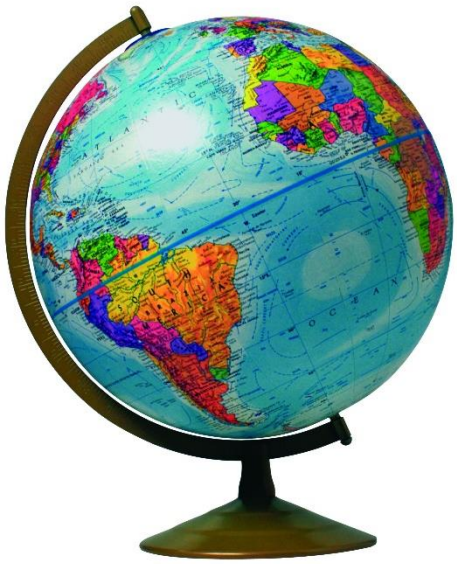
AQA GCSE Geography 2018



Paper 1: Living with the physical environment – Case study booklet

Paper 1: Living with the physical environment – Case studies

Natural hazards

- Use named examples to show how the effects and responses to a tectonic hazard vary between two areas of contrasting levels of wealth
- Use a named example of a tropical storm to show its effects and responses
- An example of a recent extreme weather event in the UK to illustrate: causes • social, economic and environmental impacts • how management strategies can reduce risk. in the UK have impacts on human activity.

Living World

- An example of a small scale UK ecosystem to illustrate the concept of interrelationships within a natural system, an understanding of producers, consumers, decomposers, food chain, food web and nutrient cycling.
- A case study of a tropical rainforest to illustrate: • causes of deforestation – subsistence and commercial farming, logging, road building, mineral extraction, energy development, settlement, population growth • impacts of deforestation – economic development, soil erosion, contribution to climate change
- A case study of a hot desert to illustrate: development opportunities in hot desert environments: mineral extraction, energy, farming, tourism • challenges of developing hot desert environments: extreme temperatures, water supply, inaccessibility

Physical landscapes

- An example of a section of coastline in the UK to identify its major landforms of erosion and deposition.
- An example of a coastal management scheme in the UK to show: • the reasons for management • the management strategy • the resulting effects and conflicts
- An example of a river valley in the UK to identify its major landforms of erosion and deposition
- An example of a flood management scheme in the UK to show: • why the scheme was required • the management strategy • the social, economic and environmental issues.

The living world – Tropical Rainforests — Case study

Title	Deforestation in Malaysia	Specific Locations	Asia, Borneo, Equator The Bakun Dam

Where is Malaysia?

Malaysia is a country in South-East Asia.

It is made up of Peninsular Malaysia and East Malaysia, which is part of the island of Borneo.

Malaysia is located 300km north of the Equator

Basic facts about Malaysia

The natural vegetation in Malaysia is tropical rainforest

67% of Malaysia Malaysia's land is covered by rainforest

Deforestation in Malaysia

The rate of deforestation is increasing faster than in any tropical country in the world. Between 2000 and 2013, Malaysia's total forest loss was an area larger than Denmark.

As natural rainforest in Malaysia is destroyed, many young orang-utans' are killed or orphaned

What are the threats to Malaysia's tropical rainforests?

Logging

Tropical wood is felled to export and sell – Malaysia was the largest exporter in the 1980s. Clear felling – where all the trees are chopped down in an area was common. This led to the destruction of forest habitats.

Mineral extraction

Mining tin and smelting is common in peninsular Malaysia. Rainforest has been cleared for mining and construction.

Population pressure

Between 1956 and the 1980s, about 15,000 hectares of rainforest was felled for settlers moving from urban areas to the countryside.

Many then set up plantations.

Commercial farming

Malaysia is the largest exporter of palm oil. During the 1970s, large areas of land were converted to palm oil plantations

Subsistence faming

Tribal people in the rainforest practice subsistence farming. One method used by the tribal people is 'slash and burn'. This involves the use of fire to clear the land – these fires can grow out of control, destroying large areas of forest

Energy development

In 2011 the Bakun Dam in Sarewek started to generate electricity – the dam supplies energy for industrialised Peninsular Malaysia.

The dams reservoir flooded over 700km2 of farmland and forests.

Impacts of deforestation in Malaysia

Soil erosion

The roots of trees and plants bind the soil together. So deforestation means that soil can easily become lose and erode away.

Loss of biodiversity

Deforestation destroys the ecosystem and the many habitats that exist on the ground and in the trees. This reduced biodiversity e.g. the Main Range – Peninsular Malaysia has 25% of all plant species found in Malaysia.

