



Answer(s)



Question(s)

- Give an example of a..
- (i) Tectonic Hazard
 - (ii) Atmospheric Hazard
 - (iii) Geomorphological Hazard

- Tectonic Hazards** – e.g. volcanoes, earthquakes, tsunamis
- Atmospheric Hazards** – hurricanes and tornadoes
- Geomorphological Hazards** – e.g. landslides, mudslides

Fold along here



Answer(s)



Question(s)

What is a natural hazard?

A natural hazard is something that poses potential risk of damage to property and loss of life

Fold along here



Answer(s)



Question(s)

Define the following terms:

- 1. Epicentre
- 2. Focus
- 3. Magnitude

- 1. **EPICENTRE** – the point on the surface directly above the focus of an earthquake – the most damage often occur here
- 2. **FOCUS** – this is the point underground where the earthquake starts – it is here where the greatest release of energy occurs.
- 3. **MAGNITUDE** – strength of an earthquake, reflecting the amount of energy released.

Fold along here



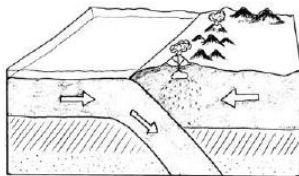
Answer(s)

A Destructive Boundary



Question(s)

What type of boundary is shown in the diagram below? Describe what happens here.



- Oceanic and continental plate move towards each other due to convection currents.
- Denser oceanic crust is subducted forming an oceanic trench
- Heat from the mantle & friction between plates causes the ocean plate to be destroyed
- As the plate melts, magma forms and due to the pressure and the heat is forced to rise to the surface
- Magma erupts at the surface as lava, form a volcano
- Fold mountains (e.g. Andes) are created due to the impact of collision (earthquakes may occur)

Fold along here



Answer(s)



Question(s)

Give some reasons why people remain in hazard vulnerable areas

- 1. **Can't move** (lack of knowledge, language barrier, expense)
- 2. **Don't want to go** (e.g. optimistic it wont happen)
- 3. **Worth staying** – jobs, resources
- 4. **Can't accurately predict hazards** – location, magnitude, timing

Fold along here



Question(s)

Give three differences between oceanic and continental crust

Answer(s)



- Oceanic crust is thinner (5-10km thick whereas continental is 25-100km thick)
- Oceanic crust is denser than continental crust
- Oceanic crust is constantly renewed and destroyed (continental is permanent and cannot be destroyed)
- Oceanic crust is mainly basalt whereas continental is granite

Fold along here



Question(s)

Give a named example of:

- Constructive Boundary
- Destructive Boundary
- Collision Boundary
- Conservative Plate Boundary

Answer(s)



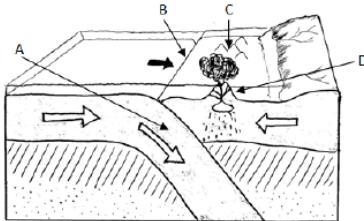
- **Constructive Plate Boundary** e.g. Mid-Atlantic Ridge (Eurasian and North American plate)
- **Destructive Plate** – South American and Nazca plate
- **Collision Boundary** – Indian and Eurasian Plate (The Himalayas)
- **Conservative Plate Boundary** – San Andreas Fault – North American and Pacific Plate

Fold along here



Question(s)

Name the features at A, B, C and D



Answer(s)



- A – subduction zone
- B – oceanic trench
- C – island arc
- D - volcano

Fold along here



Question(s)

Describe the global distribution of earthquakes and volcanoes

Answer(s)



- Both earthquakes & volcanoes **occur in long narrow bands** – often following the edge of continents (e.g. W Coast of S America)
- Largest bands of **volcanoes** are found along the **Pacific Ring of Fire** (around the Pacific Ocean)
- **Earthquakes and Volcanoes** are also found together in **bands in the middle of oceans** (e.g. Mid-Atlantic Ridge)
- **NOT all follow the same pattern** – some volcanoes are found in isolated clusters e.g. **Hawaiian Islands** – middle of Pacific Plate.

Fold along here



Question(s)

At which plate boundary will oceanic trenches, volcanoes and fold mountains be found?

Answer(s)



Destructive Boundary (Oceanic-Continental)

i.e. where subduction of oceanic crust creates oceanic trench, and forms volcanoes and the collision between the plates creates fold mountains.

Fold along here



Question(s)

Describe the formation of Fold Mountains

Answer(s)



- Fold mountains form at **oceanic –continental plate boundaries** or **continental-continental plate boundaries**
- At these boundaries as the two plates meet, the force of the collision causes **folding** and **faulting** to occur
- This results in uplift of rock and sediment squeezed during the collision
- The result is **fold mountains** such as the **Himalayas**.

