

T1

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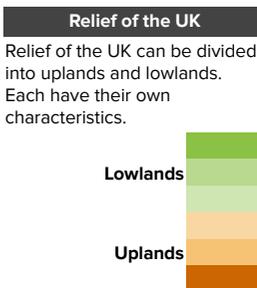
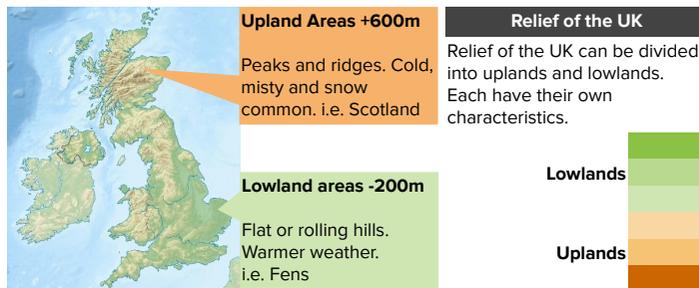
SCAN ME

Landscapes and physical processes



Geography Knowledge Organiser

1.1.1 - Distinctive landscapes



Glaciation in the UK

Over many thousands of years, glaciation has made an impression on the UK's landscape. Today, much of upland Britain is covered in u-shaped valleys and eroded steep mountain peaks.

During the ice age	
Ice covered areas eroded and weathered landscapes to create dramatic mountain scenery.	
After the ice age	
Deep valleys and deposition of sediment revealed	

What is a landscape?

A landscape has visible features that make up the surface of the land. Landscapes can be broken down into four 'elements'.

Landscape Elements	
Physical	Biological
-Mountains -Coastlines -Rivers	-Vegetation -Habitats -Wildlife
Human	Variable
-Buildings -Infrastructure	-Weather -Senses

1.1.2/3 - Human activity

Honeypot site - A location which attracts a large number of tourists who, due to their numbers, place pressure on the environment and local people.
Carrying capacity - The number of people which a region can support without damaging the location and environment.
Visitor pressure - tourists who, due to their numbers, place stress on the environment and local people.

Positives of visitor pressure	Negatives of visitor pressure
Employment opportunities are created to meet the demands of the tourists	Jobs are often seasonal or part time. This makes it harder to support family.
Tourism brings in money and will boost the local economy	There is overcrowding in the peak seasons
There will be upkeep of the area, making it a clean place to live	Businesses are designed for the tourists There can be congestion on the roads
Crime can be reduced due to higher levels of employment	Scenic walks and hikes are damaged by footpath erosion

(1.1.3) Management: repairing footpaths

Stone pitching - This technique involves digging stone into the ground to form good solid footfalls. This ancient technique is used extensively in the central fells using stone which is naturally occurring.

Soil Inversion - A digger is used to construct a ditch drain. The soil removed from the drain is placed alongside to create a hard wearing walking surface. Grass seed mix is then sown to encourage vegetation to bind all the works together.

Sheep wool - The fleece is placed between the soil and the stones to prevent the stone from sinking into the soil. This creates a 'floating' path and also absorbs some water to slow surface runoff.

1.2.1 - Processes & landforms (Rivers)

Erosion	
Attrition	Rocks that bash together to become smooth/smaller.
Solution	A chemical reaction that dissolved rocks.
Abrasion	Rocks hurled at the base of a cliff to break pieces apart.
Hydraulic Action	Water enters cracks in the cliff, air compresses, causing the crack to expand.
Transportation	
Solution	Minerals dissolve in water and are carried along.
Suspension	Sediment is carried along in the flow of the water.
Saltation	Pebbles that bounce along the sea/river bed.
Traction	Boulders that roll along a river/sea bed by the force of the flowing water.
Deposition	

When the sea or river loses energy, it drops the sand, rock particles and pebbles it has been carrying. This is called deposition.

Freeze-thaw weathering	
Stage One	Water seeps into cracks and fractures in the rock.
Stage Two	When the water freezes, it expands about 9%. This wedges apart the rock.
Stage Three	With repeated freeze-thaw cycles, the rock breaks off.

