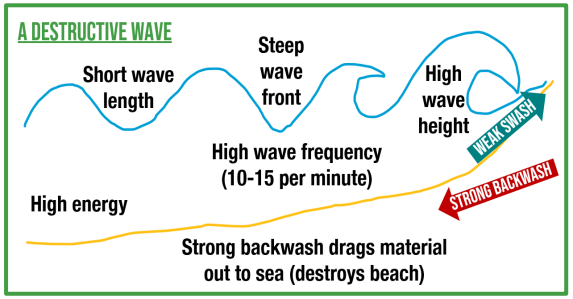
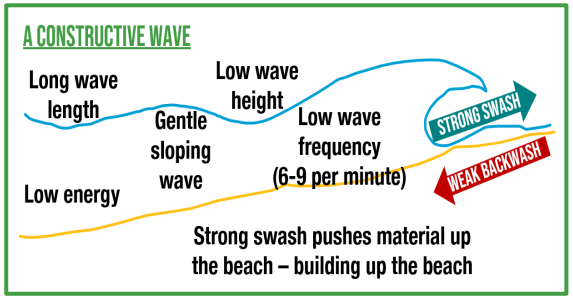
UK PHYSICAL LANDSCAPES: COASTAL LANDSCAPES (OPTION)

WAVE KEY TERMS

Crest: Point at the top of a wave.
Trough: Base of a wave.
Wave height: Distance between the trough and the crest.
Wave length: Distance between two wave crests.
Wave frequency: How often the waves break in a minute.
Swash: Waves running up the beach.
Backwash: Waves returning to the sea due to gravity.



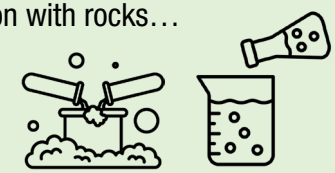


WHAT AFFECTS THE STRENGTH AND HEIGHT OF WAVES?

- The speed of the wind
- The time the wind blows for
- The fetch (the distance of water the wind blows over)

WEATHERING (THE BREAKING DOWN OF ROCK IN SITU)

Biological: Animals burrowing and plant roots.
Chemical: Rainfall creating a chemical reaction with rocks…



- **Carbonation** – carbonic acid reacts with calcium carbonate in limestone
- **Hydrolysis** – acid breaks down rock
- **Oxidation** – oxygen and water react

Mechanical (physical): Changes in temperature or moisture

- Freeze-thaw – water in cracks freezes and expands and then thaws – process repeats causing rock to break away
- Onion skin (exfoliation) – rocks are heated so expand, then contract when cool – process repeats causing layers to flake off
- Salt weathering – salt from sea spray enters cracks – evaporates and crystalises making rock weaker

EROSION WEARING AWAY OF ROCK)

Hydraulic action: Water is forced into cracks and weakens from within.
Abrasion: Sand/shingle scratches and scrapes cliff base.
Attrition: Pebbles collide with each other which wears sharp edges down.
Solution/corrosion: Chemicals in the water dissolve rock.

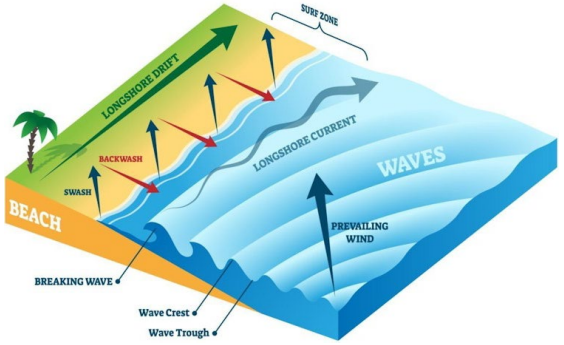
LONGSHORE DRIFT

Swash moves up the beach at the angle of the prevailing wind. Backwash moves down the beach at 90° to the coastline (due to gravity). The repeated zigzag movement transports material along the coastline.

MASS MOVEMENT (ROCK, SOIL OR MUD MOVING DOWN A SLOP DUE TO GRAVITY)

Landslides: Downhill movement of large volumes of rock, soil and mud – often after heavy rain.

