

GCSE GEOGRAPHY

Paper 1

Physical Landscapes in the UK

COASTS AND COASTAL MANAGEMENT



NAME

Model example.

TEACHER

TARGET GRADE

Geography's intent

As a curious geographer I will:
Make sense of the world around me
Find solutions to my world's challenges
Understand geographical processes
Investigate interactions between people and the environment
Apply a range of geographical methods and skills



CONTENTS:

- Learning Journey
- Political map of the world
- Physical map of the UK
- Homework list
- PLC
- Key terms with definitions
- Topic ideas
- Waves types
- Weathering and mass movement
- Erosional landforms
- Depositional landforms
- Hard engineering
- Soft engineering
- Managed retreat
- Case studies: Swanage, Lyme Regis, Pevensey Bay, Wallasea Island and Holderness

Jobs geographers do:

10 Policy and Government
 Assistant Consultant, International Development, Bonn, UK
 Director of the Mayor's Office of Housing and Community Development, City of New York
 Head of Flood Hazard Research Centre, University of Middlesex
 Property Information Manager, Borsari Borough Council
 Public Communications Manager, Greenfield Research Institute on Climate Change and Economics
 Senior Planning DCLG
 Social Development Advisor, DfID
 UK Location, Engagement and Marketing Officer, DEBRA

The Physical Environment
 Air Pollution Specialist, Local Authority
 Australia Oil and Gas Team Manager, Deloitte
 Catastrophe Risk Analyst, Fabor
 Coastal Technical Specialist, Environment Agency
 Coastal Technical Specialist, Golden Resources Ltd (UK)
 Scientist, Rivers and Coastal Environment, Arup
 Soil Mechanics Scientist, GNS Science
 Technical Specialist, Geospatial and Contaminated Land, Environment Agency

Geographical Information Systems
 Analyst, Defence Geographic Centre
 Crime and Disaster Advisor, MAPCOTE
 Data Collector, Ordnance Survey
 Geographic Information Analyst, Police
 GIS Analyst, Animal Health and Veterinary Laboratories Agency
 Hydrologist, WRI, Kenya
 Hydrology and Telephony Officer, the Environment Agency
 Large Programmes Geospatial Officer, MOD
 Training and Education Services Manager, Gov.UK

The Built Environment
 Assistant Planner, Turkey
 Chartered Surveyor, MOD
 Commercial Assistant, Royal British Legion
 Events Executive, Historic Royal Palaces
 Graduate Land Surveyor, Kemp Chartered Land and Engineering Surveyors
 Property Manager, Post One
 Regeneration Research Assistant, Aspire Housing Group
 Senior Transport Consultant, Mouchel
 Sustainability Analyst, European Bank for Reconstruction and Development

Travel, Tourism and Leisure
 Conservation Projects Coordinator, Indonesia
 Educational Travel Consultant
 Expedition Manager, Wilderness Explorer
 Holiday Centre, Park Holidays-Kazuo
 Head of Operations, Frontier
 Incident Response Manager, World Challenge
 Managing Director, MyDestination on Galileo
 Travel Writer and Broadcaster

The Business World
 Chairman, Dotted Eyes Ltd
 Corporate Responsibility and Sustainability Manager, Caracat
 National Accounts Manager, Dunons
 Resource Manager, Personal Finance Education Group
 Sales Manager, Judo Ltd
 Senior Associate, PwC
 Strategic Relations Manager, Shell International

Society
 Advanced Skills Teacher
 Chief Executive, Lake District National Park
 Fundraising Officer, RSPB
 Her Majesty's Prison Service
 Lighthoods Project Officer, Save the Children
 New Business Officer, Mammot Cancer Support
 UN Strategy Branch, DEBRA
 Victim's Outreach Worker, Together Women Project

Development and Global Issues
 Assistant Consultant, International Development Division at Ecosis UK
 Catastrophe and Exposure Manager, Munich Re
 Sustainable Insurance Group
 Catastrophe Risk Analyst, WRI
 Development and Flood Risk Specialist, Environment Agency
 Head of Education and Youth, Oxfam
 Head of Policy, Transparency FCO
 HM Arms and Forces
 Social Development Advisor, DfID

Going Places with Geography

Studying geography will help you better understand the world's people, places and environments from the local to the global scales.

The skills and knowledge you gain from this subject, at GCSE, A Level or university, are relevant to almost all jobs and workplaces.

With rising numbers of students studying this subject, and geography graduates experiencing some of the lowest levels of graduate unemployment, there has never been a better time to study geography.

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Shetland

Orkney

North Atlantic Ocean

Outer Hebrides

Northwest Highlands

Ben Nevis

Grampian Mts.

