THE DUSTON SCHOOL 4-19
Knowledge itself is power

Year 9 Geography Knowledge Booklet

Term 3

Investigating the Middle East

Name:

Class:

Geography

Geography

Enquiry Question:
Geography—The Middle East

Big questions that will help you answer this enquiry question:

BQ1: What is the Middle East?

BQ2: What are the climate and biomes of the Middle East like?

BQ3: What do hot deserts look like?

BQ4: How does human life exist in a hot desert?

BQ5 How does animal and plant life exist in hot deserts?

BQ6 + 7: What is desertification?

BQ8 + 9: How do we solve desertification?

BQ10: Why is the Dead Sea shrinking?

BQ11: Why is there issues over the use and need for water?

BQ12: Where is there conflict over water?

BQ13: Why do rivers in the Middle East flood?

BQ14 + 15: What is the importance of oil to the Middle East?

BQ16: What is the future of energy in the Middle East?

BQ17: Why is conflict happening in Syria?

BQ18: What are the effects of the Syrian conflict?

BQ19: What has happened to Syrian refugees?

BQ20: How are the UK and Middle East connected?

BQ21: What is the heroin trail?

BQ22: Is Dubai the next big tourism destination?

BQ23: Is Dubai a sustainable city?

BQ24 + 25: Should Qatar be allowed to host the 2022 World Cup?

BQ26: How is the UK involved in the war in Yemen?

BQ27: What is the Israel / Palestine conflict about?

The Middle East Topic — Key Words

Arid— a dry region that receives 10-30 centimetres of rain per year.

Asylum seeker— a person who has left their home country and is seeking safety in another.

Biome—a region of the planet that can be classified by the plant and animal life that inhabits it.

Biotic—the living components of a biome/ecosystem e.g. plants, bacteria and animals

Butte— a single hill or rock formation that rises sharply from a flat landscape, often in deserts.

Chaparral— a region characterised by hot, dry summers and mild, wet winters with evergreen shrubs, bushes and small trees.

Climate— the average weather over a long period of time, usually 15 years.

Consumer—an organism on the food chain that depends on producers (photo synthesizers) for food.

Desertification— the rapid depletion of plant life and topsoil, often associated with drought and human activity such as intensive farming.

Diurnal range— the difference in temperature between the hottest and coldest parts of the day (day and night)

Drought— an extended period of time with below average rainfall that leads to a shortage of water

Enhanced greenhouse effect— the process of more heat being trapped in the atmosphere due to an excess of greenhouse gas emissions from human activity such as burning fossil fuels.

Ephemeral— means short –lived and often refers to rivers that only flow after precipitation.

Equator- the imaginary line around a planet running east-west along across its middle from the centre of rotation

Erosion— the wearing away of rocks often by water, wind and ice.

Export— goods or services traded to another country

Finite— something with limited supply

Freeze-thaw weathering - weathering of rocks by the repetitive action of water freezing in cracks and expanding.

HDI— Human Development Index, a development indicator that is composed of life expectancy from birth, mean/expected years of schooling and GNI per capita.

High pressure—a weather system with descending air, often associated with clear skies and cool weather.

Humanitarian- related to relief, aid and supporting of others in need.

Impermeable— a surface that does not allow for the infiltration of water

Import— purchasing goods or services from another country

Infiltration— the movement of water into and through soil

Infrastructure—the structures and facilities necessary for the functioning of a society such as roads and railways.

Interdependent— two or more individuals or societies that depend on one another.

Irrigation— watering the land, usually for agriculture by artificial means

Landlocked— a country or region without access to the oceans

Low pressure—a weather system caused by rising air and is associated with storms, cloudy weather and heavy rainfall

Mesa— a broad, flat-topped landform with steep sides

Pastoralists—a farmer of cattle

Precipitation— moisture that falls from the sky in the form of rainfall, sleet, hail, snow and fog.

Rain shadow— an area of dry/drier land found beyond a mountain due to relief rainfall drying the air before reaching it.

Refugee— someone fleeing their home due to a risk to life from issues such as natural hazards, political instability and war.

Relief—can refer to the height and shape of the land *or* assistance given to those in need

Renewable— something that is infinite or can replenish itself faster than it is used by people

Rock pedestal— mushroom shaped rock landforms created by aeolian (wind) erosion.

Stakeholder— an organisation or someone with a vested interest in something

Sustainability— the use of resources in a way that they will never be exhausted

Trade winds— known as the easterlies, permanent east to west winds found in equatorial regions, caused by the Coriolis effect.

Urbanisation— the process of increasing the proportion of people living in the city compared to the countryside

Wadi— a deep channel or canyon that is often dry except during flash floods

Water deficit— where water consumption exceed water supply

Weathering— the breaking down or dissolving of the Earth's surface

Xerophytes— plant species that are specially adapted to living in environments with little liquid water such as hot deserts and snow covered mountains.

