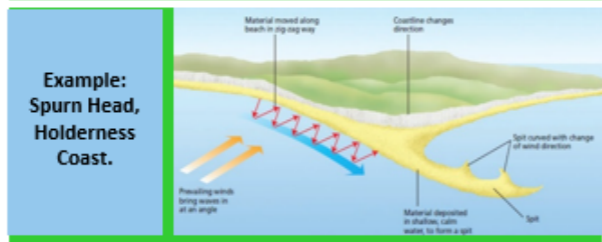


Formation of Coastal Spits - Deposition



- 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.

How do waves form?

Waves are created by wind blowing over the surface of the sea. As the wind blows over the sea, friction is created - producing a swell in the water.

Why do waves break?

- 1) Waves start out at sea.
- 2) As waves approaches the shore, friction slows the base.
- 3) This causes the orbit to become elliptical.
- 4) Until the top of the wave breaks over.

Types of Erosion

The break down and transport of rocks – smooth, round and sorted.	
Attrition	Rocks that bash together to become smooth/smaller.
Solution	A chemical reaction that dissolves 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.

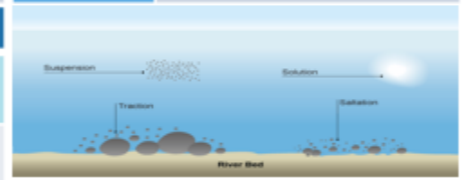
Types of Weathering

Weathering is the breakdown of rocks where they are.

Carbonation	Breakdown of rock by changing its chemical composition.
Mechanical	Breakdown of rock without changing its chemical composition.

Types of Transportation

A natural process by which eroded material is carried/transported.	
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.



What is Deposition?

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

Mass Movement

A large movement of soil and rock debris that moves down slopes in response to the pull of gravity in a vertical direction.

- 1) Rain saturates the permeable rock above the impermeable rock making it heavy.
- 2) Waves or a river will erode the base of the slope making it unstable.
- 3) Eventually the weight of the permeable rock above the impermeable rock weakens and collapses.
- 4) The debris at the base of the cliff is then removed and transported by waves or river.



Formation of Bays and Headlands

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

Physical Landscapes in the UK



Project

Research a section of UK coastline that is under threat . Examine how the coast is being threatened, the underlying geology and what short and long term impacts will affect it. You can do this digitally or on paper but you must submit this as a printed piece of work. Also include:

Background How has this area of coast been formed? What is threatened and how will it impact the local community? What measures have already been put in place? Are they effective?	Management What solutions are being used to help solve these problems? What solutions could they use? Is the cost of these solutions worth the benefit? Why?
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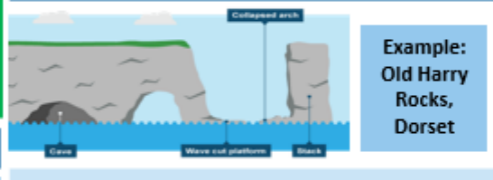
Mechanical Weathering Example: Freeze-thaw weathering

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.	
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Size of waves

<ul style="list-style-type: none"> Fetch how far the wave has travelled Strength of the wind. How long the wind has been blowing for. 	Types of Waves	
	Constructive Waves	Destructive Waves
	This wave has a swash that is stronger than the backwash. This therefore builds up the coast.	This wave has a backwash that is stronger than the swash. This therefore erodes the coast.

Formation of Coastal Stack



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

Coastal Defences			Water Cycle Key Terms		Lower Course of a River	
Hard Engineering Defences			Precipitation	Moisture falling from clouds as rain, snow or hail.		Near the river's mouth, the river widens further and becomes flatter. Material transported is deposited.
Groynes	Wood barriers prevent longshore drift, so the beach can build up.	<ul style="list-style-type: none"> ✓ Beach still accessible. ✗ No deposition further down coast = erodes faster. 	Interception	Vegetation prevent water reaching the ground.		
Sea Walls	Concrete walls break up the energy of the wave. Has a lip to stop waves going over.	<ul style="list-style-type: none"> ✓ Long life span ✓ Protects from flooding ✗ Curved shape encourages erosion of beach deposits. 	Surface Runoff	Water flowing over surface of the land into rivers		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 build up to form natural levees.
Gabions or Rip Rap	Cages of rocks/boulders absorb the waves energy, protecting the cliff behind.	<ul style="list-style-type: none"> ✓ Cheap ✓ Local material can be used to look less strange. ✗ Will need replacing. 	Infiltration	Water absorbed into the soil from the ground.		
Soft Engineering Defences			Transpiration	Water lost through leaves of plants.		Nutrient rich soil makes it ideal for farming. Flat land for building houses.
Beach Nourishment	Beaches built up with sand, so waves have to travel further before eroding cliffs.	<ul style="list-style-type: none"> ✓ Cheap ✓ Beach for tourists. ✗ Storms = need replacing. ✗ Offshore dredging damages seabed. 	Physical and Human Causes of Flooding.			
Managed Retreat	Low value areas of the coast are left to flood & erode.	<ul style="list-style-type: none"> ✓ Reduce flood risk ✓ Creates wildlife habitats. ✗ Compensation for land. 	Physical: Prolong & heavy rainfall	Long periods of rain causes soil to become saturated leading runoff.		River Management Schemes Soft Engineering Afforestation – plant trees to soak up rainwater, reduces flood risk. Demountable Flood Barriers put in place when warning raised. Managed Flooding – naturally let areas flood, protect settlements.
Project			Physical: Relief	Steep-sided valleys channels water to flow quickly into rivers causing greater discharge.		
Research a UK River. You need to include locational detail, geomorphic processes and how the river is managed at specific points to benefit people. You can do this digitally or on paper but you must submit this as a printed piece of work. Also include:			Human: Land Use	Tarmac and concrete are impermeable. This prevents infiltration & causes surface runoff.		Hard Engineering Straightening Channel – increases velocity to remove flood water. Artificial Levees – heightens river so flood water is contained. Deepening or widening river to increase capacity for a flood.
Background	The features of the Upper, Middle and Lower courses of the river. History of flooding along the river and problems this has caused.		Upper Course of a River			
Management	What solutions are being used to help solve these problems? What solutions could they use? Is the cost of these solutions worth the benefit? Why?		Near the source, the river 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.			
Formation of a Waterfall			Formation of Ox-bow Lakes			
			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.			
Step 1: Erosion of outer bank forms river cliff. Deposition inner bank forms slip off slope.			Step 2: Further hydraulic action and abrasion of outer banks, neck gets smaller.			
Step 3: Erosion breaks through neck, so river takes the fastest route, redirecting flow.			Step 4: Evaporation and deposition cuts off main channel leaving an oxbow lake.			
Case Study: The River Tees Location and Background Located in the North of England and flows 137km from the Pennines to the North Sea at Red Car.			Geomorphic Processes Upper – Features include V-Shaped valley, rapids and waterfalls. High Force waterfall drops 21m and is made from harder Whinstone and softer limestone rocks. Gradually a gorge has been formed. Middle – Features include meanders and ox-bow lakes. The meander near Yarm encloses the town. Lower – Greater lateral erosion creates features such as floodplains & levees. Mudflats at the river's estuary.			
Hydrographs and River Discharge River discharge is the volume of water that flows in a river. Hydrographs who discharge at a certain point in a river changes over time in relation to rainfall			Management - Towns such as Yarm and Middleborough are economically and socially important due to houses and jobs that are located there. - Dams and reservoirs in the upper course, controls river's flow during high & low rainfall. - Better flood warning systems, more flood zoning and river dredging reduces flooding.			