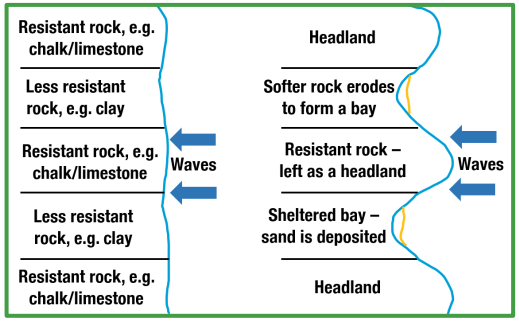
Rockfalls: Fragments of rock break away from cliff face, due to freeze-thaw weathering.
Slumping: Material moves down a concave cliff face – making the material rotate backwards into the cliff face as it slips down.

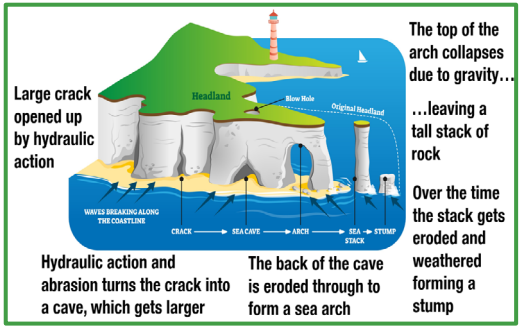


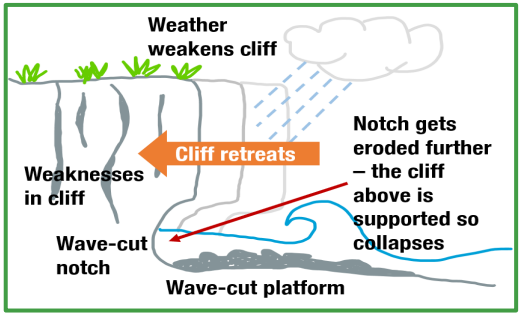
UK PHYSICAL LANDSCAPES: COASTAL LANDSCAPES (OPTION)

EROSIONAL LANDFORMS

- Bays and headlands
- Caves, arches, stacks and stumps
- Wave-cut platforms



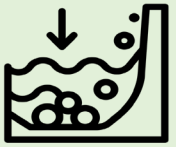




DEPOSITION

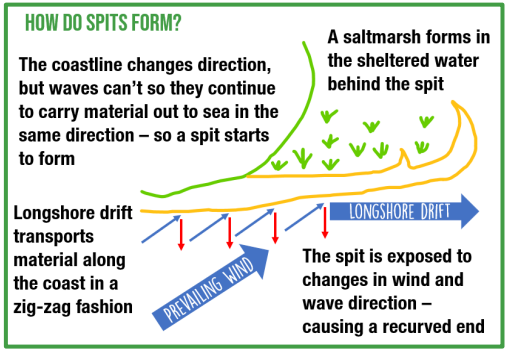
Where waves lose their energy so drop the sediment load they were carrying. Adds sediment to the beach so builds it up. Occurs where…

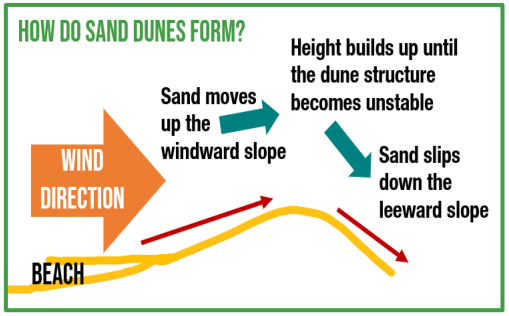
- the sea is shallow and sheltered
- there is lots of sediment,
- there is a large flat beach causing friction
- structures (e.g. groynes) trap sediment



DEPOSITIONAL LANDFORMS

- Spits and bars
- Beaches
- Sand dunes





HARD ENGINEERING STRATEGIES

Structures built to either stop flooding, reduce erosion, or both.

Sea walls: Stops sea water flooding the land behind – reflects wave power (curved); BUT very expensive, ugly, access issues, reflected waves can damage the beach.

