

13.1 Why do we need to understand why volcanoes and earthquakes occur?

Creating fact files for a volcanic eruption and earthquake

Fact file: Volcan de Fuego, Guatemala

Location: 14.4747° N, 90.8806° W



Dates of eruption: Small eruptions since 2002; major eruption on 3 June 2018; another eruption on 23 September 2021

Impact: In 2018, 165 people were killed; volcanic ash spread over a 19 km radius of the volcano; more than 3,000 people evacuated; destruction of 8,500 hectares of corn and coffee crops.

Type of plate boundary: Destructive – the Caribbean Plate is moving over the Cocos Plate, which is being subducted.

Fact file: Southern Türkiye, near the city of Gaziantep, and Northern Syria

Location: Southern Türkiye, near the city of Gaziantep, and Northern Syria



Date of earthquake: On 6 February 2023, at 4.17 a.m., a 7.8 magnitude earthquake occurred. Nine hours later, a 7.5 magnitude earthquake occurred, followed by over 200 aftershocks.

Impact: More than 50,000 people killed; millions left homeless; over 214,000 buildings collapsed; 4,300 aftershocks, complicating the rescue effort.

Type of plate boundary: Convergent

13.2 Do continents fit together like a jigsaw puzzle?

Alfred Wegener's theory of continental drift

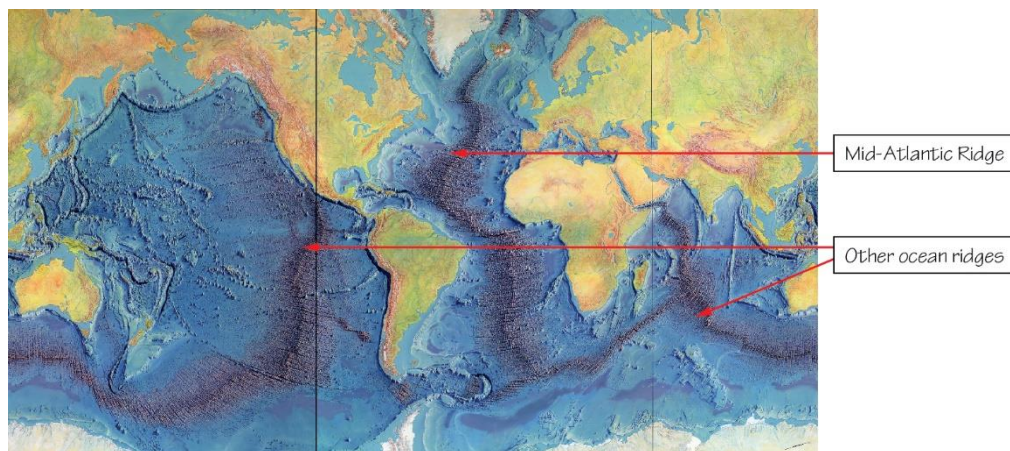
1 Example answer:

Wegener proposed that there was once a supercontinent called Pangea, which split into different continents. These continents have been drifting apart and together for millions of years. Wegener supported his idea with evidence from fossils, geology, mountain ranges and glaciation.

13.3 Where are the world's earthquakes, volcanoes and mountain belts?

Tharp and Heezen's discoveries about the ocean floor

2



© Marie Tharp, Bruce Heezen and Heinrich Berann/Lamont Doherty Earth Observatory

3 Example answer:

Tharp and Heezen showed that there were ridges and trenches on the ocean floor, which led to Harry Hammond Hess publishing the theory of sea floor spreading. This supported Wegener's theory as it suggested that plates were moving.

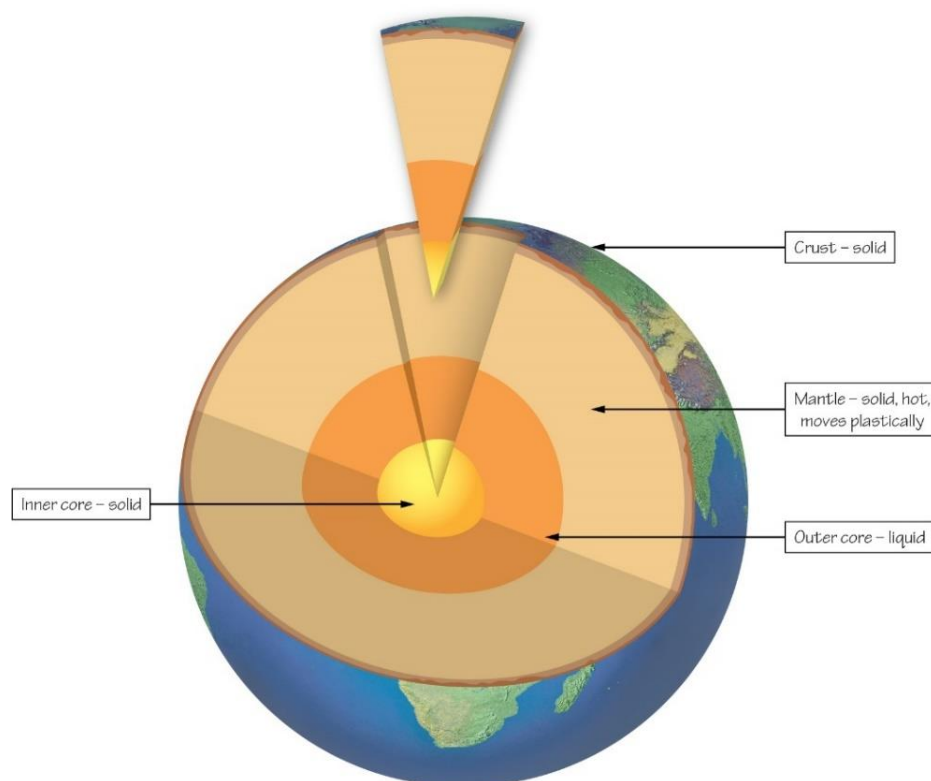
13.4 What is happening beneath our feet?

The theory of plate tectonics

- 2 The Earth is made up of several layers. The outer layer is one of the Earth's spheres; it is called the lithosphere. This layer has a thin layer of rock on top; it is called the crust. This layer is 5–30 km thick. The next layer is much thicker; it is called the mantle. The rock here is made of magma, which is soft and moves plastically. When pressure is reduced, this rock becomes liquid and can erupt on the surface as lava, forming volcanoes. The next layer is called the outer core; here material is in a liquid state. The layer at the centre of the Earth is called the inner core. This is the hottest part of the Earth.

The outer layer of the Earth is made up of slabs that sit on top of the mantle; they are called plates. There are two types: oceanic plates, which are 50–100 km thick, and continental plates, which are thicker – up to 200 km thick. These slabs of crust are constantly moving and meet in various ways along their edges at plate boundaries. This is where most volcanoes, earthquakes and mountain belts occur.

3



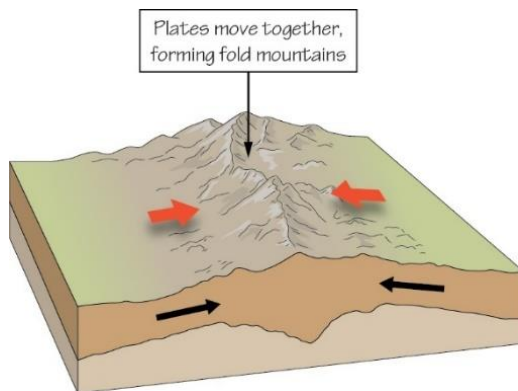
13.5 What happens at plate boundaries?

Types of plate boundary

Type of plate boundary:

Convergent/destructive

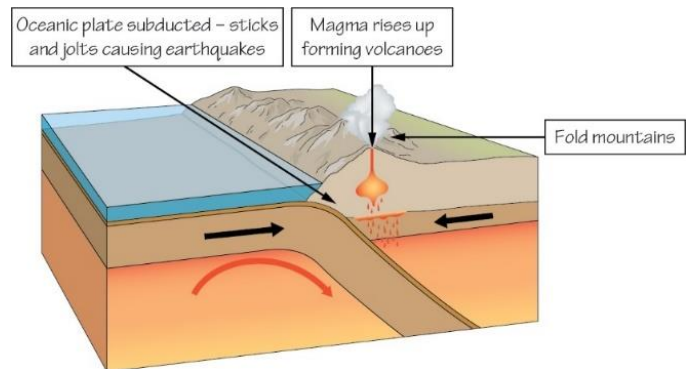
Example: Himalayas, where the Eurasian and Indian plates meet



Type of plate boundary:

Convergent/destructive

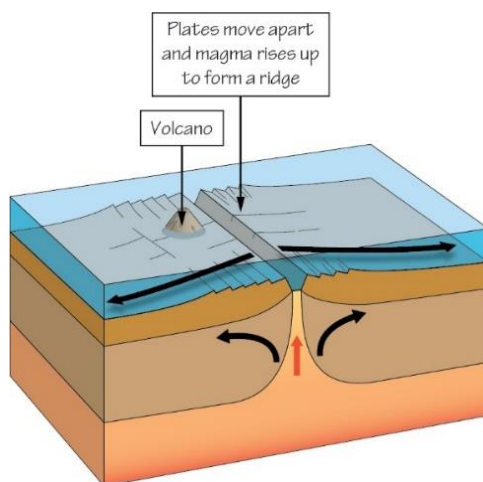
Example: The Nazca and South American plates meet in this way



Type of plate boundary:

Divergent/constructive

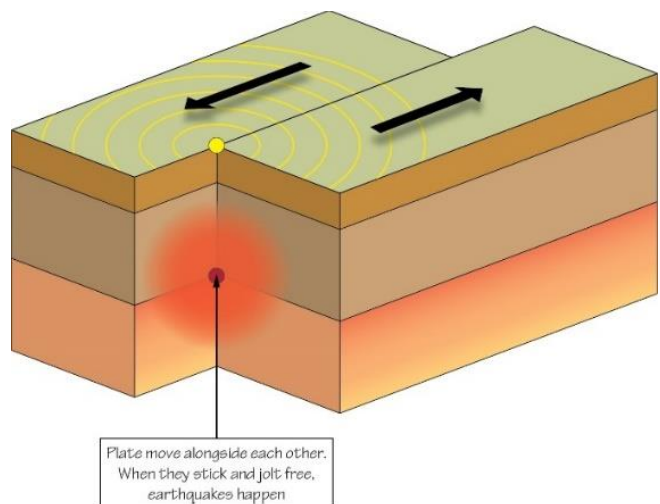
Example: Mid-Atlantic Ridge, where the Eurasian and North American Plates move away from each other



Type of plate boundary:

Conservative/transform

Example: San Andreas Fault, where the North American and Pacific Plates meet



13.6 What do we know about earthquakes?

Researching about earthquakes

1

Beginnings	Endings
An earthquake is	is called the epicentre.
The location below the Earth's surface where the earthquakes start	waves of energy caused by the sudden movement of the plates.
The area on the surface directly above the focus	along fault lines.
Seismic waves are	a sudden violent movement of the Earth's surface.
When an earthquake occurs, plates slide	mainshock; it is always followed by after shocks.
The largest main earthquake is called the	reduces the further away it is from the focus.
The power of the earthquake	is called the focus.

Answers to 2, 3 & 4 will depend on when the search is carried out and the chosen earthquake.

Example answer:

Fact file: Jishishan earthquake, December 2023

Location: Gansu, China 36.0594° N, 103.8263° E

Date: 18 December 2023

Epicentre: Linxia Hui Autonomous Prefecture

Type of plate boundary: Convergent (collision) – two continental plates meet

Plates: Australian and Eurasian

Impact on people: 149 deaths, 982 injuries and two missing people were reported

Similarities to Nepal 2015 earthquake:

- Both earthquakes were in Asia.
- Both earthquakes were caused by faulting at a collision boundary involving the Eurasian plate.
- Both earthquakes affected densely populated areas.

Differences from Nepal 2015 earthquake:

- Magnitude was less in Jishishan (5.9–6.2).
- Jishishan earthquake was caused by the Australian plate colliding with the Eurasian plate, whereas the Nepal earthquake involved the Indian plate.
- Far fewer deaths in Jishishan.

13.7 Can people living in earthquake zones manage risk?

Create a public information poster preparing people for an earthquake

This task requires students to produce a poster to let people in a chosen country know how to prepare for an earthquake. Posters should include:

- The name of the country.
- A catchy title to hook people in, for example, 'Drop, cover, hold on'.
- Appropriate use of colour and fonts in the design.
- Photos and diagrams to provide the guidance; for example, a clipboard checklist of things for people to do before, during and after an earthquake.

The best posters will include information which is specific to the chosen country and show evidence of research.

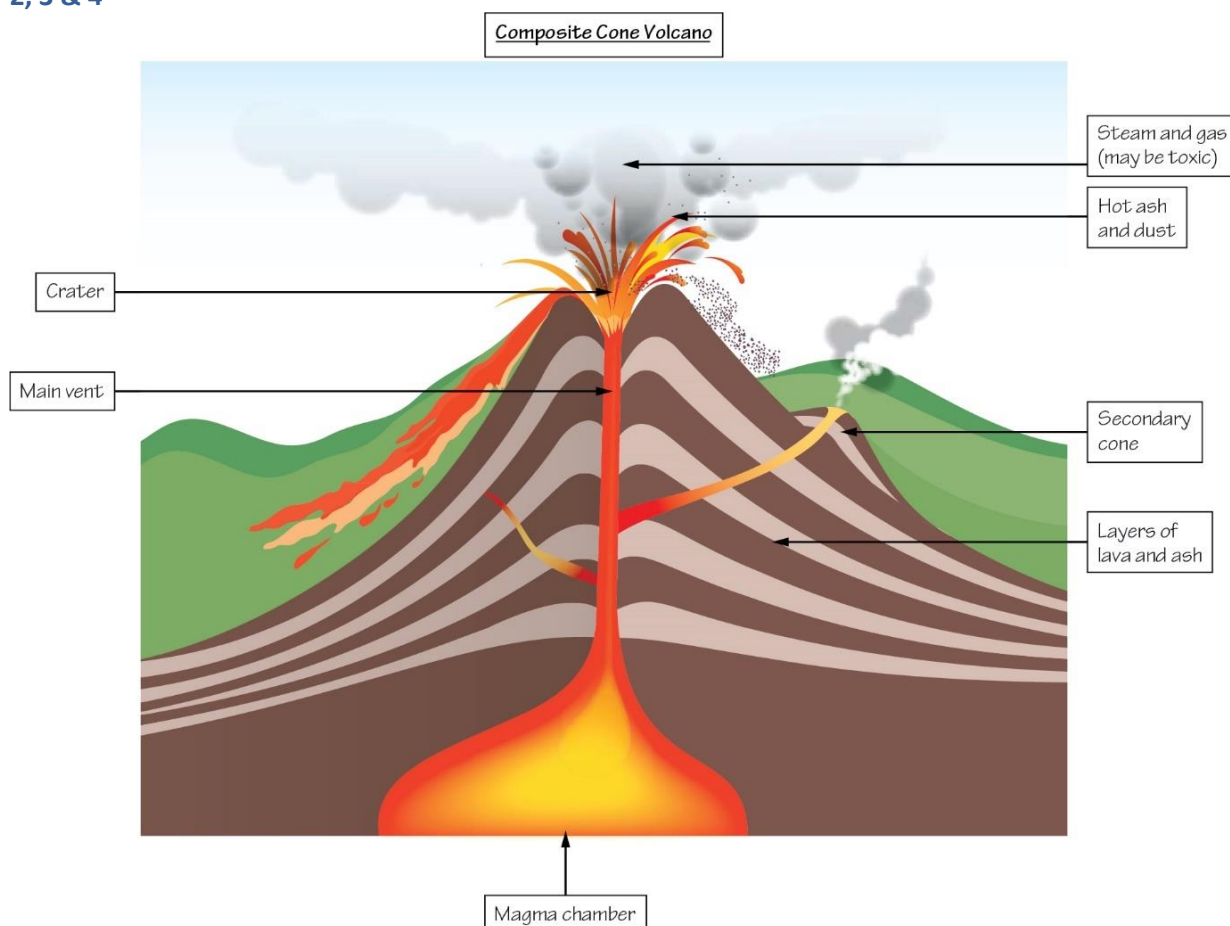
13.8 Why is every volcano unique?

What are volcanoes?

- 1 Volcanoes are formed where there is a crack in the lithosphere. The magma can erupt in a number of different forms. Lava flows from the vent or crack. Volcanic bombs are lumps of molten rock that solidify as they explode out of the vent of the volcano. Hot ash is thrown out of the volcano into the atmosphere and eventually falls back to Earth. Steam and gas can also be released by volcanoes which is poisonous. Volcanoes can build up into mountains with steep sides, as a result of successive eruptions over prolonged periods of time. These steep slopes are made of lava which solidifies into igneous rocks.

Volcanoes are found in three states: an active volcano is erupting or has erupted recently, and is likely to erupt again; dormant volcano – this has not erupted for 10,000 years, but could erupt again in the future; and extinct volcano – this hasn't erupted for the last million years and will probably never erupt again.

2, 3 & 4



5 *Example answer:*

Volcanoes are caused by magma rising through cracks in the Earth's crust. When plates move apart at constructive boundaries, magma rises up and forms shield volcanoes with runny lava. When an oceanic and a continental plate move together at destructive boundaries, the oceanic plate will melt and some of the rock will rise up to form composite cone volcanoes with thick, sticky lava.

13.9 Can people living near volcanoes manage risk?

Mount Etna – a case study of a volcano

1&2



© David Gardner

4 Example answer:

Mt Etna erupted in December 2018 and triggered a 4.8 magnitude earthquake which injured 28 people. Lava flowed from a new fissure and the ash cloud meant that Sicilian airspace was temporarily closed.

