

Name

The Challenge of Resource Management

Specification Content	Understood?	Revised?
<p>The significance of food, water and energy to economic and social well-being.</p> <p>An overview of global inequalities in the supply and consumption of resources</p> <p>An overview of resources in relation to the UK.</p> <p>Food:</p> <ul style="list-style-type: none"> • the growing demand for high-value food exports from low income countries and all-year demand for seasonal food and organic produce • larger carbon footprints due to the increasing number of 'food miles' travelled, and moves towards local sourcing of food • the trend towards agribusiness. <p>Water:</p> <ul style="list-style-type: none"> • the changing demand for water • water quality and pollution management • matching supply and demand - areas of deficit and surplus • the need for transfer to maintain supplies. <p>Energy:</p> <ul style="list-style-type: none"> • the changing energy mix - reliance on fossil fuels, growing significance of renewables • reduced domestic supplies of coal, gas and oil • economic and environmental issues associated with exploitation of energy sources. 		

Keywords

Agribusiness - Application of business skills to agriculture.

Carbon footprint - A measurement of all the greenhouse gases we individually produce, through burning fossil fuels for electricity, transport etc, expressed as tonnes (or kg) of carbon-dioxide equivalent.

Energy mix - The range of energy sources of a region or country, both renewable and non-renewable.

Food miles - The distance covered supplying food to consumers.

Fossil fuel - A natural fuel such as coal or gas, formed in the geological past from the remains of living organisms.

Local food sourcing - A method of food production and distribution that is local, rather than national and/or international. Food is grown (or raised) and harvested close to consumers' homes, then distributed over much shorter distances.

Organic produce - Food which is produced using environmentally and animal friendly farming methods on organic farms. Artificial fertilisers are banned and farmers develop fertile soil by rotating crops and using compost, manure and clover. It must be free of synthetic additives like pesticides and dyes.

Resource Management - The control and monitoring of resources so that they do not become depleted or exhausted.

Global distribution of resources - Food, Water and Energy

What is a resource?

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Using pages 256-257 in the textbook answer the following questions.

Food

What does the WHO suggest?

How many people are below this level and malnourished?

What is the definition of undernutrition?

What effects can undernutrition have?

Why do we need to be well fed?

What is an increasing problem?

Water

What five things is water essential for?

What is the imbalance in water supply due to?

What can be done about it? Why is this hard for LICs?

What does the UN estimate?

Who uses a higher proportion of water for agriculture? And for industry?

Energy

What is energy required for?

What has made the energy situation more complex?

Why is consumption increasing?

What is the relationship between richer and poorer countries regarding energy use?

What's interesting about the Middle East?

Without electricity what would people do to provide light and heat? What negative consequences can this have?

Describe the distribution of water shown on Map C p. 257.

[2 marks]

Map A p. 256

1. What is the general trend between the % of population who are undernourished in HICs and LICs?
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.....
2. What % of Australia's population are undernourished?
3. What % of Kenya's population are undernourished?
4. Are there any anomalies?

Map C p. 257

1. Name a country that has physical water scarcity
 2. Name a country that has economic water scarcity
 3. Name a country that has little water scarcity
 4. Describe the projected water scarcity situation in the UK?
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5. Where is most of the water scarcity on a global scale?

Graph D p. 257

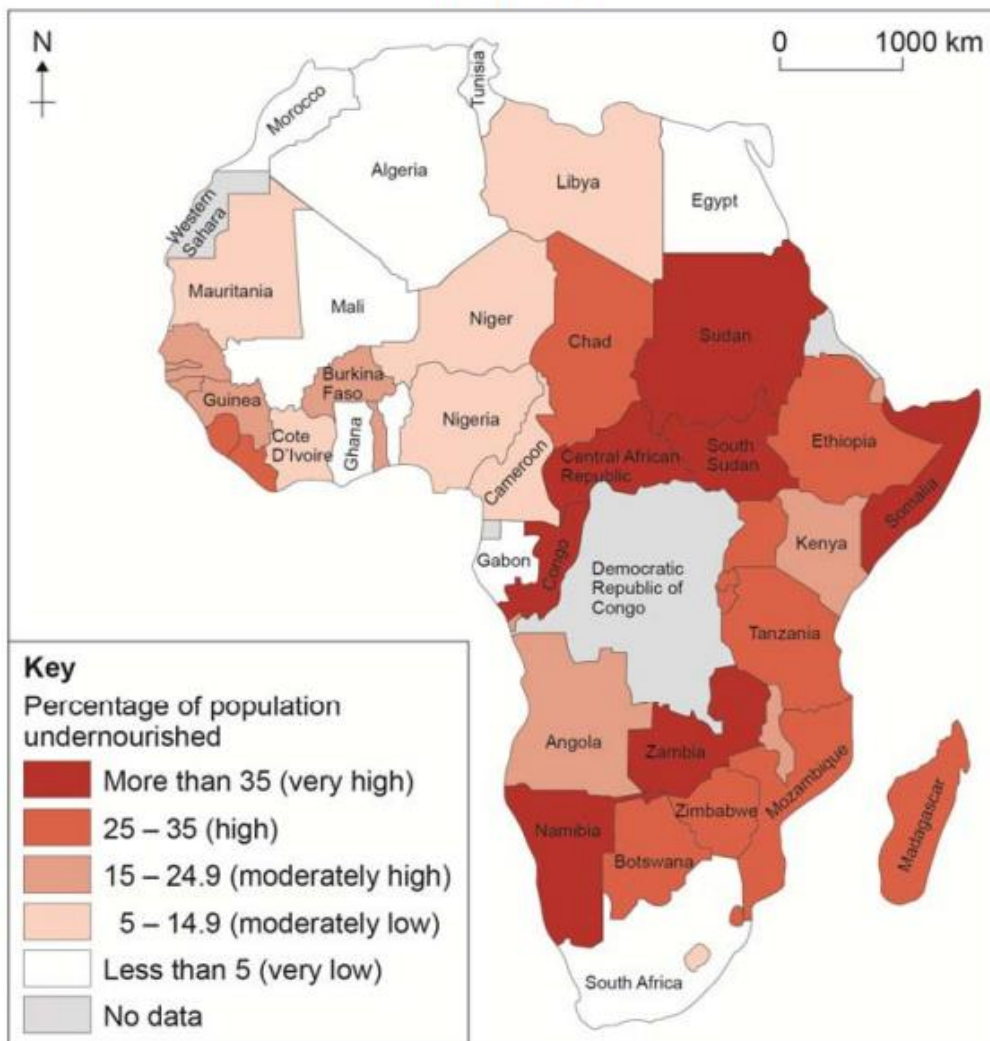
1. In a HIC what % of their water use goes on agriculture?
2. How about industry?
3. The remaining 11% is used for what?
4. For an LIC the pattern is different. What % is used for agriculture?
5. What is the difference between the proportion of water used for industry in LICs and HICs?
Why is this the case?

