AQA GCSE Geography for examination in 2018

Paper 1: Living with the physical environment – Case studies/examples

Living World

- 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.
- 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.

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.

Physical landscapes

- 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.
- 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.

PLEASE ENSURE THAT YOU READ, LEARN AND INWARDLY DIGEST THE FOLLOWING CASE STUDIES IN ORDER TO MAXIMISE YOUR CHANCES OF ACHIEVING SUCCESS IN YOUR FINAL EXAMINATIONS

The living world – Hot deserts — Case study

Title	Hot desert case study – The Sahara desert	Specific Locations	Timbuktu Morocco

Where is the Sahara Desert?

Blanketing much of the northern third of the African Continent, (3.5 million km$^{2)}$, the Sahara Desert extends eastward from the Atlantic Ocean some 3,000 miles to the Nile River and the Red Sea, and southward from the Atlas Mountains of Morocco and the Mediterranean shores more than 1,000 miles to the savannah called the Sahel. More than 16 times the size of France, the Sahara Desert blankets nearly all of Mauritania, Western Sahara, Algeria, Libya, Egypt and Niger; the southern half of Tunisia; and the northern parts of Mali, Chad and Sudan

Opportunities for development

Energy	Tourism	Mining	Solar energy
Algeria is a leader in oil exploration and extraction, 60% of its income comes from the oil and gas industry. It has many oil fields, including Hassi Messaoud, and the industry employs over 40,000 people	Sandboarding, carting and cross-desert treks are popular tourist activities in the Sahara e.g. camel trekking in Morocco boasting the economy with income and employment opportunities	Algeria is now the world's largest exporter of phosphate (which is used in fertilisers, cleaning products etc.)	12 or more hours of bright sunshine and cloudless skies everyday are ideal for generating solar power (renewable energy source). A 200km^2 area solar energy development in Tunisia is planned to supply 2 million homes in Western Europe by 2018.

Challenges for development

Extreme Temperatures	Water supply	Accessibility
Working outside in the heat of the day can be very hard, especially for farmers. Plants and animals have to adapt to survive in the extreme heat. Growing crops and breeding livestock such as cattle and goats is difficult as they need shade to protect them from the intense sun.	There are a few rivers and streams that run through the Sahara such as the River Nile. The others are intermittent and only flow after rainfall. Water in the Sahara Desert is a scarce resource. The desert has very low annual rainfall. High rates of evaporation lead to water shortages which affect people as well as animals. Drinking water for people and animals is stored in ponds, some of which are natural and some are man made	High temperatures can cause tarmac to melt and strong winds often blow sand across the roads. Most places are only accessible by camel. Due to the extreme weather and the presence of vast barren areas there is a very limited road network across the Sahara Desert

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 (cutting down of timber **==>** high value export + profit making enterprises eg. Cattle ranching, commercial farming, rubber, palm oil)

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 putting them at risk of extinction.

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 practise 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 (HEP)

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

The dams reservoir flooded over 700km^2 of farmland and forests.

Impacts of deforestation in Malaysia

Soil erosion

Roots of trees and plants bind the soil together. So deforestation means that soil can easily become lose and erode away. Land becomes unusable for farming as vegetation cannot be grown successfully.

Loss of biodiversity

Deforestation destroys ecosystems & many habitats that exist on the ground & in the trees. This reduces biodiversity e.g. many undiscovered plants have medicinal qualities.

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, particularly due to process of 'slash and burn'.