13.10 Why do we need to understand why volcanoes and earthquakes occur? Review

Volcanoes and earthquakes Review

1



Key

1 = Guatemala

2 = Hawaii

3 = Sicily

4 & 5 = Türkiye and Syria

6 = Nepal

7 = Japan

2 Example answers:

... **people who live in areas with high risk of tectonic activity?**

They need to know the signs that a tectonic event may happen and what this is likely to involve so that they can stay safe.

... **leaders of countries with a high risk of tectonic activity?**

They need to know how the people, economy and environment may be affected so that they can support planning, preparation and prevention. They need information about how different areas are likely to be affected to produce an emergency response plan.

... **geoscientists who monitor and predict tectonic activity?**

They need to understand the science behind tectonic activity so that they know what signs to look for.

3

- a) The movement of continents over millions of years.
- b) The outer layer of the Earth made up of the crust and the outer mantle.
- c) It is thought that plates move because of slab pull and ridge push.
- d) Divergent/constructive – plates move apart.
Convergent/destructive – plates move together.
Conservative/transform – plates move alongside each other.
- e) Two plates suddenly moving past each other along a fault.
- f) Preparing for an earthquake by holding earthquake drills and putting emergency survival kits together. Building earthquake-resistant buildings.
- g) An opening in the lithosphere from where magma escapes onto the surface.
- h) *Example answer:*

Prediction: Volcanologists monitor volcanoes all over the world and take readings to look for change so they can predict whether a volcano is likely to erupt.

Planning: Helps people to respond and recover from a natural disaster, such as a volcanic eruption. Includes evacuation plans, hazard mapping, warning systems etc.

Preparation: Involves educating people on what to do if a nearby volcano erupts.

14.1 What are the challenges and opportunities for countries in Africa?

What do I think I know about the continent of Africa?

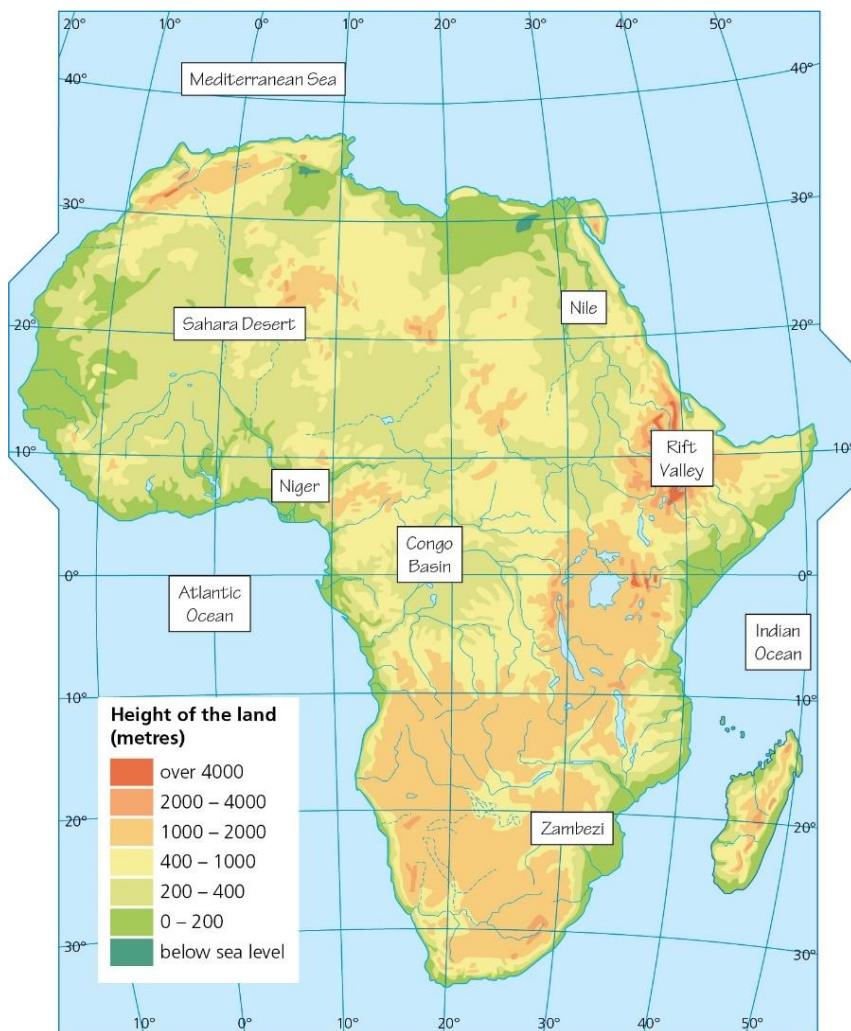
These answers will vary from student to student. Here are some examples:

- 1 In this answer, students may include facts, such as Africa being the only continent that is in all four hemispheres. This activity may also bring up misconceptions, such as Africa being dry or poor – these should be unpicked and rectified.
- 2 The single story is when people only see a place from one perspective, giving them a narrow and incomplete view of it. This can be because the same story has been repeated many times. A single story can create a stereotype of a place and its people.
- 3 Many people in the world have a stereotypical view of Africa because they hear the same story repeated in the media and also sometimes in schools. This is a story of poverty, war and suffering. It is reinforced by charities who use images of people who are struggling in order to raise money for causes related to African countries.
- 4 This will depend on the student. For example, they may have said in question 1 that Africa is poor, but then realised that this is a stereotype. They may hold this view because they have seen items about war and famine in Africa on social media

14.2 What is the physical landscape of Africa?

The physical landscape of Africa

1



2 *Example answer:*

The physical landscape of Africa is very varied, with high mountains and plateaus in some places and lowlands in others. A large area of north Africa is covered by the Sahara Desert. To the south of the Sahara there are large river networks, including the Congo Basin.

14.3 Is Africa today still influenced by colonial Europe's exploitation?

Different views about the colonialism of Africa

1

Quote	Source of Quote	Evidence for choice
A	Cecil Rhodes, British businessman and South African politician, <i>Confession of Faith</i> , 1877	The quote talks about the 'duty to seize every opportunity to acquire more territory', which is what British businessmen such as Rhodes aimed to do to expand the Empire in the 1800s.
B	Kwame Nkrumah, Ghana's first Prime Minister, <i>Africa must Unite</i> , 1963	The quote says the people were left with determination to be free and rise, so is likely to have been said by the first Prime Minister of Ghana in the 1960s.
C	Biya Bandele, a Nigerian playwright living in London	This quote discusses issues in the 1980s and so must have been from Biya Bandele. It discusses how charity projects such as Live Aid perpetuate the dependency culture of colonialism.

Example answers:

- 2 Quote A is an imperialist view as it talks about Anglo Saxons taking control of more territory.
- 3 A dependency culture means people relying on others, rather than being independent and in charge of their own lives.
- 4 Quote C suggests that African peoples should look forward and that, whilst Africa needs help from the rest of the world, change needs to come from Africans.

14.4 Is the western view of poverty in Africa a single story view or reality?

Telling a different story about Africa

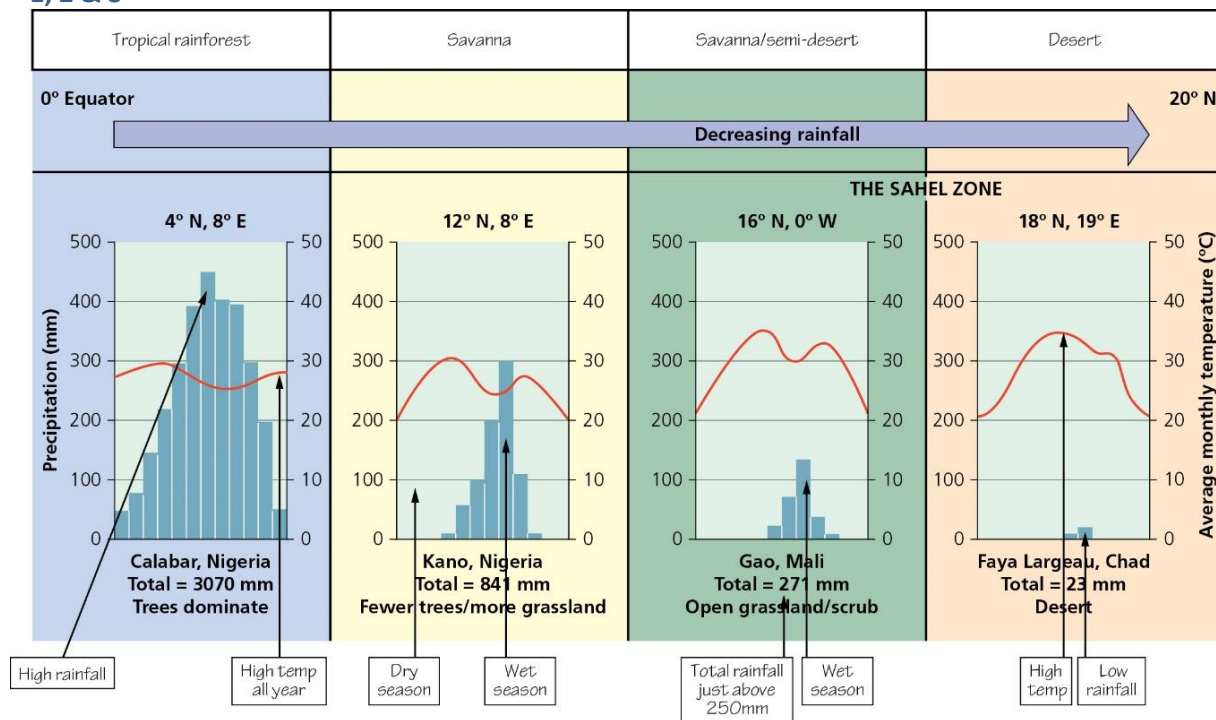
Example answers:

- 1 Food was stored sustainably, without using plastic containers or electricity, so there was no plastic waste or emissions.
- 2
 - a) Using locally sourced materials means that they don't have to be transported long distances and can easily be replaced.
 - b) Natural ventilation systems mean that air will flow through a building to keep it cool, so air conditioning units aren't needed. This keeps the temperature down without increasing emissions.
 - c) Architects and builders in the West could learn how to use locally sourced materials and how to use natural ventilation to reduce the need for air conditioning. This would help mitigate and adapt to climate change.

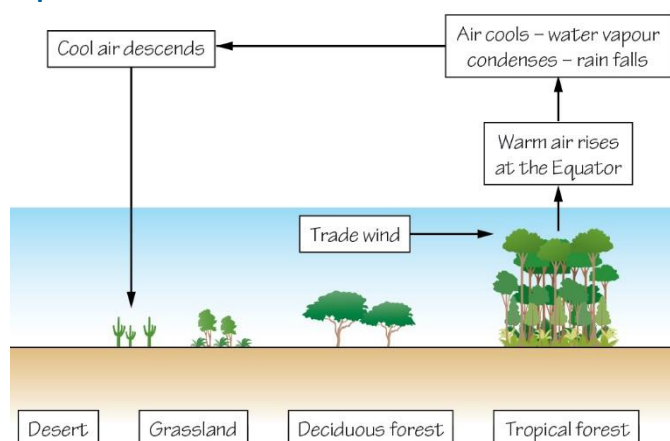
14.5 What is the pattern of climate and biomes in Africa?

The climate of Africa

1, 2 & 3



4



14.6 The Sahel – a future of opportunities or threats?

Yacouba Sawadogo, the man who stopped the desert

- 1 Yacouba Sawadogo is a peasant farmer from Burkina Faso who has become known as the man who stopped the desert.
- 2 He created a technique called Zai by using traditional African ideas. He dug holes and filled them with compost, then put seed in them at the start of the rainy season. Termites built tunnels in

the hard ground which stored the rainwater. He planted trees to hold the soil together and chose ones useful for medicine.

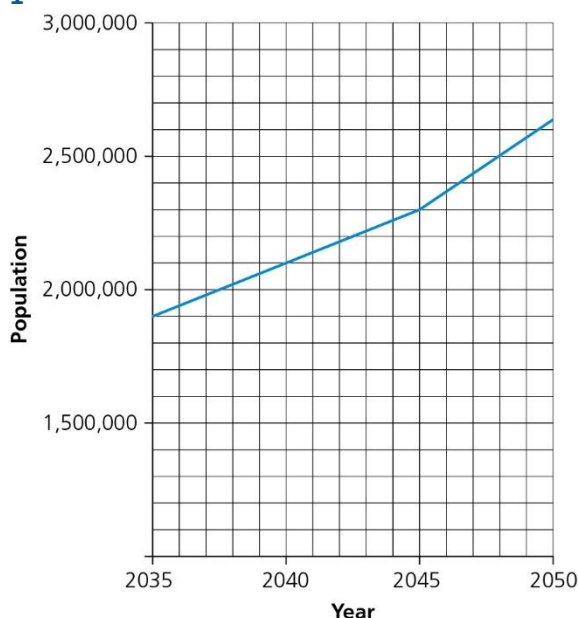
3 Students should design a poster about Yacouba Sawadogo's work, including:

- his name
- examples of his farming techniques that held back the desert
- reasons why his techniques are working
- a title to hook people into reading the poster
- weblinks used.

14.7 What are the challenges and opportunities of population change in Africa?

The changing population of Africa

1



The population of Africa is predicted to grow by $2,527,556,000 - 1,896,703,000 = 630,853,000$ between 2035 and 2050.

2 The population of Africa is predicted to increase at a consistent rate between 2035 and 2050.

Example answers:

3 Why might people have different views of birth control due to their...

... **gender?**

Women give birth to the child and are also often the main caregiver, so may be worried about having too many children.

... **age?**

Older people may have more traditional views about the role of women as mothers. They may remember times when more babies died and so larger families were popular.

... **religious views?**

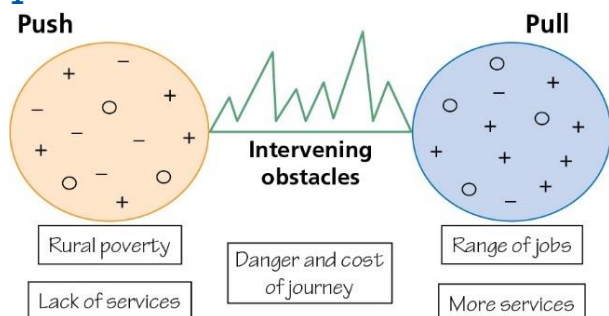
Some religions promote large families and some disagree with contraception.

4 Birth control could slow down Tanzania's population growth, potentially reducing demands on resources and freeing women to work, but it could mean that there aren't enough workers in the future.

14.8 What are the challenges and opportunities of urbanisation for Africa?

Urbanisation of Africa

1



2

a) The map shows the population of World Cities from 1950 to 2035.

b) *Example answer:*

It shows that Africa didn't have many large cities in 1950 but has several cities which are predicted to be very large by 2035. Many of the cities in Africa are located on the coast, with a large cluster on the south coast of East Africa. This contrasts with Europe, which had a lot of large cities in 1950, but shows much less growth of cities since. There are large areas of Africa without cities, but there are cities all over Europe. Cities in South America and Asia seem to have grown most rapidly in the 1990s, whereas African cities have grown more recently.

c)

Largest cities	Country	1950 population	1990 population	2015 population	2035 population
1 Al-Qahirah (Cairo)	Egypt	2.5 m	9.9 m	18.8 m	28.5 m
2 Lagos	Nigeria	0.3m	4.8 m	12.2m	24.4m
3 Kinshasa	Democratic Republic of the Congo	0.2 m	3.7 m	11.6 m	26.7 m
4 Luanda	Angola	0.1 m	1.5 m	7 m	14.5 m
5 Dar es Salaam	United Republic of Tanzania	0.1 m	1.5 m	5.1 m	13.4m

d) The most rapid growth in these cities occurred between 1990 and 2015.

14.9 Is China helping to develop African countries?

Investment in Africa

1 *Example answers:*

- a) Rwanda was a colony of European countries, so may feel that these countries see Rwanda as lesser. China wasn't a colonial power in Africa (it was also colonised by Britain) and so may be seen as an equal. Being seen as equal rather than lesser is therefore what is being said to be more precious than money.
- b) Rwanda is a member of the Commonwealth, so joins in with conferences and sports events with Britain, showing that it is still willing to work with European countries.

2 *This answer will depend on the viewpoint of the student. Here are two examples:*

I think China's approach is best for African countries as they get the investment they need to improve their infrastructure and develop industries without having to change other aspects of their countries. How leaders run their countries should be up to them and the people.

I think the Western approach is best for African countries as they get investment, but only if they agree to run their countries in certain ways. The anti-homosexuality bill in Uganda is an example of a law which will harm a lot of people in Uganda and it is good that the USA is putting pressure on Uganda to get rid of this bill.