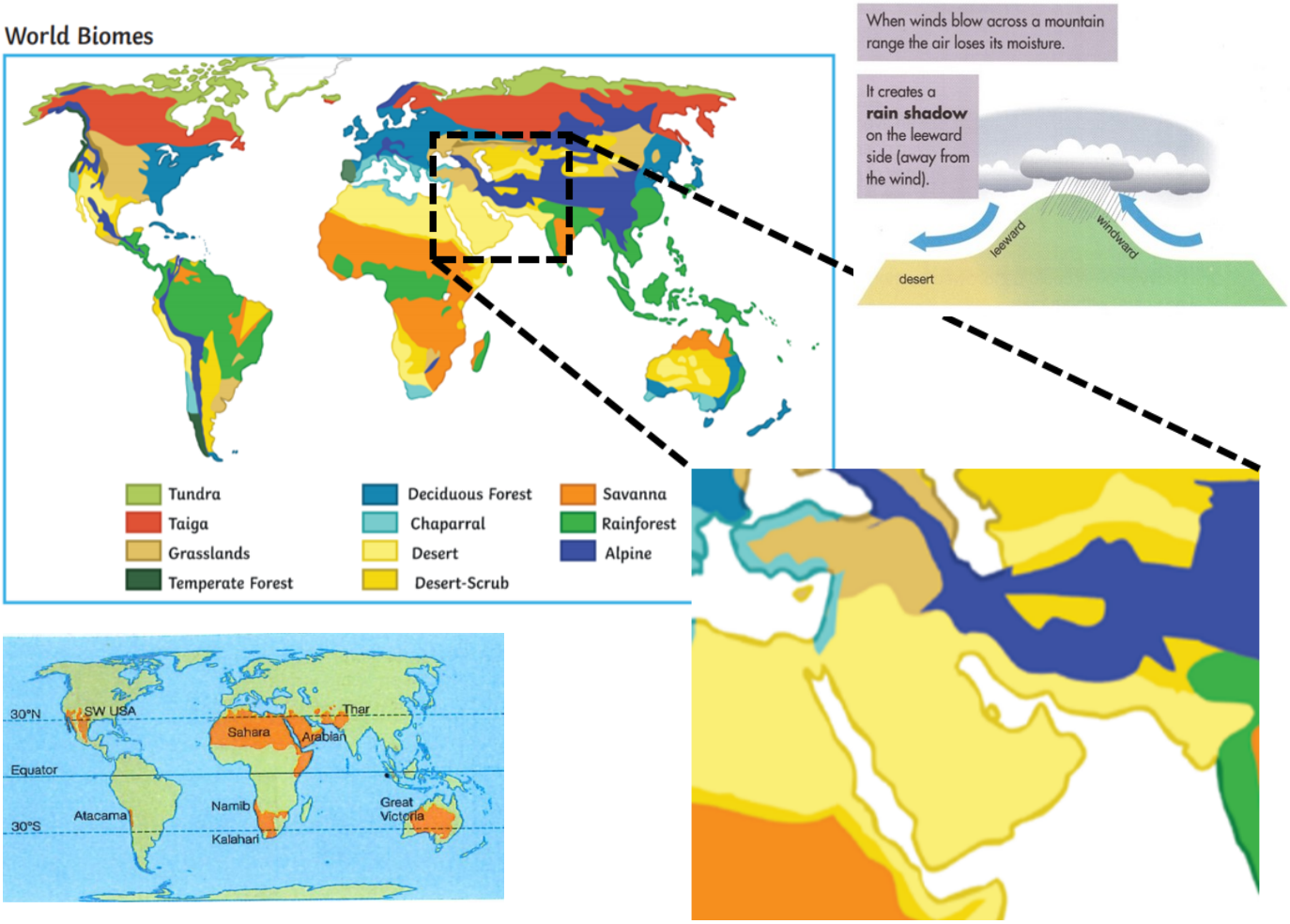
The Middle East—Location and Biomes

The Middle East is a transcontinental (crosses multiple continents) region that includes parts of Western Asia, Eastern Europe and Northern Africa.

The climate varies across the region due to a wide range of latitudes and topography types but most Middle Eastern countries fall into desert, chaparral or alpine biomes.

Much of the Middle East region is desert because of its latitude. Being close to 30 degrees north means that the is often a high pressure weather system with cool, descending air that brings dry weather and clear skies. Being between this region and the equator means having the dry, trade winds blowing across the landscape.

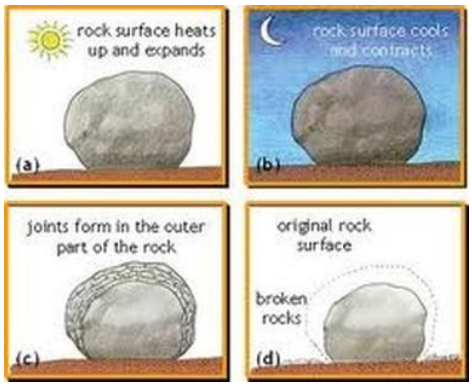
The Arabian and Thar deserts are also at least partially created by the rain shadow effect, shown below.