Fold along here



Question(s)

What is a hotspot?

Answer(s)



A hotspot is a plume of hot molten material rising from the mantle. This magma is lighter than the surroundings and rises – erupting at the surface where the crust is thin, creating a volcano (and eventually a volcanic island). They are fixed within the mantle and as the crust moves over the top a chain of volcanic islands is left behind (e.g. Hawaii).

Fold along here



Question(s)

What are the causes of plate movements?

Answer(s)



Convection currents and slab pull and ridge push.

Fold along here



Question(s)

Name the features found at an oceanic-oceanic convergence zones

Answer(s)



1. Oceanic Trench
2. Subduction Zone
3. Volcanic Islands
4. Island Arcs

Fold along here



Question(s)

Describe an oceanic trench

Answer(s)



Long, deep and narrow features form the deepest part of an ocean floor, marking the point where one plate is subducted under another.

Fold along here



Question(s)

Name an example of:

- Fold Mountains
- Oceanic Ridge
- Islands formed by hotspots
- Conservative Boundary

- Fold Mountains – e.g. Himalayas / Andes
- Oceanic Ridge – Mid-Atlantic Ridge
- Islands formed by hotspots – Hawaii
- Conservative Boundary – San Andreas Fault

Fold along here



Question(s)

For the Japan 2011 earthquake, what was the..

- Date of the earthquake
- Magnitude
- Depth of Focus
- Boundary Type

- Date of the earthquake – 11th March 2011
- Magnitude – 9.0
- Depth of Focus – 30km
- Boundary Type – **Destructive Boundary (Pacific and North American)**

Fold along here



Question(s)

For the Nepal 2015 earthquake, what was the..

- Date of the earthquake
- Magnitude
- Depth of Focus
- Boundary Type

- Date of the earthquake – 25th April
- Magnitude – 7.9
- Depth of Focus – 15km
- Boundary Type – **Collision Boundary (Eurasian and Indian plates)**

Fold along here



Question(s)

How can educating people help to save lives in a natural disaster such as an earthquake?

- Increase awareness of what to do in the event of an earthquake (e.g. through disaster drill days) helping to save lives
- Educate people about the importance of being prepared – e.g. survival kit – can help save lives in the event of a quake – e.g. food/water if trapped for several days and basic first aid supplies

Fold along here



Question(s)

Describe examples of what can be done to help limit the damage caused by earthquakes to buildings.

- Foundations sunk into bedrock
- Rubber shock absorbers between foundations and building (to absorb energy waves)
- Computer controlled counter-weights on roof
- Automatic shut off switches for electricity and gas
- Interlocking steel frames (sway during earth movements)
- Transamerica Building (San Francisco) – triangular building wide stable base and steel frame.
- San Francisco Airport

Fold along here



Question(s)

Give examples of how we can monitor and predict volcanoes

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Answer(s)



- **Satellites** (GPS) and tiltmetres monitor ground deformation as magma rises(changes in the volcano’s surface)
- **Seismometers** – measure small earthquakes / tremors (can occur as rising magma can fracture rock)
- **Thermal heat sensors** – detect changes in the temperature of the volcanoes surface
- **Gas-trapping bottles and spectrometers** – measuring sulphur gases
- **Measuring water temperature** of stream/rivers to see if it has increased.

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Question(s)

Describe efforts made to reduce the impacts of volcanic eruptions on people.

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Answer(s)



- **explosives** to divert lava flow from villages (e.g. Mt Etna – 1996)
- **spraying large volumes of water on lava flow** (cool and solidify advancing lava flows – successful in Heimaey (Iceland) – 1973 to save the port from the lava flow
- **earth walls / concrete barriers** to deflect lava flows (e.g. Mauna Loa – Hawaii – used to protect observatory)
- **digging ditches to divert lava flow paths** (e.g. Mount Etna 1991-1993)

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Question(s)

Give 4 examples of primary effects of the Japan 2011 earthquake

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Answer(s)



- 15,845 killed
- 400km stretch of coastline dropped by 0.6m
- 4.4 million households in NE Japan left without electricity
- Buildings collapsed due to liquefaction
- Nearly 4,000 roads damaged

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Question(s)

Give four examples of secondary effects of the Japan 2011 earthquake.

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Answer(s)



- Estimated overall impact of US\$300 billion
- A tsunami hit with waves up to 30m high – travelled 10km inland
- Massive coastal flooding destroyed crops / seawater contaminated soils
- Fukushima nuclear reactor went into meltdown when supplies of cold water blocked by tsunamis debris
- Shipping disrupted due to closure of ports.