Economic development

Development of land for mining, farming and energy will create jobs for local people

Companies will pay taxes to the government which can be used to make improvements to public services and transport infrastructure.

Contribution to climate change

By absorbing carbon dioxide, trees store the carbon and help to reduce the rate of global warming. Deforestation leads to more carbon dioxide in the atmosphere.

Title	Cold Environments	**Specific Locations**	Svalbard, Arctic Circle

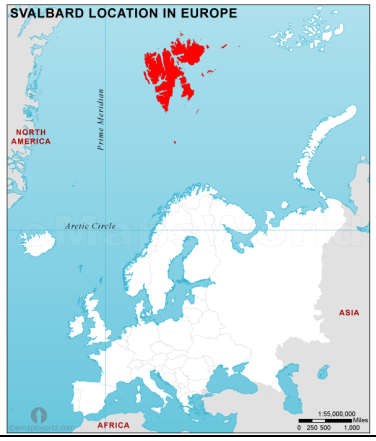
Where is Svalbard?

Svalbard is the most northerly permanently inhabited territory. It is located close to the Mid-Atlantic Ridge and has 5 major islands.

Svalbard is a territory of Norway.

60% of the land is covered in glaciers and the rest of the land is tundra. There are no trees it is too cold.

Most of the population of around 2700 live in the main town of Longyearbyen



Opportunities for development

Energy	**Tourism**	**Mining**	**Fishing**
The Longyearbyen coal-fired power station supplies all of Svalbard's energy needs. Geothermal energy is a likely future source of energy. This creates a lot of jobs.	Tourism is developing and now provides as many jobs as mining. Tourists want to see the wilderness environment, wildlife, northern lights etc. Cruise passengers land at Longyearbyen seeking glaciers, fjords and wildlife especially polar bears. Adventure tourists seek hiking, kayaking and snowmobile safaris. Tourism has less impact on the environment but does still affect it. It is however important to preserve the environment to keep visitors coming.	There are rich reserves of coal, which is one of the main economic activity and employs most people. The coal is used to fire the islands power stations but has negative environmental consequences.	The Arctic waters of the Barents Sea are rich fishing grounds with 150 species, including cod, herring and haddock. Fishing is carefully controlled and monitored to ensure sustainability of the ecosystem.

Challenges for development

Extreme Temperatures	**Construction**	**Accessibility**	**Services**
Temperatures are below freezing for most of the year. Even in Longyearbyen winter temperatures can be as low as -30˚c Frostbite is a serious risk and several layers of clothes are necessary.	The frozen ground (permafrost) hs to be protected from melting or buildings would collapse. Most building, construction and maintenance happens during the brief summer.	Svalbard can only be reached by sea or air. There are no roads outside Longyearbyen International flights link to mainland Norway and Russia and then are connected to Svalbard with smaller aircraft. Most people use snow mobiles.	Most power, water and sanitation pipes have to be heated, insulated and raised above ground, this allows easy maintenance and prevents thawing of the permafrost. Due to the small population services are limited e.g. there a limited health services and patients requiring some more complex or long term treatments have to be transferred to Norway.

The living world – Cold Environments		Example	
Title	Small scale ecosystem in the UK – Overton Lake	**Specific Locations**	Ferry meadows, Peterborough, East of England

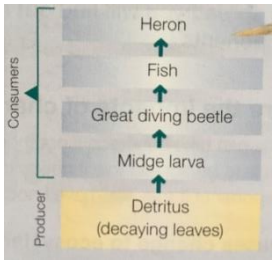
Where is Ferry Meadows?

Ferry Meadows is located in the city of Peterborough, in the East of the UK. Overton lake is a freshwater lake ecosystem.

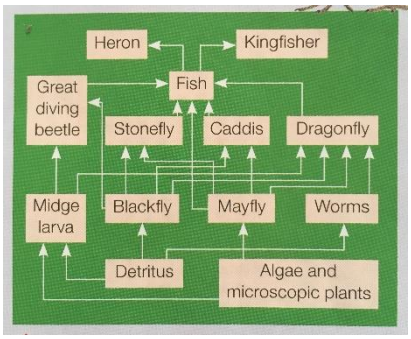
What are the main components of this ecosystem?

Producers	**Consumers**	**Decomposers**
Marsh marigold	Duck	Rhizopus
Reed mace	Coot	Alternaria
Detritus	Heron	Fusarium
Algae	Perch	
	Great diving beetle	

Food chain



Food web



Nutrient cycling

When animals or plants die, the decomposers (see above) help to recycle the nutrients making them available once again for the growth of plants and animals. This is the nutrient cycle.