Groynes: Prevents longshore drift from moving material and builds up beach – helps reduce erosion, and good for tourism; BUT Can starve areas further along the coast of material (leading to more erosion). Expensive to maintain. Access issues along beach.

Rock armour: Placed at the cliff base – gaps between the rocks slow down the wave's energy; BUT ugly, can cause damage when installed. Gaps in between can attract litter and vermin.

SOFT ENGINEERING STRATEGIES

Strategies that work with nature.

Beach nourishment/replenishment: Adding more sand to the beach – bigger beach = less erosion and more tourism; BUT needs annual maintenance as it is often just transported elsewhere.

Sand dune regeneration: Restoring existing dunes or artificially creating new ones to provide a barrier between land and sea; BUT fences off large part of the beach, subject to storm damage – unstable.

UK PHYSICAL LANDSCAPES: RIVER LANDSCAPES (OPTION)

EROSION WEARING AWAY OF ROCK)

Hydraulic action: Water is forced into cracks and weakens from within.

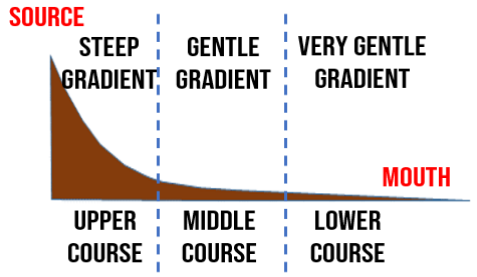
Abrasion: Sand/shingle scratches and scrapes river bed/banks.

Attrition: Pebbles collide with each other which wears sharp edges down.

Solution/corrosion: Chemicals in the water dissolve rock.

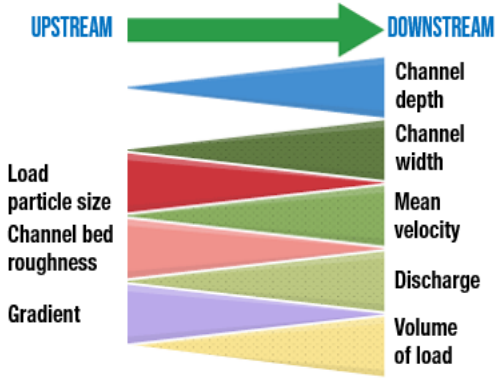
LONG PROFILE

Shows how the gradient changes as the river flows from source to mouth.



BRADSHAW MODEL

Theoretical model that describes the changes that occur as the river flows downstream – shown as a series of triangles – if the triangle widens downstream the variable increases.



TRANSPORTATION PROCESSES

Traction: Large boulders are rolled along the river bed.

Saltation: Small pebbles and stones are bounced along the river bed.

Suspension: Fine materials are carried within the river's flow.

Solution: small pebbles and stones are bounced along the river bed.

UPPER COURSE

- Interlocking spurs
- Waterfalls
- Gorges

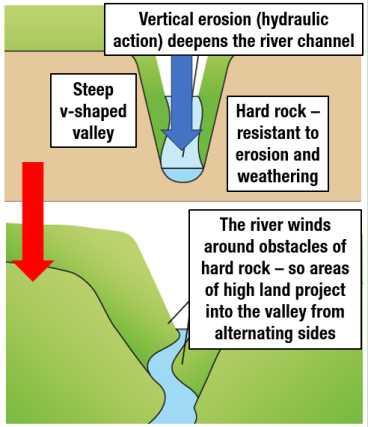
MIDDLE COURSE

- Meanders
- Oxbow lakes

LOWER COURSE

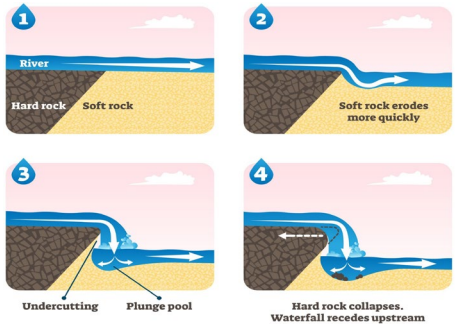
- Levees
- Floodplains
- Deltas

HOW DO INTERLOCKING SPURS FORM?



