale e.g. 0-4, 5-9 etc.
- Choose an appropriate shading to draw the map – this should be in one colour – the highest values should be represented by the darkest colour and the lower values by lighter colours.
- Shade the areas in neatly and ensure a key has been added
- Give your map an appropriate title



Source: <http://www.eps.mq.edu.au/courses/GEOS219/choropleth.htm>

Advantages of Choropleth Maps

- Give a good visual impression of the data and changes over space – patterns can easily be identified.
- Easy to complete

Disadvantages of Choropleth Maps

- hides variations within an area
- Choropleth maps also suggest that there are sharp contrasts between areas where the boundaries of the maps are drawn (again – not reflective of reality).
- If too many categories it can be difficult to distinguish between shades.
- Only shows spread of data and not actual amounts

EXAM TIP

As well as making sure you can complete a choropleth map if you are asked, will also need to be able to evaluate their use (advantages and disadvantages). You may also be given a data set and asked to suggest the groups that could be used! Make sure you read the rules for deciding on groups above!

PRACTICE QUESTIONS: Choropleth Maps

Emissions of gases which caused acid rain in 1980 and 2000

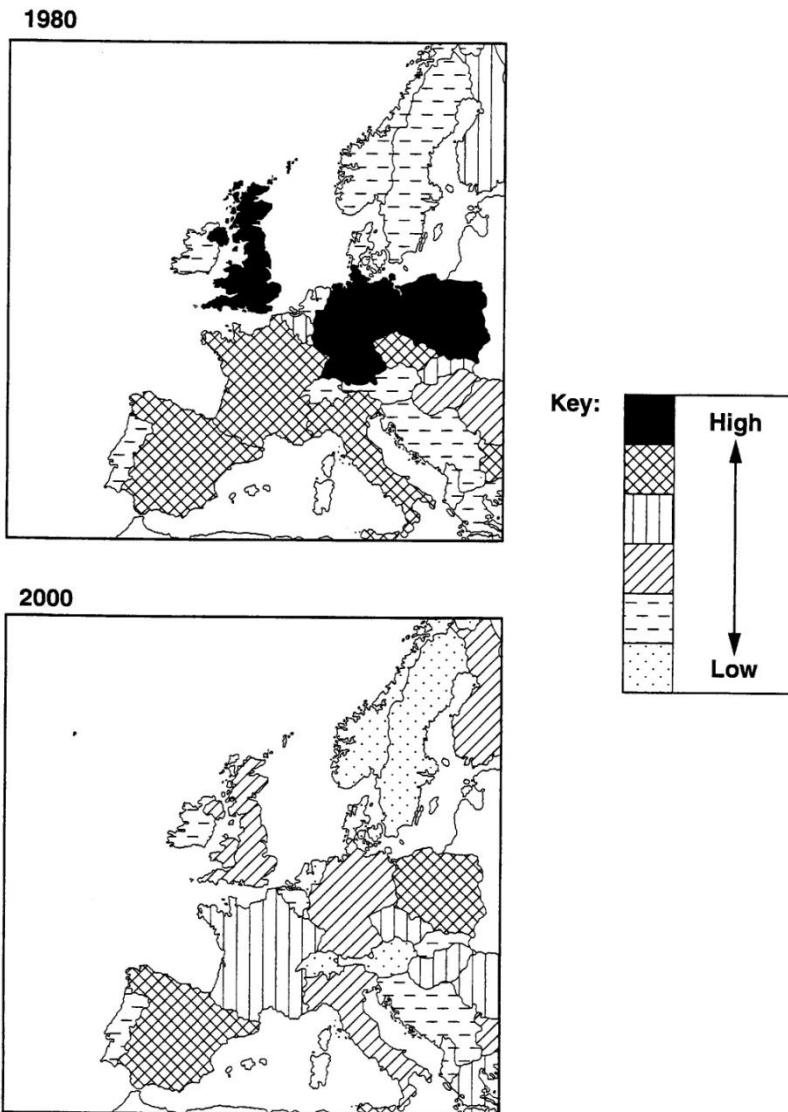


Fig. 8b

- 1a. Briefly describe the main changes which have taken place in the emissions of gases which have caused acid rain between 1980 and 2000 (3 marks)

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1b. Give 2 advantages of a choropleth map as a data presentation technique (2 marks)

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1c. Name another sophisticated data presentation technique which could be used to present this data (1 mark)

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1d. Why would a histogram be a more suitable alternative than a bar chart for displaying this data?