Graph E p. 257

1. What has happened to energy consumption over time?
2. How much energy did the USA consume in 1970 and in 2010?
3. How much energy did China consume in 1970 and in 2010? Be careful on this question!
4. Looking at China and USA, which country's energy consumption increased the most over the 42 years?
5. Calculate the % increase in global energy consumption between 1970 and 2012.

Exam Question

Figure 13



0 4 . **1** What percentage of the population in Chad was undernourished in 2014? Shade **one** circle only.

- A 5–14.9%
- B 15–24.9%
- C 25–35%

0 4 . **2** Using **Figure 13**, describe the distribution of countries in Africa where there are high and very high levels of undernourishment.

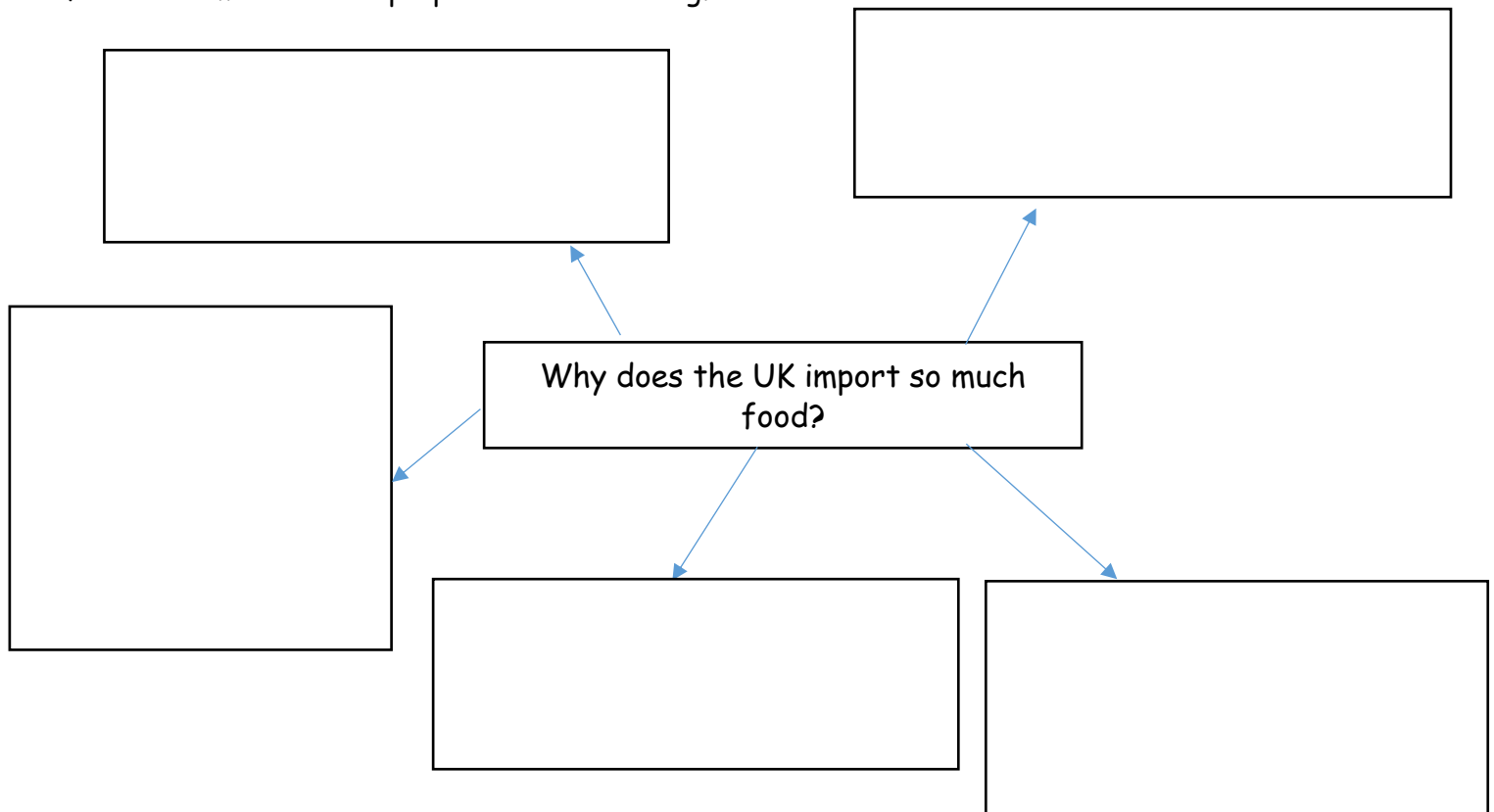
[2 marks]

Provision of food in the UK

Where does our food originate from?



By **2037** the population of the UK is expected to rise to **73 million** (from 64 million in 2015). This will **increase** the future **demand for food**. Despite the UK's efficient and productive farming sector the **UK is not self-sufficient** for food supplies. In fact the **UK imports about 40 per cent** of the total food consumed and this proportion is increasing.