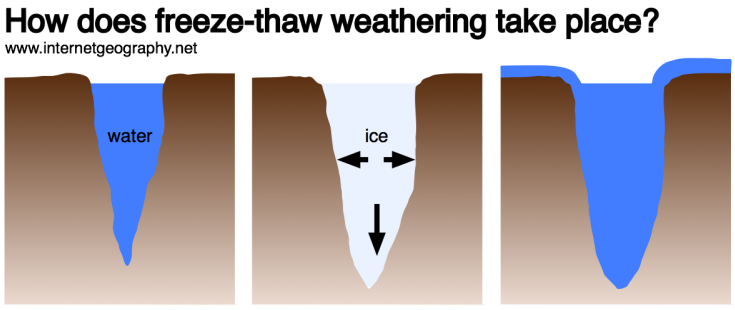


A map showing the global distribution of desert biomes in relation to the tropics and equator.

Desert Processes

Exfoliation weather-





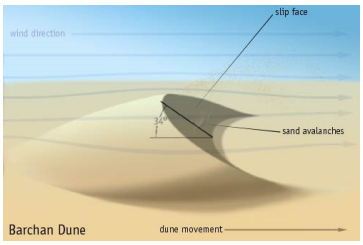
Water enters cracks in the rock. Temperatures fall at night, causing water to freeze. When water turns to ice it expands by ten percent. This puts pressure on the rock, prising the crack apart. The ice melts, water seeps deeper into the crack and freezes again. Over a period of time large blocks of rock can be shattered by repeated freeze-thaw weathering.

Erosion processes

Erosion is the wearing away of land by wind, water and ice. In desert environments the wind is the most significant cause of erosion. The winds carry sand and dust that scours the surface of rocks much like using sandpaper or a sand blaster would. This is called aeolian erosion.

Desert Landforms—Erosion, weathering and deposition

Rock pedestals—mushroom shaped formations formed by winds eroding the base of the rock.



Barchan dunes—curved dunes formed by wind transport and deposition

Mesa—large, flat topped hill with steeply sloped sides.

Wadi—a river channel/valley with an ephemeral river and is often dry.

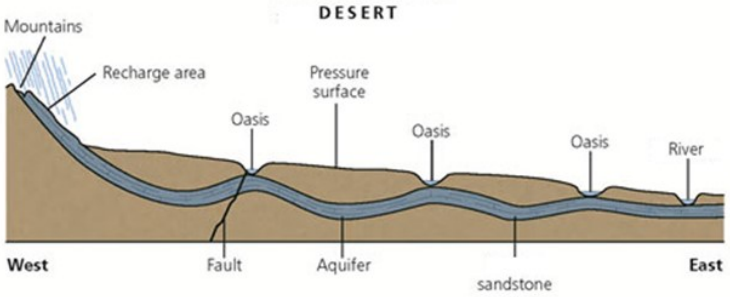
Butte -A hill with steep, often nearly vertical, sides and a relatively falt top.

Mesa or butte?

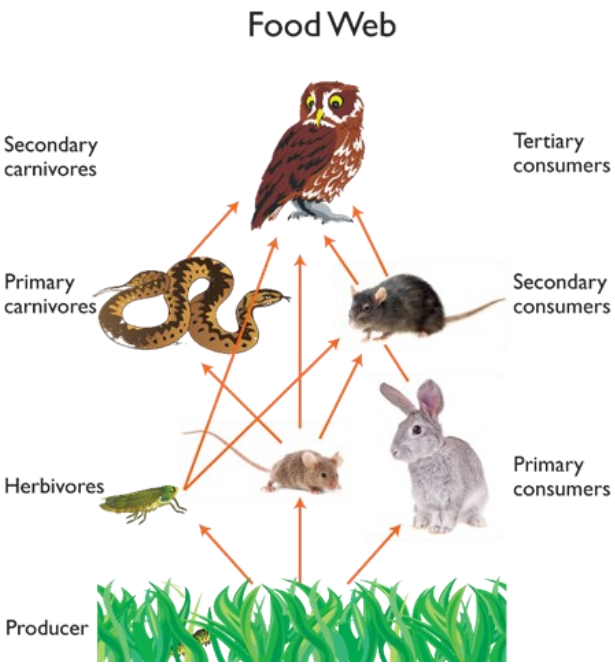
Buttes were once part of flat, elevated areas of land known as mesas or plateaus. In fact, the only difference between a mesa and a butte is its size. Most geographers say a butte is taller than it is wide, while a mesa is a much larger, slightly less elevated feature.