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Question(s)

Give four examples of secondary effects of the Nepal 2015 earthquake.

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Answer(s)



- Avalanches on Mount Everest killed 19 people – the greatest loss of life on a mountain in a single incident
- Tourist industry saw a decrease in employment and income (usually it makes up about 9% of Nepal’s GDP)
- Food shortages due to rice seed being lost in homes ruined by the rubble
- Relief efforts made difficult by landslides and avalanches blocking the roads.

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Question(s)

Give 4 examples of primary effects of the Nepal 2015 earthquake

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Answer(s)

- 9,100 dead and over 16,800 injured
- 1 million made homeless
- 50% of schools destroyed and 25 hospitals
- Reduced supply of water, food and electricity
- Historic buildings, including temples in Kathmandu destroyed – including the UNESCO world heritage Dharahara Tower.



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Question(s)

Give 2 examples of long term responses to the Japan 2011 earthquake.

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Answer(s)

- Japan’s food exports limited due to radiation fears
- Japan government approved budget of £190 billion to attract investment to reconstruct the economy
- Long term challenge – to remove radioactive contamination
- Priority given to repair and re-opening of transport links and by Nov 2011 expressway, railway and airport was restored.



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Question(s)

Give two examples of short term responses to the 2015 Nepal earthquake

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Answer(s)

- Requested international help – search and rescue teams came from places like UK / China / India (including medical and water supplies)
- Helicopters rescued many on Mount Evert
- Half a million tents required for the homeless (many provided by the Red Cross)
- UN / WHO distributed medical supplies to reduce the spread of waterborne disease
- Sherpas used to hike relief supplies to remote areas



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Question(s)

Give two examples of long term responses to the Nepal 2015 earthquake

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Answer(s)

- Stricter controls on building codes
- June 2015 – Nepal hosted international conference to discuss reconstruction / seek financial / technical support
- Recovery needs of US \$6.8 billion – a third of the economy
- Need to boost tourism – some sites reopened by August and new routes established on Everest
- UN FAO (Food and Agriculture organisation) started a recovery phase 6 months later teaching farmers how to maintain / repair irrigation channels.



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Question(s)

Give two examples of short term responses to the Japan 2011 earthquake

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Answer(s)

- Aircraft deployed immediately to survey devastation / identify priority areas
- JSDF (Japan Self Defence Force) moved in and within 2-days had cleared debris enabling emergency goods to be delivered twice a day
- Over 116 countries / 28 international organisations responded
- A&T maintained wireless / telephone networks for free
- 140,000 evacuated 20km radius around Fukushima



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Question(s)

Why do people continue to live in areas prone to earthquakes?

Answer(s)



- As they don't happen often some don't see them as a great threat (particularly if they have never experienced one)
- Better building design means people feel less at risk from earthquakes
- Better monitoring of earthquakes and volcanoes make people feel safe
- Many live in poverty / can't afford to move
- Some might not be aware of the risk they are under.

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Question(s)

Why do people continue to live in areas of volcanic activity?

Answer(s)

Fertile soils (due to weathering of ash) means good farming areas (e.g. citrus fruits / olives – Mt Etna and Rice – Indonesia)



- **Geothermal Energy** – cheap / renewable energy – heat from earth used to create steam to turn turbines (e.g. Iceland – GE creates 25% of the electricity and provides heat / hot water for 90% of homes and buildings)
- **Tourism** – these areas have dramatic landscape attracting tourists (provides jobs / multiplier effect – e.g. Iceland (5% of GDP from tourism))
- **Mining** – precious minerals are found / can be mined – e.g. copper / gold and sulphur (Kwah Ijen mine – Indonesia)

Fold along here



Question(s)

What are the three different names for tropical storms and where are their different locations?

Answer(s)



1. **Hurricanes** – Atlantic and E Pacific Ocean
2. **Cyclones** – Indian and South Pacific Oceans
3. **Typhoons** – North Pacific Ocean.

Fold along here



Question(s)

Give four facts about the conditions required for tropical storms to form.

Answer(s)



- Form over **areas of deep water** (at least 70m)
- Form over **warm water (above 27°C)**
- Most **form 5-15° N/S of the equator** – because at the equator there is not enough spin from the rotation of the earth
- **Low wind shear** – i.e. wind stays relatively constant with height (important so it doesn't tear apart the storm clouds)
- **Tropical regions** – intense heat makes the air unstable.

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Question(s)

Give the basic sequence of the formation of tropical storms.