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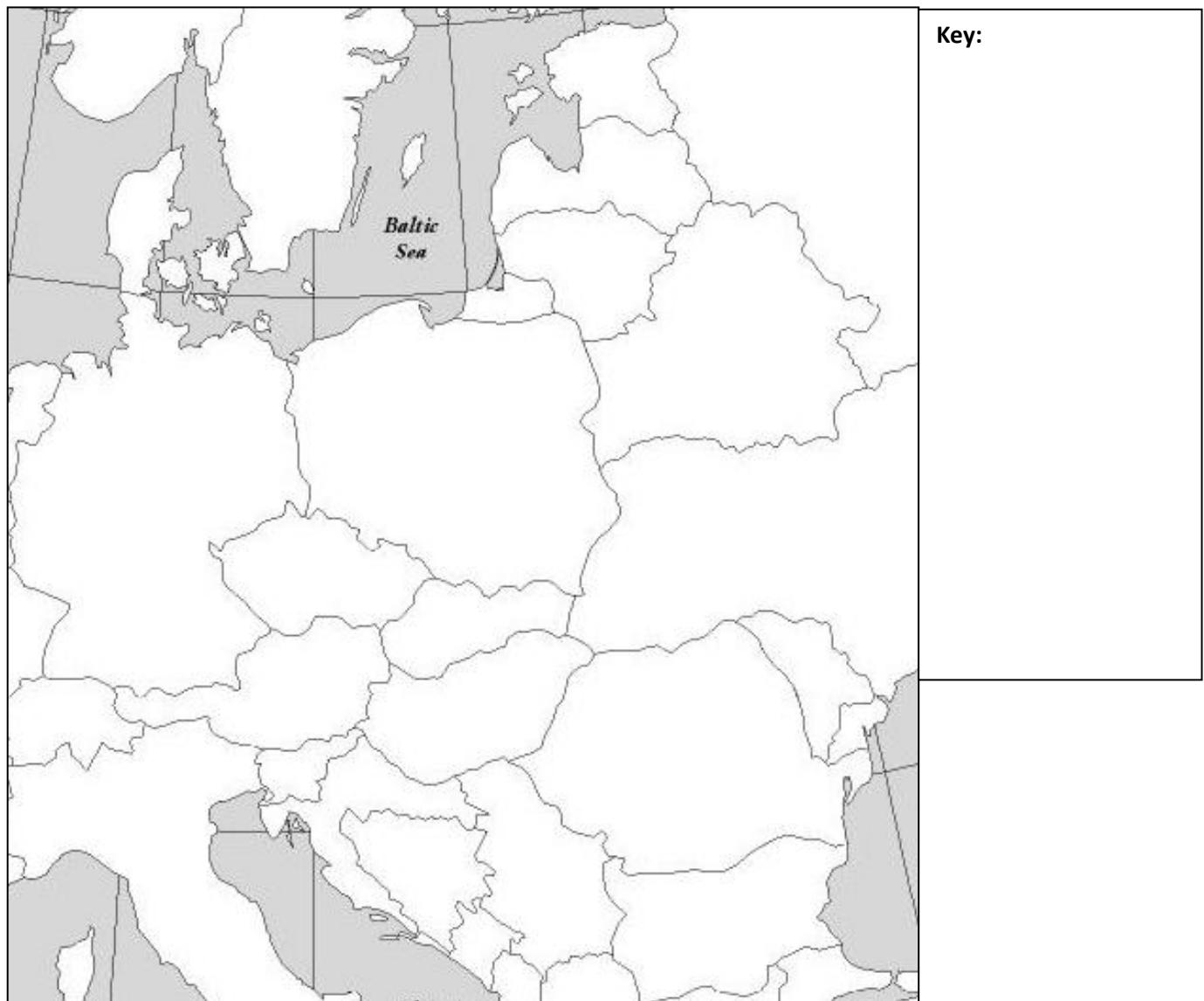
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2a. Study the data below showing the source countries of migrants to the UK from Eastern European countries between 2004-2006.

Country	Number of Migrants (thousands)
Czech Republic	25
Estonia	10
Hungary	20
Latvia	28
Lithuania	55
Poland	260
Slovakia	40
Slovenia	5

Source: Warren, S – Geographical Skills (2010)

Using the data above, draw a choropleth map of the source countries of migrants to the UK from Eastern European countries between 2004-2006.



Describe the pattern shown by the map

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Give a disadvantage of using a choropleth map to show data such as this.

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GRAPHICAL SKILLS: (xi) Proportional Symbols

Proportional symbols are drawn in a proportion that represents the size of the value that is being presented.

Examples: Proportional circles showing the number of British tourists visiting other European destinations; Proportional circles showing population distribution in a particular continent (see example of Africa below)

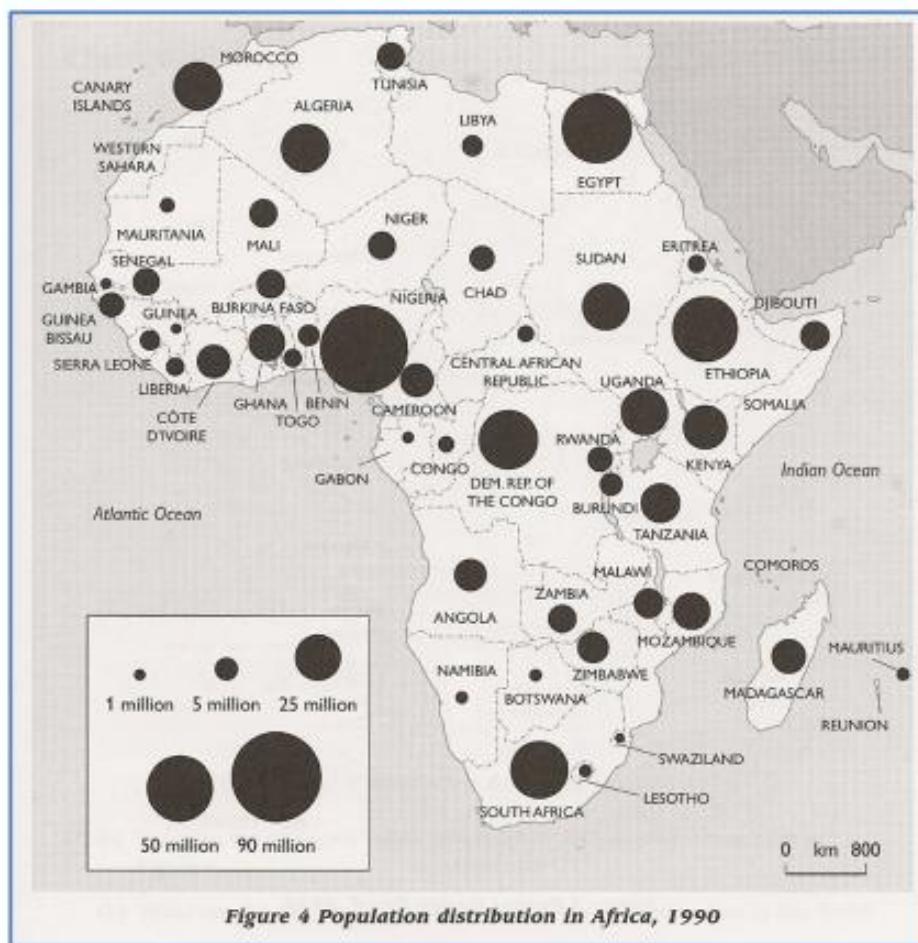


Figure 4 Population distribution in Africa, 1990

This is what is known as a sophisticated data presentation technique – it is likely that this will only appear on higher papers.

How to construct a Proportional Circles Map

- Locate an appropriate base map for the data to be plotted
- Calculate the square root of each of the values (this is used to help calculate the radius of the circle of side of a square)
- Identify the range of values and determine a suitable scale – e.g. if scale = 5mm – the size of a circle representing a value of 20 would be 5 x square root of 20.
- Locate point on map, set compass to calculated radius and draw symbol
- Symbols should be shaded and a key and title provided

Sometimes this technique is combined with another data presentation technique to illustrate two sets of data – e.g. proportional pie charts.