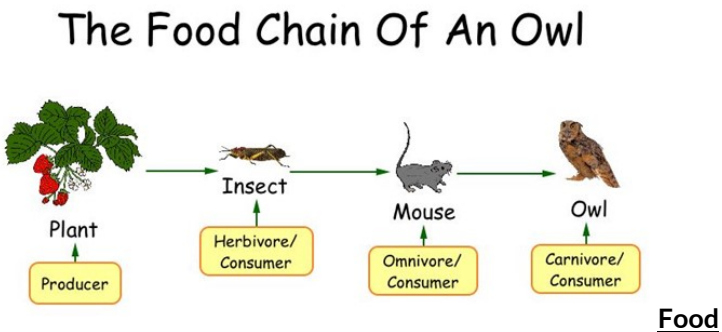
Oases

Desert areas where water is naturally forced to the surface by impermeable rock layers moving closer to the surface. Water flows through the sandy soil from wetter regions but cannot percolate through the impermeable rocks below.



Middle East Ecosystems





Food Chains vs Food Webs

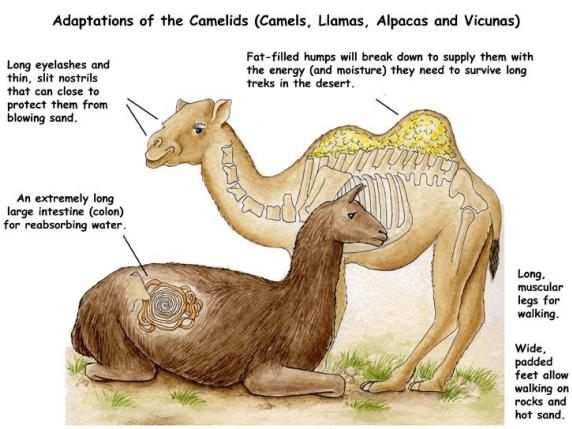
Food chains show a simple, linear process of consumption from plants (producers) photosynthesizing, being eaten by herbivores or omnivores and finishing with a carnivore (often an apex predator). In reality food chains are too simplistic and imply single lines of predation/consumption. Food webs show a more realistic relationship between wide varieties of species and how can be interdependent.

Food chains and webs can be used to show how ecosystems can be disrupted by natural and human events such as droughts causing a loss of plant cover that might cause a food web collapse or humans introducing a new species such as rats to an island that would outcompete other species and

Plant and animal adaptations

Plants and animals that are able to survive in arid/desert conditions are called xerophytes. They have developed special adaptations to overcome the challenges of living in these environments. Living in these environments requires that the plants and animals can cope with extreme diurnal temperatures, a lack of consumable water, a scarcity of food, extreme heat and brightness and infrequent, unpredictable precipitation. Some plants and animals are migratory or ephemeral, choosing only to live or grow in these locations when conditions are better.

Cacti are synonymous with arid environments. Most cacti have the ability to expand and contract, when rains fall their shallow, wide reaching roots quickly absorb as much water as possible. The water is stored inside the cacti and it can swell in side to store as much as possible .This store of water would be attractive to consumers so cacti protect themselves with spines formed from what would normally be leaves on other types of plant. Cacti often also produce toxins that would poison animals that ate or drank from them.



Plants in less extreme climates can grow quickly , losing some leaves to herbivores is not an issue for them. Desert plants often grow incredibly slowly and are unlikely to survive damage from herbivores so put a lot of energy into protecting themselves. Thick, wavy coatings over the cacti help to prevent loss of water through evapotranspiration meaning that they can store water for long periods of time where it might not rain for many years.

There are no species of cacti that live in the Middle East but many plants that live in these regions have similar adaptations.

Desertification—causes and solutions

Desertification is the process by which fertile land becomes desert, typically as a result of drought, deforestation, or inappropriate agriculture.

Causes of desertification

Desertification can be a naturally occurring event. Prolonged droughts and increasing aridity can cause plants to die off, leaving the soil susceptible to drying out and blowing away. However humans activities are greatly exacerbating desertification and accelerating the rate that it is happening at.

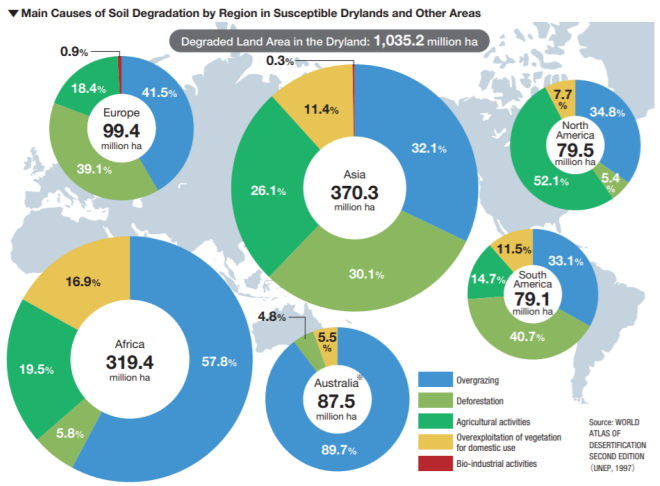
Farming in particular is increasing desertification rates. Farmers cut trees down to make space for more farmland. These trees previously would have sheltered the land from the sun and also helped to trigger rainfall through evapotranspiration. Removing the trees results in less rainfall and more evaporation of water from the ground. Deforestation is also occurring to supply timber for construction, manufacturing and as firewood to fuel homes.