The living world – Ecosystems — Example

Title	Small scale ecosystem in the UK – Overton Lake	Specific Locations	Ferry Meadows, Peterborough, East of England

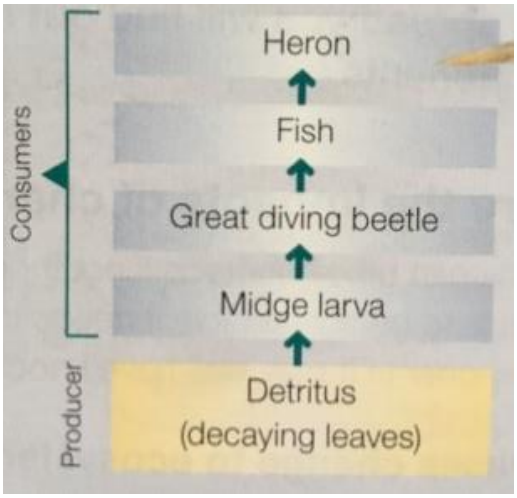
Where is Ferry Meadows?

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

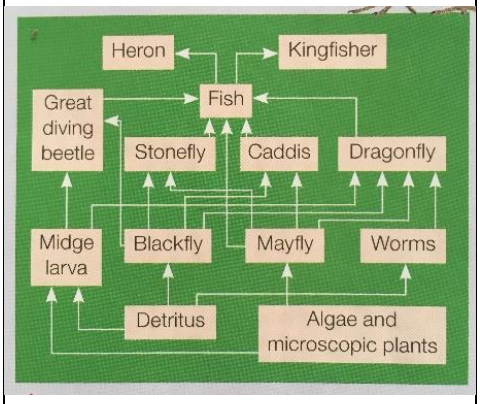
What are the main components of this ecosystem?

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

Rainwater washes chemicals out of the atmosphere.

Weathered rock releases nutrients into the soil. This is the nutrient cycle.

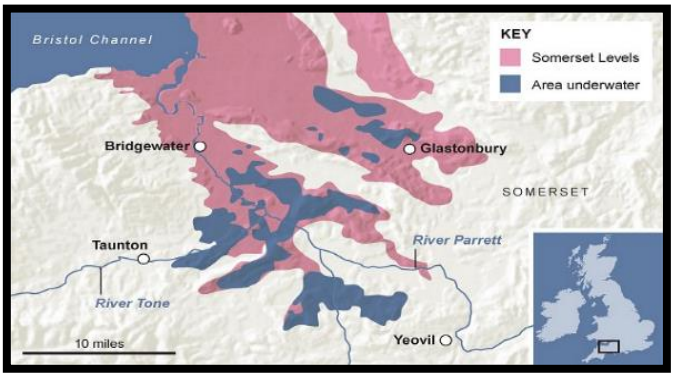
When animals or plants die, the decomposers (see above) help to recycle the nutrients making them available once again for the growth of plants and animals.

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 Jan since records began – succession of depressions (low pressure) driven across the Atlantic Ocean brought period of wet weather lasting several weeks. 350mm of rain fell in Jan and Feb (100mm above the average)
- High tides and storm surges swept water up the rivers from the Bristol channel.
- Rivers had not been dredged for at least 20 years, so high sediment levels reducing capacity of river.

What were the impacts of the flood?

Social	Economic	Environmental
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 from flood plains, roads + river channels

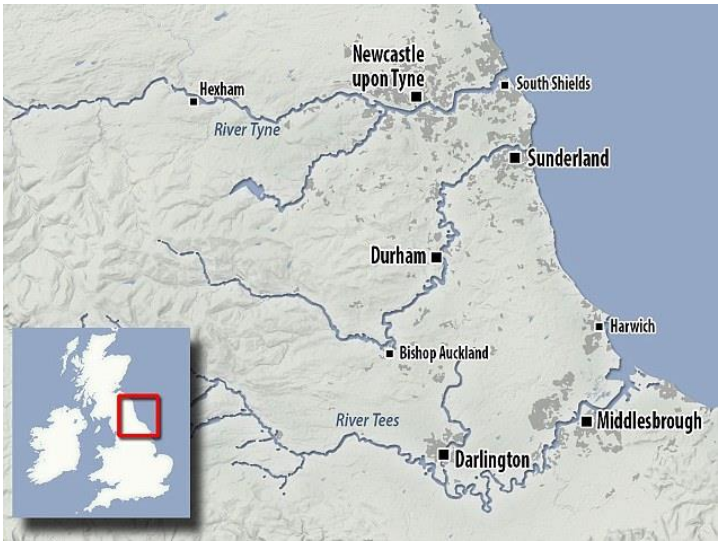
What were the responses to the floods?