The challenge of natural hazards — Example

Title	The effects and responses of two tectonic hazards in two contrasting countries – Iceland and Haiti	Specific Locations	Iceland Haiti

Location of Iceland

Iceland is located on the Mid Atlantic Ridge between the North American and Eurasian plate. It is located on a constructive plate boundary.

Location of Haiti

Haiti is located in the Caribbean

What caused the eruption?

Iceland is located on a constructive plate boundary

What caused the earthquake?

Conservative plate boundary between the north American and Caribbean plate. The plate is moving 2.5cm per year.On 12 January 2010, a magnitude 7 earthquake hit Haiti at 16:53 local time. The earthquake's epicentre was 25 km west of Port-au-Prince, the capital. Most people, businesses and services were located in the capital.

What were the earthquakes effects?

Chile Earthquake

Primary

Day turned to night due to the ash blocking out the sun., rescuers wore face masks to prevent them choking on the clouds of ash. Homes and roads damaged and services disrupted, crops damaged by ash, roads washed away. 100,000 flights cancelled over 8 days. Total loses of £80million.

Ice sheets above the volcano melted and caused flooding.

Secondary

Sporting events were cancelled or affected due to cancelled flights. Fresh food imports stopped and industries were affected by a lack of imported raw materials. Local water supplies were contaminated with fluoride. Flooding was caused as the lacier melted and torrents of water flowed out from beneath the ice.

Haiti earthquake

Primary

3 million people affected.

Over 220,000 deaths.

300,000 injured.

1.3 million made homeless.

Several hospitals collapsed.

30,000 commercial buildings collapsed.

Businesses destroyed.

Damage to the main clothing industry.

Airport and port damaged.

Domenican Republic accepted refugees.

Secondary

Seven years after the earthquake people were still living in temporary accommodation

Due to the lack of clean water there was a cholera epidemic. Cholera killed more people than earthquakes.

Government building collapsed making it challenging to rule which led to poor rescue efforts and looting

What were the responses to the tectonic hazards?			
Chile Earthquake		**Nepal earthquake**	
Immediate responses	**Long- term responses**	**Immediate responses**	**Long- term responses**
Emergency services acted swiftly and evacuated people. Farm animals were moved in doors to avoid suffocation. Roads were bulldozed to allow flood water to escape to the sea.	Further research into the effects on ash on aircraft. Reconstruction of roads, local flood defences needed reconstructing.	People searched for survivors USA and European countries sent aid to Haiti. They sent supplies e.g. water and medication. They set up emergency medical centers in tents, however this took 89 hours.	Money was pledged by organisations and governments to assist in rebuilding, but only slow progress had been made after one year. After one year, there were still 1,300 camps. 'Cash for work' programs are paying Haitians to clear rubble. Small farmers are being supported – so crops can be grown. Schools are being rebuilt. World Bank cancelled Haiti's debt repayments for 5 years Eu gave $330 million in aid 23 charities raised $1.1 billion but only 2% of the money has been released.

The challenge of natural hazards			Example
Title	Typhoon Haiyan – A tropical storm	**Specific Locations**	Philippines, Tacloban

The track of Typhoon Haiyan

Background information

In November 2013 Typhoon Haiyan – a category 5 storm on the Saffir-Simpson scale – hit the Philippines. Huge areas of coastline and several towns were devastated by winds of up to 170 mph and waves as high as 15m.

What were the effects of Typhoon Haiyan?

Primary effects	Secondary effects
• 6300 people killed – most drowned by the storm surges • 600,000 displaced and 40,000 homes damaged or flattened – 90% of Tacloban City destroyed • Tacloban airport terminal badly damaged • Typhoon destroyed 30,000 fishing boats	• 14 million people affected, many left homeless and 6 million people lost their source of income • Flooding caused landslide and blocked roads, cutting off aid to remote communities • Power supplies in some areas cut off for a month • Looting and violence broke out in Tacloban City

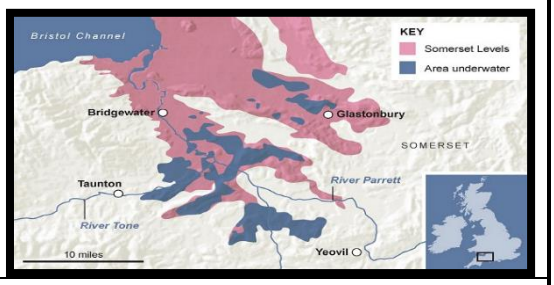
What were the responses to Typhoon Haiyan?