Weathering	
Chemical	Action of chemicals within water dissolving the rock.
Biological	Rocks that have been broken down by living organisms or plant roots.

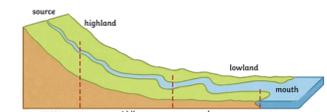
Formation of a waterfall	
	1) River flows over alternative types of rocks.
	2) River erodes soft rock faster creating a step.
	3) Further hydraulic action and abrasion form a plunge pool beneath.
	4) Hard rock above is undercut leaving cap rock which collapses providing more material for erosion.
	5) Waterfall retreats leaving steep sided gorge.

Formation of floodplains and levees	
When a river floods, fine silt/alluvium is deposited on the valley floor. Closer to the river's banks, the heavier materials builds up to form natural levees.	

Formation of a meander	
	A meander is a curve in a river's course formed when erosion and deposition take place on opposite river banks. The two sides of the meander eventually meet and create a straight channel.
Inside bend: Slowest speed Deposition Slip-off slope/point bar	
Outside bend: Fastest speed Erosion River cliff/undercut	

Formation of a V-shaped valley	
The river has eroded downwards.	
	These stones scrape along the bed of the river, eroding it downwards.
Weathering breaks up this rock. It falls into the river and is used for more erosion.	

River long profile	
Upper course	Near the source, the river is flows over steep gradient from the hill/mountains. This gives the river a lot of energy, so it will erode the riverbed vertically to form narrow valleys.
Middle course	Here the gradient get gentler, so the water has less energy and moves more slowly. The river will begin to erode laterally making the river wider.
Lower course	Near the river's mouth, the river widens further and becomes flatter. Material transported is deposited.



1.2.1 - Processes & landforms (Coasts)

Formation of bays and headlands

- 1) Waves attack the coastline.
- 2) Softer rock is eroded by the sea quicker forming a bay, calm area causes deposition.
- 3) More resistant rock is left jutting out into the sea. This is a headland and is now more vulnerable to erosion.

Formation of coastal landforms

1. Hydraulic action widens cracks in the cliff face over time. Abrasion forms a wave cut notch between HT and LT.
2. Further abrasion widens the wave cut notch to form a cave.
3. Caves at both sides of the headland break through to form arch
4. Weather above/erosion below –arch collapses leaving stack.
5. Further weathering and erosion leaves a stump.

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Types of coastline

Concordant
A concordant coastline occurs where the bands of differing rock types run parallel to the coast. The outer hard provides a protective barrier to erosion of the softer rocks further inland. Sometimes the outer hard rock is punctured allowing the sea to erode the softer rocks behind. This creates a cove which is a circular area of water with a relatively narrow entrance way from the sea.

Discordant
Discordant coastline occurs where bands of differing rock type run at right angles to the coast. The different resistance to erosion leads to the formation of headlands and bays.

Formation of coastal spits (longshore drift)

- 1) Swash moves up the beach at the angle of the prevailing wind.
- 2) Backwash moves down the beach at 90° to coastline, due to gravity.
- 3) Zigzag movement (Longshore Drift) transports material along beach.
- 4) Deposition causes beach to extend, until reaching a river estuary.
- 5) Change in prevailing wind direction forms a hook.
- 6) Sheltered area behind spit encourages deposition, salt marsh forms.

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Mass movement

Mass Movement is the downhill movement of cliff material

- Rockfall** As the weathering processes weaken the structure of the cliff rock fragments fall away.
- Landslide** Large blocks of the cliff slide down to the base of the cliff due to erosion weakening the base of the cliff
- Slumping** When soft rocks like clay become too wet from rainfall and weakened by erosion, the entire cliff face slips down in a curve, making steps in the cliff

Wave-cut landforms

1. The sea attacks the base of the cliff between the high and low water mark.
2. A wave-cut notch is formed by erosional processes such as abrasion and hydraulic action - this is a dent in the cliff usually at the level of high tide.
3. As the notch increases in size, the cliff becomes unstable and collapses, leading to the retreat of the cliff face.
4. The backwash carries away the eroded material, leaving a wave-cut platform.
5. The process repeats. The cliff continues to retreat.