Definitions (use the missing words opposite to complete the paragraph below)

Carbon footprint is the measure of the impact that h_____ activities have on the en_____ in terms of the amount of greenhouse g_____ they produce.

Food miles are the d_____ that food travels from p_____ to c_____.

Carbon Footprint Facts

Summarise the info and add it to the footprint

Global Interdependence

This means

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It can cause problems because

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How is the UK responding to the challenge?

The UK is facing the challenge of an increased demand for food which has resulted in a greater need to import food to supply this demand. As a result the UK's carbon footprint is increasing and our **dependence on other countries leaves us vulnerable.**

Solutions include:

- 1.
- 2.
- 3.
- 4.
- 5.

Definitions

Agribusiness -

Organic farming -



	Agribusiness farming	Organic Farming
Features (describe it...)		
An example		
Positives		
Negatives		

Exam question

Explain the UK's attempt to respond to changing demands for food (4marks)

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Provision of water in the UK

What are the demands for water in the UK?

Nearly half of water used in the UK is used by This is called domestic water use. In the home% of our water use is to flush toilets. The next highest use is for at 20%. Of all the water used in the UK% is lost through leakages.

Challenge: 'manipulate the data' Write a sentence to describe water use in the UK that includes some basic maths. For example...'*Households use nearly 10 times as much water as manufacturing users do*'.

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Why is demand for water increasing? Develop the point...

1. The population of the UK is increasing. This means that
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2. Technological advancement means that we now have more appliances like dishwashers and washing machines. This means that
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3. We are now more hygiene conscious and more people shower or bathe every day. This means that
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Does the UKs water supply meet demand?

Draw a diagram to show the main sources of water in the UK

Definitions

Areas of surplus	
Areas of deficit	
Water stress	

Describing distribution

Population density:

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Rainfall:

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Water stress:

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Exam Question: Explain the pattern of water stress in England (6 marks)

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Words to use: surplus, deficit, stress, north, south, east, west, high population density, low population density

Solutions to water stress

Saving Water - How?	Water Transfer - How?
Saving Water - Problems	Water Transfer - Problems

Challenge: classify the problems into environmental, social, economic, political

What are the causes of water pollution?

Only % of the UK's water is classified as 'good', this is largely due to that is entering our rivers, lakes and coastal areas. Some of the causes of water pollution include that have been used on farmland running into rivers, releasing untreated waste which often contains and metals, people dumping rubbish such as trolleys and bicycles. One large problem is sewage works that pump sewage that still contains into the sea.

How does water pollution affect the UK?

Water pollution can have a number of serious effects which consequences that vary in length.

- T.....waste can poison wildlife, this can work its way through the food chain and even be transferred to h..... which can cause birth d.....
- Drinking water can be

- The bacteria from the s..... can cause the spread of infectious d.....
- Fishermen and workers who rely on clean water for their may suffer.

How is water quality managed in the UK?

There are numerous ways that the water quality in the UK is kept as high as possible.

- **Legislation** - the UK have in place that restrict the amount and type of waste that f put into r..... Penalties are in place for those who do not adhere.
- **Waste water treatment** - Treatment plants remove b....., c..... and solids such as to produce clean water for human c.....
- **E..... campaigns** - The public are educated about the damage certain items can cause if they make their way into to the s..... systems. For example, one campaign teaches how to dispose of baby w..... correctly and to prevent engine oil leaking.

Challenge: Choose at least one of the ways given for managing water quality and describe the opportunities and challenges it has.

Provision of energy in the UK

How is demand changing?

Definitions

Fossil fuel:

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Renewable energy:

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The UK's energy mix

	<u>1990</u>	<u>2007</u>	<u>2014</u>
<u>coal</u>	65%	25%	31%
<u>oil</u>	9%	0	0
<u>gas</u>	1%	35%	25%
<u>nuclear</u>	15%	30%	19%
<u>renewable</u>	5%	3%	22%
<u>other</u>	5%	7%	3%

Exam questions

- 1) Name 2 different graphs that could be used to show this information.
- 2) What % of the UK's energy came from oil in 1990? ...
- 3) What % of the UK's energy came from oil in 2014? ...

- 4) Which energy source saw the greatest reduction between 1990 and 2014?
- 5) Which fossil fuel increased in use from 1990 to 2014?
- 6) Describe the change in the UK's energy mix (*the answer has been started for you*)

In 1990 almost three-quarters of UK energy came from coal and oil - fossil fuels.

By 2007

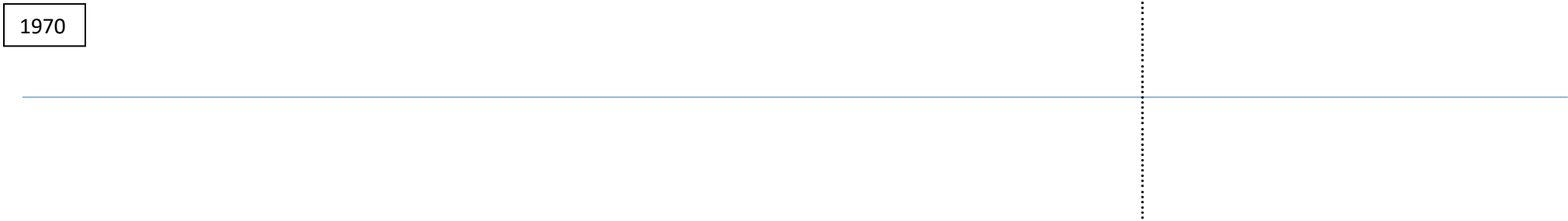
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By 2014

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Timeline of how the energy mix is changing in the UK



Energy Security

The UK is no longer self-sufficient in energy. This means

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Challenge: why is this a problem?

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Why are we still reliant upon fossil fuels?