SCOTLAND

Southern Upland

North Sea

NORTHERN IRELAND

Scafell Pike

Snaefell

Irish Sea

IRELAND

Snowdon

Cambrian Mts.

WALES

ENGLAND

Celtic Sea

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English Channel

Homework list

Week commencing	Task	Completed
27/2/2023	Exam questions including climate change, desertification, characteristics of trfs and plant adaptations deserts	
6/3/2023	Exam questions including constructive waves, destructive waves, mass movement and weathering	
13/3/2023	Exam questions including mass movement, headlands and bays and longshore drift	
20/3/2023	Sketch map skills, grid reference and sea stack	
27/3/2023	Hard and soft engineering strategies	

Unit 1: Living with the physical environment
Section C: Physical landscapes in the UK
Topic: Coasts

Unit content: RAG the following throughout, or at the end of the unit.	R	A	G
The coast is shaped by a number of physical processes			
Wave types and characteristics.			
Coastal processes:			
1. weathering processes – mechanical, chemical			
2. mass movement – sliding, slumping and rock falls			
3. erosion – hydraulic power, abrasion and attrition			
4. transportation – longshore drift			
5. deposition – why sediment is deposited in coastal areas.			
Distinctive coastal landforms are the result of rock type, structure and physical processes.			
How geological structure and rock type influence coastal forms.			
Characteristics and formation of landforms resulting from erosion			
• headlands and bays			
• cliffs and wave cut platforms			
• caves, arches and stacks.			
Characteristics and formation of landforms resulting from deposition			
• beaches			
• sand dunes			
• spits and bars			
An example of a section of coastline in the UK to identify its major landforms of erosion and deposition.			
Different management strategies can be used to protect coastlines from the effects of physical processes.			
The costs and benefits of the following management strategies:			
• hard engineering: sea walls, rock <u>armour</u> , gabions and <u>groynes</u>			
• soft engineering – beach nourishment and reprofiling, dune regeneration			
• managed retreat – coastal realignment.			
An example of a coastal management scheme in the UK to show:			
• the reasons for management			
• the management strategy			
• the resulting effects and conflicts.			
Unit skills	R	A	G
Map skills			
Interpreting data and trends			
High quality evaluation skills (balanced arguments and your own opinions)			
Ability to think synoptically (using content from a range of topics and units)			
Understand the meaning of common command words like describe, explain, analyse			
P.E.E.L Technique			

Key terms

- **Abrasion:** wearing away of cliffs by sediment flung by breaking waves. See **Corrasion**.
- **Arch:** wave-eroded passage through a small headland. This begins as a cave formed in the headland, which is gradually widened and deepened until it cuts through.
- **Attrition:** erosion caused when rocks and boulders transported by waves bump into each other and break up into smaller pieces.
- **Backwash:** the return of water to the sea after waves break on a beach.
- **Bar:** where a spit grows across a bay. A bar can eventually enclose the bay to create a lagoon.
- **Bays:** found between headlands where there are alternating outcrops of resistant (harder) rock and less resistant (softer) rock. Waves erode the areas of softer rock more rapidly to form bays. The more resistant, harder rock forms the headlands that protrude out to sea.
- **Beach:** the temporary deposition of sand and shingle along the coastline. Without its beach a coast is vulnerable to erosion, e.g. the cliffs at Barton on Sea were easily eroded following the construction of a groyne updrift at Bournemouth.
- **Beach Depletion:** the loss of beach material e.g. by offshore dredging of shingle banks.
- **Bedding Plane:** a line in rocks separating two different layers: one usually more resistant to erosion, one usually weaker. The layers, deposited horizontally millions of years ago as sediment on the sea bed, have often been tilted through earth movements (tectonics), creating an angle of dip.
- **Beach Replenishment:** the addition of new material to a beach naturally, through the action of longshore drift or artificially, through the dumping of large amounts of material.
- **Biological Weathering:** the breakdown of rock through the action of plants and animals.
- **Breakwaters:** offshore coastal defence structures built of stone parallel to the coastline; they help absorb the energy of breaking waves. Deposition occurs in the calmer water created behind the breakwater.
- **Cave:** found in coasts formed of resistant rock. Corrasion, Corrosion and Hydraulic action widen any weakness within the rock e.g. joint, bedding plane or fault, to form a cave.
- **Chemical Weathering:** the decomposition (or rotting) of rock caused by a chemical change within that rock; sea water causes chemical weathering of cliffs.
- **Clay Cliffs:** clay is a soft, impermeable rock which soaks up water to become saturated. When this happens the clay becomes unstable and begins to slump. Clay cliffs have gentle slope angles.
- **Cliffs:** hard, resistant rocks form steep cliffs; soft rocks such as clay create low, gentle cliffs.
- **Cliff Collapse:** steep cliffs made of hard, resistant rock, fall down when there is a loss of supporting rock underneath caused by wave attack.
- **Cliff Drainage:** steel barriers and drains put into a cliff to intercept the water movement through the cliff which causes mass movement.
- **Constructive Waves:** found on low-angled beaches and mainly responsible for coastal deposition. They are gently breaking, with a much stronger swash than backwash.
- **Corrasion:** wearing away of cliffs by sediment flung by breaking waves. See **Abrasion**.