Farmers may also extract water from the ground and rivers in unsustainable amounts, causing the supply to run low and increase desertification. Farmers are also switching from what were often small scale, traditional and more sustainable farm and forage methods to intensive, year round farming that depletes the soil of natural minerals and fertility more rapidly. This results in a loss of plant cover that can cause the ground to dry and soil to blow away.

Due to the enhanced greenhouse effect and climate change extreme weather events are likely to occur more often and with more severity. Over the coming century more frequent, longer and severe droughts will accelerate desertification processes around the world.

As human populations grow in areas prone to desertification these effects will increase in severity unless action is taken.

Long **droughts** dry out temporary surface water storage bodies like oases, seasonal rivers and lakes.	Reduced rainfall decreases water available for plant growth. When the roots die the soil is easily eroded.	Excessive use of irrigation water causes **salinization**, where water brings salt to the surface.
Large herds of cattle can compact the top soil layer, making it hard for water to penetrate/infiltrate.	**Deforestation**. Logging to provide fuel wood for local communities and their growing populations.	Excessive water consumption in tourist areas means groundwater and surface water stores become depleted.
Logging leaves top soil at risk of erosion from natural rainfall events, **surface run off** can carry away the fertile layer.	Destruction of the soil by poor farming methods (ploughing too deeply and over use of pesticides and fertilisers).	Population growth puts pressure on scarce farmland leading to overgrazing and cultivation.
People in rural desert communities rely on fuel wood for cooking due to the remoteness of settlements.	**Urbanisation** and building of roads and infrastructure increases surface run off and soil erosion.	Global temperatures are expected to rise, which results in more water evaporating from plants and surface water (lakes and rivers).
Reduction in **nomadic** lifestyles in the Sahel has meant cattle and goat herds stay in one place, resulting in overgrazing.	Incorrect irrigation is commonly used in poorer areas. Farmers are using canal irrigation which causes a build-up of salt in the soil.	Desertification is occurring in the Sahel region because farmers are using the **slash and burn** method to clear land for crops. This degrades the quality of soil.



Top Down Solutions to Desertification

Top down solutions are those that are run by the government using money from taxes or loans. These large scale schemes are often expensive and usually focus on providing the largest benefit to high density, urban populations of tax paying citizens.

To help tackle desertification governments may wish to build dams that aim to store large quantities of water for irrigation and drinking water. These schemes tend to be expensive and can have their own negative environmental impacts. In developing countries the costs of dam construction may come from loans , debt that they may not be able to afford, especially if the dam does not help to tackle the issues faced across the country.

Bottom Up Solutions

Bottom up schemes are much smaller scale, community based solutions. They are often funded by local communities or by charitable organisations.

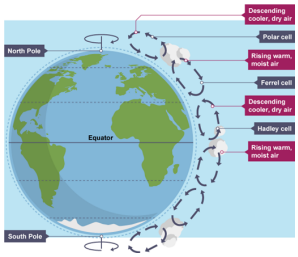
After consulting the needs of the local community they will work to provide quick, cheap and sustainable methods of supporting them.

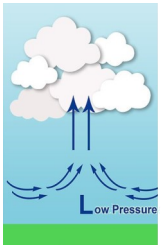
Planting tree seedlings and shielding them with earthen mounds can help to limit or even reverse desertification can be a cheap and effective solution. However, convincing an entire community to give up short term benefits for potentially unknown long term rewards can be challenging and not all communities will be in favour of them.

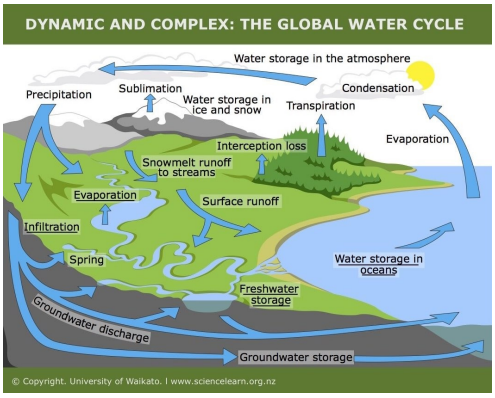
Flooding in the Middle East

Causes of flooding

Flooding is often triggered by intense or prolonged rainfall. Intense rainfall is causes by low pressure weather systems. As the ground is heated it causes the air to rise rapidly, drawing in more air from the surrounding areas. As the air rises it cools and any moisture in the air condenses to form clouds and then rainfall. However, low pressure weather systems are uncommon in the Middle East as the region sits under the descending, high pressure air of the Hadley cell or dry trade winds that are more commonly associated with clear skies and dry weather.







Urbanisation

Normally precipitation takes a variety of routes to rivers, lakes and oceans. Some might be absorbed and evapotranspirated by trees, remain in surface storage, flow overland or through the soil and rocks.