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Exam question

Explain why the UK's energy mix will include non-renewables and renewable sources in the future (6 marks)

Plan

<i>Reasons we will still use fossil fuels:</i>	<i>Reasons we will use renewables:</i>

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Teacher Feedback

Energy Exploitation

Definition

Fracking involves shooting _____ and _____ deep underground at _____ speeds to force out _____. This is cheaper and cleaner to burn than _____ and other gasses.

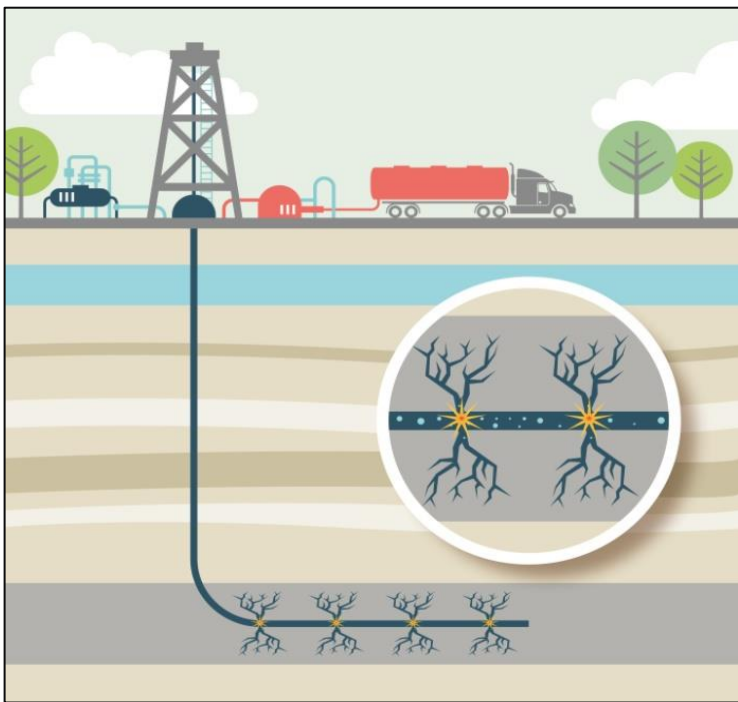
How does fracking work?

The drill hole, or well, then turns horizontal (sideways), where it can be drilled for another 3 more kilometres.

The pressure of the water mixture forces the rock apart and releases the shale gas that has been trapped.

A special type of gun is then fed into the hole which shoots small holes through the casing.

It takes around a month to drill down to the correct layer (about 1-2 kilometres below the surface). This is where you can find gas-rich Shalebeds



The shale gas comes to the surface where it can be gathered and pumped through pipes to the energy market. A good well can remain active for 20-40 years.

All the liquid is then pumped back out of the well. This 'flowback' water contains some nasty chemicals and gases which needs to be stored in tanks and have the pollutants removed.

To protect the hole from collapsing, steel casing is placed into the hole to line the walls. This also prevents the escape of dirty water and gas.

Huge amounts of water needs to transported to the fracking site to be mixed with sand and various chemicals and pumped into the well at a very high pressure.

Where can you find shale gas in the UK?

Stakeholders who approve of fracking?

Stakeholders against fracking?

Why is fracking a controversial issue?

Advantages	Disadvantages

Energy Exploitation

Create a key then colour the opportunities and challenges below

Economic opportunities (+ve) Economic challenges (-ve)

Environmental opportunities (+ve) Environmental challenges (-ve)

<u>RENEWABLE ENERGY</u>	High set up costs of wind turbines, solar farms and tidal power stations.	Jobs created in manufacturing, research & development.	Many people think wind turbines are unsightly.
The land wind turbines are on can have other functions e.g. farming.	Low profitability	They produce much lower carbon emissions.	Wind turbines effect bird migration patterns.
Offshore wind turbines can act as a reef creating marine habitats.	Turbines can be noisy and disturb people and wildlife.	If seen as visual pollution may affect tourism which can have a negative impact on the economy	
<u>FOSSIL FUELS</u>	Coal mines are unsightly and disturb wildlife	Waste from coal mining causes visual pollution	
Burning of FF creates greenhouse gases, which may contribute to climate change.	Fracking might cause earthquakes	Expensive to clean up environmental problems.	
Creates jobs.	Costly to import coal from countries such as South Africa.	Brings money into an area.	
<u>NUCLEAR POWER</u>	Creates jobs in research and development for new technologies	High cost of building nuclear power stations	If a nuclear accident occurs, there will be a long-term impact on wildlife & people
Waste needs to be stored safely for many years.	High costs to store and transport nuclear waste.	After initial cost, nuclear energy is cheap to generate.	Nuclear power is less polluting than most fossil fuels.

Challenge questions

Have a go at these if you finish any tasks earlier than others or to stretch yourself to get the skills and knowledge for those 7+ grades. Ask for a text book to borrow in class if you need a boost.

1. Describe the global inequality in the supply and consumption of either food or water or energy
2. How has foreign travel and migration affected the demand for, and supply of food in the UK?
3. Make a table to show the arguments for and against subsidising renewable energy. Try and consider as many different stakeholders as you can.
4. Explain how access to safe water can improve people's standard of living (be specific, don't drift in to quality of life...)
5. Explain why demand for energy is increasing in LICs
6. Link the global interdependence around energy to conflicts and indeed the avoidance of conflicts (i.e. has our dependence stopped us from speaking out against other countries?)
7. What conflicts may arise when trying to reduce reliance on fossil fuels? Mention different stakeholders in your answer.