- **Destructive Waves:** found on steep beaches, are steeply breaking and mainly responsible for coastal erosion. Their backwash is much stronger than their swash.
- **Dredging:** excavating sand and shingle from the sea bed; this can contribute to coastal erosion.
- **Erosion:** the wearing away of the land by rivers, ice sheets, waves and wind.
- **Estuary:** the tidal mouth of a river where it meets the sea; wide banks of deposited mud are exposed at low-tide.
- **Fault:** a large crack in the rock caused by earthquake movements.
- **Fetch:** the maximum distance of water over which winds can blow. In the case of south-west England the maximum fetch is from the south-west (5000 miles). This also coincides with the direction of the prevailing wind and leads to large storm waves attacking Barton on Sea, particularly in Winter.
- **Fiord (or Fjord):** a long, narrow, steep-sided inlet formed by glaciers and later drowned by a rise in sea level. Fjords are often over 3 kilometres deep.
- **Freeze-Thaw Weathering:** also called frost-shattering as it occurs in cold climates when temperatures are often around freezing point and where exposed rocks contain many cracks. Water enters the cracks during the warmer day and freezes during the colder night. As the water turns into ice it expands and exerts pressure on the surrounding rock, causing pieces to break off.
- **Gabions:** steel wire mesh filled with boulders used in coastal defences.
- **Geological Structure:** see bedding planes, angle of dip and fault.
- **Groyne:** a wooden barrier built out into the sea to stop the longshore drift of sand and shingle, and so cause the beach to grow. It is used to build beaches to protect against cliff erosion and provide an important tourist amenity. However, by trapping sediment it deprives another area, down-drift, of new beach material (beach replenishment). See **Rock Strongpoints**.

- **Headlands:** areas of land protruding out to sea formed of resistant (harder) rock. They help protect the bay which forms between them from wave attack.
- **Human Factors:** see Coastal Erosion Factors and Coastal Deposition Factors.
- **Hydraulic Action:** the process by which breaking waves compress pockets of air in cracks in a cliff. The pressure may cause the crack to widen, breaking off rock.
- **Impermeable Rock:** a rock that will not allow water to pass through it e.g. clay.
- **Joints:** small cracks in the layers of rock created during earth movements.
- **Lagoon:** a former bay cut off from the sea by a bar.
- **Land Reclamation:** areas of land that were once below the sea; the sea has either been blocked off by dykes and the sea water pumped out (e.g. Dutch Polders), or material has been dumped into the sea to raise the level of the seabed until it becomes dry land.
- **Longshore Drift:** waves approaching the coast at an angle result in the gradual zig-zag movement of beach materials along the coast.
- **Managed Retreat:** allowing cliff erosion to occur as nature taking its course: erosion in some areas, deposition in others. Benefits include less money spent and the creation of natural environments.
- **Mass Movement:** the downhill movement of weathered material under the force of gravity. The speed can vary considerably, from soil creep, where the movement is barely noticeable, to slumps, slides and mudflows, where the movement becomes increasingly more rapid.
- **Mud Flows or Slides:** occur after periods of heavy rain when loose surface material becomes saturated and the extra weight causes the material to become unstable and move rapidly downhill in an almost fluid state.
- **Notch:** an undercut part of the cliff base where wave attack concentrates erosion. See **Wave Attack Zone**.
- **Off-shore:** out at sea, away from the land.
- **Onion Weathering:** see **Exfoliation**.
- **Permeable Rock:** allows water to percolate or pass through it e.g. limestone, sandstone and chalk.
- **Physical Weathering:** the disintegration of rock into smaller pieces without any chemical change in the rock; this is most likely in areas of bare rock where there is no vegetation to protect the rock from extremes of weather e.g. freeze-thaw and exfoliation (or onion weathering).
- **Polders:** areas of reclaimed land that were once part of the sea bed in the Netherlands. See IJsselmeer Polders.
- **Prevailing Wind:** the direction from which the wind usually blows.
- **Raised Beach:** beach left stranded high on a cliff face after a fall in sea level.
- **Revetments:** wooden, steel, or concrete fence-like structures that allow sea water and sediment to pass through, but the structures absorb wave energy. A beach can build up behind the revetment and provide further protection for the cliff. These are used as part of coastal defences.
- **Ria:** a river valley drowned by a rise in sea level. It provides an excellent, natural, sheltered harbour.
- **Rip-Rap:** large boulders dumped on the beach as part as part of coastal defences.
- **Rock Strongpoints:** rocks dumped into sea to form a narrow artificial headland; these have replaced wooden groynes at Barton on Sea. Their aim is to control longshore drift of sediment in a similar way to wooden groynes and have proved to be more effective as they have a stronger structure to resist storm waves.
- **Saturation:** loose surface material after heavy rain can become saturated and therefore unstable due to the extra weight, leading to mud slides. Where permeable sand rock overlays impermeable clay (e.g. the cliffs at Barton on Sea), the sand can become saturated and slump or slide along a shear plane.
- **Sea Level Changes:** changes in the level of the sea against the land are caused by either the building up of melting of polar ice caps, or by rising and falling land levels.

