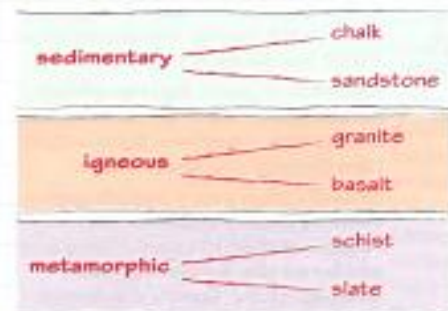




# Main UK rock types

The UK is made up of many rock types, but the three main groups are sedimentary, igneous and metamorphic.

## Main UK rock types



## Distribution of UK rock types



### Sedimentary rocks

Sedimentary rocks are formed in layers called beds. They often contain fossils. Examples include chalk and sandstone.

- ✓ **Chalk** is made up of calcium carbonate, and is susceptible to chemical weathering.
- ✓ **Sandstone** is made of sand-sized grains cemented together. It can be hard and resistant to weathering, but is permeable.

### Igneous rocks

Igneous rocks are hard and formed of crystals so are resistant to erosion. They are usually impermeable – water doesn't pass through them. Examples include granite and basalt.

- ✓ **Granite** is affected by chemical weathering. Granite landscapes drain badly, so tend to be boggy.
- ✓ **Basalt** is a grey rock made from very small crystals. Lava flows cool to form basalt.

### Worked example

Study the photograph, which shows slate, a metamorphic rock. Explain how metamorphic rocks form. (2 marks)

Metamorphic rocks are formed by great heat and pressure. Examples are schist and slate. Slate is formed from mudstone at convergent plate boundaries. Schist is formed at higher pressure at the same plate boundary.



Slate splits easily into thin layers

When you are asked to explain **how**, remember to include the key points of the process.

### Now try this

Explain two differences between igneous and sedimentary rocks.

(2 marks)

# Upland and lowland landscapes

Geology and past tectonic activity have influenced the physical landscapes of the UK.



The imaginary Tees-Exe line divides the UK into uplands (north) and lowlands (south).

### Geology

The UK is split into two halves geologically.

- The north-western UK is mainly harder igneous and metamorphic rocks, forming **upland** landscapes.
- The south-eastern UK is mainly softer sedimentary rocks, forming **lowland** landscapes.

### Plate tectonics

Millions of years ago the UK was close to plate boundaries. Plate movements caused mountains (huge folds) and faults in the rocks. 520 million years ago two plates converged to form upland mountain landscapes – northern Scotland, the Lake District and North Wales. 50–60 million years ago diverging plate boundaries caused the Atlantic Ocean to open. Rising lava produced the distinctive basalt geology of the Giant's Causeway.

### Distinct landscapes

North-west of the Tees-Exe line the UK's geology is largely igneous: rocks formed from magma and lava, associated with tectonic events. Long-extinct volcanoes form hills and mountains.

Basalt can form a very distinct landscape as the lava cools into polygon shapes: for example, the Giant's Causeway in Northern Ireland and Fingal's Cave in Scotland.

### Worked example

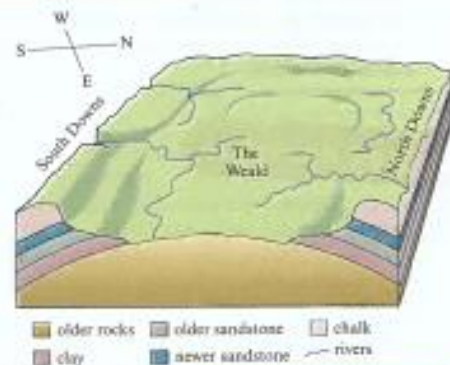
Study the geological cross-section, showing the rocks forming part of south-east England.

- a Name the rock group to which these rocks belong. (1 mark)

Sedimentary

- b Explain why lowland landscapes are usually formed by this rock group. (2 marks)

Sedimentary rocks are much softer and more easily eroded than igneous and metamorphic rocks. Therefore sedimentary rocks are worn down rapidly to form low hills and lowland basins.



The distance between the North and South Downs is about 60 km so the geological cross-section shows a large area.

### Now try this

Study the map of the UK rock types on page 1. Explain one reason why upland Britain is made up of igneous and metamorphic rocks.

(2 marks)



# Human activity

The UK has been settled by humans for many thousands of years and all its landscapes have been heavily influenced by human activity.



## Agriculture

This OS map extract is at 1:25 000 scale. It shows a region of Suffolk in the east of the UK.

- The blue lines are drainage ditches, built to drain water away from low-lying agricultural land to allow crops to grow.
- Straight drainage ditches are not produced by natural physical processes so they are a good indication of human activity.

Humans have altered almost all the landscapes of the UK through farming. Different farming types are suited to different landscapes: for example, sheep farming in upland areas and arable farming in fertile lowland valleys.

## Forestry

Forestry is managing woodland for timber.

- Many UK upland landscapes have been planted with trees for forestry. Sometimes they are in straight rows to make them easy to manage.
- The UK would naturally be covered by deciduous woodland. However, some UK landscapes feature conifer plantations, which are very distinctive.