Immediate responses	Long- term responses
• International government and aid agencies responded quickly with food aid, water and temporary shelters • Over 1200 evacuation centres were set up to help the homeless • UK government sent shelter kits, each one able to provide emergency shelter for families • The Philippines Red Cross sent basic food aid which included rice, canned food, sugar, sal	• Rebuilding of roads, bridges and airport facilities • 'Cash for work' programmes – people paid to help clear debris and rebuild • Oxfam supported the replacement of fishing boats – a vital source of income • Thousands of homes have been built away from areas at risk from flooding

The challenge of natural hazards			Example
Title	The Somerset level floods – extreme weather in the UK	**Specific Locations**	Burrowbridge, Bristol channel, Bridgwater

Where are the Somerset levels?

The Somerset levels are located in the south-west of England. The Somerset levels and the Somerset Moors form an extensive area of low-lying farmland and wetlands bordered by the Bristol Channel and the Mendip Hills to the north.



What caused the floods in 2014?

- Wettest January since records began – a succession of depressions (low pressure) driven across the Atlantic Ocean brought a period of wet weather lasting several weeks. 350mm of rain fell in January and February (about 100mm above the average)
- Hide tides and storm surges swept water up the rivers from the Bristol channel.
- Rivers had not been dredged for at least 20 years.

What were the impacts of the flood?

Social	Economic	Environmental
Over 600 houses flooded 16 farms evacuated Residents evacuated to temporary accommodation Villages such as Moorland cut off. This affected people's daily lives e.g. attending school, shopping etc. Many people had power supplies cut off	Somerset County Council estimated the cost of flood damage to be more than £10 million Over 14,000 ha of agricultural land under water for 3-4 weeks Over 1000 livestock evacuated Local roads cut off by floods	Floodwaters were heavily contaminated with sewage and other pollutants including oil and chemicals A huge amount of debris had to be cleared

What were the responses to the floods

Immediate responses	Longer- term responses
Homeowners coped as best as they could. Villagers cut off by the floods used boats to go shopping or attend school. Local community groups and volunteers in Burrowbridge gave invaluable support Many pumps were used to get water off the Levels and back into the rivers. These pumps were pumping 10 tonnes of water per second.	The Somerset Contingencies Partnership improved their website and set up a social media site to give people detailed and easy access to information on how to reduce their flood risk and prepare for a flood. By 2015, some of the temporary pumping stations such as those at Northmoor and the Bridgewater Taunton Canal were to be made permanent so they could be used again in times of flooding Increasing the capacity of Sowy/King Sedgemoor drain. The Sowy channel was to be widened to increase its capacity

River landscapes		Example	
Title	River landforms along the River Tees	**Specific Locations**	Pennine hills, North Sea, High Force waterfall, Middlesbrough, Darlington

Where is the River Tees?

The River Tees is located in the North-east of England. Its source is high in the Pennine Hills near cross fell (893m) From there it flows roughly east for around 128km to reach the North Sea at Middlesbrough.

<u>Main features of the River Tees upper course</u>

- Source high in the Pennines (893m above sea level)
- High run off as steep V shaped valleys of impermeable rock – vertical erosion
- High rainfall – good water supply
- Many tributaries
- Famous High Force waterfall – tallest in England 21 metres high. Resistant rock – dolerite (igneous rock). Less resistant limestone. As the waterfall retreats upstream it leaves behind a gorge
- Gorges, rapids and potholes at Low force

<u>Main features of the River Tees middle and lower course</u>

- Clear widening and meandering - between Darlington and Yarn.
- Meanders cut off in the 19th century
- Sides become less steep, more lateral erosion taking place.
- Natural Levees formed due to silt build up
- Mouth is in the North Sea
- Wide Mudflat estuary (tidal)

River landscapes			Example
Title	Managing floods at Banbury	**Specific Locations**	Cotswold Hills, Oxford, River Cherwell

Where is the Banbury?

Banbury is located in the Cotswold Hills about 50km north of Oxford. The town has a population of around 45,000 people. Much of the town is on the floodplain of the River Cherwell, a tributary of the River Cherwell.

Why was the scheme needed?

Banbury has a history of devastating floods. In 1998, flooding led to the closure of the towns railways station, shut local roads and cause £12.5 million of damage. More than 150 homes and businesses were effected.

What has been done to reduce the risk of flooding in Banbury?