Advantages...

- Proportional Symbol maps are not dependent on the size of the area associated with the variable so all areas have equal visual importance
- Provides a quick visual comparison in a spatial context – i.e. differences between places.

Disadvantages...

- If very large amounts of data and subtle variations it can be difficult to provide visually meaningful comparison

PRACTICE QUESTIONS: Proportional Symbols

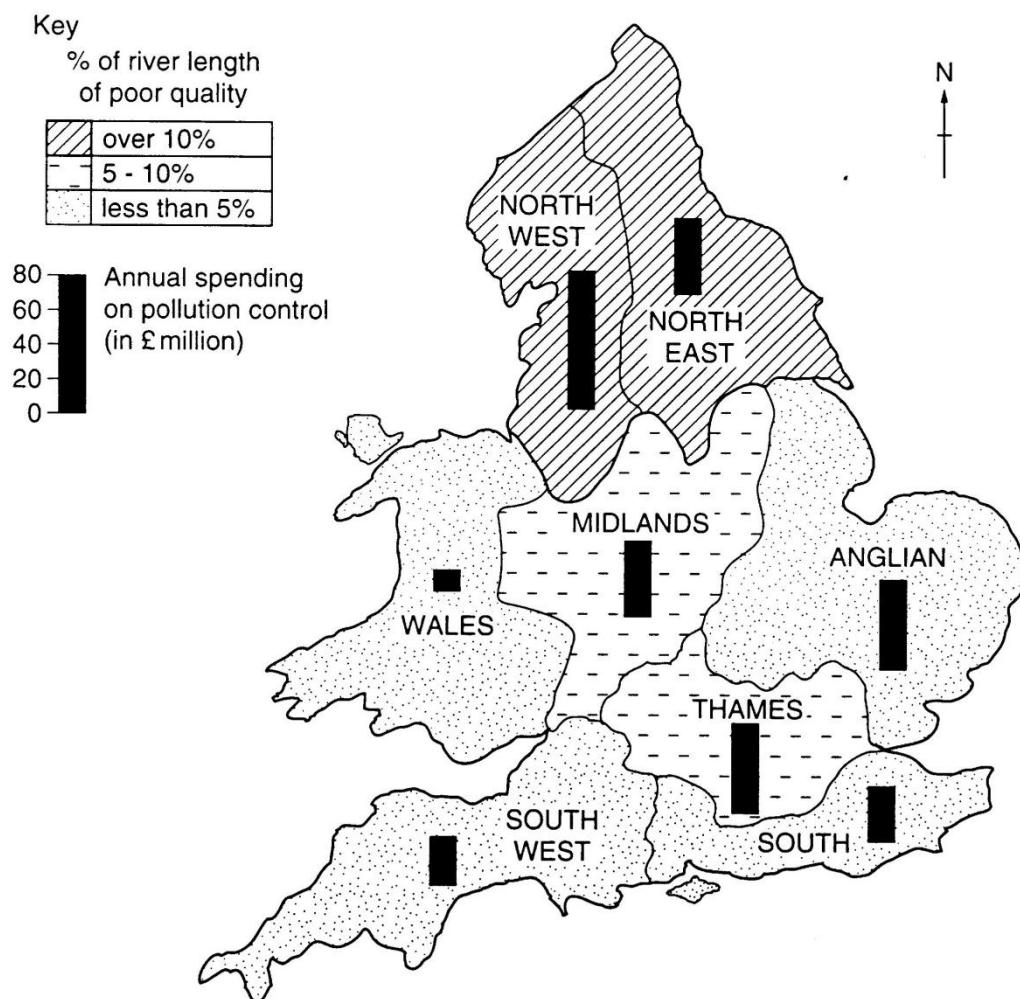


Fig. 2b Variation in river quality and annual amount spent on controlling river pollution in the regions of England and Wales.

1586/4 S01

1. Use evidence from Fig 2b to describe how the river quality varies across England and Wales (2 marks)

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Study the diagram below showing visitors to National Parks in England & Wales.