When trees are felled for timber, a section of the plantation may be cleared. This aerial photo shows a cleared area in the Strathgryne Forest, Scotland.

## Worked example

Explain why lowland landscapes have been more altered by human settlement than upland landscapes. (4 marks)

Settlements grew up where the landscape offered advantages, such as flat land that is easier to build on. Lowland landscapes also provided river meander loops where it was easy to defend towns, coastal plains and natural harbours for fishing villages and shallow points on rivers where fords could be made (for example, Oxford). Over time, the settlements spread over the landscape. In big cities, many streams and small rivers now run in underground tunnels, so cannot be seen on maps. Upland landscapes of hills and mountains make it more difficult to construct settlements so are less built up.

The question asks about both lowland and upland landscapes - make sure you include both in your answer.

## Now try this

The map below shows the Shropshire town of Shrewsbury. Suggest one reason why the site of Shrewsbury was chosen for a settlement. (2 marks)



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## REVISION TASKS –

1. Summarise each red box section on each of the pages into your own words (use shortenings, add diagrams, highlight key points only. Do not copy the typed material.)
2. Summarise each section a second time onto Revision cards - using subheadings and trigger words  
E.g. **Rock types**
  - **Igneous** = Scotland, N/W – granite/basalt – hard impermeable
  - **Sedimentary** = South – chalk/limestone – permeable/soft
3. Complete the 3 blue boxed 'Now Try This' exam Qs on each page
4. Complete these Qs:
  - i) Give one characteristic of metamorphic rock (1)
  - ii) Explain why springline settlements are built above a layer of clay (3)
  - iii) Explain 2 reasons why southern England is more likely to be used for arable farming (4)

What do you need to know?	Where can you find the information?	First Revision Date	RAG	Second Revision Date	RAG	Third Revision Date	RAG
<b>Coasts</b>							
<p>A variety of physical processes interact to shape coastal landscapes</p> <ol style="list-style-type: none"> <li>a. The physical processes at work on the coast: weathering, mass movement, erosion, transport and deposition.</li> <li>b. Influence of geological structure (concordant/discordant, joints and faults), rock type (hard/soft rock) and wave action (destructive and constructive waves) on landforms</li> <li>c. How the UK's weather and climate (seasonality, storm frequency and prevailing winds) affect rates of coastal erosion and retreat, and impact on landforms and landscape.</li> </ol>	<p>Edexcel GCSE (9-1) Geography A Revision Guide: pgs. 5, 6, 7</p>						
<p>Coastal erosion and deposition create distinctive landforms within the coastal landscape</p> <ol style="list-style-type: none"> <li>a. development of landforms of erosion: headlands and bays, caves, arches, cliffs, stacks, wave cut platforms.</li> <li>b. landforms of deposition: bars, beaches and spits.</li> </ol>	<p>Edexcel GCSE (9-1) Geography A Revision Guide: pgs. 9, 10, 11</p>						



# Physical processes 1

The coastline is shaped by the interaction of the different physical processes of weathering, mass movement and erosion. You need to understand how each process causes change along coastlines.

## Weathering on the coast

Weathering helps wear away rocks but leaves weathered material *in situ*. There are three types of weathering.

**Chemical** - rocks reacting with slightly acidic water, e.g. limestone dissolved by carbonation

**Biological** - action of plants and animals (e.g. tree roots widen in cracks in rocks), causing the rock to split apart

### Weathering

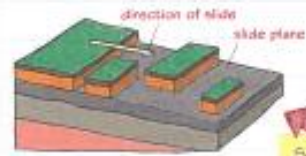
In this component you must study two of Coastal River and Glaciated landscapes. Only revise this section if it is one of the two you have studied.

**Mechanical** - water falls into the cracks in rocks and freezes, causing it to expand; over time the repeated thawing and freezing causes the rock to break apart

## Mass movement on the coast

Mass movement is the downhill movement of material under the influence of gravity. Types of mass movement vary according to:

- material involved
- amount of water in the material
- type of movement, e.g. sliding, slumping.



Sliding happens when loosened rocks and soil suddenly slide down the slope. Blocks of material may all slide at once.

## How waves erode the coast

**Abrasion:** breaking waves throw sand, pebbles and boulders against the coast during storms.

**Hydraulic action:** the sheer weight and impact of water against the coastline, particularly during a storm, erodes the coast. Also waves compress air in joints in rocks, forcing them apart.

**Attrition:** rocks and pebbles carried by waves rub together and break into smaller pieces.

**Solution:** the chemical action of seawater dissolves some rocks.

## Worked example

Study the diagram opposite. Explain how slumping occurs.

(2 marks)

Slumping happens when the rock is saturated. Loose, wet rocks slump down under the pull of gravity along curved slip planes.



Slumping often happens on clay coasts.

## Now try this

Explain how sliding can cause downhill movement of material. (3 marks)

Remember to read questions like this carefully, and don't mix up sliding and slumping.

# Physical processes 2

Waves transport eroded material along the coast and deposit it when they lose the energy to carry it further.