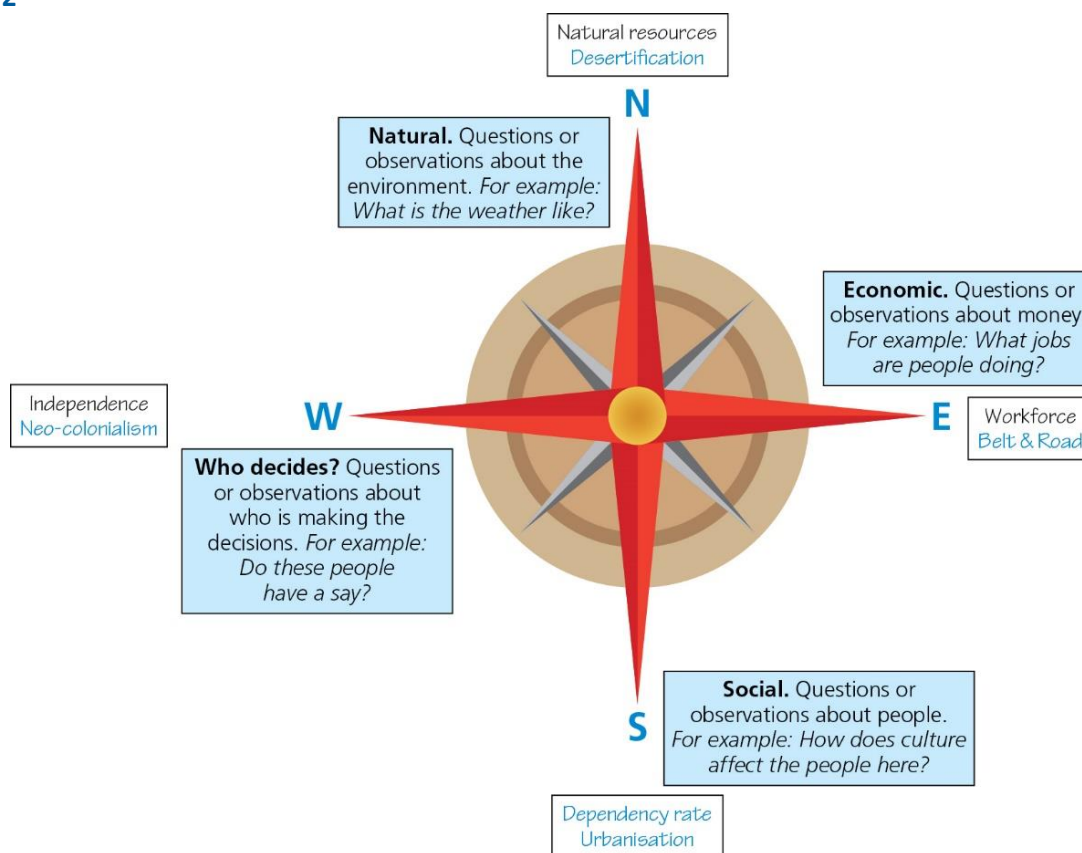
14.10 What are the challenges and opportunities for countries in Africa? Review

Challenges and opportunities in Africa Review

1 *Example answers:*

Country name	Challenges	Opportunities
DRC	Colonial legacy – 10 million died during Leopold's rule.	Large reserves of tantalum, diamonds etc.
Burkina Faso	Desertification	Using traditional techniques to plant seeds and trees (as Yacouba Saradogo has)
Tanzania	High dependency rate due to youthful population	Youthful population will provide a large workforce
Ethiopia	Urbanisation leading to higher crime rates, congestion and inequality	Sustainable urban growth, i.e. waste to energy facility, circular economy
Djibouti	Belt and Road project could lead to neo-colonialism by China	Belt and Road project funded by China will connect its port to the world and will fund a railway line to connect it to Ethiopia

2



3 This will depend on the student. It may involve changing perceptions of Africa in terms of its physical geography (it's not all dry) or human geography (it's not all poor).

4 This will depend on the country chosen. Here is an example:

Country:	Information	Source of information
Uganda		
Location	East Africa	www.worldatlas.com
Physical landscape	On a high plateau with many lakes, including Lake Victoria, which is one of the sources of the River Nile	https://www.countryreports.org/country/Uganda/geography.htm
Colonial background	Colonised by Britain. Became a protectorate in 1894 and gained independence in 1962	https://microform.digital/boa/collections/64/uganda-under-colonial-rule-in-government-reports-1903-1961#:~:text=This%20collection%2C%20drawn%20from%20the,independence%20from%20Britain%20in%201962
Climate and biomes	Equatorial climate – hot and wet all year round. Biomes include forests (including some tropical rainforest), savanna grasslands and deciduous forests	https://www.worldatlas.com/articles/ecological-regions-of-uganda.html
Impact of climate change	Uganda's stable rain patterns have changed, with shorter or longer rains leading to flooding and drought, particularly in the east and north east	https://uganda.iom.int/news/impacts-climate-change-uganda

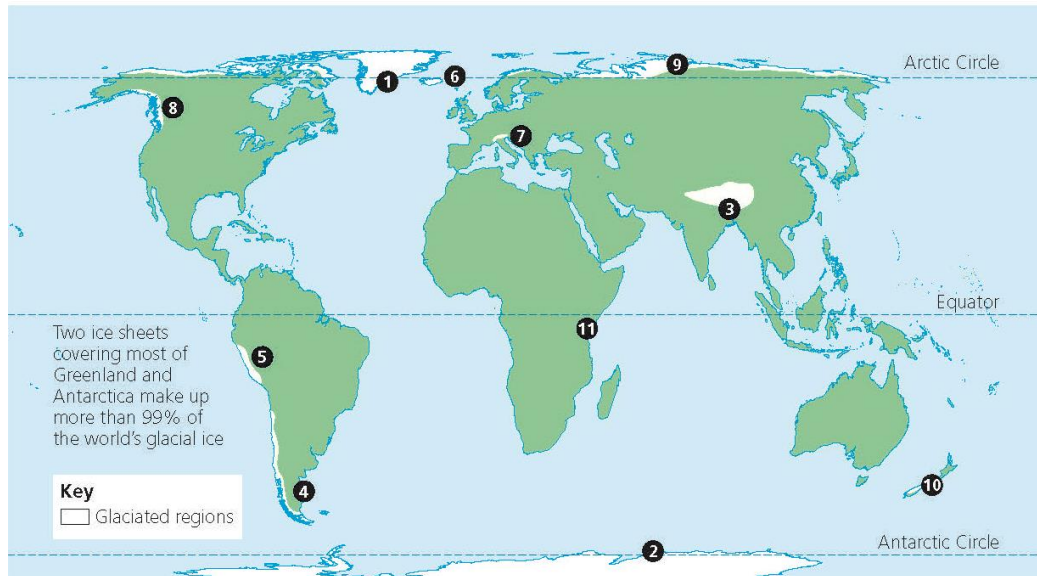
14 What are the challenges and opportunities for countries in Africa?

Impact of population change	The population is rapidly increasing, which could provide a demographic dividend, with plenty of workers and a lower dependency ratio	https://blogs.worldbank.org/africacan/demographic-boom-explainer-ugandas-population-trends
Impact of urbanisation	The urbanisation rate is 4.5%, with 26% of the population urbanised. Kampala, the capital city, is growing rapidly and there is a lack of affordable quality housing for new arrivals	https://unhabitat.org/sites/default/files/2023/07/uganda_country_brief_final_en_1.pdf
Chinese investment	China is the largest investor in Uganda and the countries have been linked since Uganda became independent in 1962	https://www.ugandainvest.go.ug/ui-chair-makes-case-for-strengthening-investment-and-trade-between-uganda-and-china/#:~:text=UIA%20Chair%20makes%20case%20for%20strengthening%20investment%20and%20trade%20between%20Uganda%20and%20China,-July%2031%2C%202023&text=Uganda%20Investment%20Authority%20is%20a,forms%20of%20Investments%20in%20Uganda

15.1 How does ice change the world?

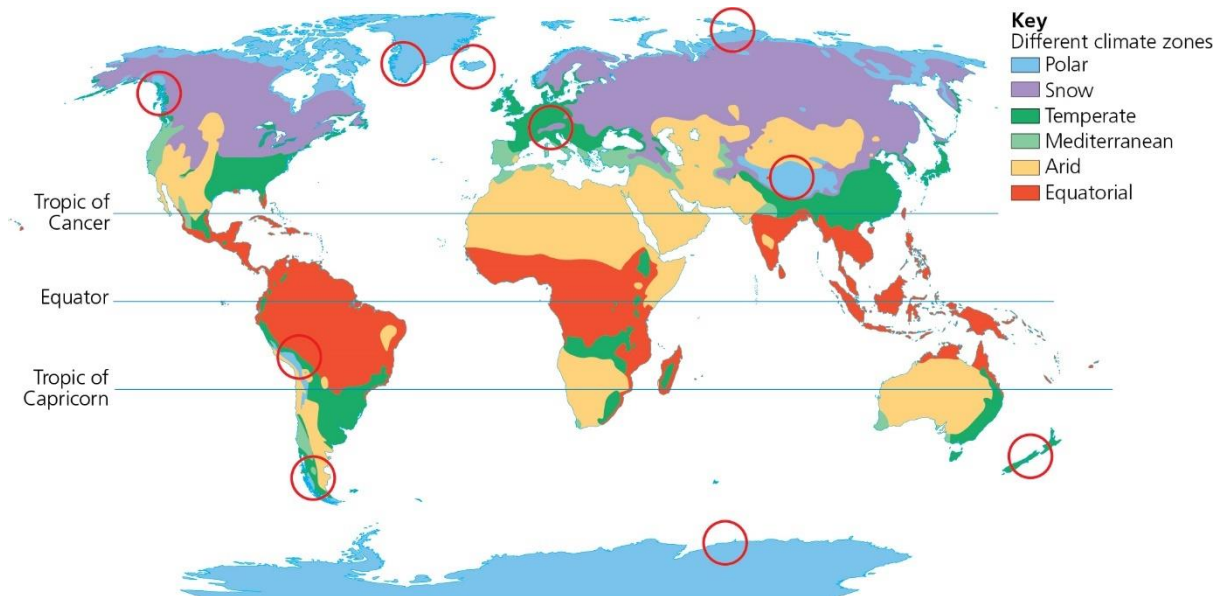
The world's glaciated regions

1



- | | |
|--------------|---------------------------------|
| 1 Greenland | 7 European Alps |
| 2 Antarctica | 8 Athabasca |
| 3 Himalayas | 9 Siberia |
| 4 Patagonia | 10 Southern Alps of New Zealand |
| 5 Andes | 11 Kilimanjaro |
| 6 Iceland | |

2

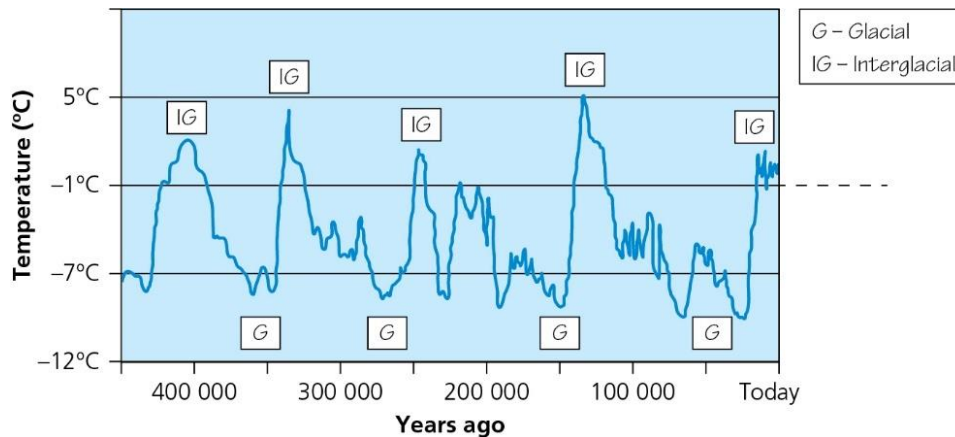


- 3 The glacial areas are mainly located in polar areas.

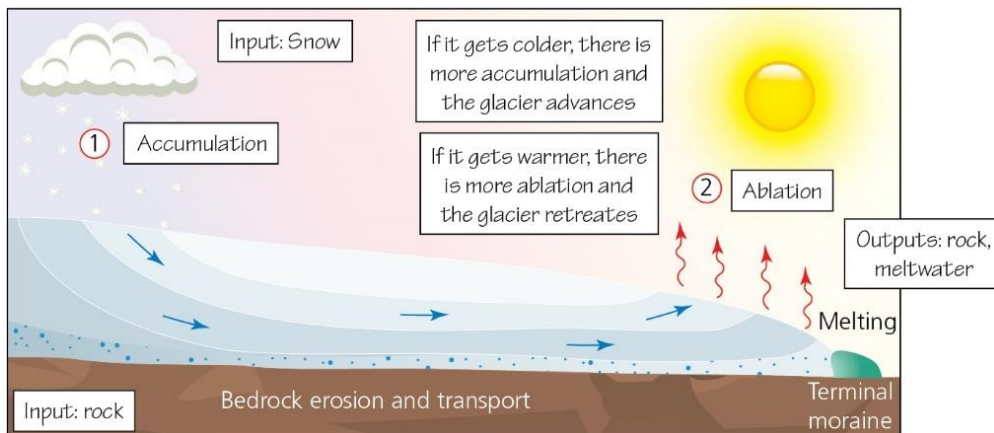
15.2 How and why do glaciers form and move?

How do glaciers develop?

- 1 An ice age is when temperatures are low enough for ice to form glaciers and ice sheets in lower latitudes.
- 2 Glacials are periods of extreme cold, whilst interglacials are warmer.
- 3



- 4 The temperature varies by up to 15 degrees centigrade between glacials and interglacials.
- 5

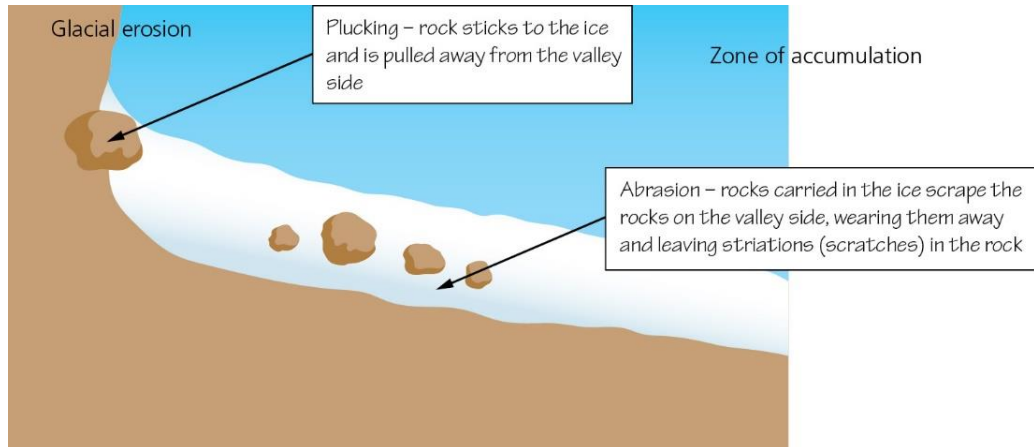


15.3 How do glaciers change landscapes?

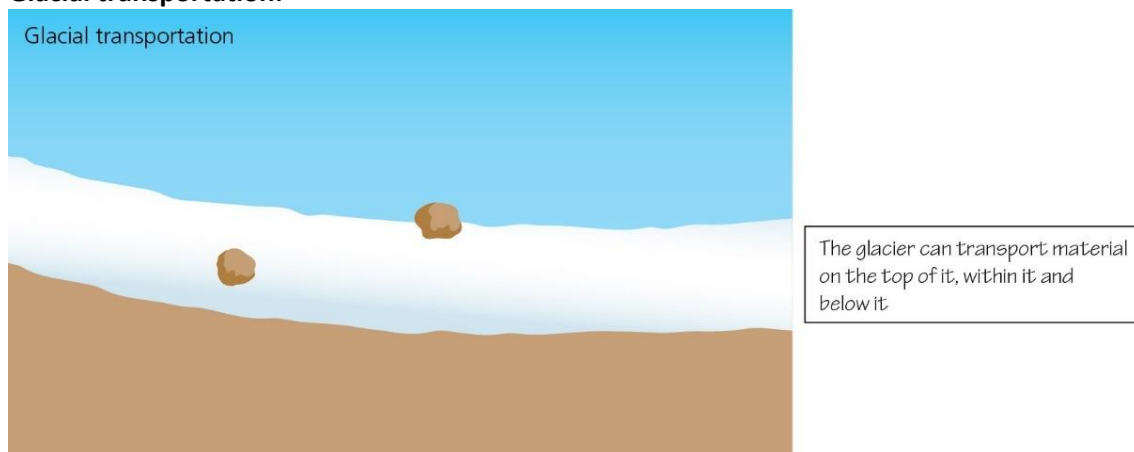
Glacial erosion, transportation and deposition

1

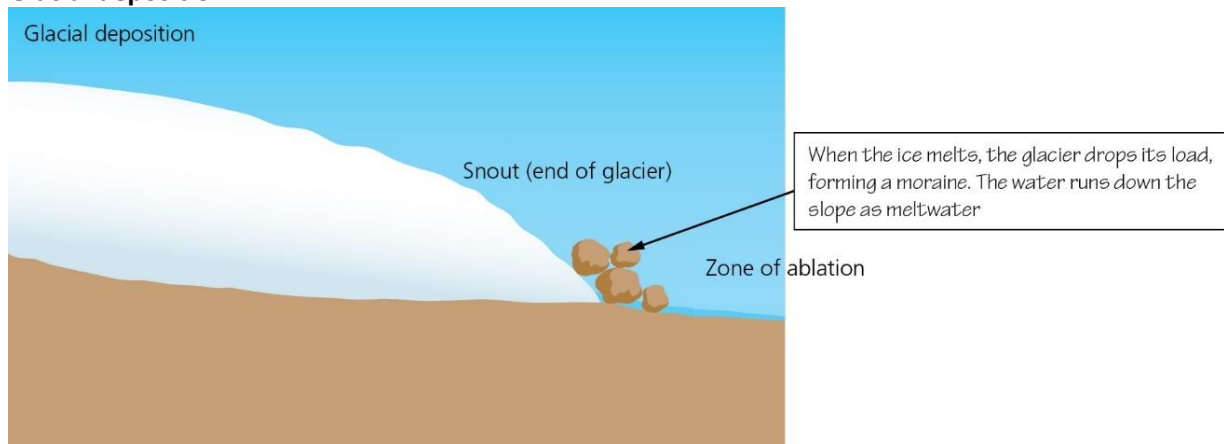
Glacial erosion:



Glacial transportation:



Glacial deposition:

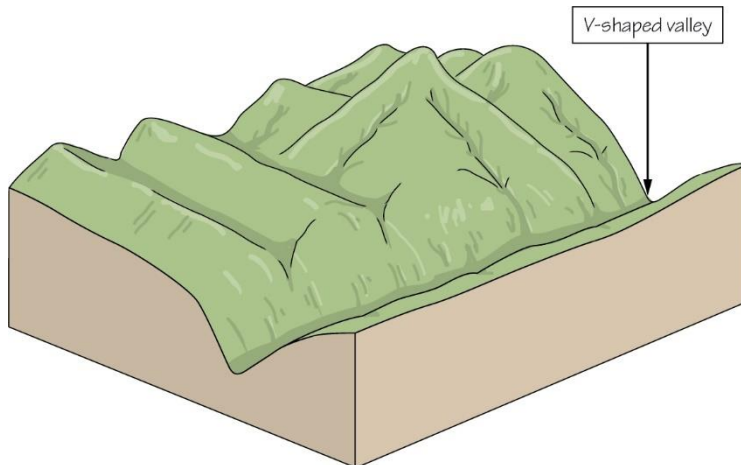


15.4 How are landforms shaped by glacial erosion?

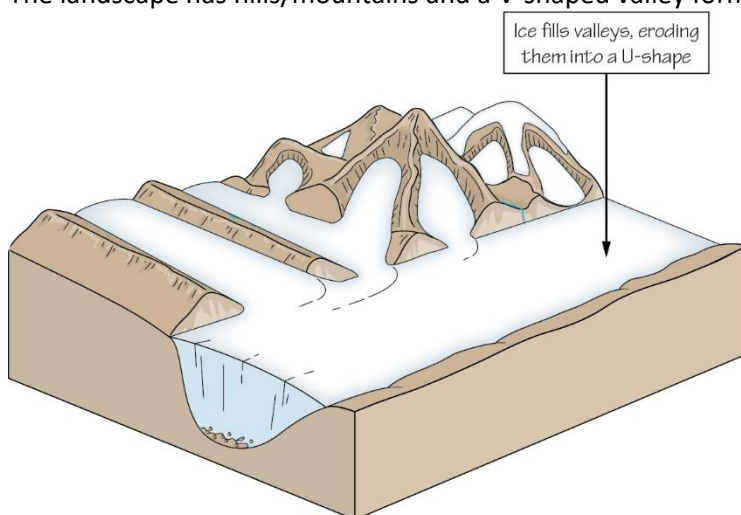
Part 1

Glacial landforms formed by erosion

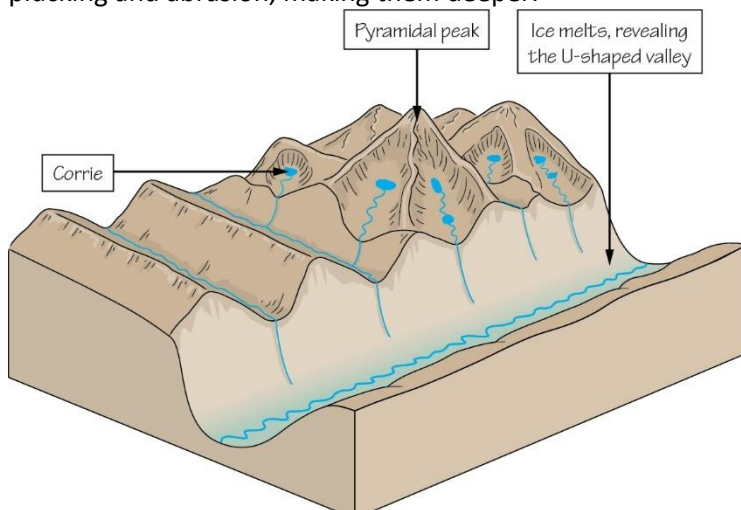
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The landscape has hills/mountains and a V-shaped valley formed by a river.



The ice has filled the V-shaped valley and hollows in the mountainsides. It is eroding these using plucking and abrasion, making them deeper.



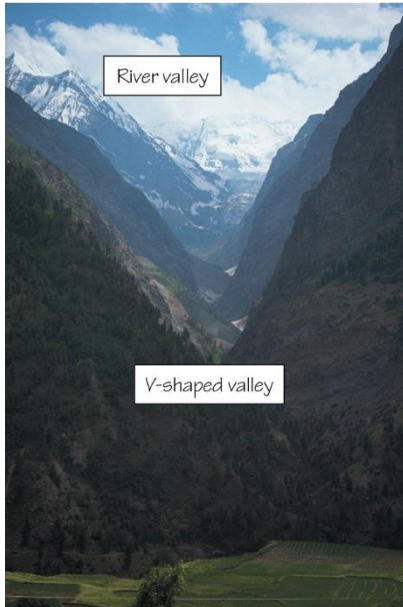
When the ice melted, it left the U-shaped valley and the corries in the open. Lakes filled the corries and there is a river in the valley.

15.5 How are landforms shaped by glacial erosion?

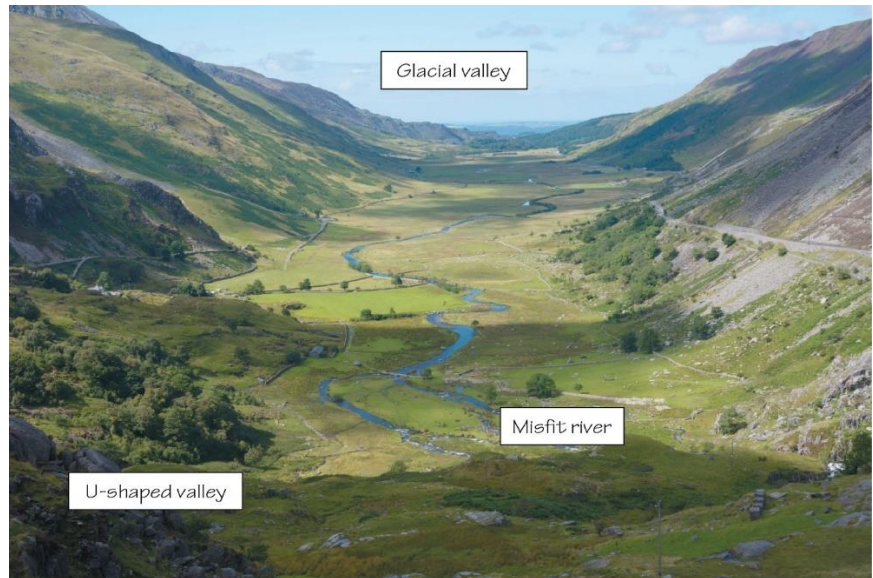
Part 2

Glacial landforms formed by erosion

1

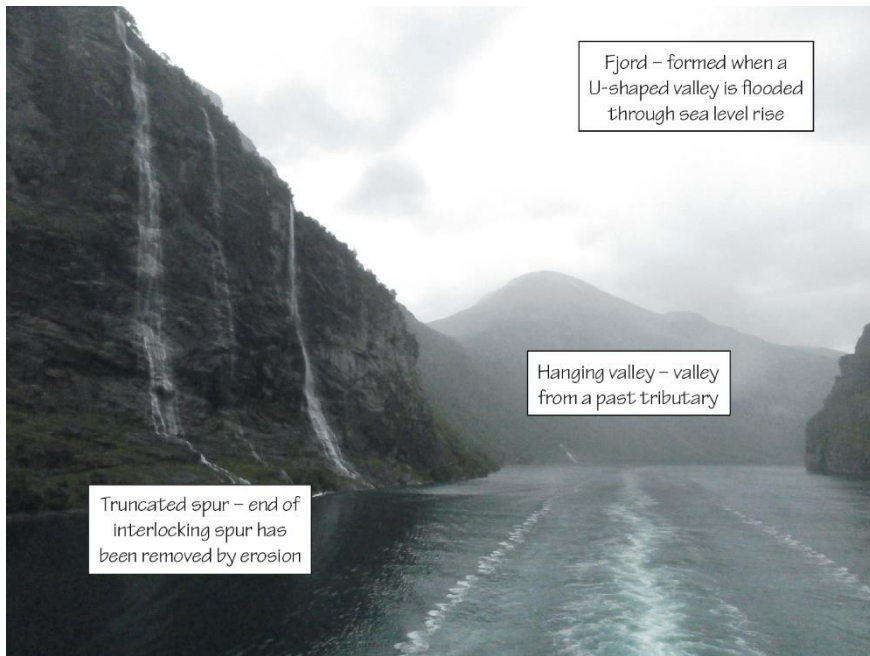


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2 & 3

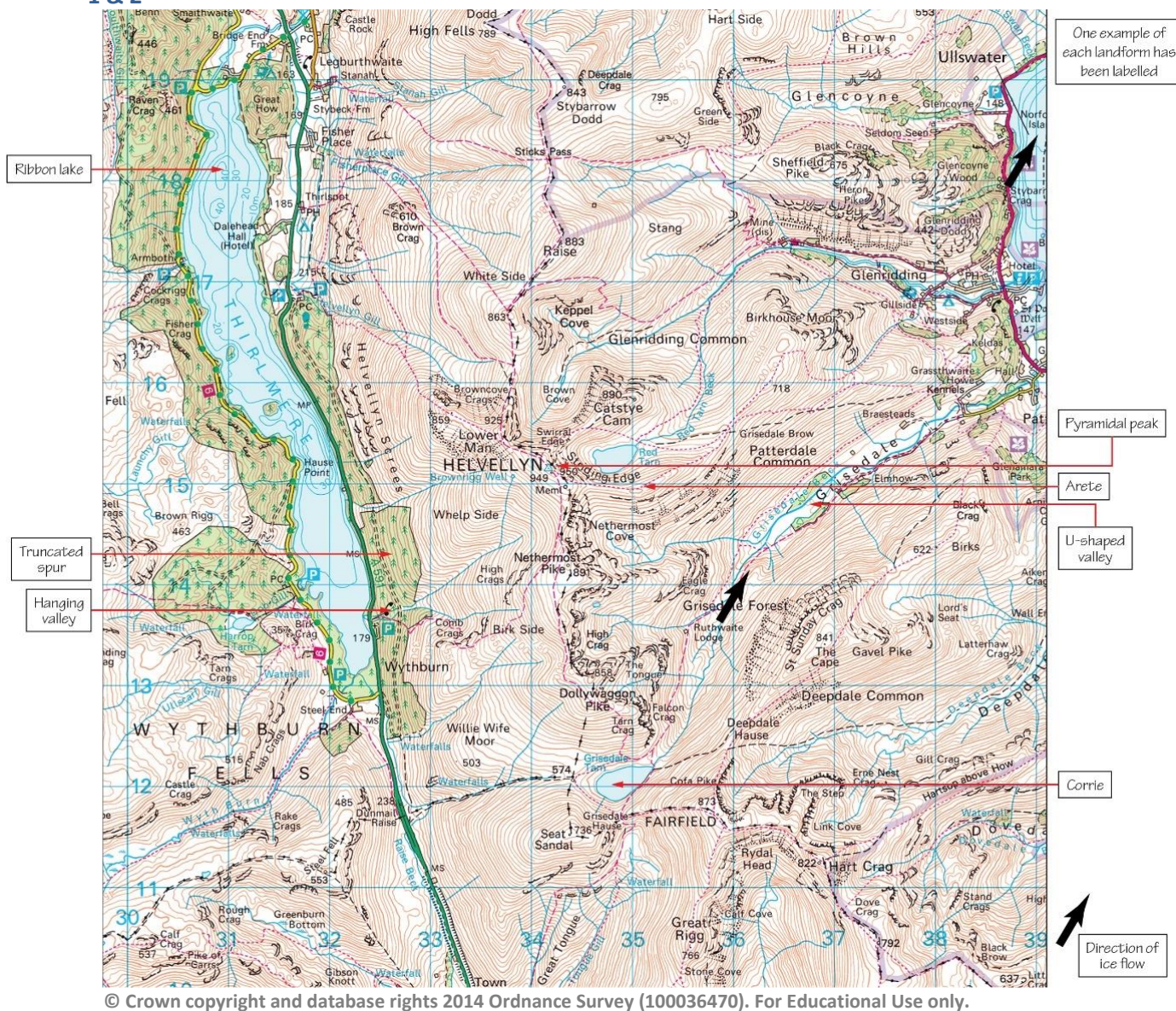


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15.6 How do we know the Lake District was glaciated?

Using an OS map to identify evidence of glaciation

1 & 2



15.7 How are landforms shaped by glacial deposition?

Glacial landforms formed by deposition

1 A glacier deposits material at its edges and snout when it melts, and so drops the material it is carrying.

2 A Glacier B Till C Drumlines D Terminal moraine E Outwash plain F Erratics

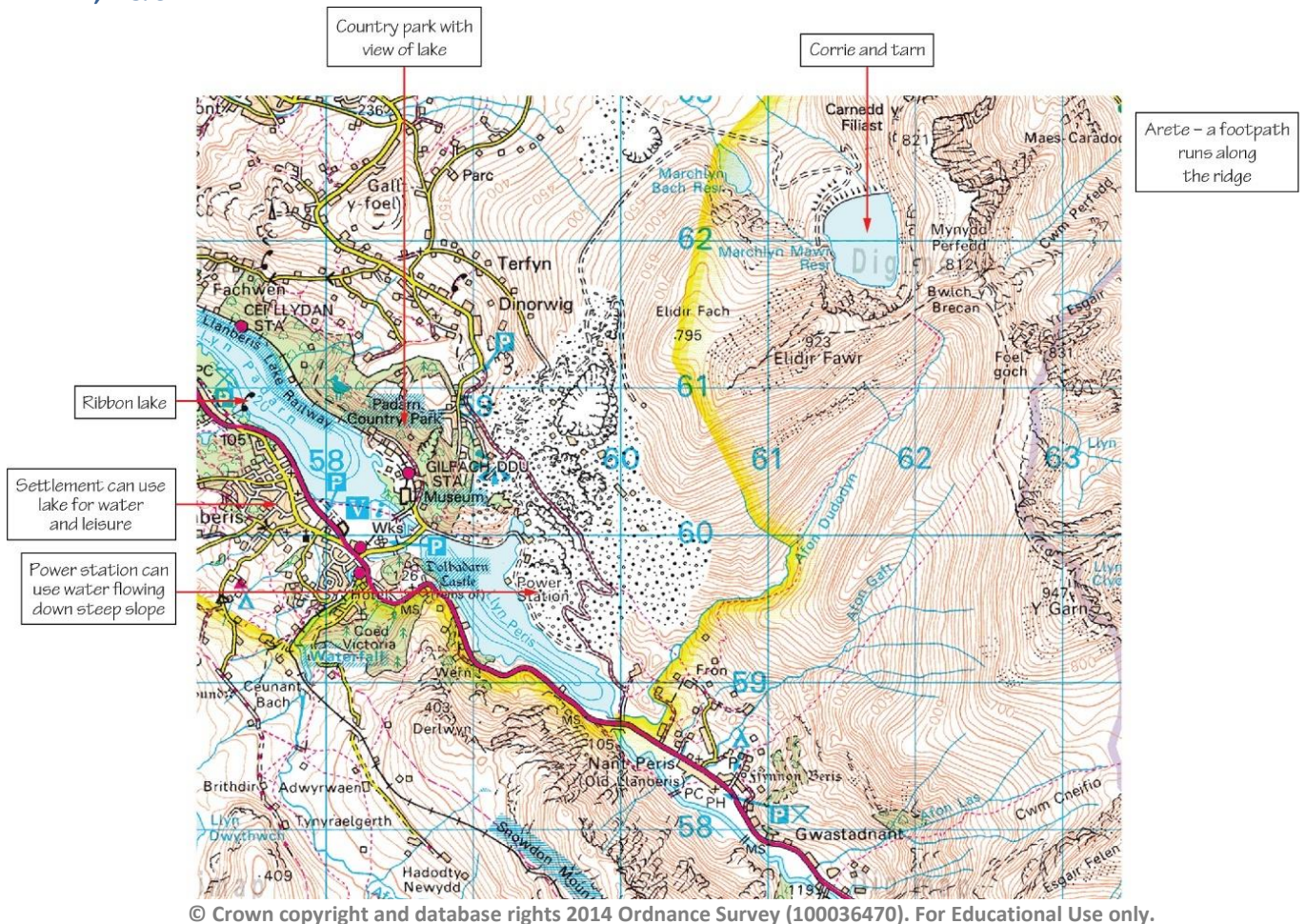
3

Landforms formed from melting ice	Landforms formed from meltwater
Till, Drumlines, Erratics, Terminal moraine	Outwash plain

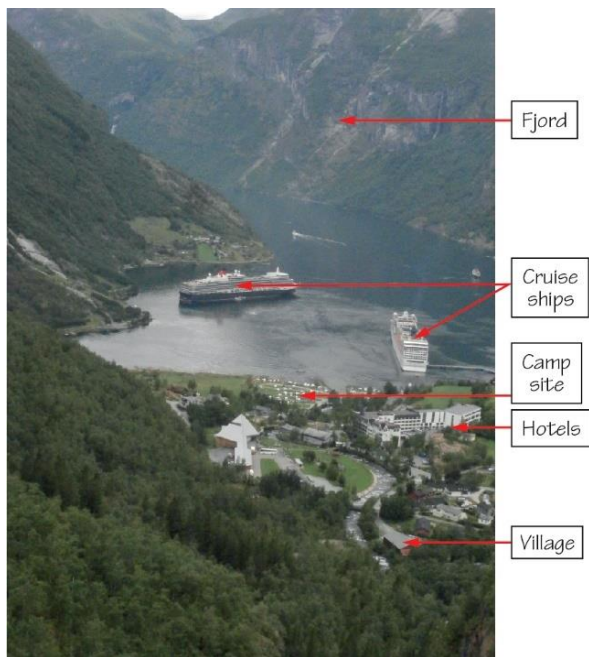
15.8 How do people use glacial landforms?