Water management (this will be question 5 on your Paper 2 exam, ignore questions 4 & 6)

Global water supply

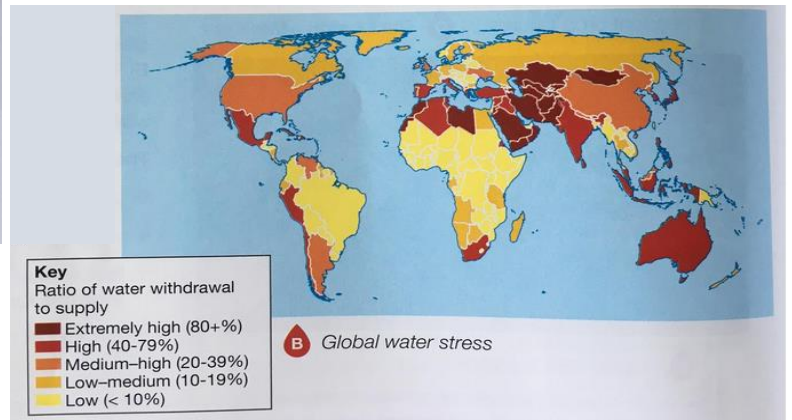
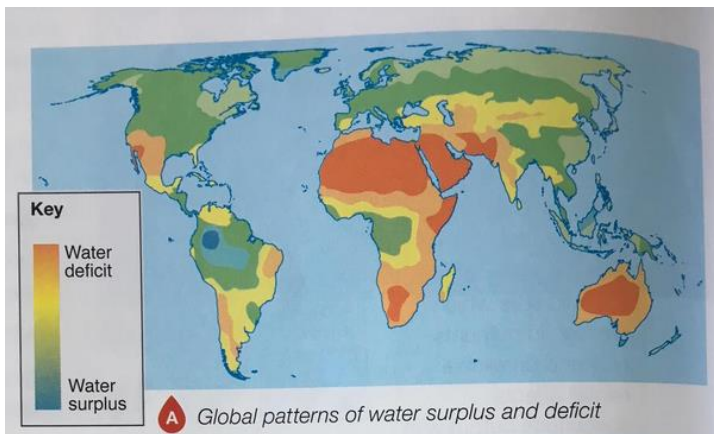
Definition:

Water stress includes

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Global Distribution of water surplus and stress

What is the global distribution of water supply like? Annotate the 2 maps to show similarities/differences, patterns etc. Be specific with place names



Reasons for increasing water consumption

There are 4 reasons why we are all using more water (careful, this is globally, not in the UK)

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Words you must include: economic development, population growth, lifestyle, demand for food, energy production

Exam question: explain how both physical and human factors influence the availability of water (6 marks).

Water availability - what affects it?

Geology:

Pollution:

Climate:

Limited infrastructure:

Over-abstraction:

Poverty:



Impacts of water insecurity - this causes the following problems:

1. Waterborne diseases and water pollution

In countries where water supply infrastructure is limited, there may be little or no sanitation. There may be open sewers (think Dharavi) and high levels of pollution in rivers and other water sources. Contaminated drinking water can cause outbreaks of life-threatening diseases such as cholera and dysentery. With a shortage of clean water, people may have to queue for a long time to obtain water from standpipes (imagine a community hosepipe where clean water comes out). This wastes time and reduces levels of productivity.

The River Ganges in India is an example of high levels of pollution in a river. It is 2520km long and the most polluted river in the world, contaminated by both human and industrial waste.

Annotate the below picture and map with information from the PowerPoint.



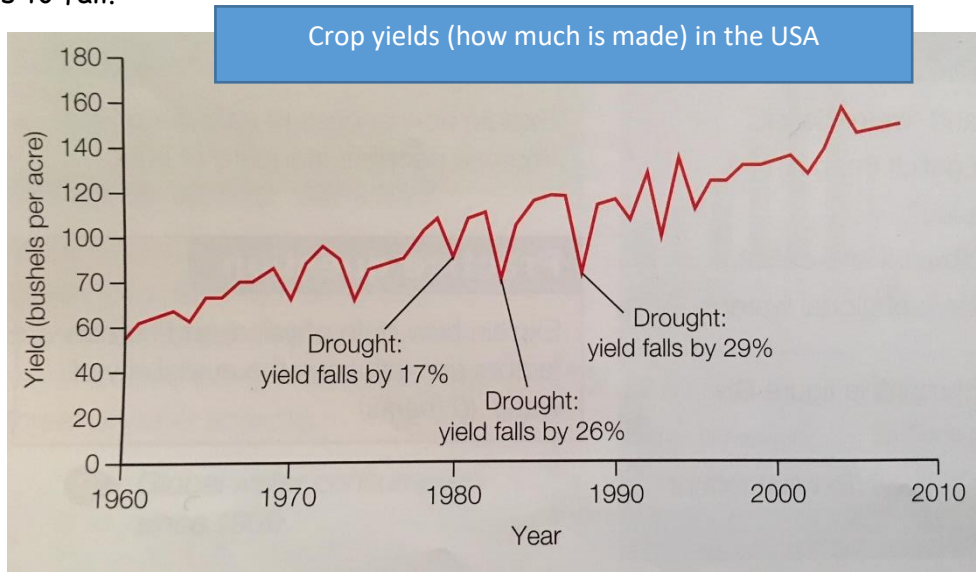
2. Food production

Agriculture (growing food) uses 70% of global water supply and suffers the most from water insecurity. Drier regions of the world, with unreliable rainfall, are most at risk.

Draught can cause crop yields to fall.

For example,

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3. Impacts on industrial output

The manufacturing industry (secondary sector) is increasing, especially in NEEs like India and China. This means that as industry grows the demand for water will increase, as industry needs water to function.