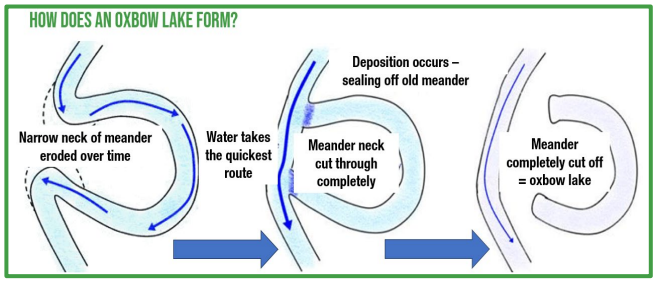
WATERFALL FORMATION

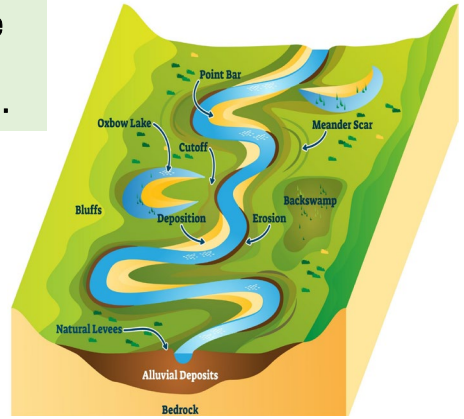
Form where water falls down a vertical drop in the river channel.



MEANDER FORMATION

Inner bends have a slower flow (shallower so have more friction) = deposition; Outer bends have a faster flow (deeper so have less friction) = erosion.

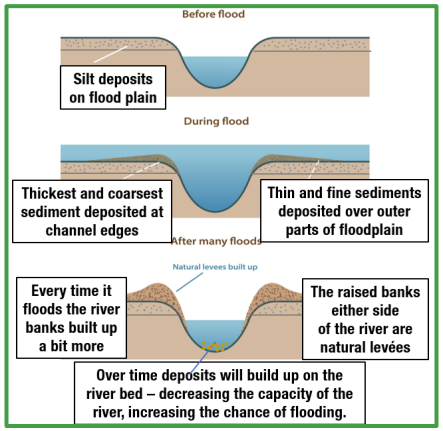




UK PHYSICAL LANDSCAPES: RIVER LANDSCAPES (OPTION)

LEVÉE FORMATION

Naturally raised river banks at the sides of a river channel, formed after a flood deposits sediment on the flood plain close to the river.



FACTORS THAT INCREASE THE RISK OF FLOODING

Physical factors…

Prolonged heavy rainfall: Drainage systems overwhelmed, and land saturated.

Steep slopes: Hard for rain to infiltrate the soil – easier to flow down the slope instead.

Low-lying land: Flood water can spread out further.

Geology: Impermeable rocks don't allow water to infiltrate.

Confluence: Where 2 rivers meet (more water).

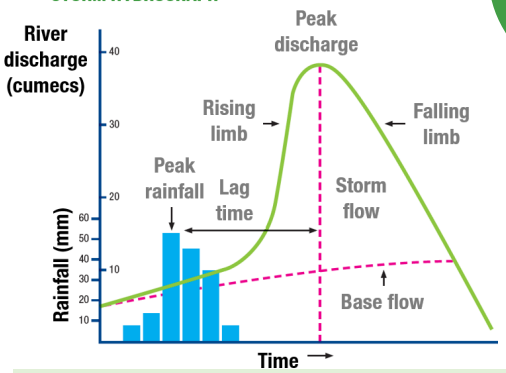
Snowmelt: Increase of water in area.

Human factors…

Deforestation: Fewer roots to absorb water and fewer leaves to intercept rain.

Urbanisation: Covers land in impermeable tarmac or concrete – increased surface-run-off.

STORM HYDROGRAPH



HYDROGRAPH KEY TERMS

Peak rainfall: Highest amount of rainfall

Peak discharge: Highest river level after a storm

Lag time: Hours between peak rainfall and peak discharge

Rising limb: Discharge rising after a storm

Falling limb: Discharge decreasing after run-off has passed

Base flow: Normal river flow

HYDROLOGICAL CYCLE KEY TERMS

Infiltration: **Water seeping down into soil.**

Percolation: **Water seeping down into rock.**

Water table: Level of saturated rock/soil (no more water can be absorbed).