Answer(s)



1. Air heated above surface of water oceans rises under low pressure
2. Rising air draw up more air and moisture – causes strong winds
3. Coriolis effect causes the air to spin around a central calm eye
4. The rising air cools, condenses and forms huge cumulonimbus clouds generating torrential rain
5. Cold air sinks in the eye – lack of cloud and a calm dry area
6. The tropical storm travels across the ocean in the prevailing wind
7. Once it reaches the land the storm isn't fuelled by moisture / heat from the ocean (loses power and weakens).

Fold along here



Question(s)

True or false?

- High wind shear is required for hurricanes to form
- Surface water temperatures of less than 27°C are required for tropical storms to form
- The eye of the storm has heavy winds and rain
- Depth of water required for typhoons to form is at least 70m

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Answer(s)



- High wind shear is required for hurricanes to form (**FALSE – low wind shear**)
- Surface water temperatures of less than 27°C are required for tropical storms to form (**FALSE – need 27°C +**)
- The eye of the storm has heavy winds and rain (**FALSE – calm and little rain**)
- Depth of water required for typhoons to form is at least 70m (**TRUE**)

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Question(s)

Which way do hurricanes spin in:

- (i) Northern Hemisphere
- (ii) Southern Hemisphere

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Answer(s)



Northern Hemisphere – storms swirl anti-clockwise
 Southern Hemisphere – storms swirl clockwise.

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Question(s)

How is climate change expected to change the:

- (i) Distribution of tropical storms
- (ii) The frequency of tropical storms
- (iii) The intensity of tropical storms

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Answer(s)



1. Distribution - not expected to change
2. Frequency – likely to stay the same or decrease (but expected to be a greater number of more severe storms (4 and 5)
3. Intensity – expected to become more intense and more category 4/5 storms.

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Question(s)

What is the name of the scale on which Tropical Storms are formed? How does the scale work?

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Answer(s)



The scale is known as the Saffir-Simpson scale – it is based on wind speed – the higher the category scale – the higher the intensity of the storm.

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Question(s)

Where and when did Typhoon Haiyan strike?

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Answer(s)



7th November 2013
 Philippines in SE Asia.

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Question(s)

What category was Typhoon Haiyan on the Saffir Simpson scale and what wind speeds were reached.

Answer(s)

Category 5 and wind speeds of between 170-190mph were reached.

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Question(s)

List 5 primary effects of Typhoon Haiyan.

Answer(s)

- 6,300 deaths
- 400mm of rain – led to widespread flooding
- 40,000 homes destroyed
- 14 million affected in total – 4 million homeless
- 90% of Tacloban city was destroyed by winds and a 5m storm surge
- Widespread damage to infrastructure

Fold along here



Question(s)

List 4 secondary effects of Typhoon Haiyan

Answer(s)

1. Surface and groundwater chemicals were contaminated by chemicals / sewage leading to disease
2. Oil barge ran aground at Estancia – 800,000 litres of oil leaked – destroying habitats.
3. Agricultural land destroyed – food shortages and rice prices rose by 11.9%
4. Looting became an issue – survivors fighting for food supplies.

Fold along here



Question(s)

Give 4 immediate responses to Typhoon Haiyan

Answer(s)

- Warning on TV given and 800,000 evacuated
- 33 countries/ organisations pledged help – e.g. UK sent shelter Kits / France sent field hospitals
- \$1.5 billion of foreign aid was pledged
- Distribution of aid made difficult by damaged infrastructure
- Curfew set up after 2 days due to looting problems

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Question(s)

Give 4 long term responses to Typhoon Haiyan

Answer(s)

- More cyclone shelters built – new storm surge warning system put in place
- 'cash for work' programmes – people paid to help clear debris / rebuild the city
- Government announced a 4 year £6.2 billion programme to rebuild houses, infrastructure etc.
- Oxfam supported the replacement of fishing boats
- New legislation to prevent re-building in high-risk areas.

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Question(s)

What are the four things that can be done to reduce the effects of Tropical Storms with the acronym MPPP?

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Answer(s)

1. MONITORING
2. PREDICTION
3. PLANNING
4. PREPARATION



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Question(s)

Give 2 ways in which Tropical storms can be monitored.

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Answer(s)

1. **SATELLITES** – distinctive cloud patterns associated with tropical storms can be measured by satellite and rainclouds reaching 16km in altitude are likely to indicate intensification to tropical storm within 25 hours.
2. **AIRCRAFT** – specially equipped aircraft fly through tropical storms collecting air pressure, rainfall and wind sensors – used in forecasting models.