Using an OS map and a photograph

1, 2 & 3



4



© David Gardner

Where? Geirangerfjord, Western Norway.

What? Steep-sided Fjord with settlement on an area of flat land.

Why? Formed by glacial erosion and subsequent sea level rise.

How is it changing? Large numbers of cruise tourists are visiting.

Who is affected? Some local residents will benefit if they earn money from tourism. others may dislike the crowds.

15.9 How do we investigate how glaciers are changing?

The work of glaciologists

2 *Example answer:*

Glaciologists investigate glaciers by taking measurements in the field, creating computer models and creating physical models in the lab. This allows them to see how glaciers and meltwater will change in different conditions.

4

Technique	Explanation
Ice cores	Drilling into ice and removing cores allows scientists to test air trapped in bubbles in the ice to see its composition.
Repeat photographs	Modern photographs can be taken in the same places as historic photographs and compared to see how the glacier has changed.
Remote camera	A camera can be set up to transmit photographs of the glacier to the glaciologist so that they can see how it changes over time.
Satellite images	Satellite images show glaciers in photographs taken from space. These are very useful for judging the extent of land covered by the ice.

5 *Example answer:*

Glaciologists have discovered that glaciers are retreating as the climate warms. This means that they aren't coming as far down mountains as they used to. The volume of ice has decreased in both glaciers and ice sheets. This ice is vital for feeding into rivers and providing water for farming and settlements.

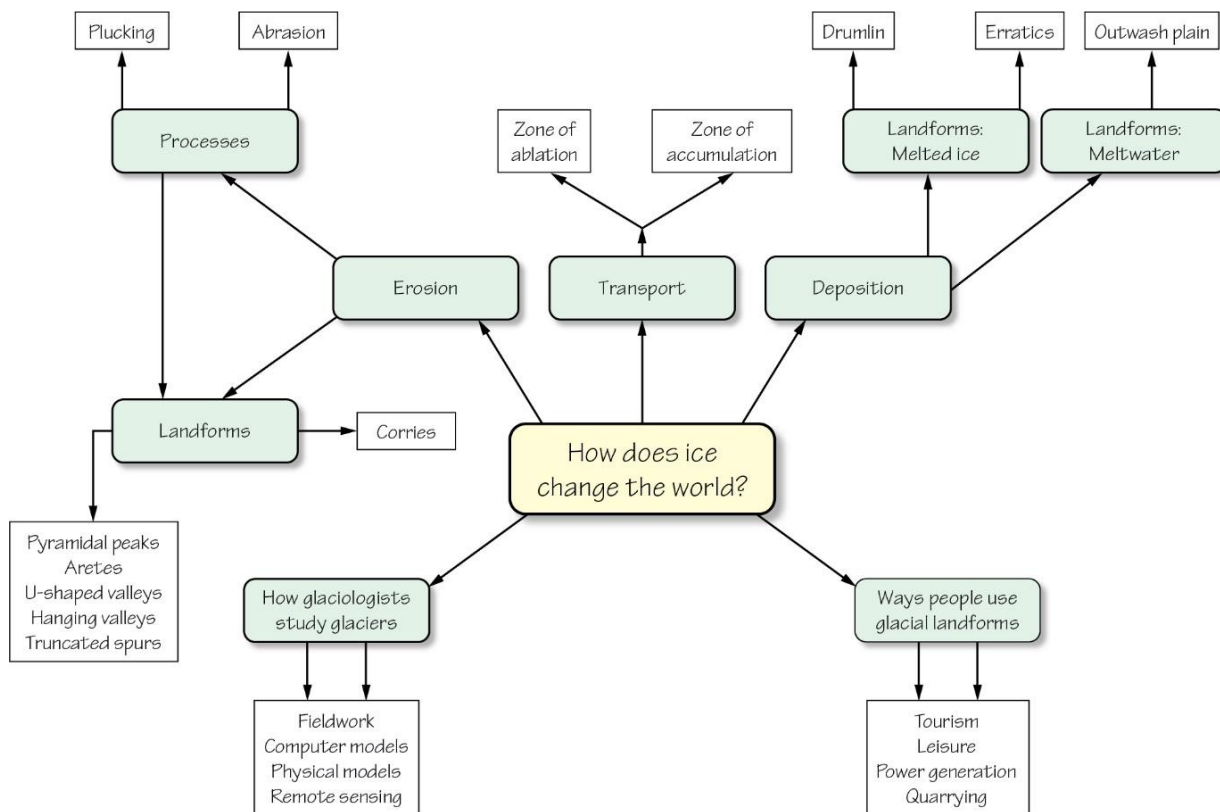
15.10 How does ice change the world? Review

Ice Review

1

- | | |
|------------------|--------------------|
| 1 Corrie | 6 Arete |
| 2 Tarn | 7 Meltwater |
| 3 Pyramidal peak | 8 Terminal moraine |
| 4 Hanging valley | 9 Outwash plain |
| 5 Waterfall | 10 Medial moraine |

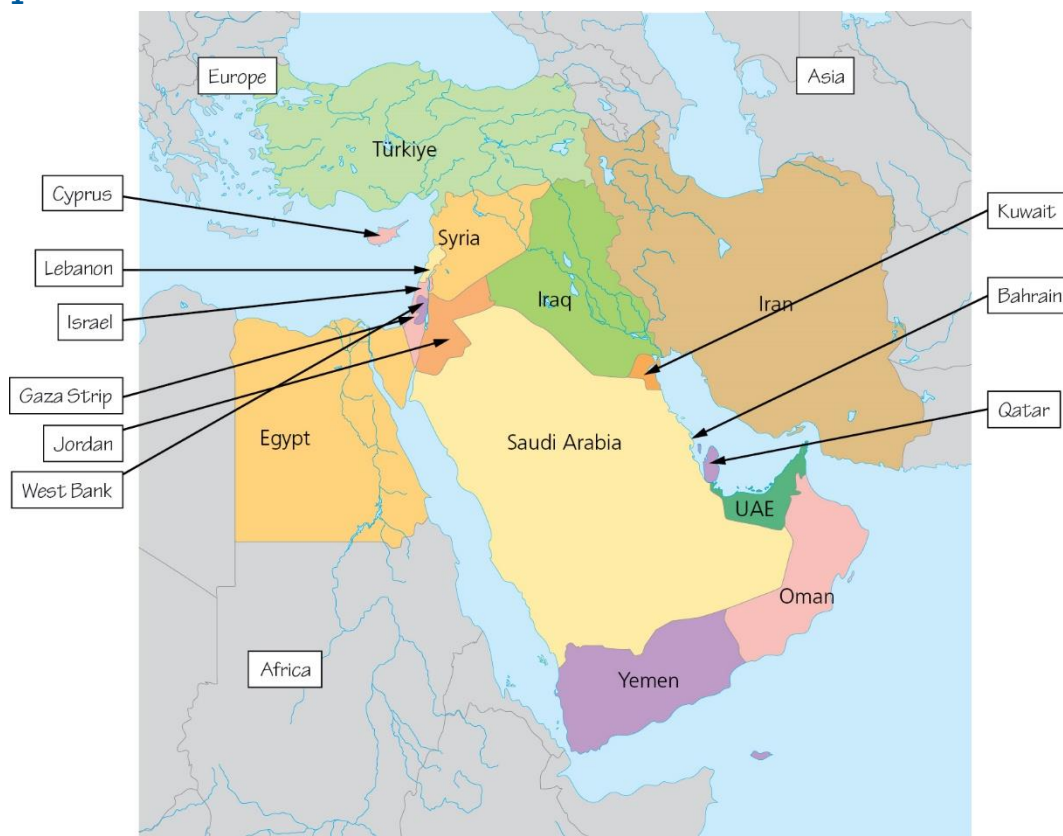
2



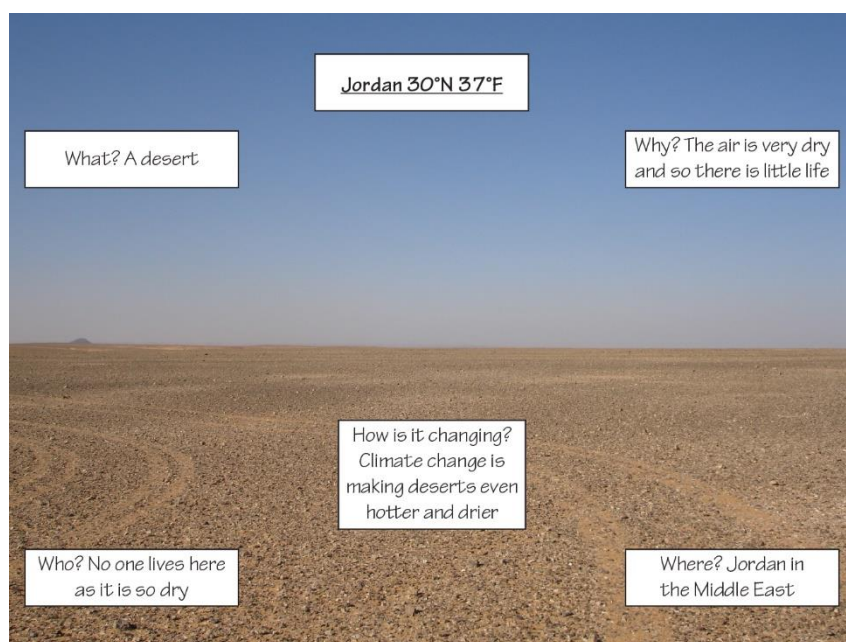
16.1 Why is the Middle East an important world region?

What is the region of the Middle East like?

1



2 The answer will depend on the confluence chosen. Here is an example:

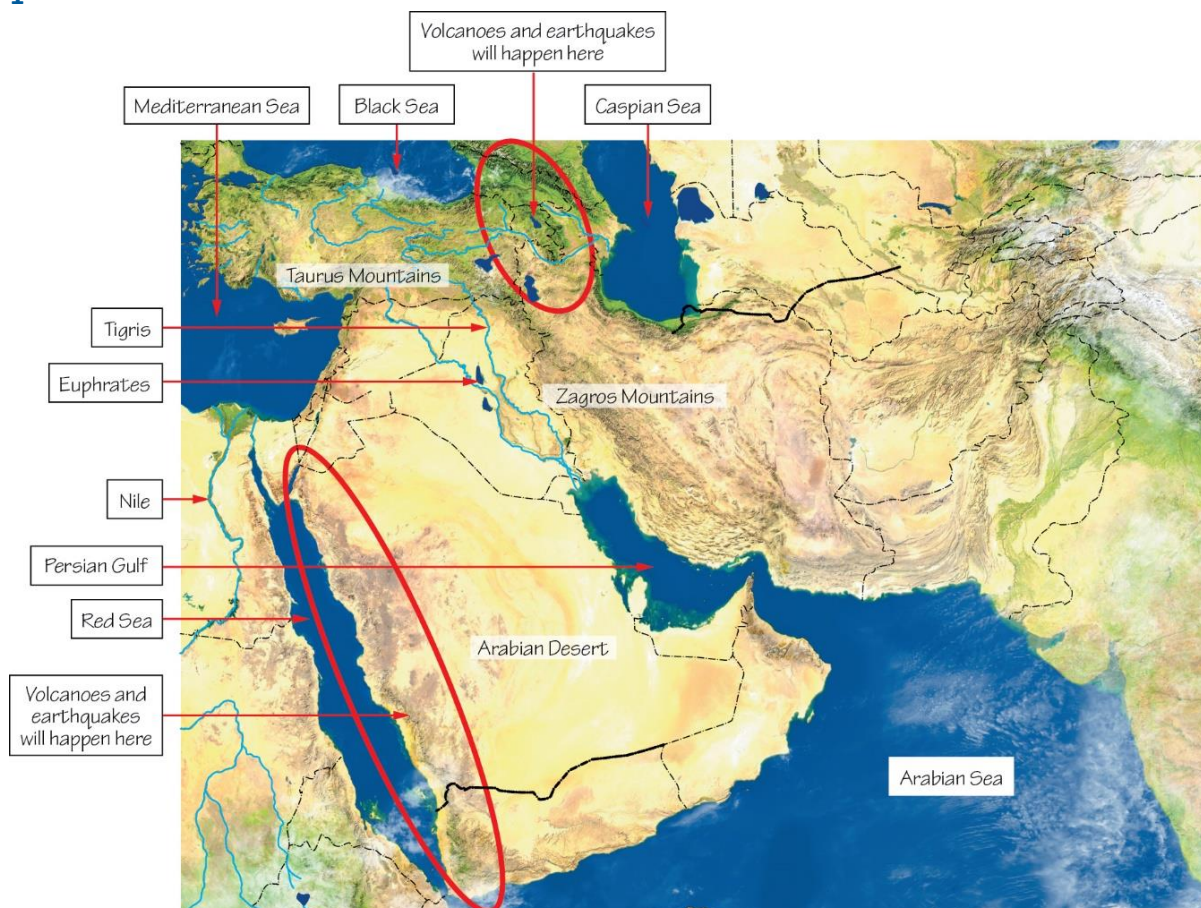


© Dennis Vilovic

16.2 How does physical geography influence the region?

Research the physical geography of the Middle East

1



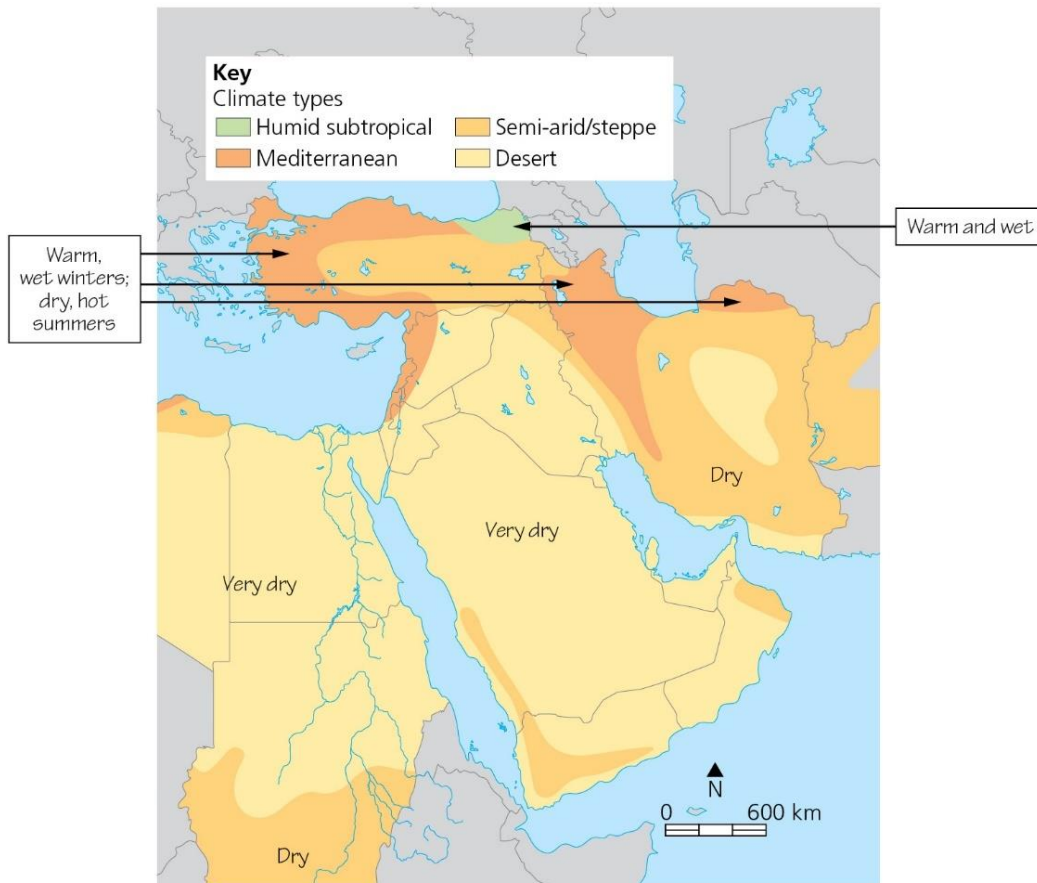
2 *Example answer:*

Volcanoes and earthquakes happen in the Middle East because there are plate boundaries in the region. The Arabian Plate meets the African Plate at the Red Sea, where the plates are moving apart, leading to volcanic activity. There is also a convergent boundary where the Eurasian and Arabian plates meet in Türkiye and Syria. When the plates stick and jolt free, it causes earthquakes.

16.3 What problems does the climate of the Middle East create for the region?

The climate of the Middle East

1

2 *Example answer:*

Water is a precious resource as so much of the Middle East is dry.