In an urban environment there is less vegetation to allow for evapotranspiration and surfaces are often impermeable. This limits the ways that water can reach lakes and oceans. More of the water will flow over the land and through drainage systems, reaching rivers much, much more quickly than it would naturally. This sudden arrival of a large volume of water may result in a flood.

As human population continues to grow and more people move from the countryside to urban environments this is likely to become a more significant issue for the Middle Eastern region.

Relief

Relief is the height and shape of the land. Steep slopes make overland flow much more likely as it is difficult for water to infiltrate at steep angles. This water flows more quickly over land and reaches the river quickly causing discharge to spike up and result in flooding.

Sustained Rainfall or Intense Dry Periods

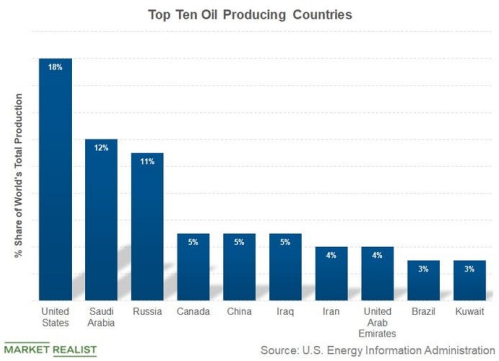
If there has been a prolonged period of rainfall the ground becomes saturated and unable to take up more of th water. This results in overland flow and increases flooding risk as described above. This effect can occur as flash flooding when it rains heavily (intense) and quickly saturates the ground Equally intense dry periods may cause the ground to become hard and impermeable preventing infiltration and encouraging overland flow as well.

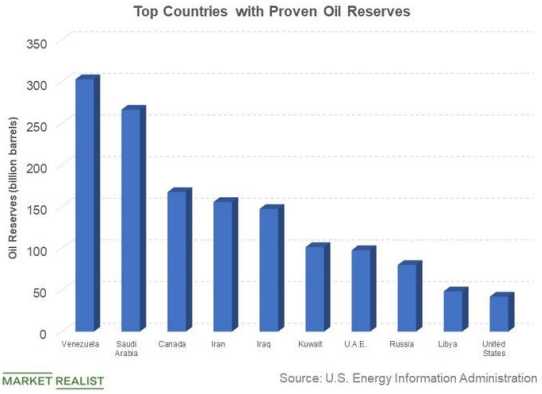
Primary Impact vs Secondary Impacts

In geography we often categorise impact of an event into **primary** and **secondary** impacts. Primary impacts are those caused directly by the event. In the case of flooding this may include drowning people, destroying home and crops. Secondary impacts are those that occur as a result of the primary impacts, in the case of flooding secondary impacts may include homelessness caused by housing destruction and starvation

The Middle East, Oil and Climate Change

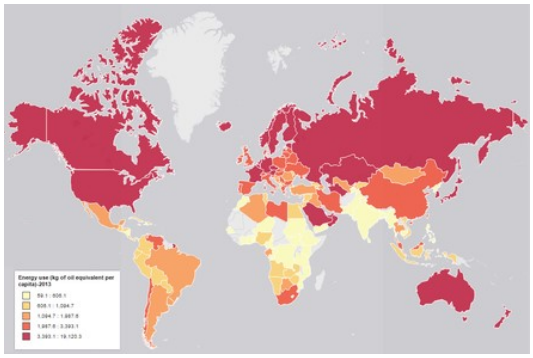
A bar chart showing the top ten oil producing countries by share of total produced. 5 of the top 10 countries are Middle Eastern.





A bar chart showing the total oil reserves (how much oil they have left) by country. 5 of the top 10 reserve countries are Middle Eastern.

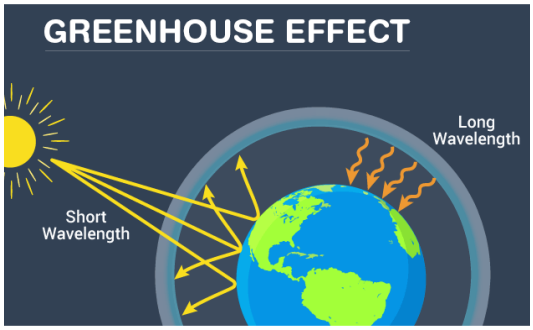
Middle Eastern countries are some of the world's biggest producers of oil and have some of the largest remaining stores. This provides these countries with a lot of resource wealth that, in many cases, has helped that country to develop more rapidly. In some cases this valuable resource has been a curse and caused conflict in the region.



Extracting oil is an energy intensive process and results in large amount of fossil fuel consumption. Cheap, locally available oil supplies also encourages more consumption of energy resulting in a higher consumption of oil per capita than many other countries in the world.

When fossil fuels are burned they produce carbon dioxide, one of many greenhouse gases that help to cause further global warming.