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Question(s)

Name an example of a cyclone that can be used to show that prediction technology is worth it

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Answer(s)

Cyclone Phailin – India – 2013 – 1.2 million had been evacuated and 21 people died as a direct result of the cyclone.

In 1999 a similar cyclone in same area hadn't been predicted – more than 10,000 lives were lost.



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Question(s)

Give four examples of how people can protect themselves from the hazards associated with tropical storms.

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Answer(s)

1. Cover windows with hurricane shutters
2. Bring in outdoor furniture and anything not secured
3. Install an emergency generator
4. Storm drains take away excessive rain / reduce flooding
5. Remove trees close to buildings
6. Houses close to the coast may be built on stilts in some area
7. E.g. Cyclone shelters in Bangladesh



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Question(s)

Give 3 examples of what people can do to plan ahead in order to reduce the hazards associated with Tropical Storms.

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Answer(s)

1. Emergency kits in the house with bottled water etc.
2. Place valuable on upper floors in waterproof containers
3. Store loose objects
4. Plan with family what to do in an emergency
5. Preparation of what to do in a Tropical Storm – e.g. National Hurricane Preparedness Week in the UK



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Question(s)

Give 3 examples of extreme weather that the UK face and that can suggest weather is becoming more extreme.

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Answer(s)



- EXTREME COLD** – 1978-79 extreme cold, also 2014-2015 was unusually cold and 2018 – ‘Beast from the East’ – risks of frost to cattle / crops, freezing conditions cause problems for traffic etc.
- DROUGHT / HEAT** – 1976 – particularly severe drought / heatwave and in 2003 there were 2,000 heat related deaths in the UK.
- FLOODING** – prolonged rainfall is common in late winter / early springs and recently have seen more severe flooding as a result – e.g. **Winter 2014 – particularly bad in S England.**

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Question(s)

Why does extreme weather occur in the UK?

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Answer(s)



The UK is at the meeting point between several different types of weather from different directions. Arctic air brings heavy snow and bitter cold and weather from the East is often also severe cold. Storms from the Atlantic bring heavy rain and strong winds and winds from the South can bring hot / sunny weather and potential heatwaves and droughts.

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Question(s)

Why might extreme weather be increasing?

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Answer(s)



- Linked to a warming world
- More energy in the atmosphere could lead to more intense storms
- Atmospheric circulation may be affected – bringing floods to normally dry regions and heatwaves to normally cooler areas.

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Question(s)

What are the predicted changes in the following as the UK’s weather changes?

- Precipitation
- River Flow
- Evaporation

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Answer(s)



- Precipitation** – likely that it will become even more seasonal but annual total will stay the same
- River Flow** – predicted that UK rivers will flood more in future winters
- Evaporation** – predicted to increase due to higher air temperatures causing more drought.

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Question(s)

Name 4 possible types of extreme weather in the UK

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Answer(s)



1. Drought
2. Heavy Rain
3. Heatwaves
4. Gales
5. Extreme Cold Weather
6. Thunderstorms

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Answer(s)



Question(s)

Name, locate and date an example of a recent extreme weather event and associated hazard in the UK

Extreme flooding in Somerset due to heavy rain in the winter of 2013-2014.

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Question(s)



Answer(s)



What was the cause of the severe flooding in Somerset 2013-2014?

Autumn/winter 2013-2014 – series of low pressure systems from the Atlantic brought weeks of prolonged rainfall

- December’s rain was twice the monthly average and it was the wettest Jan on record – 350mm of rain fell in Jan/Feb (100mm above average)
- Clay / Peat lands quickly saturated and the Rivers Parrett and Tone Flooded
- The rivers hadn’t been dredged for 20 years and made the flooding worse.

Fold along here



Answer(s)



Question(s)

Describe the location of the Somerset Levels affected by the 2013-2014 floods

Somerset levels are an area of low-lying land boarded by the Bristol Channel and the Quantock Hills to the West and the Mendip Hills to the North.

Fold along here



Answer(s)



Question(s)

Give 3 social effects of the 2013-2014 Somerset floods.

- Over 600 houses flooded
- Many people left without power
- Residents evacuated to temporary accommodation for several months
- Villages like Moorland were cut off affecting people’s daily lives (e.g. school and shopping)

Fold along here



Answer(s)



Question(s)

Give 3 economic effects of the 2013-2014 Somerset Floods

- Bristol to Taunton railway line was closed (as part of track washed away)
- Estimated that costs of flooding were £10 million
- Over 24,000 ha. of agricultural land flooded for 3-4 weeks and livestock from 16 farms were evacuated.