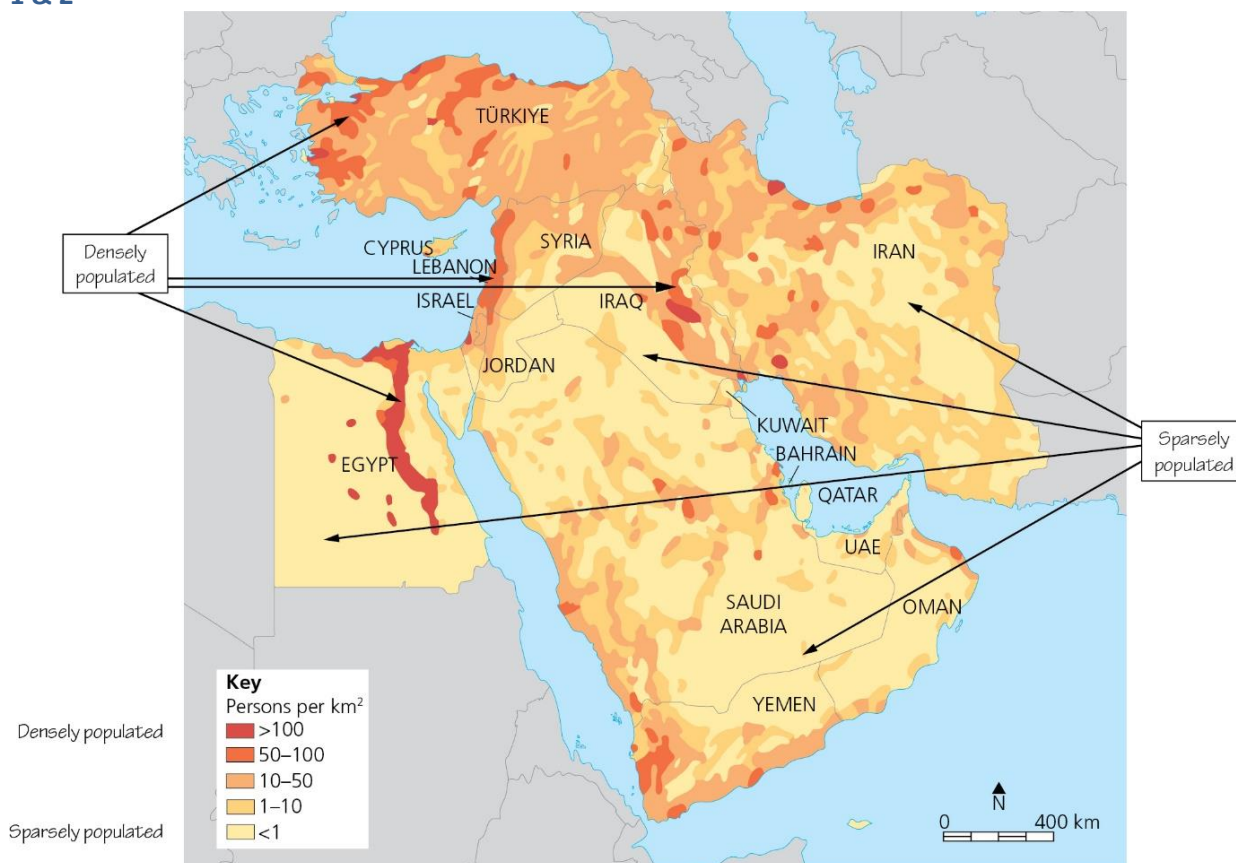
3 Viewpoint A is improving water supply by recycling water and using drip irrigation to put water at the roots of crops. Viewpoint B is advising people not to use the water from aquifers too quickly as it is non-renewable.

4 Viewpoint A is conserving water as the water is being recycled and used in smaller amounts. This saves 40 per cent of water used in farming.

16.4 Why is the population of the Middle East so diverse?

The population distribution of the Middle East

1 & 2



3

Factor	Sparsely populated areas	Densely populated areas
Physical geography – coast, mountains, flatland, rivers	Areas that are a long way from the coast are often sparsely populated.	There is dense population along rivers such as the Nile.
Climate	Deserts are sparsely populated because they are so hot and dry.	Population density increases in areas with a Mediterranean climate as it is milder.

16.5 Why is the Middle East a major economic region of the world?

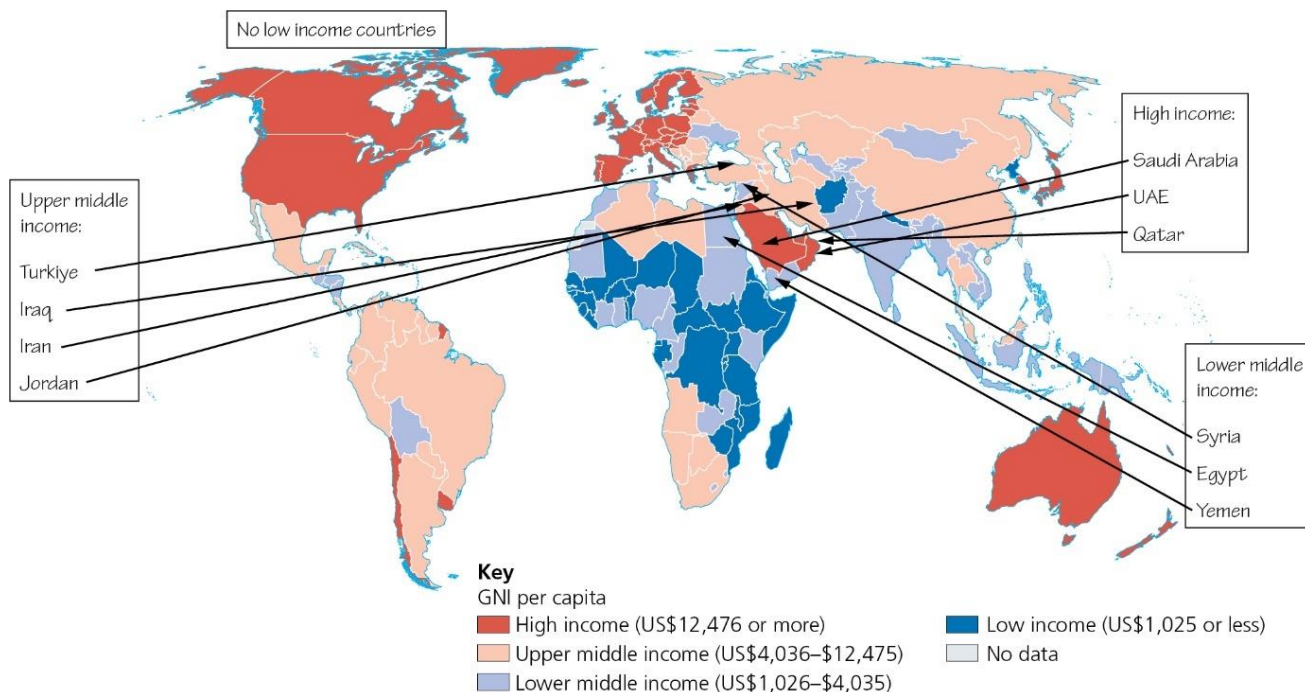
The global balance of trade in oil

- 1 They produce more oil than they consume.
- 2 They consume more oil than they produce.
- 3 The group in Question 1 is in the strongest position as they produce enough oil to meet their own needs and have enough left to trade.
- 4 The Middle East is in the strongest position because it produces much more oil than it consumes, meaning it can trade with all of the regions listed in Question 2.

16.6 How has the United Arab Emirates developed?

Levels of development in the Middle East

1

2 *Example answer:*

The countries with high incomes are next to each other, as are the countries with upper middle incomes. The countries with lower middle incomes are dispersed around the region.

3 *Example answer:*

The UAE has diversified by developing its tourism and as a transport hub (using its port and airport). This is important because oil is non-renewable and also many countries are trying to reduce their use of oil so that they can meet their climate change targets. When the UAE can no longer sell oil, it will still have income from tourism and its commercial port.

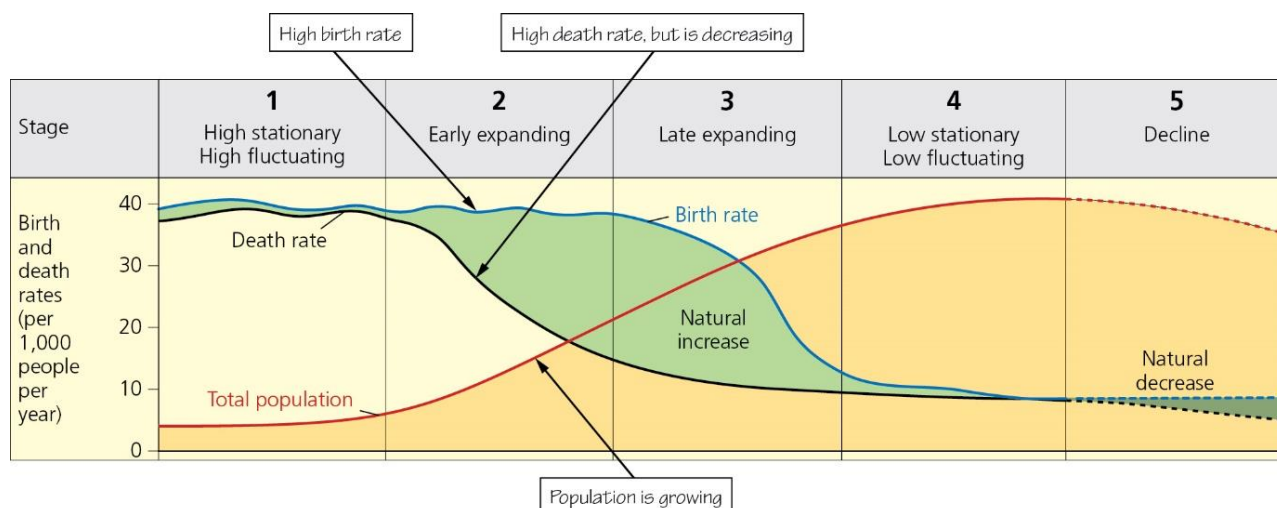
16.7 Why is Yemen the poorest country in the Middle East?

Population change in Yemen

1 **Young (0–15):** 39.6%**Economically active (16–65):** 57.5%**Old (65+):** 2.8%2 *Example answer:*

This suggests that Yemen has a youthful population, with far more young people than old people. There are also more people who are economically active than dependent.

3 Yemen is in Stage 2 of the demographic transition model.



16.8 Why is there ongoing conflict in the Middle East?

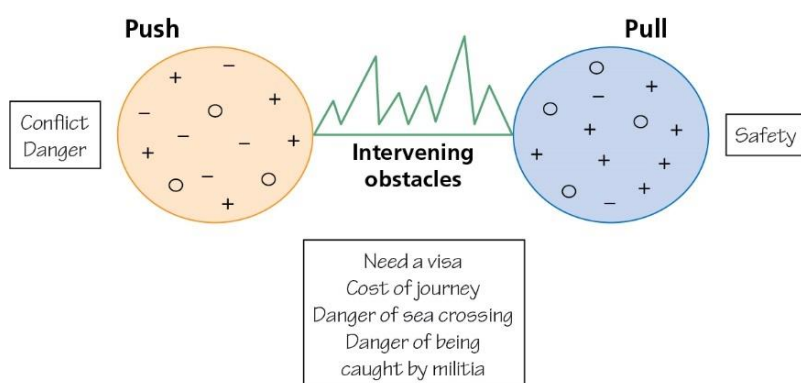
Reasons for conflict in the Middle East

- 1 Wars occur on a regular basis in the Middle East, for a variety of reasons. Many country borders in the region were created artificially by Britain and France when the regions were colonies. Israel, for example, was created in 1948 as a Jewish homeland, dividing Palestine, causing ongoing conflict. In 2011, protesters across the Middle East region took to the streets, demonstrating against their governments, where unemployment and corruption were common. This was called the Arab Spring and led to a change of government in several countries and ongoing armed conflict in others. Oil and the wealth generated by it are significant causes of conflict in the region. This has led to the interference by countries like the USA in conflict, to protect their economic interest, which only intensifies conflict. There is religious division in the region between two Islamic sects, the Shia Muslims and the Sunni Muslims.
- 2 Sunni Muslims: Saudi Arabia, Jordan, UAE, Egypt, Syria, Oman, Yemen, Qatar, West Bank
Shia Muslims: Iraq, Iran

16.9 What are the global consequences of war in Syria?

The refugees of Syria

1

2 *Example answer:*

The refugee camp is overcrowded as so many people have fled Syria. Several families have to share a shelter. When they build their own extensions to shelters, they may be demolished. Tents are supposed to last six months, but many families live in them for longer. They can collapse when there are storms or burn if there are fires, so families are keen to improve them. Families are also given a kitchen set, stove and bedding. Community spaces are provided for people to meet up. Water is distributed every day and container buildings house schools. Food vouchers are given to people to use in a supermarket outside the camp, but refugees have set up their own shops, including a bakery which employs 20 refugees. There are seven schools, but some children don't go to school, working to support their families instead. Refugees often move again from the camps so that they can find jobs and better homes. They remember the homes they left behind and hope they can live in homes like these again.

16.10 Why is the Middle East an important world region? Review

Middle East Review

1 *Example answers:*

The Middle East as a region

The Middle East has long been important for trade and was colonised by Britain and France. The legacy of this colonialism is that people from different groups have been forced together, leading to conflict. Much of the region is desert or semi-desert, but there are parts with a Mediterranean climate.

Population

Desert areas are sparsely populated as they have little water and can be very remote. Coastal areas and land alongside rivers such as the Nile are often densely populated. The region is very ethnically diverse. There are large numbers of migrant workers in countries like Dubai.

Plate tectonics

There are volcanoes and earthquakes in the Middle East as there are plate boundaries in the

region. The Arabian and African plates are diverging at the Red Sea, whilst the Eurasian and Arabian plates are converging in the north of the region.

Migration

Conflict has forced people to migrate from many different parts of the Middle East through the years. The war in Syria has led to the growth of large refugee camps in countries including Türkiye. People have also been forced to move due to natural hazards such as the earthquake which struck Syria in 2023.

Economy

There are large and important reserves of crude oil, which have made some countries very wealthy. However, some countries are diversifying their economies as they are thinking about the future when oil reserves run out or aren't needed. An example is Dubai, which has invested in tourism and becoming a 'gateway to global trade'.

2 Example answer:

The Middle East is important because:

- 1 It is important historically and culturally.
- 2 It is an important region for trade.
- 3 It has the largest and most important reserves of oil.
- 4 Innovative ideas are being used to diversify economies.
- 5 Conflicts affect people both in the region and across the world.

17.1 Are natural disasters 'natural'?

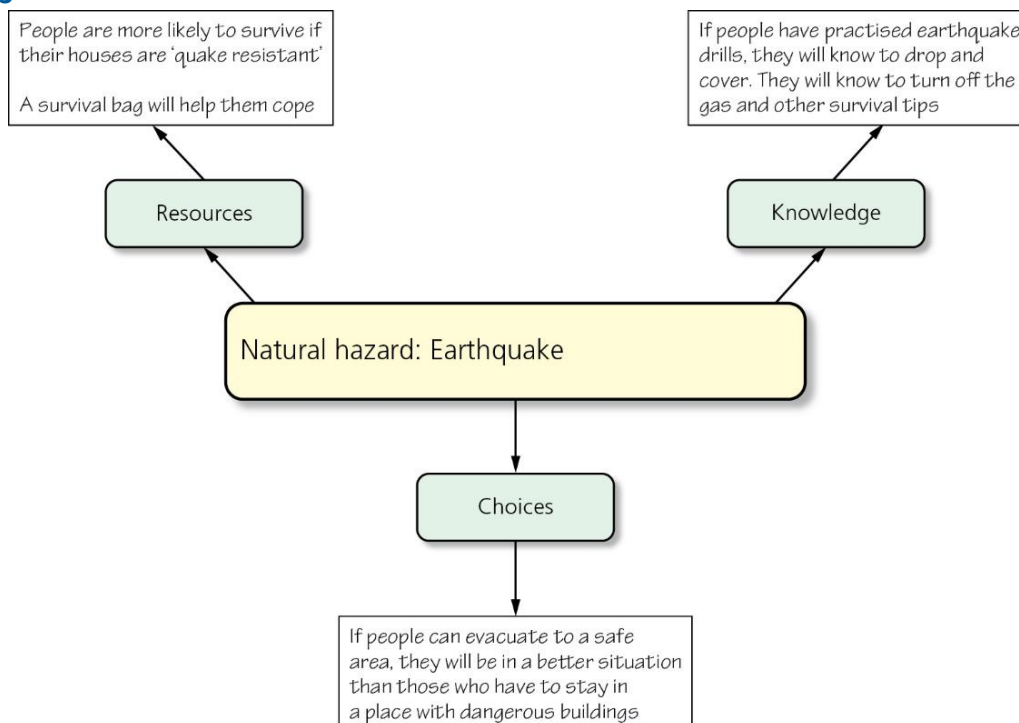
Vulnerability to hazards

1 *Example answer:*

Some people don't get the chance to be educated about how nature could harm them. Some don't have the money and resources needed to protect themselves – an example is people wanting to live in a well-built home, but not being able to afford this. People can't make choices to prevent harm if they are limited in what they can do and where they can do it, which could be because of laws.

2 *This will depend on the hazard chosen. Here is an example:*

3



17.2 Which parts of the world are vulnerable to natural hazards?

Global deaths from natural disasters

Example answers:

1 As countries have developed, they are more likely to be able to predict droughts and floods and have plans in place to help people cope with them. They may have built flood defences and improved water security by building more reservoirs.

2 Earthquakes are much harder to predict than weather hazards. Events such as the 2004 Boxing Day tsunami affected huge areas of the world.

3 227,000 people died in the 2010 Haiti earthquake. Haiti is a country where a large proportion of the population lives in poverty, and it is located on plate boundaries, so has a high risk of earthquakes. The poor education system meant that people had little knowledge about earthquakes, but the lack of resources due to poverty was the most significant factor. Most people lived in houses made from mud bricks, which crumbled easily when the earthquake

struck. Widespread poverty meant that people didn't have the choice to build better houses. The government was also ineffective, meaning that the immediate response wasn't very effective.

17.3 Was the 2010 Haiti earthquake a natural disaster or 'disaster by choice'?

Disaster by choice?