Number of visitors to National Parks in England and Wales

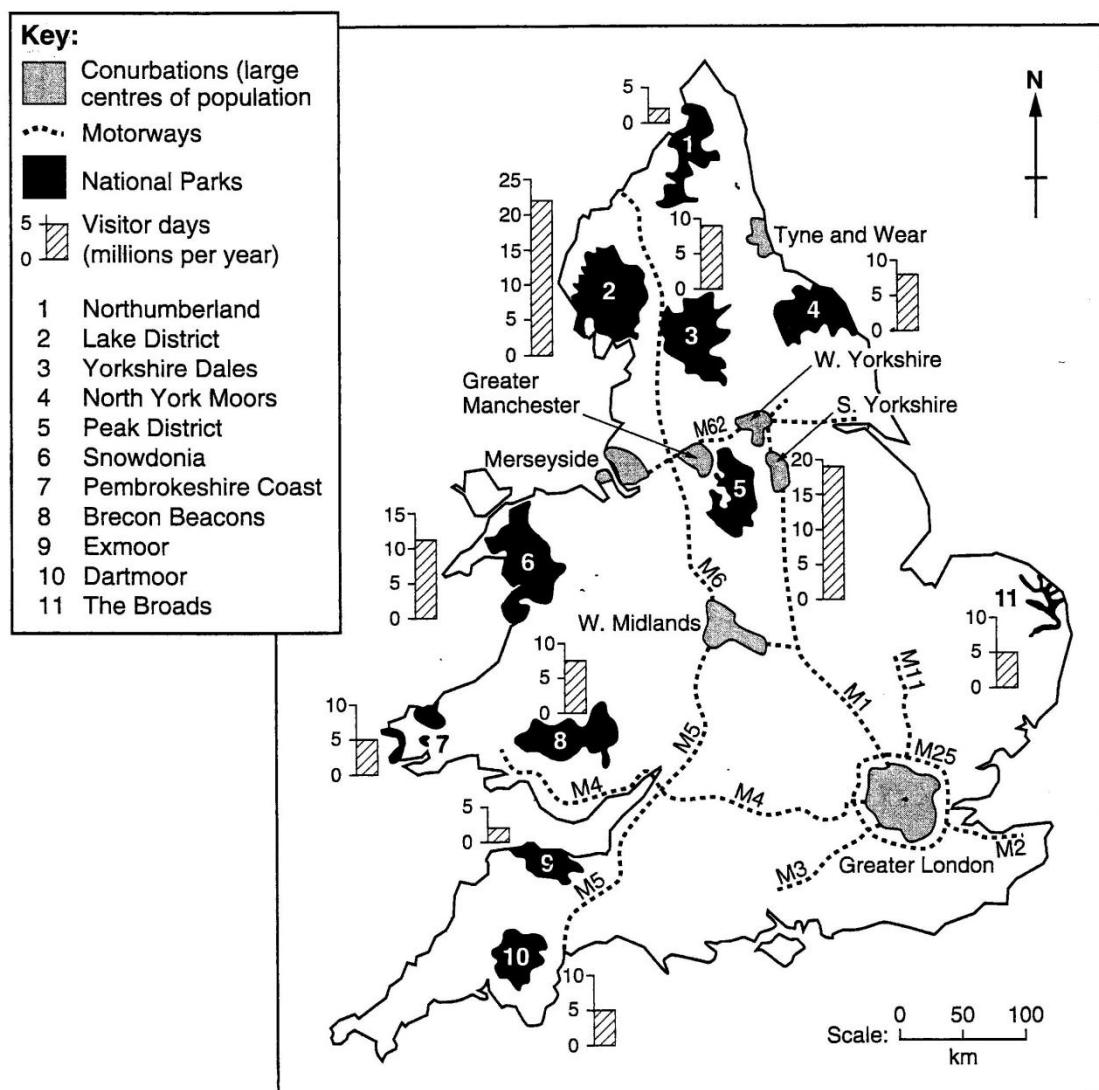


Fig. 7

2. Which National Park is located 275km from the centre of Greater London and 525km from the centre of Tyne and Wear conurbation? (1mark)
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3. Rank the following National Parks in order of the number of visitor days per year. Rank from highest to lowest. (1 mark)

1.
2.
3.
4.

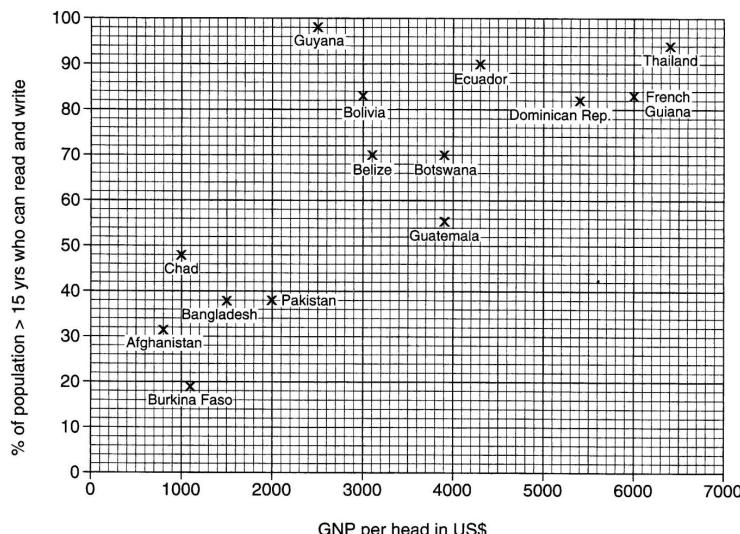
GRAPHICAL SKILLS: (xii) Scatter Graphs

Scatter graphs can be used to see if two sets of data are related to each other (i.e. if there is a correlation). Having plotted the data as a scattergraph, the pattern of the points can be used to identify if there is a relationship and what the nature of the relationship is (see examples below).

A best fit line can then be drawn onto the graph to indicate the strength of the relationship between the two variables. The closer the points are to the best fit line the stronger the relationship. It is also then possible to identify anomalies. These are points that do not fit the relationship shown.

Examples: GNP and Birth Rate; Distance Downstream and Velocity in a river; Strength of an earthquake on the Richter scale and number of deaths

Scatter graph of GNP per head and percentage of population over 15 years who can read and write in selected LEDCs

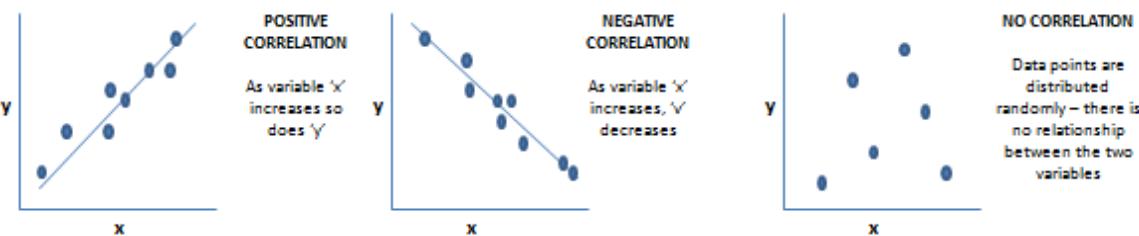


Advantages

- enables us to identify if a relationship exists between two data sets
- Can be used to identify the nature of any relationship that exists and indicate the strength of it

Disadvantages

- data on both axis must be continuous
- Whilst a line of best fit line can suggest a relationship, a statistical test will be required to test for the significance of the relationship



How to construct a Scatter Graph

- Firstly decide which variable is the independent variable (i.e. affects the other one e.g. wealth) and which is the dependent variable (e.g. Birth Rate)
- The independent variable must be plotted along the x-axis and the dependent variable along the y-axis
- Based on the range of data values, select an appropriate scale for both the x and y axis
- Plot the measurements for each on to the graph using a cross to mark where the x & y values meet
- Draw a line of best fit which is a STRAIGHT line drawn through the middle of the plotted points, trying to keep an even number of points either side.
- Add a title and label axes
- Identify and try to explain any correlation which exists between the two data sets.