Fold along here



Answer(s)



Question(s)

How many cells are there in the Global Atmospheric Circulation model and what are they called?

There are 3 cells – the Hadley, Ferrel and Polar cell

Fold along here



Answer(s)



Question(s)

What is meant by a high pressure system and how will this affect the weather?

High pressure means the air is sinking and gives rise to more stable conditions. As the air is not rising, condensation is not occurring, clouds are not forming and therefore there is little rain.

Fold along here



Answer(s)



Question(s)

What is the climate like in equatorial regions? What explains this?

- At the equator conditions are hot and wet.
- The high temperatures are due to the fact that the sun is directly overhead.
- The high levels of rainfall are because the air is rising at this point at the start of the Hadley cell creating an area of low pressure. Here as the air rising, condensation occurs and clouds form. This leads to high levels of rainfall.

Fold along here



Answer(s)



Question(s)

What is the climate in desert areas like and what explains this?

- Desert climates are hot and dry.
- Most deserts are at 30°N or S of the equator. At this point air is sinking – high pressure.
- Air isn't rising and therefore there are few clouds forming and little rain.
- The lack of clouds also means that during the day it is very hot as there is nothing to stop the sun's rays and it is very cold at night.

Fold along here



Answer(s)



Question(s)

Using the global atmospheric circulation model, explain the UK climate.

- The UK is about 55°N and is close to the boundary of the cold polar air moving down from the N and the warm sub-tropical air moving up from the south. Here this is rising air, cooling, condensing and forming cloud and rain.
- Surface winds from the SW in summer bring warm and wet conditions.
- If the air comes from the north, as it often does in the winter it can bring snow and very cold weather.

Fold along here



Question(s)

Give 3 environmental effects of the Somerset Floods

Answer(s)



- Floodwater contaminated with sewage and other pollutants
- Stagnant water that had collected for months had to be pumped back into reservoirs
- Huge amount of debris to clear.

Fold along here



Question(s)

Give at least 2 strategies used to manage the risk of the Somerset Floods.

Answer(s)



- **20 year Flood Action Plan** – launched by Somerset Council and Environment Agency – includes strategies to plan / protect against it happening again in the future
- **Flood defences** – including new culverts, water control structure, more pumping stations
- **River Parrett and Tone were dredged** – to remove soil, clay and vegetation from the channel to increase capacity and reduce risks of flooding
- **Roads raised** to prevent disruption to transport in future events.

Fold along here



Question(s)

Give 3 examples of evidence for climate change.

Answer(s)



1. **Sediment cores** – remains of organisms and plankton become trapped in ocean sediments - can be used to show levels of oxygen and surface water temperatures.
2. **Tree Rings** – a tree grows a new ring every year- in warmer, wetter years, tree rings are thicker and can reveal evidence of temperature and weather changes over the past 10,000 years.
3. **Ice Core** – gas levels (oxygen isotopes) in ice cores can be used to estimate what the temperatures at the time would have been
4. **Pollen Analysis** – pollen from plants is preserved in lake beds and bogs – can help identify plants that grew in the past and the climate in which they grew

Fold along here



Question(s)

What is meant by glacial periods and inter-glacial periods?

Answer(s)



- **Glacial Periods** – when ice covered vast area of continents (last between 80-100,000 years)
- **Inter-glacial periods** – warmer period (like today) where only ice sheets over Antarctica and Greenland (last approx 10,000 years).

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Question(s)

What is meant by proxy data and how reliable are they?

Answer(s)



Proxy data is the use of 'natural-recorders' e.g. ice cores and tree rings – used to estimate what climate was like. They indicate change rather than providing direct evidence of actual temperatures.

Fold along here



Question(s)

What visual evidence of climate change is there?

Answer(s)



1. **Retreating Glaciers** – glaciers retreating and shrinking due to melting suggesting warming
2. **Rising sea-level** – since 1900 levels have risen by 20cm due to thermal expansion and melting ice sheets
3. **Seasonal Changes** – timing of bird migration / tree flowering is advancing.

Fold along here



Question(s)

Give 2 examples of external factors causing climate change.

Answer(s)



1. Solar Output
2. Orbital Geometry

Fold along here



Question(s)

Give 2 examples of internal factors causing climate change.

Answer(s)



1. Volcanic activity
2. Surface reflection
3. Changes in atmospheric gases.

Fold along here



Question(s)

Explain how Milankovitch cycles lead to natural climate change.

Answer(s)



The earth's orbit changes from elliptical to more circular every 100,000 years – when it is circular the climate is colder and when it is elliptical it is warmer. The earth's tilt of axis also changes – when the angle of tilt is greater the summers get warmer and winters cooler.