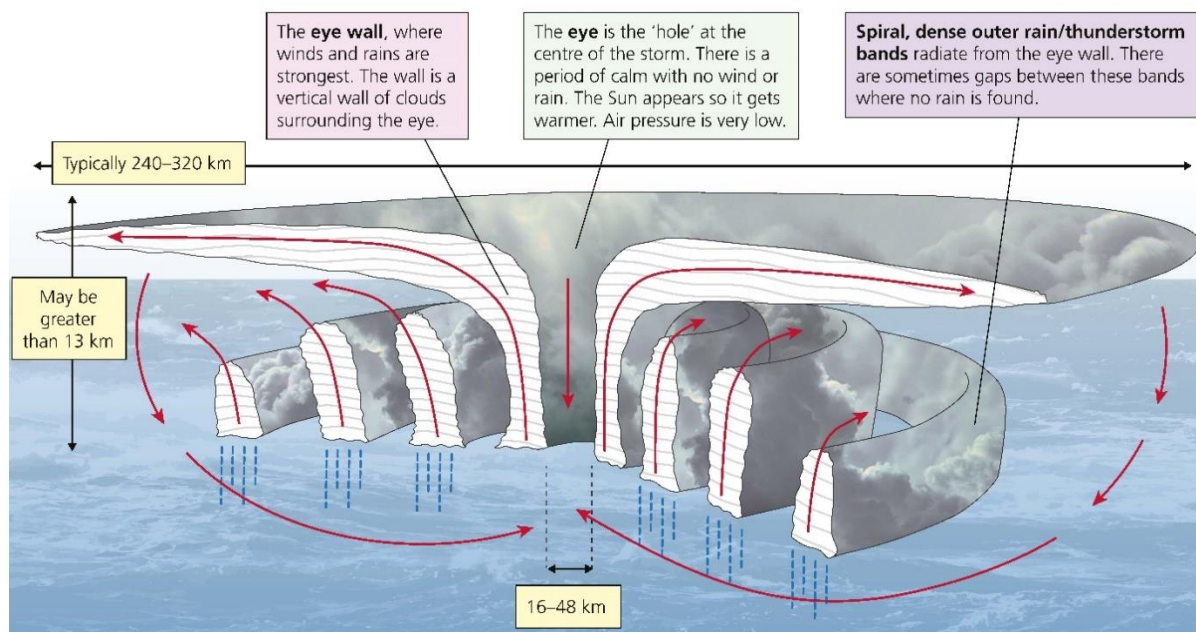
Example answers:

- 1 The cholera outbreak was thought to have been started by an aid worker who was infected, so their choice to travel to Haiti could be said to have led to the outbreak. The aid agency who sent the aid worker also made a choice. However, if Haiti had better systems for providing clean water, cholera wouldn't have spread, meaning the choices made in the past had a big impact.
- 2 The aid agency could have had a quarantine period to make sure workers weren't carrying diseases, but this would have slowed the response down. The government of Haiti could have invested in better water supplies but had limited money to do this. Aid agencies could have helped the government improve the water supplies.
- 3 Water supplies could be improved so that cholera can't spread so easily in the future. The health care system could be improved so cholera can be treated easily and a plan put in place for limiting the impact of future outbreaks.

17.4 What is a tropical cyclone and how do people make them more destructive? Part 1

Tropical cyclones and vulnerability

1



2 *Example answer:*

Ahead of the cyclone the weather will be calm, but the wind speed will start to increase as the cyclone moves closer. When the cyclone reaches an area, it will experience rain and increasingly strong winds until the eye passes over, when it will experience a period of calm. Once the eye passes, the winds will become very strong and rain will fall again, reducing in intensity as the eye moves further away.

3 *Example answer:*

A place will be more vulnerable to a cyclone if it is coastal and flat as there is likely to be a storm surge. It will be more vulnerable if there has been poor planning, meaning that people don't know what to do or where to go. Vulnerability is also increased if the population is poor as they will have limited resources to evacuate and protect themselves.

17.5 What is a tropical cyclone and how do people make them more destructive? Part 2

Vulnerability to tropical storms in Florida

1 *Example answer:*

I understand why people in Florida have removed the mangroves, as they want to be able to use the beaches and get to the sea more easily, but I think this is a bad choice. Florida often experiences hurricanes, which lead to storm surges, which flood flat coastal areas. Mangroves can absorb the impact of hurricanes and protect buildings behind them from flooding, but if they are cut down this protection is lost.

2 *This answer will depend on the choice made by the student. Here are two examples:*

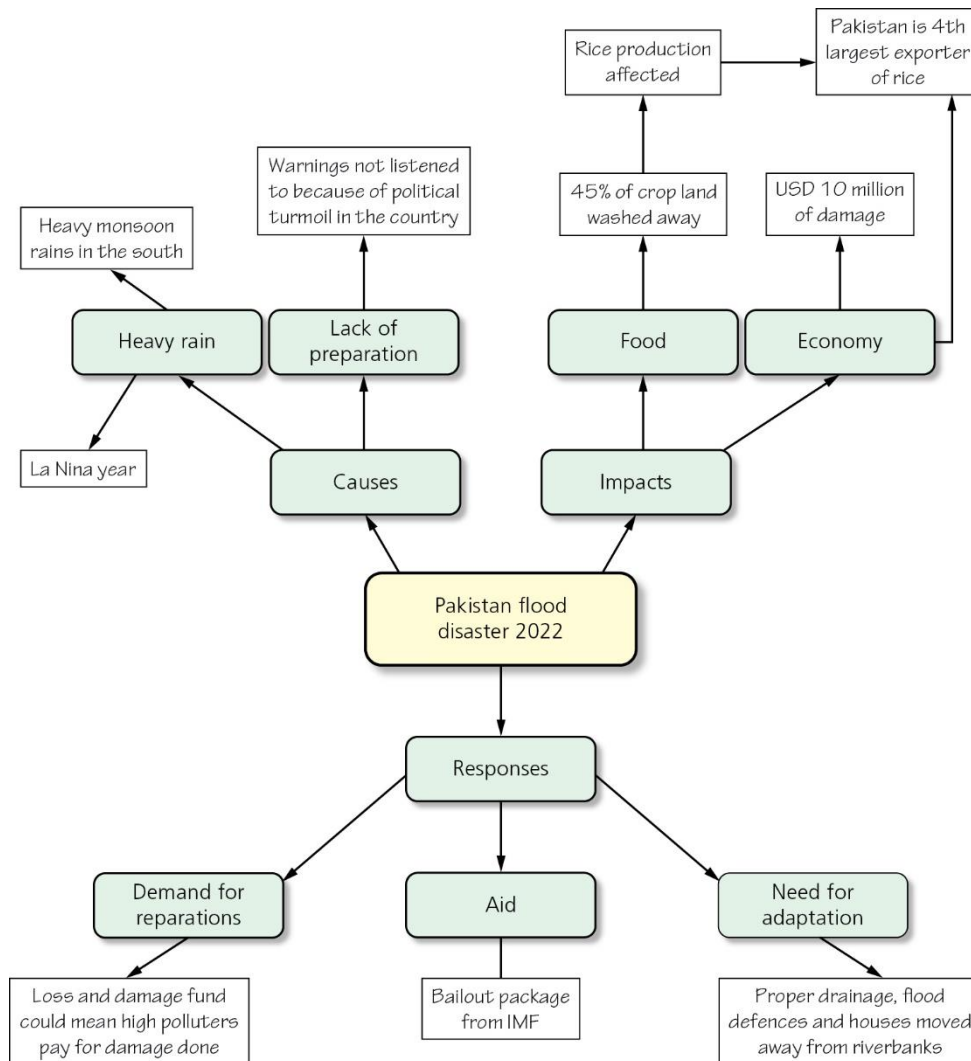
I would choose to live on the coast in Florida because it is beautiful and I would like to be able to go to the beach. The USA is a rich country and so can monitor the weather carefully, warning people in Florida if a hurricane is coming so that they can evacuate. I would evacuate if a hurricane was forecast and would insure my home so that I could mend anything broken by the hurricane.

I wouldn't choose to live on the coast in Florida because the land is very low lying and the area experiences hurricanes, which can flood beachside properties. I would rather live somewhere higher and safer. I am also worried that rising sea levels due to global warming will make the Florida coastline a more dangerous place to live.

17.6 The 2022 Pakistan flood: a natural or human disaster? Part 1

Pakistan Flood 2022

1



2 Example answer:

It is important to read articles by people living in the country affected by hazards as they may have first-hand experience of the hazard and will understand how the hazard is affecting their country in particular ways due to its context. People from outside the country may have different values to people in the country and interpret the impact of the hazard in different ways.

17.7 The 2022 Pakistan flood: a natural or human disaster? Part 2

Reducing deaths from cyclones in Bangladesh

Articles written to celebrate Bangladesh's achievements in reducing deaths from cyclones should include:

- A suitable headline in the top box – this should have a celebratory tone.
- Information about successes such as:
 - one of the best disaster warning systems in the world, evacuation plans and shelters
 - children learn about cyclones in schools and take part in simulations
 - technology to forecast and track cyclones and floods to inform updates
 - sending information and updates to everyone using mobile phones.
- A relevant illustration in the blank box, for example a warning coming through on the screen of a mobile phone.

Students should take care with their spelling, punctuation and grammar.

17.8 The 2022 European heatwave: a sign of things to come?

Coping with heatwaves

- 1 This will depend on the student. They may identify people who are very young or very old as being vulnerable, or people with conditions such as asthma.
- 2 Keeping out of the sun at the hottest part of the day. Closing windows and shutting curtains in rooms facing the sun. Wear hats and sunscreen when going out. Drinking plenty of fluids and not drinking alcohol.
- 3 Someone may be suffering from heatstroke if they are confused, lack co-ordination, have a fast heartbeat or rapid breathing, are short of breath, have hot skin that isn't sweating or are having seizures.
- 4 If you think someone has heatstroke, you should call 999 and then try to cool them down.
- 5 You can stay safe when swimming by looking for warning signs, going to areas with lifeguards, being aware of cold water shock, getting out of the water as soon as you start to feel cold, swimming parallel to the shore and always swimming with someone else.

17.9 Covid-19: a 'disaster by choice'?

Covid-19

1 What does 'encroaching on ecosystems and wildlife' mean?

It means humans using areas which are habitats for wildlife, starting to take them over.

Why does this happen?

This happens because villages and towns grow out into the countryside and people are always looking to use the resources in areas for farming, mining etc.

2 What is 'local and international monitoring'?

Local monitoring means keeping an eye on what is going on in small areas, whereas international monitoring happens at a much larger scale.

Why is this important when there is an outbreak of a disease?

Monitoring needs to happen at both scales so issues in a local area are quickly picked up and the spread of disease is then monitored across countries as well.

3 What does 'vocal minorities with disinformation' mean?

People who don't listen to the science and speak loudly about what they think is happening without evidence to back these ideas up. This often happens on social media.

Why did this cause problems during the pandemic?

Some people said the pandemic wasn't real and there were false cures for Covid spread on social media.

4 Taking all of these points into account, why do you think Kelman argues that 'disasters occur due to societal failures, not nature'?

Kelman suggests that society caused the pandemic by moving into ecosystems and then didn't manage the situation well due to failures in monitoring etc.

To what extent do you agree?

This will depend on the view of the student.

17.10 Are natural disasters 'natural'? Review

Natural disasters review

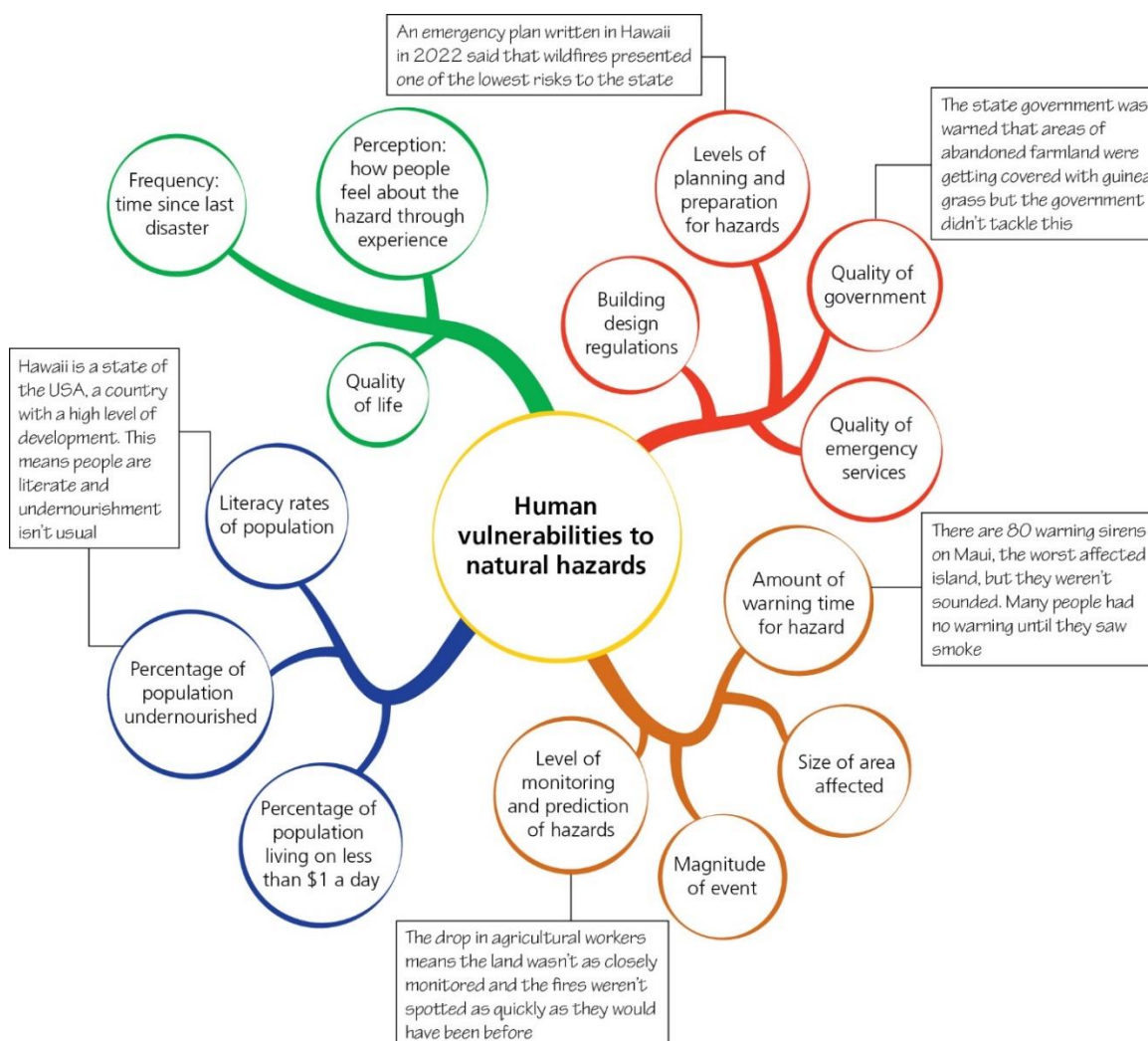
1 Example answers:

Key term	Definition	Why is it important to know this?
Natural hazard	Extreme natural events that can affect people, property and the environment.	Natural events may not matter if they don't harm people etc.
Natural disaster	When a natural hazard event happens and causes harm to people, property and the environment, it is known as a disaster.	This is different from a hazard because the event has taken place and caused harm.
Vulnerability	People don't have resources, knowledge or choices available to stop nature harming them.	People will suffer more harm in natural disasters if they are vulnerable.
Colonialism	When one country controls another country.	A country's past will often affect its present and future.
Reparations	When one country pays money to another country to help them repair problems caused by the first country	Paying reparations can help develop countries affected by colonialism.

	in the past, i.e. through colonialism or pollution.	
Infrastructure	Physical and organisational structures needed for a society to operate, i.e. roads, internet.	If the infrastructure collapses, it is very hard to respond to a disaster.
Impervious surfaces	Water doesn't soak in, i.e. concrete	More impervious surfaces due to urbanisation means an increased flood risk.
Climate change	Long-term shifts in temperatures and weather patterns.	Increased temperatures mean more energy for hurricanes, whilst changing rainfall patterns can lead to floods and droughts.
Heatwaves	Prolonged period of weather that is much hotter than usual.	Heatwaves can be hazardous and are increasing due to climate change.
Wildfires	A large and destructive fire that spreads through an area and is difficult to control.	Wildfire disasters are becoming more common due to climate change and people moving into vulnerable areas.
Pandemic	When an infectious disease spreads across a region or the world at a particular time.	Since 2020, people are much more aware of the potential impact of pandemics.

2 This will depend on the natural disaster chosen. Here is an example:

Chosen natural disaster: Hawaii wildfires, 2023



18.1 What is the future for our planet?

Different views about climate change

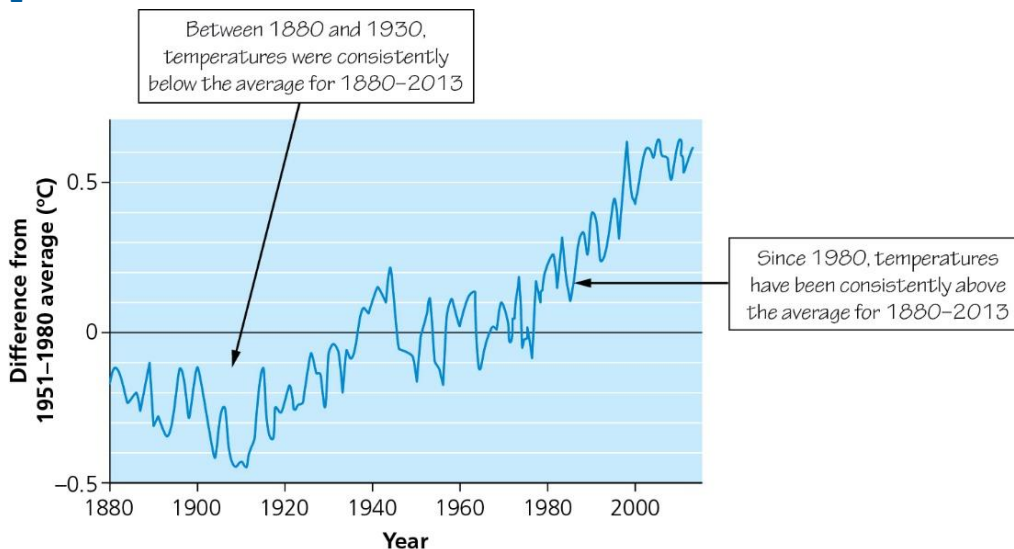
Example answers:

- 1 Greta Thunberg is talking to the older generation, including politicians and business leaders. She is talking about the younger generation who have to live with the consequences of climate change.
- 2 The CEO of ExxonMobil argued in 1997 that people were only contributing four per cent of carbon dioxide in the atmosphere because his company was selling fossil fuels. He didn't want to admit that burning fossil fuels was releasing carbon dioxide as it would affect his business negatively.
- 3 There are a range of difficult choices to be made when tackling climate change. One is how to cut carbon emissions without causing too much damage to the economy, an example being the closure of coal mines to reduce emissions, resulting in miners losing their jobs. However, these miners may be able to get jobs in new green industries.