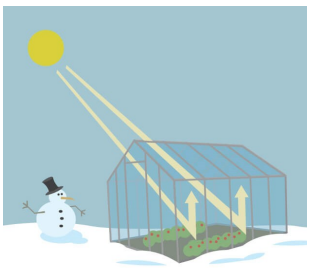
In a real greenhouse the panes of glass allow sunlight through which warms the soil and plants inside. This heat is infrared radiation which cannot easily pass through glass like visible light does. This means that the heat is trapped and it keeps the inside much warmer than it would otherwise be.

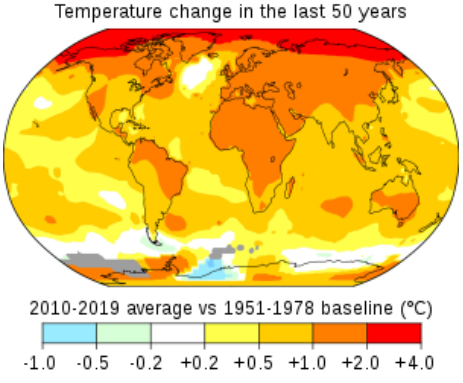


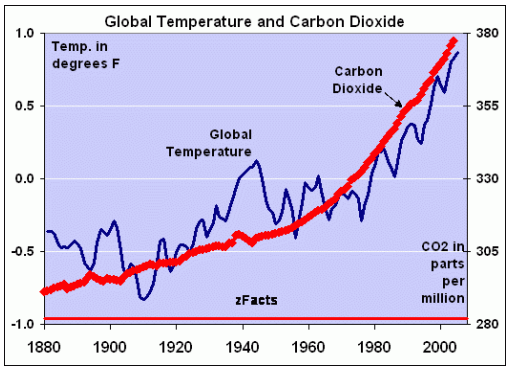
Our atmosphere works much like a greenhouse but instead of panes of glass we have greenhouse gases that let light through but act as a blanket, trapping heat energy on Earth.

When sunlight penetrates our atmosphere and warms the air and surface of the planet it converts to infrared radiation which has a longer wavelength. This longer wavelength energy is absorbed and reradiated back to Earth. Burning more fossil fuels leads to more carbon dioxide, more carbon dioxide means more heat is trapped and the Earth, on average, gets hotter.

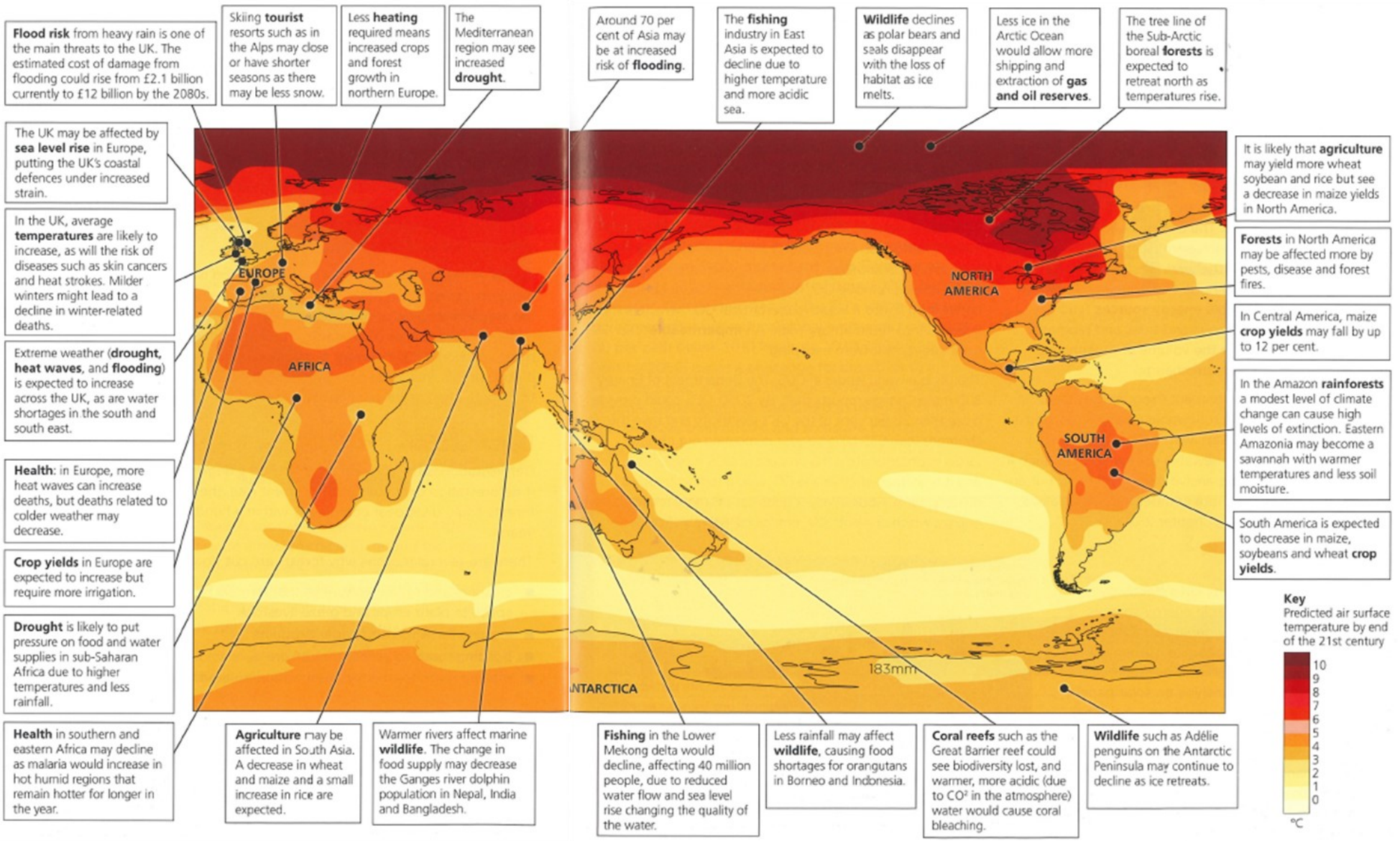
The reliance on oil is also and economic challenge for Middle Eastern countries. Whilst this valuable resource is able to provide money now it will eventually run out and many Middle Eastern countries rely on oil as their main source of income. 42% of Saudi Arabia's GDP and 90% of its export earnings come from oil. These nations will need to rapidly transition to other sources of income by retraining and educated their populations to perform new, desirable and well paid jobs.