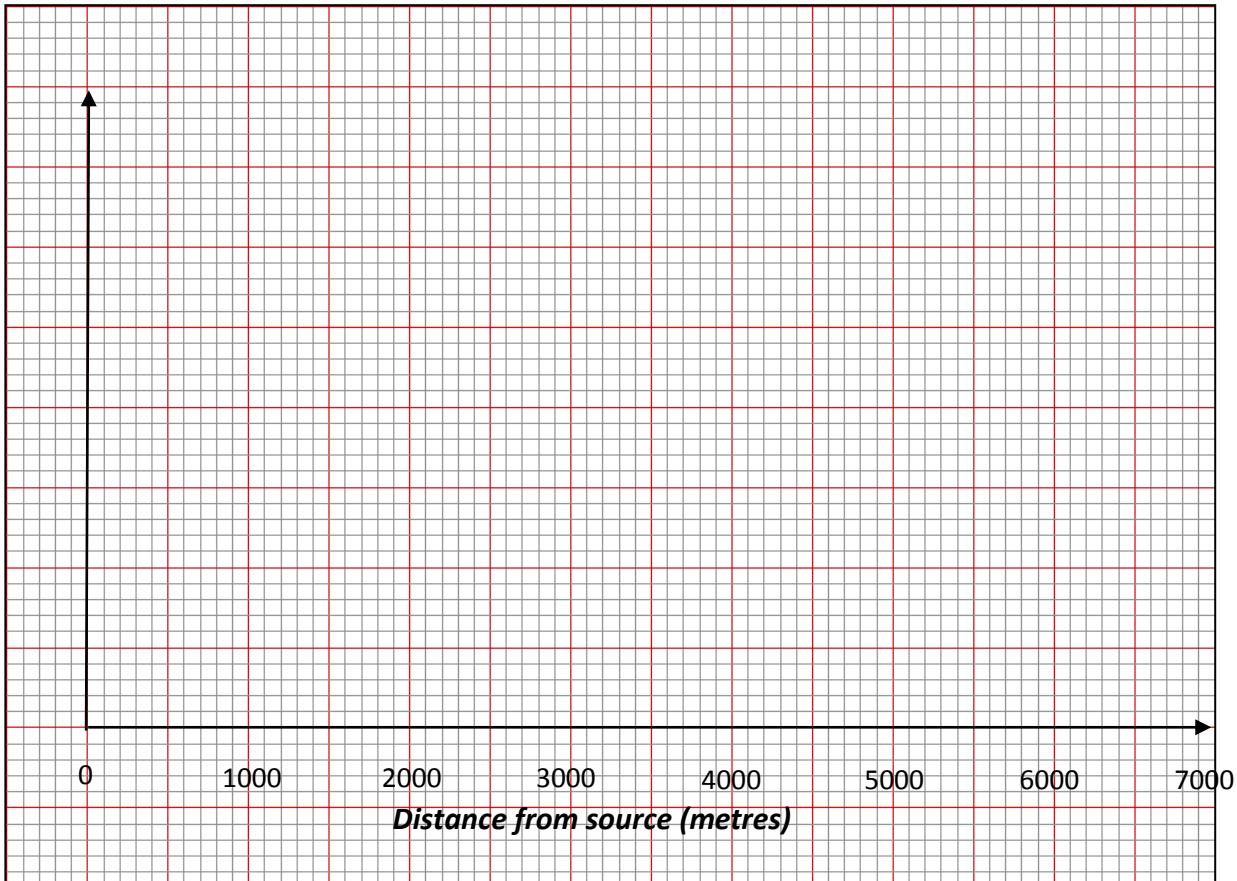
PRACTICE QUESTIONS: Scatter Graphs

Using the data from the table below:

- (i) Plot a scatter graph to show the relationship between the two variables
- (ii) Draw a line of best fit on to your graph.

Site	1	2	3	4	5	6	7	8	9	10
Distance from Source (m)	200	1100	1900	2400	3100	3900	4200	5300	5900	6500
Average Speed (m/s)	0.78	0.62	0.54	0.91	0.89	0.99	1.2	1.34	1.21	1.45

GRAPH TITLE:



- (iii) Describe the relationship shown

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PRACTICE QUESTIONS: Scatter Graphs

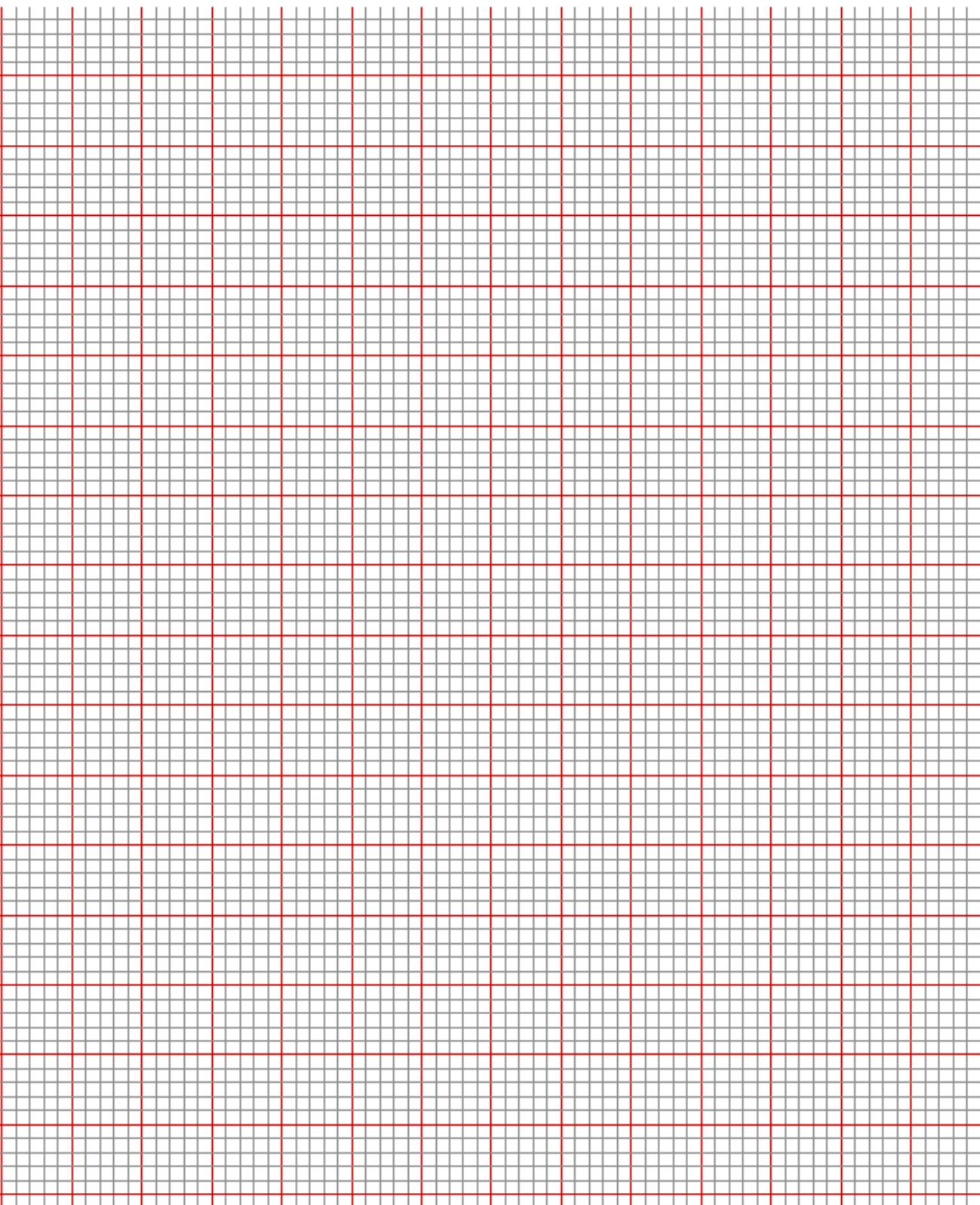
Using the data from the table below:

- (i) Plot a scatter graph to show the relationship between domestic water usage (%) and GDP (\$) on the graph paper on the following page.

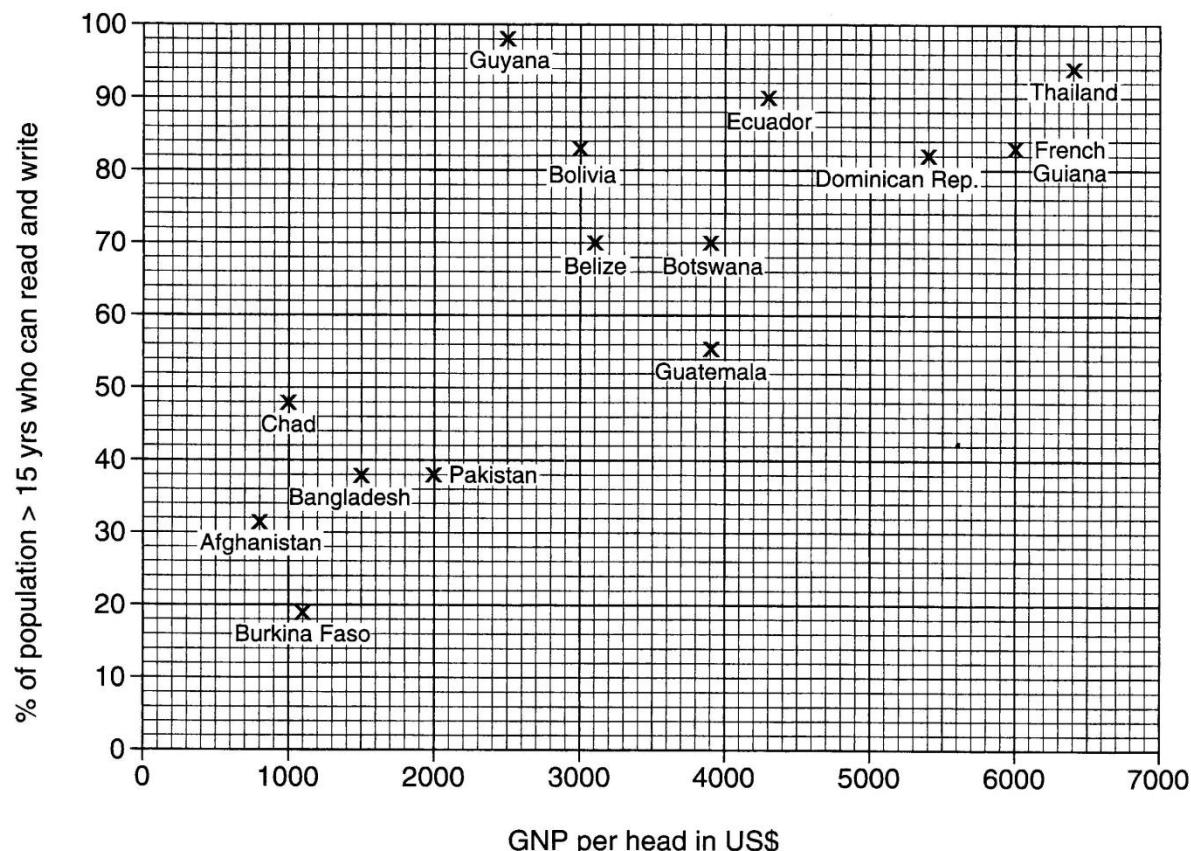
	Domestic Water Usage (%)	GDP (\$)
China	12	5,000
Australia	15	29,000
Japan	20	30,000
Thailand	9	7,400
Korea	14	17,700
India	6	2,900
Indonesia	8	3,200
Russia	19	9,000
Turkey	15	6,700
New Zealand	48	21,600
Uzbekistan	5	1,700
Malaysia	17	8,500
Sri Lanka	4	3,700
Algeria	25	5,900
Afghanistan	3	700
Sierra Leone	2	500
USA	17	37,800

- (ii) Is there a correlation between the two variables? What is its nature?
 - (iii) Add a best fit line to your graph. Circle any anomalies on your graph.
 - (iii) Describe and give reasons for the pattern that is shown by the graph.