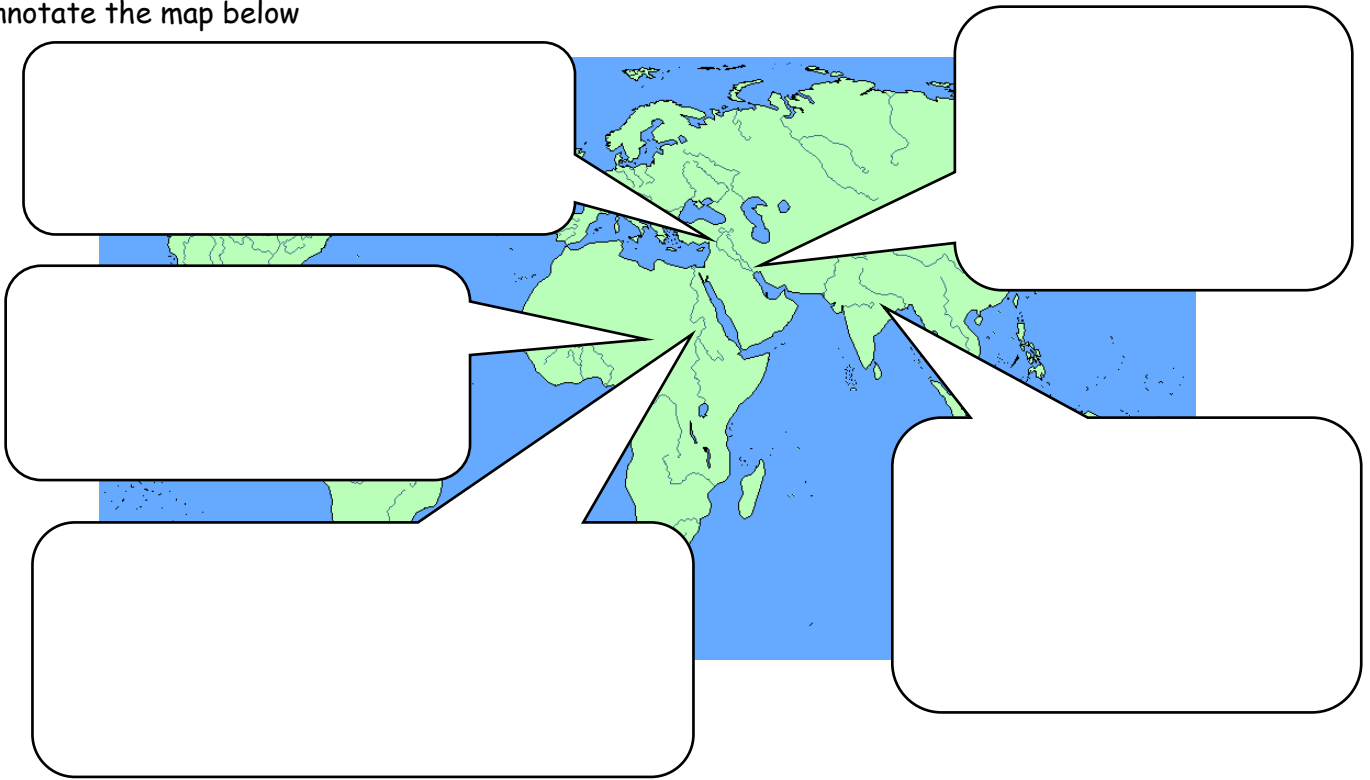
By Chinese industry will use of the country's available water. Water shortages means China loses through lower levels of production. Some factories have closed temporarily due to shortages. China's coal resources are one of the main drivers of the country's economy. Coal mining and power stations use 20% of China's water.

Use the following to fill the gaps: • water • 2030 • 33% • \$40 billion

4. Water conflict

In the past, wars were fought over oil supplies - in the future they may be fought over water. This is because water sources, such as rivers and groundwater aquifers, cross national borders. Many of the world's greatest rivers, such as the Nile (in northern Africa) and the Danube (in Europe), flow through several countries. Issues such as where to construct reservoirs and pollution can impact on more than one country, and create conflict.

Annotate the map below



Increasing water supply

The amount of fresh water available is limited. To make more water available means finding new resources or moving it from areas of surplus (where there is plenty) to areas of deficit (where there isn't much).

Using the information from p.280-281 of the textbook, complete the below table.

Ways to increase water supply	
Diverting supplies and increasing storage	Dams & reservoirs
Water transfers	Desalination

Sustainable water supplies

Definition

Sustainable water supply is

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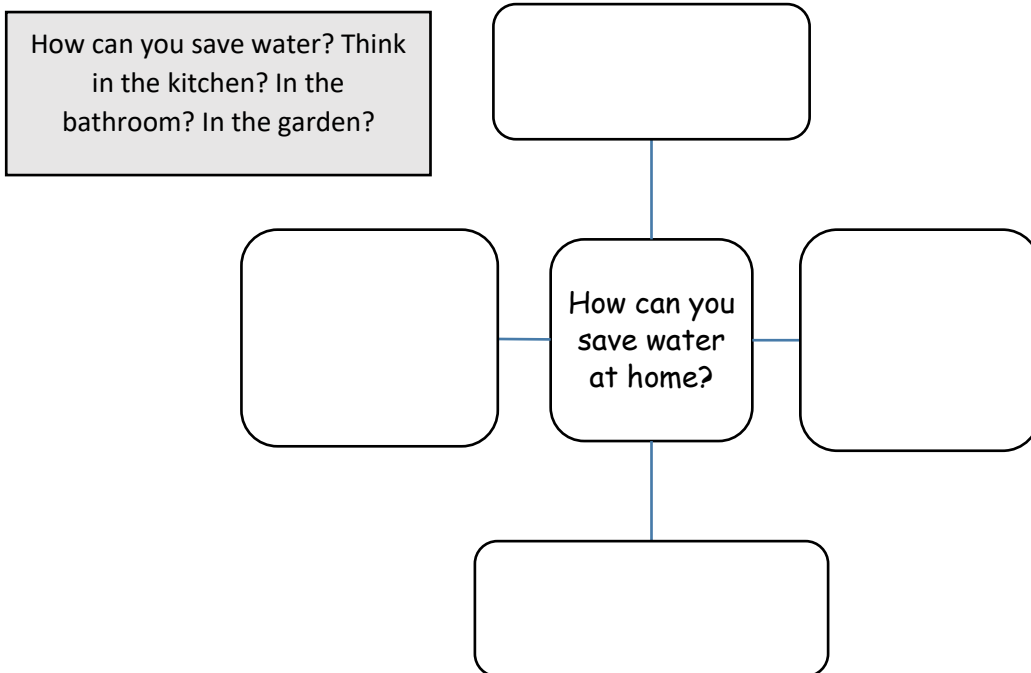
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There are three ways nations and people can try and be more sustainable with their water use & supply and these include:

1. Water conservation

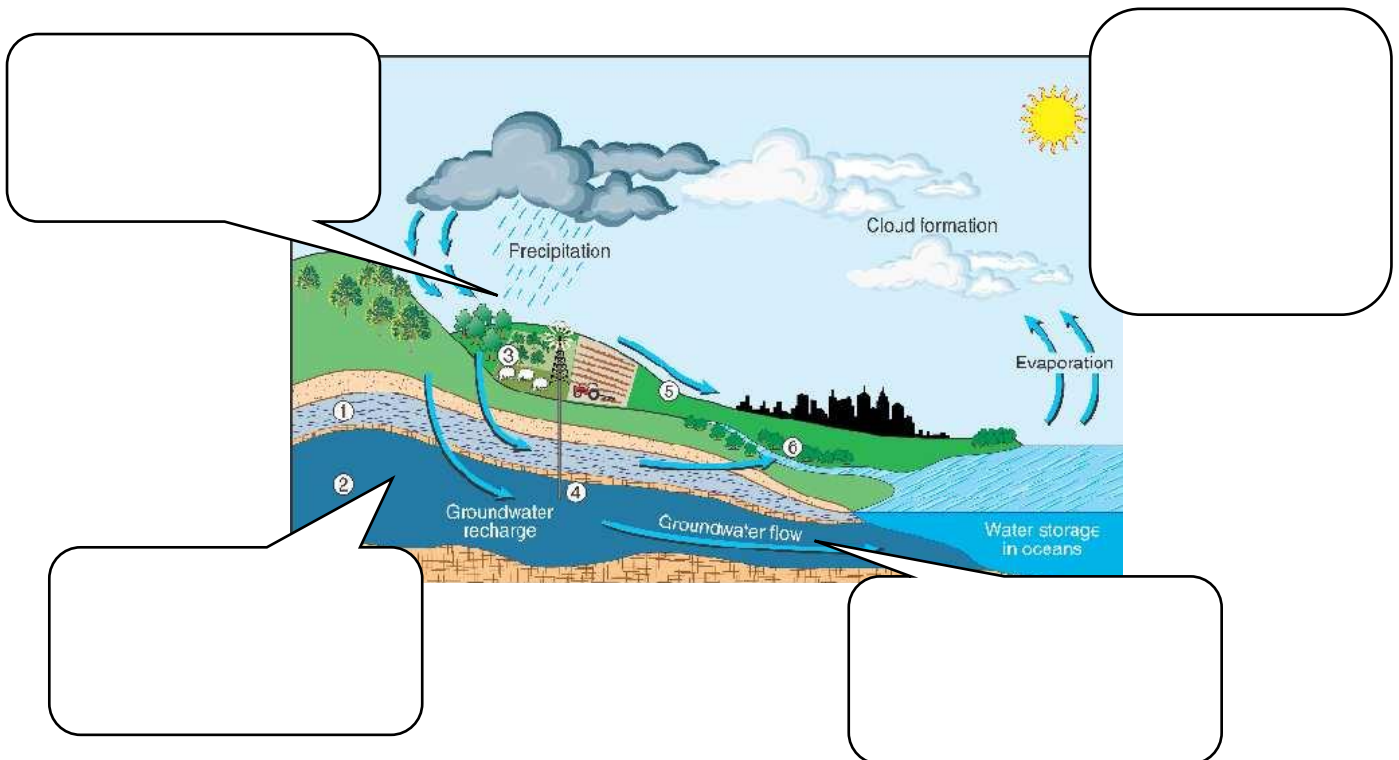
Water conservation can:

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2. Groundwater management

Use the points on the PowerPoint to link the information to the below diagram.