Immediate responses	Longer- term responses
Homeowners coped as best as they could. **Villagers** cut off by 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- temporary pumping stations eg. 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 (Erosion and deposition)	**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>

(Vertical erosion)

- 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>

(Lateral erosion and deposition)

- 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 (deposition).
- **Mouth** is in the North Sea
- Wide Mudflat **estuary** (tidal)

River landscapes Example

Title	Managing floods at Banbury (A flood management scheme in the UK)	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 flood management 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.

The challenge of natural hazards		EXAMPLE	
Title	The effects and responses of two earthquakes in two contrasting countries – Chile and Nepal	Specific location	Chile and Nepal

Location of Chile

Earthquake struck just off the coast of Chile (South America). Destructive plate boundary. (Nazca and South American plates) Chilean Trench.

Nepal

The epicentre was about 80km to the north-west of Nepal's capital Kathmandu in the foothills of the Himalayas (Asia)

What caused the earthquake?

Destructive plate margin – Nazca plate moving beneath South American Plate.

Magnitude – 8.8 on Richter scale

What caused the earthquake?

Destructive plate margin – Indo-Australian plate is colliding with the Eurasion Plate

Magnitude – 7.9 on Richter scale

What were the earthquakes effects?

Chile Earthquake

Primary

500 people killed and 12,000 injured – **800,000** people affected.

220,000 homeless, 4500 schools, 53 ports destroyed.

Santiago airport badly damaged.

Cost of earthquake **US$30 billion**

Secondary

1500 km of roads damaged mainly by landslides – remote communities cut off for many days.

Several coastal towns devastated by tsunami waves.

A fire at a chemical plant in Santiago – the area had to be evacuated.

Nepal earthquake

Primary

9000 people died and 20,000 injured = **8 million** people affected

3 million left homeless when homes were destroyed

1.4 million needed food, water and shelter in the days after the earthquake

7000 schools destroyed

Cost of damage **US$5 billion**

Secondary

Ground shaking triggered landslides and avalanches, blocking roads and hampering relief efforts. Avalanche on Mt Everest killed at least 19 people.

A landslide blocked the Kali Gandaki river, 140km north west of the capital – many people evacuated in case of flooding.

No tsunami because earthquake occurred on land.

What were the responses to the earthquake events?

Chile Earthquake

Immediate responses

Emergency services acted swiftly. International aid needed to supply field hospitals, satellite phones and floating bridges.

Power and water restored to 90% of homes within 10 days.

A national appeal raised US$60 million – enough to build 30,000 small emergency shelters.

Long- term responses

A month after the earthquake Chile's government launched a housing reconstruction plan to help 200,000 households affected by the earthquake.

The president announced it could take up to four years for Chile to recover fully from the damage to the buildings.

Nepal earthquake

Immediate responses

Search and rescues, water and medical support arrived quickly from countries such as UK, India and China.

Helicopters rescued many people caught in the avalanches at Mt Everest

Half a million tents needed to provide shelter for the homeless.

Long- term responses

Stricter controls on building codes.

7000 schools rebuilt.

Repairs made to Everest base camp and trekking routes - by August 2015 new routes had been established.

Roads repaired and landslides cleared.

Coastal landscapes — Example

Title	Coastal management at Lyme Regis	Specific Locations	Lyme Regis, Dorset

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	Phase 2	Phase 3	Phase 4
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.	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.	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.	The final phase focused on 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 stood 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

The challenge of natural hazards — Example

Title	Typhoon Haiyan – A tropical storm (cyclone/hurricane)	Specific Locations	Philippines, Tacloban South-East Asia

The track of Typhoon Haiyan

Background information

November 2013 Typhoon Haiyan – a category 5 storm on the Saffir-Simpson scale – hit the Philippines (South-east Asia).