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Question(s)

How does solar output lead to natural climate change?

Answer(s)



- Sun's output can be measured by observing sunspots (dark patches on the surface of the sun).
- The number of sunspots varies increasing from a minimum to a maximum over a period of 11 years
- When there are more sunspots the sun gives off more energy by solar flares (explosions on the surface)
- When there are fewer sunspots – solar output is reduced and temperatures lower.

Fold along here



Question(s)

Suggest how volcanoes can cause climate change

Answer(s)



Volcanoes release large quantities of volcanic ash which can block out the sun and reduce temperatures (e.g. Mount Tambora – Indonesia – 1815) and volcanoes also contribute to climate change by the release of greenhouse gases.

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Question(s)

What is the difference between mitigation and adaptation with regards to strategies used to reduce the effects of climate change?

Answer(s)



Mitigation - these strategies aim to reduce the causes of global warming by reducing the concentration of greenhouse gases in the atmosphere.

Adaptation – adaptation strategies aim to limit the negative effects of climate change on humans

Fold along here



Question(s)

Describe the main changes in global climate since the end of the last ice age.

Answer(s)



- Temperatures have increased by 6°C since the last ice age
- There have been fluctuations with warmer and colder periods
- 8000-4000 years ago – 2 warmer periods with cold spell in between
- 1450-1850 – little Ice Age
- Since 1960s there has been a rapid rise in temperature

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Question(s)

How does surface reflection affect global temperatures?

Answer(s)



Different types of surface have a different albedo – capacity of surface to reflect radiation

Lighter surfaces – e.g. snow and ice reflect large amounts of radiation back to space (high albedo) reduces temperatures

Reduction in snow and ice – less sunlight reflected back and temperatures warm.

Fold along here



Question(s)

What is the overall name for cycles of orbital geometry?

Answer(s)



Milankovitch Cycles

Fold along here



Question(s)

Give two examples of key greenhouse gases

Answer(s)

1. Methane
2. Carbon Dioxide



Fold along here



Question(s)

Give two sources of:

- (i) Methane (ii) Carbon Dioxide

Answer(s)

- **Methane Sources**
Wetlands, paddy fields, landfill, burning vegetation, bowels of cattle and sheep.
- **Carbon Dioxide Sources**
Burning of fossil fuels (coal, oil and gas) in power stations and from car exhausts



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Question(s)

Why are levels of methane and carbon dioxide increasing?

Answer(s)

Methane Increasing – increase in population (particularly in LICs) means an increase in demand for rice to feed expanding population and an increase in western style diets (more cattle and sheep raised for meat); also rising temps see release of methane from permafrost.

Carbon Dioxide Increasing because – increased energy use due to greater population and increase in electrical goods (due to greater wealth); also greater transport demands (e.g. flying and greater car ownership).



Fold along here



Question(s)

Why is international co-operation essential to tackle the problem of climate change?

Answer(s)

Once released into the atmosphere, the greenhouse gases that cause global warming spread far and wide and affect everyone. Therefore actions taken by individual countries will not be successful unless countries work together to reduce their gas emissions.



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Question(s)

What is the difference between the natural and the enhanced greenhouse effect?

Answer(s)

In the natural greenhouse effect some heat reflected from the earth's surface is trapped by natural greenhouse gases in the earth's atmosphere keeping the earth warm enough for life whereas some escapes back to the atmosphere.

The enhanced greenhouse effect is where human activity has increased the amount of greenhouse gases which means that more heat is trapped and less escapes back to space causing a warming climate.



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Question(s)

Name 4 examples of mitigation strategies against climate change

Answer(s)

These are things to reduce / prevent greenhouse gases:

1. Alternative energy production
2. Carbon Capture and Storage
3. Planting Trees
4. International Agreements



Fold along here



Question(s)

Give examples of renewable energy sources that can be used to reduce greenhouse gas emissions.

Answer(s)

- Solar Power
- Geothermal Energy
- Wind Power
- Wave and tidal power
- Biomass / Biogass



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Question(s)

What are the potential problems with solar power as a renewable energy source in the UK?

Answer(s)

When there is no sunshine (i.e. night) or less sunshine – solar energy cannot be relied on to generate electricity.



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Question(s)

What is Carbon Capture and Storage? What are the disadvantages of this?

Answer(s)

This is used to capture CO₂ created from burning fossil fuels. Once it is captured it is compressed, transported by pipeline and injected into the ground to be stored in rocks below.

Disadvantages: expensive; doesn't discourage use of fossil fuels; CO₂ won't necessarily stay trapped in the long term.