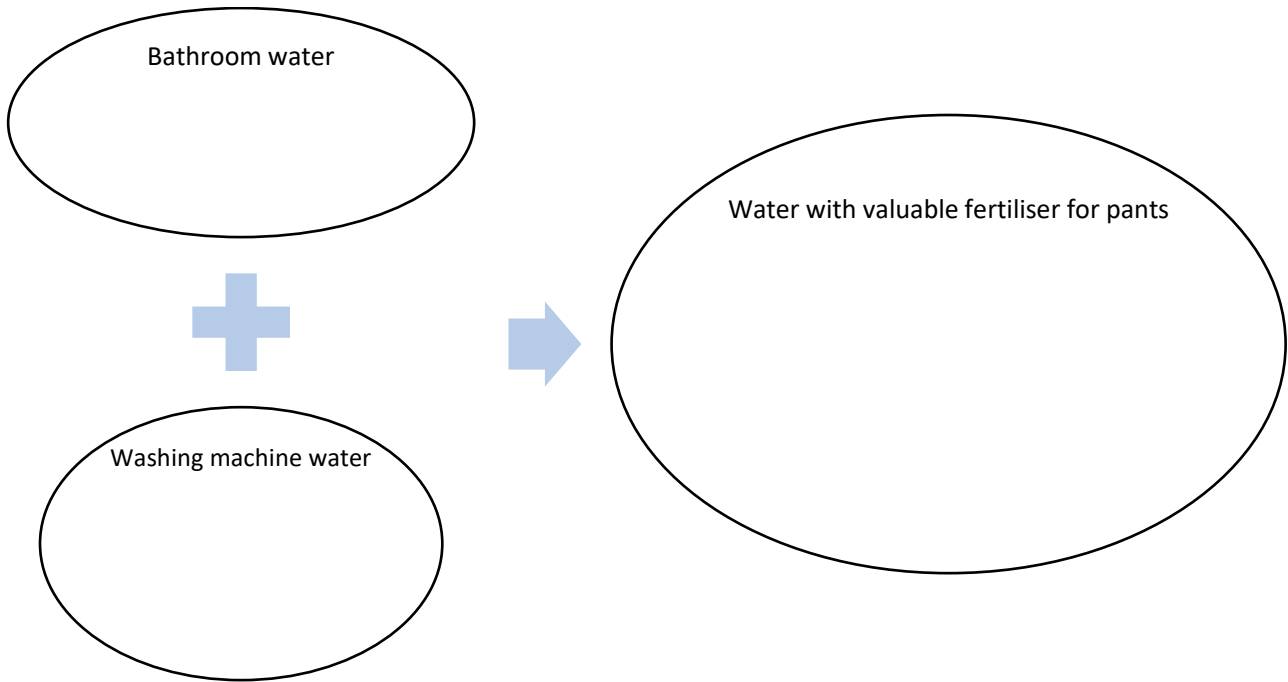
3. Recycling

Water recycling involves reusing treated domestic and industrial wastewater for useful purposes like irrigation (getting water to plants) and industrial processes.

Drawing	Example
	Large quantities of recycled water are used for cooling in electricity-generated and steel-making plants. In some Australian power stations recycled water replaces enough fresh water to fill Olympic sized swimming pools
	In Kolkata, India, sewage water is re-used for fish farming and agriculture. Sewage is pumped into shallow lagoons where sunlight helps algae to photosynthesise. This oxygenates the water so it can be re-used
	Some nuclear power plants e.g. in Arizona USA, recycled water is used for cooling.

4. Using grey water

Use the information on the PowerPoint to draw in the circles below to explain use of grey water



The Wakel River Basin Project - a local scheme to increase sustainable water supply

What are the issues with the water supply?

About the Wakel River Basin Project

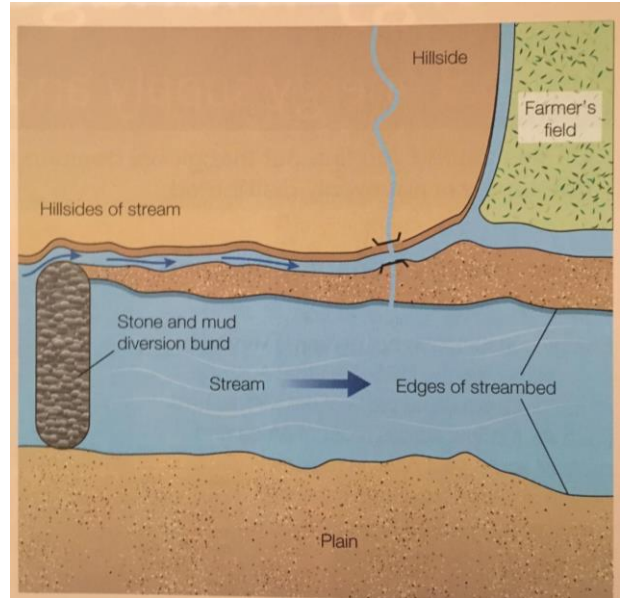
Increasing water supply



Rajasthan is a region in northern India. It is the driest & poorest part of India, and largely covered by the Thar desert. Summer temperatures reach 53 °C. Rainfall is less than 250mm a year, with 96% falling between June - September. There is little surface water and rain quickly soaks away or evaporates.

Increasing water supply

How a *pat* system works



Increasing public awareness and education

How does this system demonstrate (show) the importance of communities working together to reduce water security?

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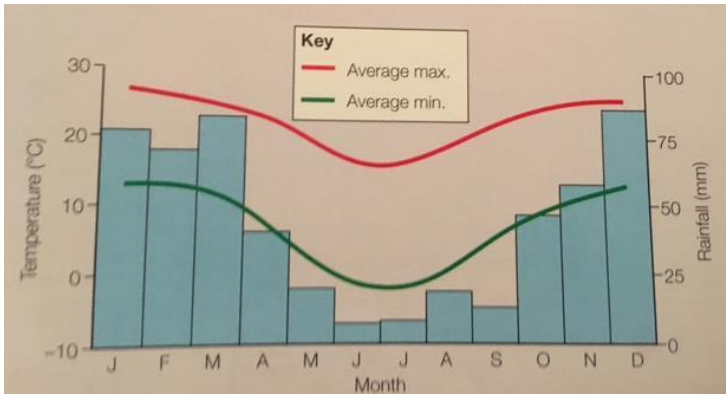
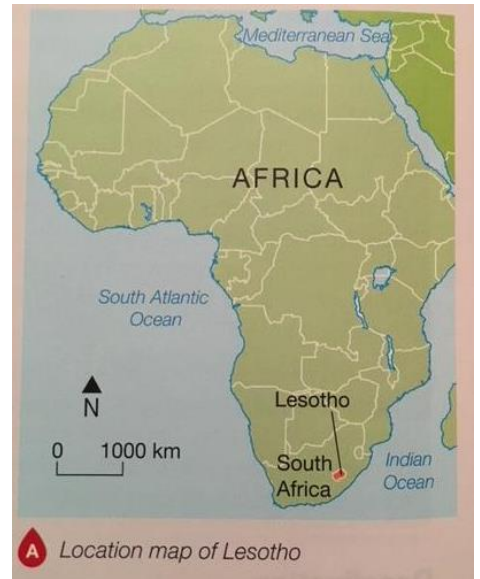
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The Lesotho Highland Water Project - a large scale water transfer scheme

About Lesotho (use figures A & B)



B The climate of Lesotho

Estimate the total annual rainfall for Lesotho _____ What is the mean? _____

What is the Lesotho Highland Water Project?