In 2012 Banbury's flood defence scheme was completed. A 2.9km earth embankment was built parallel to the M40 motorway to create a flood storage area. The embankment is capable of holding 3 million cubic metres of water. The flood storage area is located mainly on the natural floodplain of the River Cherwell. It collects rainwater that would otherwise fill the river and caused ot to burst its banks

A new pumping station built to transfer excess water into the river below the town

Raised the A361 road in the flood storage area plus improvements made to the drainage beneath the road to prevent flooding.

What have been the social, economic and environmental costs and benefits?

Social:

The raised A361 route into Banbury will be open during a flood, to avoid disrupting people's lifes

Quality of life for local people is improved with new footpaths and green areas

Reduced anxiety amd depresssion through fears of flooding

Environmental

Part of the floodplain will be deliberately allowed to flood if river levels are high

Around 100,00 tonnes of earth needed to build embankment – this was extracted from nearby creating a reservoir

Economic

The cost of the scheme was £18.5 million

By protecting 441 homes and 73 commercial properties, the benefits are estimated to be over £100 million.

Coastal landscapes			Example
Title	Coastal landforms in Dorset	**Specific Locations**	Durdle Door, Swanage, Atlantic Ocean, Lyme Regis, Bournemouth

Where is Dorset?

- Located on the South Coast of England.
- Stretches from Lyme Regis in the west to Bournemouth in the east
- The Dorset Coast is part of an area of coastline known as the Jurassic Coast
- Some rocks, especially Portland Stone, very resistant to erosion (differential)
- Weaker sands/ clays e.g. Oxford Clay, easily eroded, can retreat 1 metre+/year

Erosional landforms

1) Durdle Door - an excellent example of a sea arch. Erosion by waves has opened up crack in the outer wall of Portland Stone (limestone) headland, becoming a cave, and rapidly eroded the Purbeck Bed behind, developing into an arch.

2) Lulworth Cove - is a cove formed after a gap was eroded in a band of limestone. Behind the Portland Stone is band of softer clay, eroded away to form the cove. The same process is occurring further west along the coastline, at Stair Hole.

3) Bays – 2 bays with beaches called Swanage & Studland Bay, both areas of softer sock (sandstone/clay). In between is headland called The Foreland formed of hard rock (chalk). Heathland behind Studland is a haven for many rare birds/ wildlife.

4) Old Harry Rocks - eastern end of Jurassic Coast towards Studland Bay, chalk headland of The Foreland has been dramatically eroded at the end into a stack (Old Harry) and a stump (Old Harry's Wife).

Depositional landforms

1) Chesil Beach - stretches 18km, made of pebbles and shingle and Britain's longest tombolo. Tombolo is spit that connects mainland to an island (the Isle of Portland) by longshore drift. Behind Chesil Beach is shallow lagoon – The Fleet

Coastal landscapes — Example

Title	Coastal management at Lyme Regis	Specific Locations	

Where is Lyme Regis?

Lyme Regis is a small coastal town on the south coast of England in the county of Dorset. It lies at the heart of the World Heritage Site known as the Jurassic Coast.

What are the issues at Lyme Regis?

Much of the town has been built on unstable cliffs. The coastline is eroding more rapidly than any in Europe due to the powerful waves from the south west. Many properties have been destroyed or damaged, and there has been considerable erosion of the foreshore. The sea walls have been breached many times.

How has the coastline been managed?

Phase 1

New sea wall and promenade constructed to the east of the River Lim

In the winter of 2003 a £1.4 million emergency project was completed to stabilise the cliffs – hundreds of large nails were used to hold rocks together.

Phase 2

Creation of a wide sand and shingle beach to absorb wave energy and increase us of the shore: shingle dredged from the English Channel and sand imported from France

Phase 3

Initial plan to prevent landslips and coastal erosion to the west of the Cobb were shelved. It was decided to leave this stretch of the coast alone as the costs outweighed the benefits.

Phase 4

The final phase focused om the coast east of the town. It cost £20 million and involved constructing a new 390m sea wall in front of the existing wall

How successful has the management scheme been?

Advantages:

- The new beaches have increased visitor numbers and sea front businesses are thriving
- The new defences have stoop up to recent stormy winters
- The harbour is now better protected, benefiting boat owners and fishermen

Disadvantages:

- Increased visitor numbers have led to conflicts with locals about traffic congestion and litter
- Some people think the new defences have spoilt the natural coastal landscape
- The new sea wall may interfere with coastal processes and affect neighbouring stretches of coastline, causing conflicts elsewhere