18.2 What is the evidence for climate change?

Analysing evidence of climate change

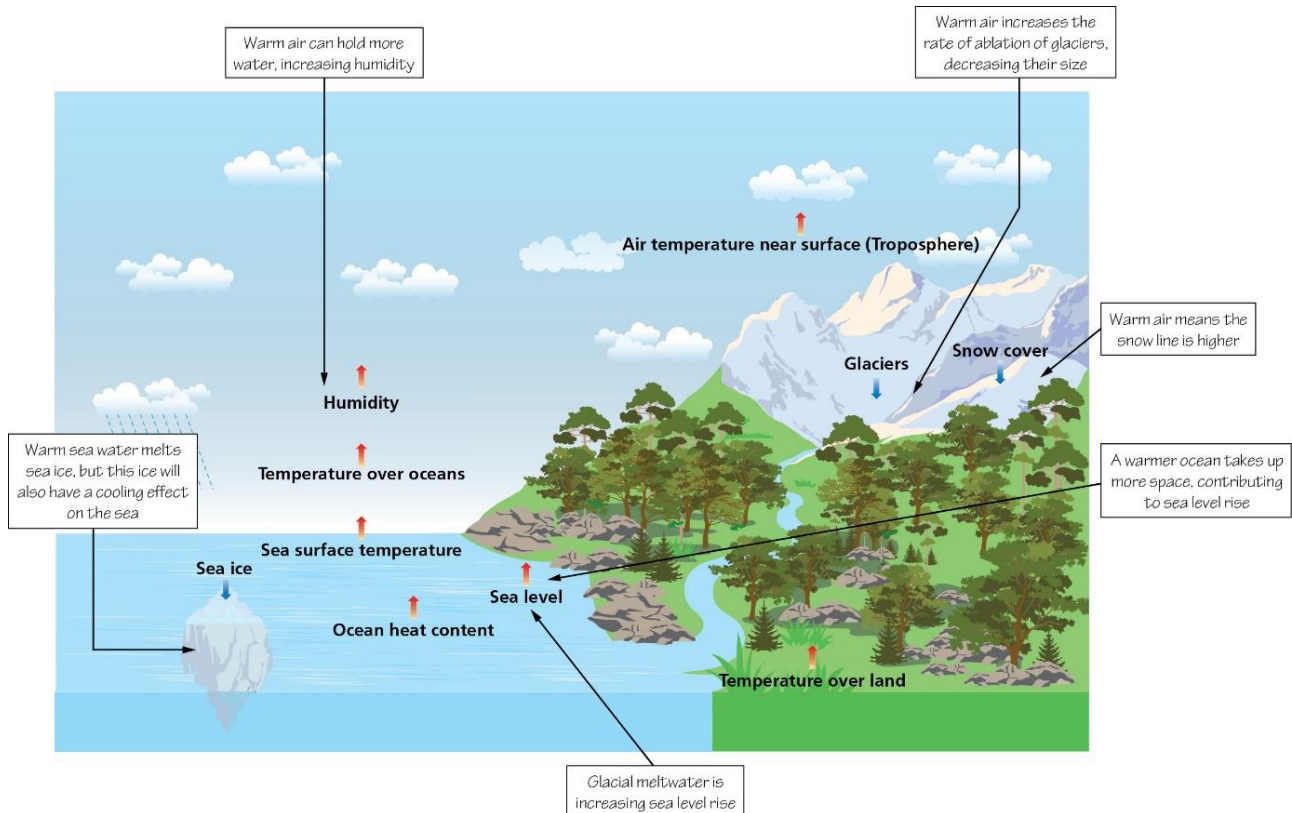
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2 *Example answer:*

The world's climate is changing because temperatures are rising. Warm air can hold more water, so rainfall patterns are also changing. Warmer temperatures also lead to more extreme weather.

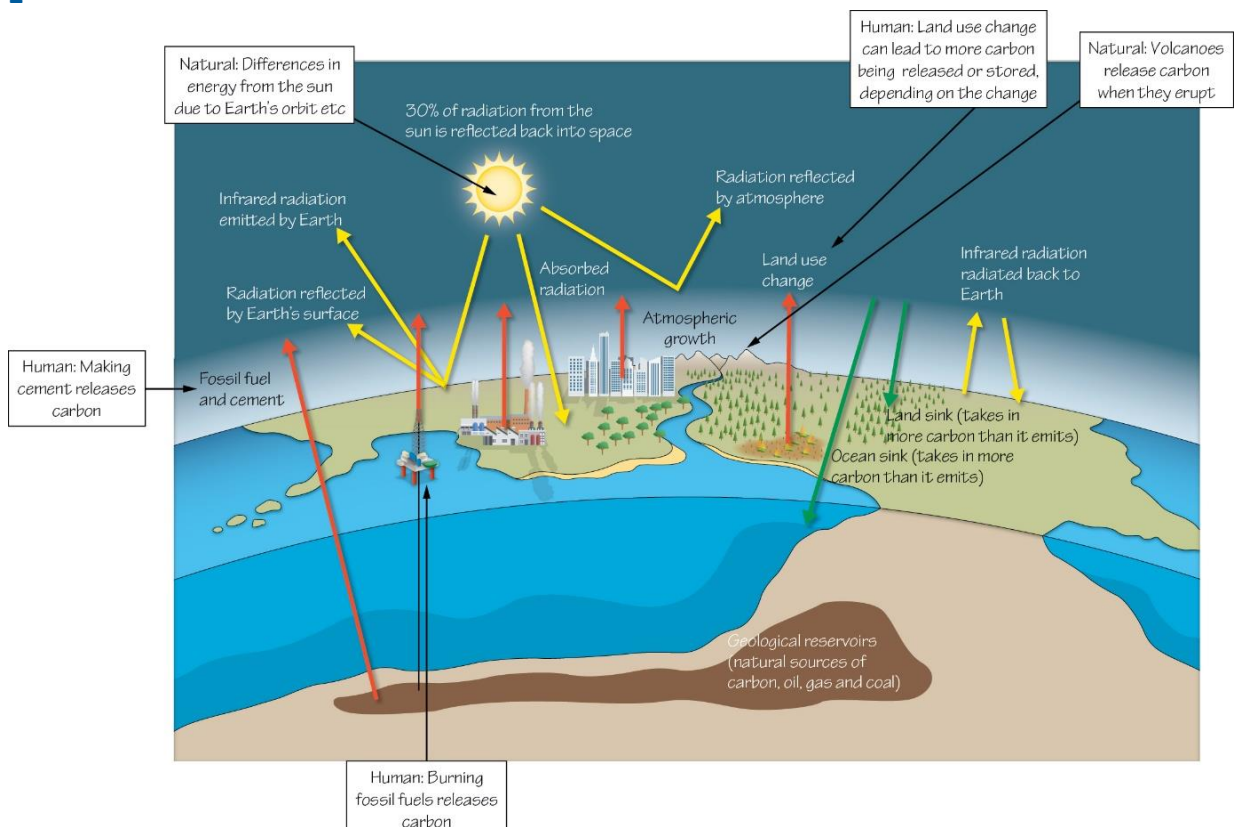
3



18.3 What are the causes of climate change?

The greenhouse effect

2



3 Example answer:

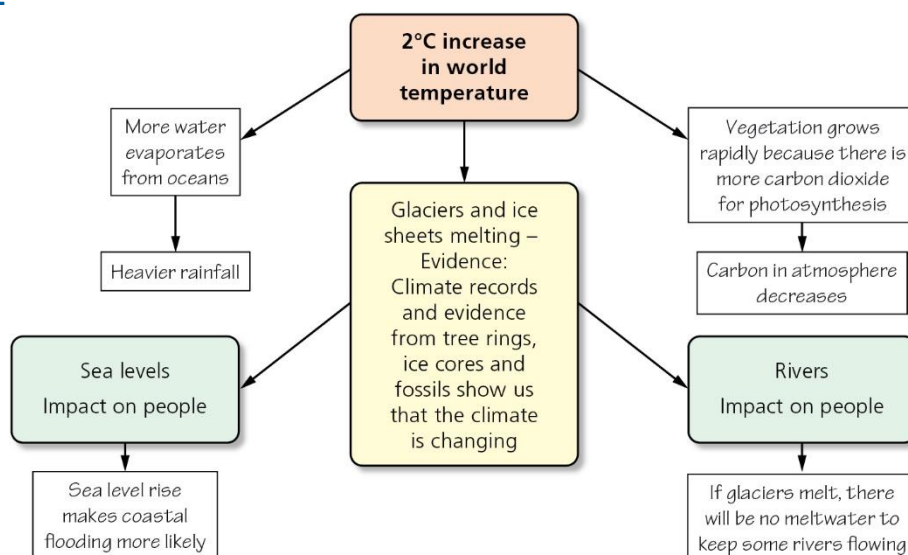
Increases in greenhouse gasses in the atmosphere mean that more of the heat radiated from the Earth's surface is absorbed by the atmosphere. This increases temperatures around the world, with some areas more affected than others. Oceans absorb heat from the atmosphere and become warm. These changes affect rainfall patterns and make extreme weather events more likely.

18.4 What are the consequences of climate change for our planet? Part 1

Researching the consequences of climate change

1 Answers will depend on the consequences chosen. Here are some examples:

	Consequence	Description of impact on people and the planet
1	Heatwaves	People may suffer from heat exhaustion or heatstroke, especially the very young and very old. Birds find it particularly hard to adapt.
2	Drought	People experience water shortages; wetlands dry out, affecting their ecosystems.
3	Stronger storms	There is more energy in the atmosphere, so hurricanes can become more intense. Coastal communities may experience flooding.
4	Coral bleaching	Warmer oceans and increasing acidity due to oceans absorbing more carbon means coral becomes bleached, affecting the ocean food chain.
5	Melting glaciers	Meltwater from glaciers is used as a water supply for major cities including Lima in Peru, so these cities risk water shortages.

2

18.5 What are the consequences of climate change for our planet? Part 2

Create a campaign poster supporting people affected by climate change

Students should create a poster to promote the climate change actions being carried out by either Oxfam or ActionAid. Posters should include:

- the name and logo of the organisation
- a catchy title to hook people in to look at the poster in detail
- photos and data to provide evidence of the impact of climate change on poverty
- key facts, which are highlighted.

18.6 What are the consequences of climate change for the UK?

Impact of climate change on the UK

1 *Example answer:*

Impact of climate change	Effects
Rising temperatures	Warmer and wetter winters. Hotter and drier summers. More frequent and intense weather extremes.
Rainfall patterns and water supply	More rain in storms and heavier rain in general. Flash flooding is more likely, especially in urban areas. Risk to water supplies.
Oceans	Oceans are warming and their chemical composition is changing.
Food production	Increased food insecurity as conditions for growing crops change. Failure of fisheries. Spread of pests into new areas.
Ecosystems	Increased risk of wildfires, damage to marine ecosystems. Loss of biodiversity.
Human health	Severe heatwaves risk the health of vulnerable people.

2 Climate change is likely to mean **more frequent and intense flooding**. **Floods destroy – lives, livelihoods, and property**. **Our flood defences reduce the risk of flooding, and our flood warnings help keep communities safe when it threatens**. But we can never entirely eliminate the risk of flooding. This is why we have **launched guidance on flooding**. **Checking your flood risk** is the first step to protecting yourself, your loved ones and your home.

3 *Answers will depend on the postcodes entered.*

18.7 What decisions do we need to make about climate change? Part 1

Working towards very low emissions

Students should create a poster with the infographic in the centre, aiming to encourage people to work towards the low emissions scenario.

They may:

- give an overview of the infographic
- explain what the infographic tells us about the different scenarios

- explain why it is important to work towards the low emissions scenario
- give examples of what we can do to work towards the low emissions scenario.

The best posters will present their message clearly, with reference to the infographic.

18.8 What decisions do we need to make about climate change? Part 2

Tackling climate change at different scales

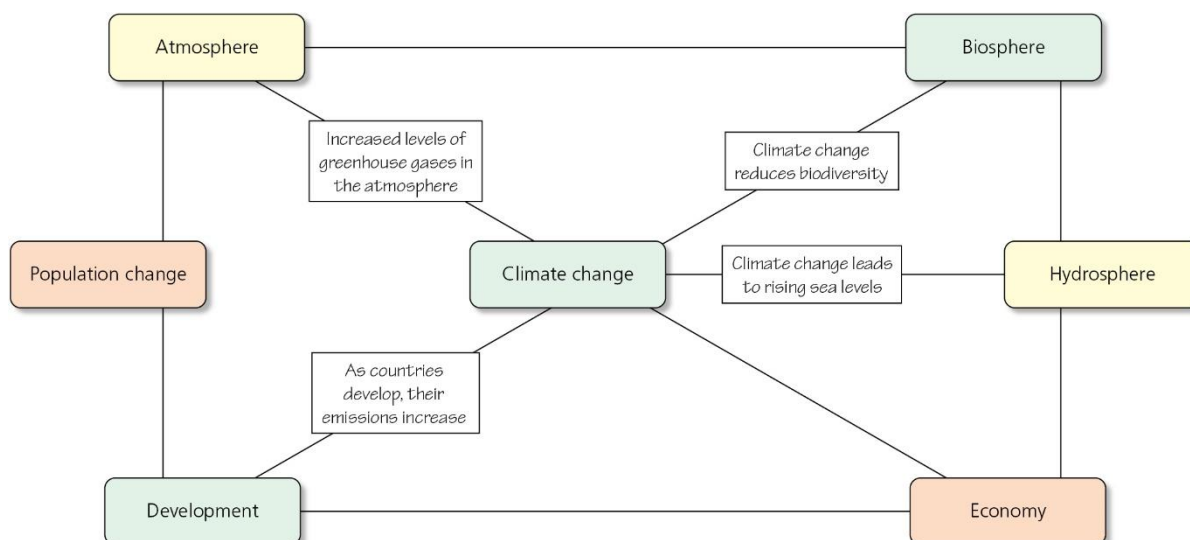
Answers will depend on the choices made by students. Here are some examples:

- 1 I would like to eat a plant-based diet so that less carbon is being released producing my food. The diagram shows that this would have a high impact.
- 2 A barrier that could stop me doing this is that I often eat with my family and it would be difficult if I was eating something different to them. They might be happy to eat some plant-based meals though.
- 3 If my school offered a good range of plant-based meals, it would help me to achieve this. It would also help if shops made this kind of food cheaper.
- 4 If everyone had one less child, it would mean fewer people using resources. This would make the most difference if people in wealthy countries have fewer children as they use the most resources.

18.9 What is the future for our planet? A geographer's view: Review

What is the future for our planet? Review

- 1 There are many connections students could make. Here are some examples:



- 2 Example answer:
Daunting means that something is intimidating. The 'daunting power of humans' means that people can make really big changes to the Earth.
- 3 This will depend on the view of the student. Here is an example:
 - a) I would like to see governments helping people to use green energy and conserve energy, setting up systems for this to happen without it being too expensive. I would like to see laws to control how businesses use resources and the environment.

- b) Energy companies need to generate renewable energy and help people to conserve energy in their homes.
- c) Banks could offer loans to people who want to set up green businesses and give them advice on how to run their businesses.
- d) Educational organisations should make sure young people know how their choices affect the environment so they can make informed choices in the future. They should set a good example by using renewable energy and conserving energy.

18.10 What is a geographer? Review

What is a geographer? Review

This will depend on the careers chosen by the student. Here are three examples:

Career 1: International development

Working to help countries develop economically and socially. This could be running projects, assessing political situations, working out how to spend money and planning development strategies. It could involve working for a charity, a government department or an organisation like the United Nations.

Career 2: Risk management and insurance

Geographers can understand and analyse human and environmental changes and hazards, which is important when analysing risks and deciding how to manage them. They can also model risks and understand how they affect people at different scales. This career could involve working for an insurance company, a local council or an environmental management company.

Career 3: Mapping and GIS

This involves handling, analysing and presenting geospatial data and is becoming more and more important in the UK economy. GIS specialists have a wide range of opportunities, including designing AI to improve mapping, creating hazard maps and analysing the predicted performance of shops in different locations.

This will vary from student to student. Here are some examples:

Skill 1: Fieldwork

I have learnt how to collect information in different ways to answer different questions. This could be useful if an employer wants me to carry out research to answer a question or solve a problem.

Skill 2: Communication

I have learnt how to speak and write clearly and how to structure an argument. Communication is important in every job as you need to be able to speak to other workers and customers and to share ideas.

Skill 3: Reading information

I have learnt how to read information so that I can understand key points and draw conclusions. An employer might want me to read information about an issue and draw conclusions from it.

This will depend on the student and could be very varied. They may think about:

- knowledge gained
- understanding of different people and places
- awareness of issues
- skills developed