A scatter graph to show the relationships between Domestic Water Usage (%) and GDP (\$)



Scatter graph of GNP per head and percentage of population over 15 years who can read and write in selected LEDCs



Study the scattergraph above showing GNP per head and % of population over 15 who can read and write in selected LICs.

To which country does the following information refer?

GNP per Head - US\$3,900

% of people over 15 who can read and write - 70% (1 mark)

To what extent is there a relationship between GNP per head and % of the population over 15 who can read and write? (2 marks)

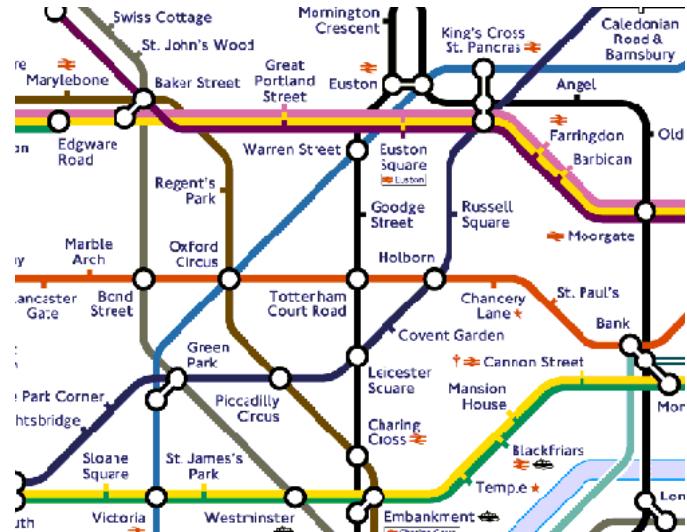
Topological Diagrams

Topological maps simplify reality, distorting real distance and direction in order to produce a map or diagram which is simpler to understand.

There are **TWO** types of typological maps/diagrams:

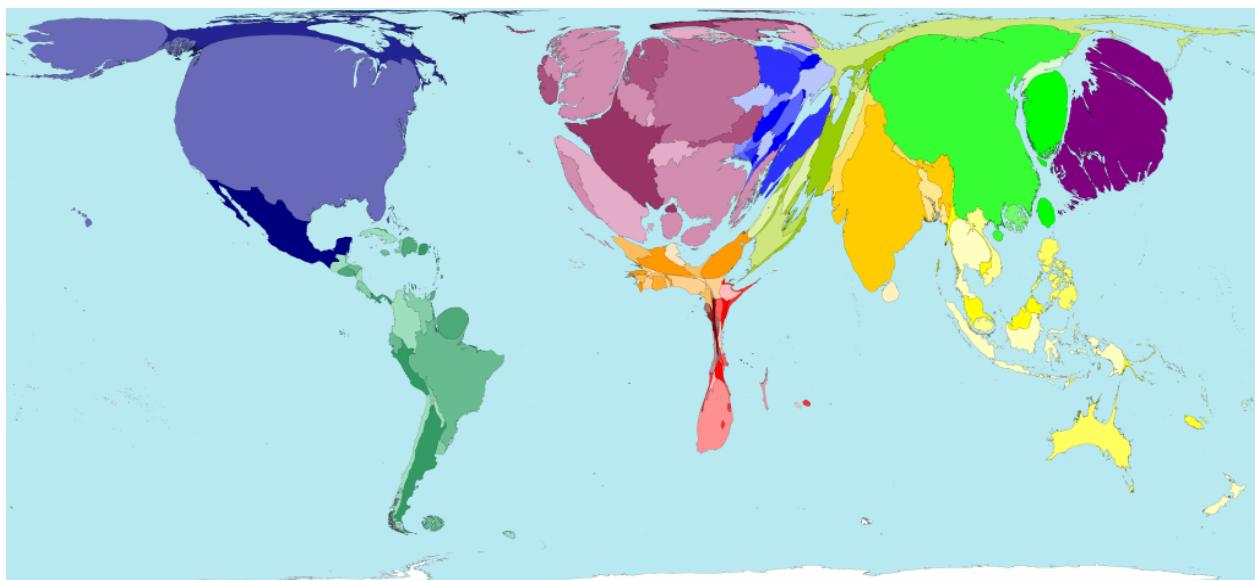
1. Maps showing **ROUTES** – e.g. the **LONDON UNDERGROUND MAP**

The position of places relative to one another remains the same but the actual distance and direction are not important.



1. Maps of **AREAS** like countries, where the size of the country has been altered as it has been drawn to represent a different value.

The example below shows World Wealth as a topological map – the larger the country area represents a greater wealth – provides great visual comparison!