- **Sea Defences:** measures taken to defend the coast from erosion, cliff collapse and flooding.
- **Sea Walls:** aim to prevent erosion of the coast by providing a barrier which reflects wave energy.
- **Sediment:** material originating from rock weathering and erosion. Shingle and sand are examples found along the coast.
- **Sediment Cell:** Sediment moved along the coast by longshore drift appears to form part of a circular cell which leads to it eventually returning updrift. Dredging of offshore shingle banks can therefore contribute to beach depletion.
- **Shear Plane:** a bedding plane or dividing line between a permeable rock, e.g. sand, and an impermeable rock, e.g. clay. This can become saturated after prolonged heavy rain and provides a line over which part of the cliff can shear (break) away. See **Slumping**.
- **Slides:** saturated weathered material moving down a slope under the influence of gravity. See **Mud Slides**.
- **Slumping:** involves a whole segment of the cliff moving down-slope along a saturated shear-plane.
- **Soil Creep:** the slowest of downhill movements, occurring on very gentle and well-vegetated slopes. Although material may move by less than 1 cm a year, its results can be seen in step-like terracettes on hillsides.
- **Spit:** a long, narrow accumulation of sand and shingle formed by longshore drift and deposited where the coastline abruptly changes direction. One end of the spit is connected to the land and the other end projects out to the sea, often with a curved (hooked) end.
- **Stack:** rock left standing out at sea after wave erosion has separated it from the mainland. This is the next stage from an arch. Waves will continue to erode the foot of the arch until its roof becomes too heavy to be supported. When the roof collapses, it will leave part of the former cliff isolated.
- **Storm Surge:** a rapid rise in sea level caused by storms forcing water into a narrowing sea area. Low air pressure at the centre of the storm also causes sea levels to rise.
- **Stump:** formed by continuing wave action attacking a stack until it collapses.
- **Swash:** forward movement of a wave up a beach.
- **Terracing:** the construction of horizontal steps down the cliff face; once these become vegetated, they help stabilise the cliff and prevent erosion.
- **Time:** an important factor in coastal erosion and deposition.
- **Tombolo:** a spit joining an island to the mainland.
- **Tourist Developments:** resorts such as Barton on Sea wish to build their beaches to attract tourists who are an important source of income to the area. Cliff-top hotels, however, can actually contribute to erosion, creating an impermeable zone that increases saturation in the surrounding cliff area. Tourists walking on the cliff face also contribute to erosion by destroying vegetation.
- **Updrift:** areas that provide a supply of material for deposition by longshore drift further along the coast. Updrift areas along the south coast of England are to the west.
- **Vegetation:** a ground cover of bushes and grass on a cliff face helps prevent cliff erosion; their roots hold and trap (stabilise) soil and prevent it being lost by mass movement.
- **Waves:** caused by the transfer of energy from the wind blowing over the surface of the sea. The largest waves are formed when winds are very strong, blow for lengthy periods and cross large expanses of water. See **Fetch** and **Prevailing Wind**.
- **Wave Attack Zone:** the area between low and high tide where wave erosion is most effective.
- **Wave Cut Platform:** a gently sloping, rocky platform found at the foot of an eroding cliff and exposed at low tide.
- **Wave Erosion:** the power of the wave is generated by the fetch. Waves erode cliffs by abrasion/corrasion and hydraulic pressure.
- **Weathering:** the break-down of rock by physical or chemical processes.