Huge areas of coastline and several towns were devastated by winds of up to 170 mph and storm surge waves as high as 15m.

What were the effects of Typhoon Haiyan?

Primary 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.

Secondary effects

- 14 million people affected, many left homeless and 6 million people lost their source of income from primary industries eg. Fishing.
- Flooding caused landslides 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

- 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, salt and cooking oil

Long- term responses

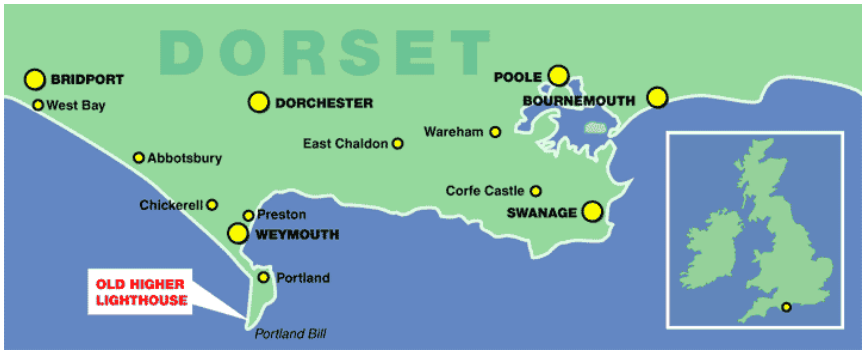
- Rebuilding of roads, bridges and airport facilities
- ‘Cash for work’ programmes – people paid to help clear debris and rebuild
- Oxfam supported the replacement of fishing boats – a vital source of income
- Thousands of homes have been built away from areas at risk from flooding

Coastal landscapes — Example

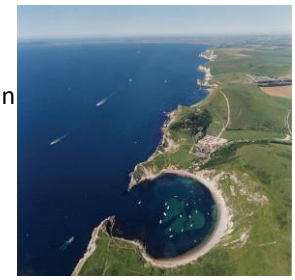
Title	Coastal landforms in Dorset (Erosion and deposition)	Specific Locations	Durdle Door, Swanage, Atlantic Ocean, Lyme Regis, Bournemouth

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, eg. Portland Stone, very resistant to erosion (differential)
- Weaker sands/ clays e.g. Oxford Clay, easily eroded, can retreat 1 m+/yr



Erosional landforms



1) **Durdle Door** = **Arch**. **Erosion** by waves has opened up a 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

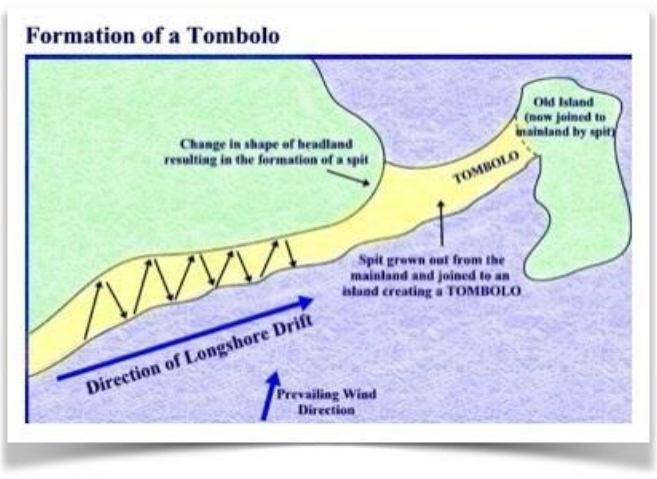
the Portland Stone is band of softer clay, eroded away to form the cove.

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



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