Groundwater: Water stored in rock.

Surface run-off: Water flowing over the ground (overland flow).

Throughflow: Water flowing through soil.

Groundwater flow: Water flowing through rock.

HARD ENGINEERING STRATEGIES

Dams: Concrete barrier built across river to control the flow of water; BUT expensive, the land behind is flooded – people displaced, less water downstream, impact on river ecosystem.

Embankments: Artificially raised river bank to increase capacity of river; BUT prone to erosion and disrupts river habitats.

Channel straightening: Water travels along the river quicker – so water is removed from areas quicker, BUT can make flooding downstream worse.

SOFT ENGINEERING STRATEGIES

Flood plain zoning: Land with the lowest economic value has the highest flood risk so is not used for homes or businesses, BUT too late in many areas!

Flood warnings: Environment Agency warns of flood risk – time to evacuate; BUT many ignore warnings, can increase insurance premiums.

Afforestation: More trees to absorb water and intercept rain, BUT changes natural landscape and affects wildlife.

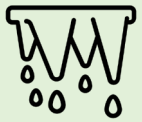
UK PHYSICAL LANDSCAPES: GLACIAL LANDSCAPES (OPTION)

GLACIAL PROCESSES

Freeze-thaw weathering: Repeated freezing and melting of water inside cracks – weakens rocks.
Erosion: Wearing away of rocks…

- Abrasion – ice scraping/scratching valley floor
- Plucking – meltwater freezes and sticks to rocks, pulling them loose as the glacier moves

Movement: Glaciers either move by sliding on meltwater, or more slowly as they are frozen to rocks below.
Transportation: Glaciers carry rocks on, in and below the ice – called moraine.



Deposition: Glaciers drop the material they have been carrying when ice melts…

- Till – jagged rocks left behind when glaciers retreat
- Outwash – material carried away from snout of glacier by meltwater rivers

EROSIONAL LANDFORMS

Corries: Armchair like hollows formed by abrasion and plucking.
Arêtes: Sharp ridge formed when 2 corries meet.
Pyramidal peaks: Formed when 3 or more corries meet.
Truncated spurs: Formed when glaciers cut through interlocking spurs (cutting them off).
Glacial troughs: U-shaped valleys with steep sided and flat bottoms formed when glaciers move down v-shaped valleys.
Ribbon lakes: Deeper depressions formed when ice melts.
Hanging valleys: Valleys from tributaries joining the main glacial trough which have eroded less.

LANDFORMS OF TRANSPORTATION AND DEPOSITION

Erratics: Large rocks left on top of different types of rock (transported and deposited by glaciers).

Drumlins: Egg-shaped hills with a blunt and pointed end.
Moraine: Material carried and deposited by a glacier – several types…

- Ground moraine – found under the glacier
- Lateral – found at the sides of a glacier
- Medial – found between 2 glaciers when they meet
- Terminal – found at the glacier's snout

ECONOMIC ACTIVITIES

Tourism: Spectacular landscape – attracts thousands of visitors, potential for adventure tourism, e.g. hiking, mountain biking, skiing, climbing, etc.

Farming: Mainly grazing due to harsh climate and poor soils, particularly sheep farming as they can cope with the cold and wet weather.

Forestry: Many conifer plantations – grow well in acidic soil and can cope with the weather conditions. Cut down after 20-30 years for timber – quick growing trees.

Quarrying: Hard rocks found in glaciated upland areas, e.g. granite, slate and limestone, are ideal for construction.

CONFLICT

Between different land uses: e.g. quarrying may put off tourists, tourists may upset farmers by walking on their land;
Between development and conservation: e.g. conservationists may argue that farms, quarries, tourists, etc, could harm the environment.

IMPACTS OF TOURISM

Social: Increase in house prices (second home demand).
Economic: Generates money/creates jobs – multiplier effect.
Environmental: Footpath erosion, congestion, air pollution from cars, lakes polluted, etc