In this component you must study two of Coastal River and Glaciated landscapes. Only revise this section if it is one of the two you have studied.

## Longshore drift

This is the process by which beach sediment can be transported along the coast by waves.

Sediment is moved along the beach. This process is called longshore drift (LSD).

The action of the wave swash forces the sediment up the beach at a 45° angle.

The action of the backwash will bring the sediment back down the beach at a 90° angle.

The direction of the prevailing wind will dictate the angle and direction in which beach sediment will move.



## Transport

Waves transport material by:



**Traction** - large boulders are rolled along the seabed by waves



**Saltation** - smaller stones are bounced along the seabed



**Suspension** - sand and small particles are carried along in the flow



**Solution** - some minerals are dissolved in seawater and carried along in the flow

## Deposition

(A constructive wave)



The load carried by waves is deposited by constructive waves. Different factors influence deposition, for example:

- sheltered spots (e.g. bays)
- calm conditions
- gentle gradient offshore causing friction. All reduce the wave's energy.

## Worked example

The command word here is **explain**, so you need to say **how** the process happens.

Explain how longshore drift transports material along the coastline. (4 marks)

The direction of material movement is determined by the prevailing wind direction. Waves approach the coastline at an acute angle, bringing sediment onto the beach in the swash. Sediment is then dragged back to sea in the backwash, under the force of gravity at a right angle. This process continues in a zigzag pattern, moving sediment along the beach.

## Now try this

Remember to name at least two processes here and explain how material is transported.

Explain how waves can transport material. (4 marks)



# Influence of geology

The geological structure of coasts, rock type and wave action all influence coastal landforms.

Only revise this section if you studied Coastal landscapes.

## Geological structure

Geology affects how fast coastal erosion occurs. Soft rock is eroded much faster than hard rock. Particular landforms are created when soft rocks and hard rocks occur together.

### Soft rock, such as clay

- ✓ Soft rock is easily eroded by the sea.
- ✓ Cliffs will be less rugged and less steep than hard rock coasts.
- ✓ Soft rock landscapes include bays.

### Hard rock, such as granite

- ✓ Hard rock is resistant to all types of erosion.
- ✓ Cliffs will be high, steep and rugged.
- ✓ Hard rock landscapes include wave-cut platforms and headlands where caves, arches and stacks are formed.

Read more about erosional landforms on page 9.

## Concordant and discordant coasts

Concordant coasts are made up of the same rock type. On discordant coasts, the rock type alternates, forming headlands and bays.

Revise these on page 9.



### Worked example



Study the geological map above. State which point marks the location of a chalk headland and stacks.

(1 mark)

These two maps show the same coastline. The hard rocks are chalk and limestone; the soft rocks are mudstone, sands and clays.

## Joints and faults

- Joints are smaller cracks; faults are larger.
- Both make rock more prone to erosion.
- Rocks with more joints and faults are eroded more quickly.

## Destructive and constructive waves

- In a **destructive wave**, the swash is weak and the backwash strong. Material is dragged into the sea, eroding the coast. Destructive waves have high energy, and occur in stormy conditions.
- In a **constructive wave**, material is deposited, building up the coast.

See the diagram on page 6.

Constructive waves have lower energy and occur in calm conditions.



Destructive wave

## Now try this

Identify two landforms found along a discordant coast.

(2 marks)

# Depositional landforms

The process of deposition causes the formation of distinctive landforms including beaches, spits and bars.

In this component you must study two of Coastal, River and Glaciated landscapes. Only revise this section if it is one of the two you have studied.

## Beaches

Beaches are accumulations of sand and shingle formed by deposition and shaped by erosion, transportation and deposition.



Beaches can be straight or curved. Curved beaches are formed by waves refracting, or bending, as they enter a bay.



Beaches can be sandy or pebbly (shingle). Shingle beaches are usually found where cliffs are being eroded and where waves are powerful. Ridges in a beach parallel to the sea are called berms and the one highest up the beach shows where the highest tide reaches.

## Spits

material moved along beach in a zigzag way by longshore drift



Spits are narrow beaches of sand or shingle that are attached to the land at one end. They extend across a bay or estuary or where the coastline changes direction. They are formed by longshore drift powered by a strong prevailing wind.

## Worked example

On an OS map spits are shown by a stretch of beach that carries on past the main coastline. They are thin and normally curved in shape.

Explain how a bar is formed.

(4 marks)

A bar forms in the same way as a spit, with longshore drift depositing material away from the coast, until a long ridge is built up. But, unlike a spit, a bar then grows all the way across a bay, so that a stretch of water is cut off and dammed to form a lagoon.



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## Now try this

Explain how beaches are formed.

Your answer should include both how and why beach material is transported and deposited.

(4 marks)

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- 2) Summarise each section a second time onto Revision cards - using subheadings and *trigger words* E.g. **Physical processes**
  - **weathering** = *physical/ biological/ chemical*
  - **mass movement** = *rock fall, sliding slumping*
  - Etc.
- 3) Complete the 4 blue boxed 'Now Try This' exam Qs on each page