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Question(s)

Why is international co-operation to tackle the climate change problem difficult to achieve?

Answer(s)

- Countries are trying to balance commitment to economic growth with commitment to cutting emissions
- Some countries will need to increase CO₂ emissions to develop
- Some countries can afford to mitigate more than others
- Some countries are considered to be more responsible for climate change than others.



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Question(s)

Give 2 examples of international agreements regarding reducing climate change and greenhouse gas emissions.

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Answer(s)



- Kyoto Protocol** – first international treaty became law. Over 170 countries agreed to reduce CO₂ emissions by 5.2% below 1990 levels by 2012 (only USA and Australia of the major GHG emitters refused to sign).
- Paris Agreement – 2016** – 195 countries adopted first ever universal and legally binding global climate deal.

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Question(s)

Give 3 adaptation strategies used to tackle the issues of Climate Change.

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Answer(s)



Adaptation is used to reduce the impacts of climate change on an area.

Strategies include:

- Adapting agricultural systems
- Managing water supplies
- Reducing risk from rising sea-levels.

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Question(s)

How can agricultural systems be adapted to try and tackle potential issues brought about by climate change?

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Answer(s)



- Educating farmers in the use of water harvesting
- Developing new irrigation systems
- Planting trees around seedlings to provide shade from strong sun
- Use of new drought-resistant strains of crop

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Question(s)

Give an example of how water supply can be managed to adapt to a changing climate.

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Answer(s)



- Water harvesting in Peru**
 - Nets constructed on the hillside – farmers take advantage of the daily fog to capture condensation – water is stored in tanks and gravity fed to crops below.
- Managing water in London**
 - Desalination plant opened in Beckton to produce drinking water and increase supply for 400,000 homes

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Question(s)

Give one example of how a place has adapted to reduce the risk from rising sea-levels

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Answer(s)



- The Thames Barrier – London** – built in 1982 to stop tidal surges entering London – with extremes predicted will be breached once every 1000 years – but with a 50cm sea-level rise – risk would increase to once every 100 years.

OR

- The Maldives – Indian Ocean** – houses built on stilts, artificial islands 3m higher built to relocate people; sea-walls built around capital (Male)

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Question(s)

What is the potential impact of climate change on Coral Reefs?

Answer(s)

e.g. GREAT BARRIER REEF IN AUSTRALIA AT RISK



Coral Bleaching caused by rising sea temperatures which kills the algae that gives the coral its food and colour – causes collapse of local ecosystem as lots of species rely on the reef

Climate change can cause increased absorption of CO₂ causing ocean acidification – limits ability of coral to absorb calcium carbonate

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Question(s)

What is the potential impact of Climate Change on Health?

Answer(s)



- Rising temps mean more heart attacks, heat strokes and changes in food supply.
- Higher temps mean disease carriers like mosquitoes and ticks move into more regions carrying diseases such as Malaria and Lyme disease
- More climate related hazards – wildfires, drought etc. threatening food / water supplies & therefore health.

Fold along here



Question(s)

What is the potential impact of Climate Change on the Weather?

Answer(s)



- More extreme events as warmer temperatures and higher sea levels will lead to more extreme weather events and a change in rainfall patterns.

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Question(s)

What is the potential impact of Climate Change on Food?

Answer(s)



- Production of corn, cotton etc. will initially increase but will then decrease temperature continues to rise.
- Livestock will also suffer in heat – will mean less milk production and fewer pregnancies
- More pests and diseases that affect crops and livestock will prevail
- Changes in rainfall will affect crops – increase in droughts
- With more extreme weather – cause problems such as soil erosion – will affect crops.

Fold along here



Question(s)

Give 5 negative impacts of climate change (could include effects on people and the environment).

Answer(s)



- Wildlife such as Polar Bears in the arctic and penguins in the Antarctic peninsula will decline due to loss of habitat as ice melts
- In Central America – crop yields of Wheat and Maize will decrease (predicted 12% decrease in Maize)
- Increased drought put pressure on food/water supplies in Sub-Saharan Africa
- Shorter skiing seasons in Alps due to less snow
- Increased drought in the Mediterranean region
- Fishing in the Lower Mekong delta would decrease – affecting 40 million
- Around 70% of Asia may be at risk of flooding.

Fold along here



Give 2 possible positive effects of climate change.

Answer(s)

1. Less ice in the Arctic Ocean would allow more shipping and extraction of gas and oil reserves
2. Crop yields are likely to increase in Europe (although they will require more irrigation)
3. Increase forest growth in Northern Europe

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