Advantages of Topological Maps

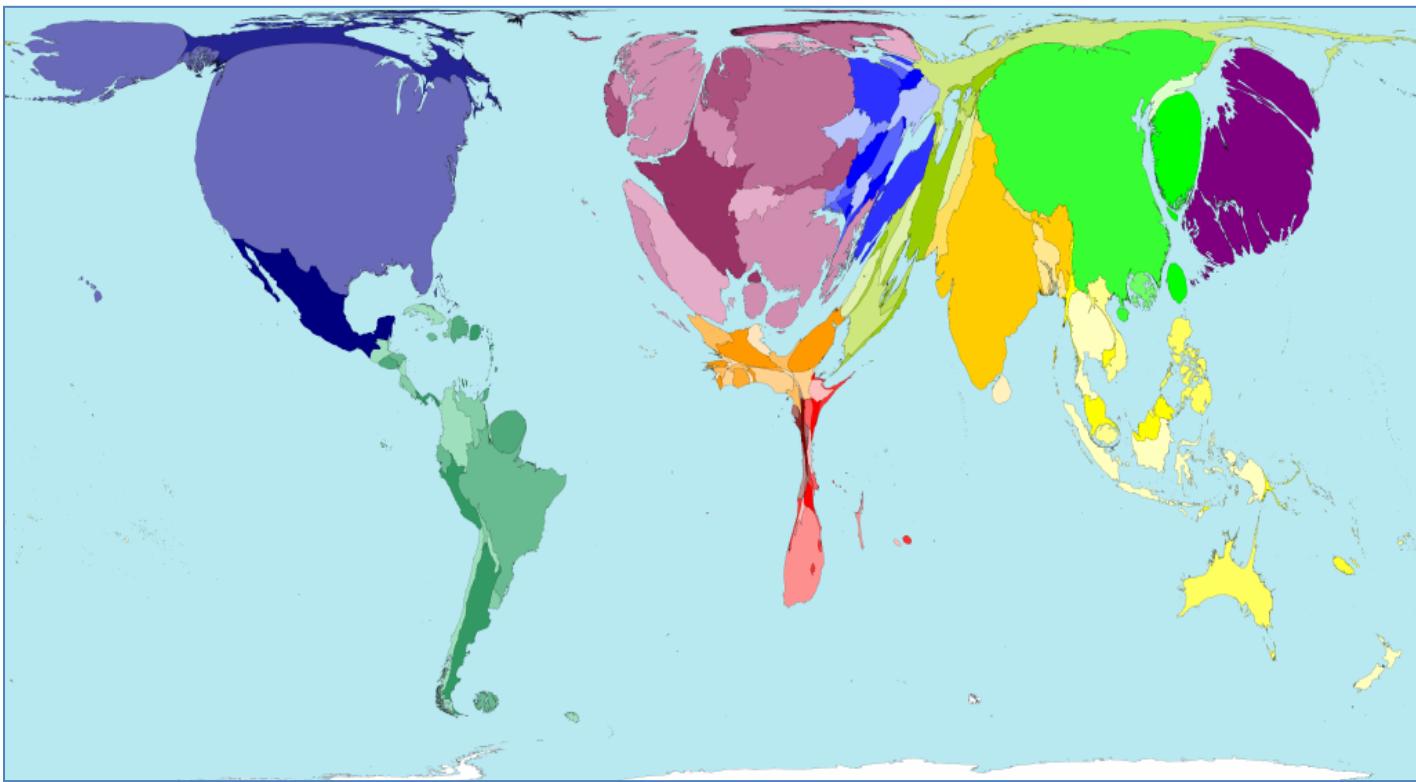
- They condense and simplify information allowing lots of information to be shown in a small space
- They allow inaccuracies as they distort distance and direction

Disadvantages of Topographical Maps

- It is not possible to tell the exact direction that you are travelling
No scale is given so distance can not be calculated

PRACTICE QUESTIONS: Topological Maps

In the topological map below the size of the country has been drawn to represent wealth and therefore is no longer its geographical size.



A topological map of World Wealth

Study the topological map above. Outline and explain the main features of the map. (4 marks)

Test your Understanding – Making appropriate use of Data presentation techniques

What data presentation techniques could be used to show the following & why?

Focus of Data	Possible presentation techniques & Justification
Car ownership in the UK	
Population Density in the UK	
World Population Change	
Number of migrants coming to the UK from the rest of Europe	
% of carbon dioxide emissions per continent	
Life Expectancy & GDP	
Employment structure	
Number of different services in a settlement	
% of energy consumption per country	
Distance from city centre and land-values	
Top 10 source countries for tourists to the UK	
% of water used for agriculture, domestic and industrial uses in different countries	
Number of people coming to the UK from different countries.	
Number of deaths in an earthquake & level on the richter scale	

GEOGRAPHICAL ENQUIRY SKILLS

Step 1
Identification of issue,
question, problem

- A topic for investigation is recognised through observation, discussion, reading or previous study. The design of hypotheses to test the issue, question or problem.

Step 2
Formulation of
design of
work

- The objectives of the study are defined in specific terms.
- Decisions are made concerning: (a) what data is relevant to the study; (b) how the data can be collected.

Step 3
Collection of data

- Candidates carry out a group or individual set of tasks which may include fieldwork to collect primary data such as undertaking questionnaires, mapping or sketching observation, recording counts or measurements. It may also involve gathering data from secondary sources such as from Census information, the Internet, published maps, books, newspapers or magazines.

Step 4
Selection and
collation of
data

- Teacher collates data for class use. Candidates select data to develop the aims or hypotheses for the topic.

Step 5
Representation and
recording of results

- Candidates individually record results and represent findings in an appropriate form using a variety of maps, graphs, etc.

Step 6
Analysis and
interpretation

- Candidates individually analyse and interpret their findings in response to the issue/question/problem with reference to relevant geographical concepts.

Step 7
Conclusions,
suggesting
solutions, evaluation.

- Candidates individually draw conclusions from their findings and make evaluations related to the original objectives. If appropriate, comments may be made on the limitations of the data and possibilities for further study.

What may you be asked to do in an exam?

- You may be given a question and asked to develop hypotheses to answer it
- You may need to explain why these are relevant

- You may be asked to suggest what data may be required to test a particular hypothesis
- You may be asked to suggest possible sources of data.

- You may be given an example of data that has been collected and be asked to suggest appropriate ways of presenting this data.

- You may be given data to analyse:
 - Describe what you see - what are the main patterns / features?
 - Are there any relationships or links between the data
 - Are there any anomalies or features which are different?
 - Try and give reasons for what you see? Try & back these up by relating to other data

- You may in an exam be given some findings and asked to answer a hypothesis based on these.

- You may be asked to evaluate a particular data presentation technique or the findings of a study.
- Think about: what can be improved; what problems and how might you solve them

SKILLS REVISION CHECKLIST

SELF EVALUATION

	Need more Revision on	Understand & confident in use of
Basic Skills:		
Labelling and Annotation		
Interpretation of Photographs (Aerial, Satellite & Oblique)		
Cartographic Skills:		
Atlas Maps		
Sketch Maps		
Ordnance Survey Maps		
- Compass Directions		
- Measuring distances		
- Symbols		
- 4 and 6 figure grid references		
- Information shown on Ordnance Survey Maps		
- Relief, Drawing and Annotating Cross-Sections		
- Distributions and Patterns of Human and physical land-use		
- Site, Situation and shape of settlements		
Graphical Skills:		
- Bar Graphs and Compound Bar-Charts		
- Pyramid Chart		
- Line Graphs and Compound Line Graphs		
- Isolines		
- Flow Lines		
- Pie-Charts		
- Wind Rose/ Radial Diagrams		
- Triangular Graphs		
- Topological Diagrams / Maps		
- Choropleth Maps		
- Proportional Symbols		
- Scatter Graphs		
Geographical Enquiry Skills		