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1.2.2 - Rates of change

Climate

The rainfall map of the UK shows variations in rain. Less precipitation occurs in low land areas. East England Most precipitation occurs in upland areas. Scotland.

These differences mean...
Uplands experience more weathering, erosion and mass movement.

Geology

Some rock types erode faster than others (sedimentary limestone or clays erodes quicker than metamorphic granite). The direction rocks are layered in can also affect this eg. concordant or discordant coastlines

Human activity

Humans can increase rates of change such as footpath erosion on cliffs or building on floodplains but humans can also put management in place is slow erosion or transport processes, like dams, groyne, river dredging & afforestation.

1.3.1 - Drainage basins

Hydrological cycle

Surface runoff- water runs across the ground to a river
Infiltration- water seeps into the soil in the ground
Percolation- water seeps into rock deeper in the ground
Groundwater flow- water flows through the soil and rock in the ground

Drainage basin

- Condensation**- when water vapour cools to form clouds
- Evaporation**- where water is turned into water vapour (gas)
- Precipitation**- any water that falls from the sky (rain, snow etc)
- Interception**- vegetation traps water before it reaches the ground
- Transpiration**- water is evaporated from the leaves of vegetation

- Drainage Basin**- is the area of land drained by a river and its tributaries
- Watershed**- the area of high land forming the edge of a river basin
- Source**- where a river begins
- Mouth**- where a river meets the sea
- Tributary**- a small river or stream that joins a larger river
- Confluence**- the point at which two rivers meet
- Main river channel**- main river flow in the drainage basin
- Floodplain**- flat land on the sides of the river that takes the overflow water

1.3.2 - River flooding

Factors influencing how rivers flood:

- Steep Slopes** - If the land surrounding a river is steep, rainfall will run quickly across the ground as surface runoff, increasing the river's discharge
- Urbanisation** - Roads and pavements are built using a tarmac, an impermeable material. Rainfall flows quickly over tarmaced surfaces as it cannot infiltrate into the ground, leading to rapidly increasing discharge
- Geology** - If a drainage basin has impermeable rock, water is unable to percolate into the rock. As a result, the rainfall flows into the river via throughflow and surface run off
- Heavy or prolonged rainfall** - A high volume of rainfall will cause a river's discharge to increase rapidly, increasing the chances of the river bursting its banks
- Vegetation** - Trees intercept rainfall as it falls from the sky. If there is a lack of vegetation, more rainfall reaches the ground and eventually the river, seeing a large increase in discharge

1.3.3 - Flood management

Hard Engineering - Hard engineering management involves using artificial structures, such as dams and embankments which try to control rivers. They tend to be expensive.

Soft Engineering - Soft engineering management is a more natural approach to manage flooding, it does not involve building artificial structures, but takes a more sustainable approach to managing the potential for river flooding.



River defences

Hard Engineering

- Channel straightening** Removing meanders, increases velocity to remove flood water.
- Artificial Levees** Man-made banks heighten river so flood water is contained.
- Channel widening** Makes river wider to increase capacity for a flood.

Soft Engineering

- Afforestation** Planted trees soak up rainwater, reduces flood risk.
- Managed Flooding** Naturally let some areas flood to protect settlements.

Home study questions

DEVELOPING

Describe how tourists can have benefits and negatives to honeypot sites [3 marks]

Explain why a waterfall migrates backwards the source [4 marks]

SECURING

Analyse the pattern of average precipitation (rainfall) in the UK (1 . 2 . 2) [6 marks]

MASTERING

'Urbanisation is the most significant factor in flooding' **To what extent** do you agree with this statement? [8 marks]

CHALLENGE

Create a spider diagram to show how all the erosional processes and landforms of rivers and coasts are linked