Global Impacts of Climate Change



Homework 1: Spelling Test

Instructions: You will be given a list of 10 key terms that will be used with this topic.

1. Write the definition for each term .
2. Write the word within a sentence.
3. Practice spelling the word.

You will be tested on these spellings and your understanding of what the words mean.

Due date:

Spellings

Climate

Drought

Desert

Biome

Weathering

Diurnal Range

Ecosystem

Bedouin

Oases

Desertification

Homework 2: Desert Landforms

Produce a series of diagrams/storyboards with detailed, step by step explanations for how the following landforms are created:

- Mesas
- Rock Pedestals
- Barchan dunes

You will need to use the internet or library books to help with this task.

Due date:

Homework 3—Revision for Mid Unit test

Instructions: Revise for a mid unit test.

You will be tested on the information and knowledge you have gained so far.

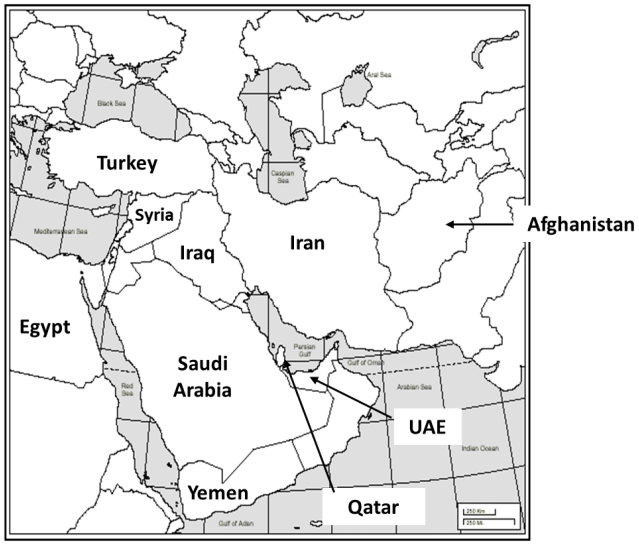
Please use this knowledge organiser and the questions in your homework booklet as a clear focus for your upcoming mid unit test. Your teacher will tell you what pages to focus on.

Due date:

Homework 4: Geographical Literacy

Instructions: Using the map below you need to learn the spelling and location of 10 countries in the Middle East.

- You should practice on the three blank maps in your homework booklet for a quick quiz in lesson where you will be given a blank map and 10 minutes.
- One mark for location, one mark for spelling. There will be house points rewarded for high scorers!



Due date:

Homework 5—Geographical Skills Practice

Country	Gallons of oil consumed per capita per year.	GDP per capita ($)
USA	934	63,000
China	138	9,700
India	51	2000
Russia	383	11,300
Saudi Arabia	1560	23,300
Cambodia	46	1,500
Benin	50	900
UK	366	42,900
France	404	41,400

1) Produce a scatter graph to show the relationship between GDP per capita and oil consumption using the data provided.
2) Draw a line of best fit on your graph. Ask your teacher for help and use online guides to understand how to do this.
3) Describe the trends and any anomalies that you see on the graph.
4) Create a spider diagram or list showing other factors that might influence how much oil a country consumes per capita than just GDP/wealth.

Due date:

Homework 6—Revision for End of Year test

Instructions: Revise for a end of topic test.

You will be tested on all aspects of your Middle Eastern knowledge from **this topic**. Please use **all of** this knowledge organiser and the questions in your homework booklet as a clear focus for your upcoming test.

Due date:

Reading lists