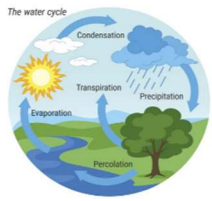
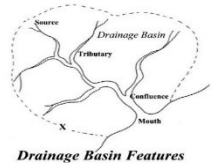
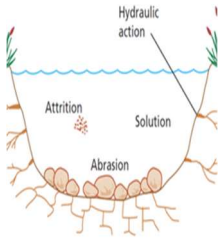
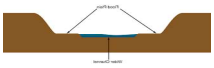
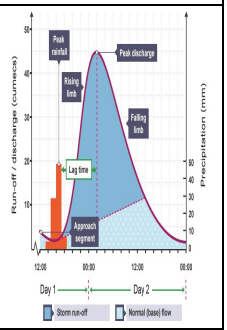
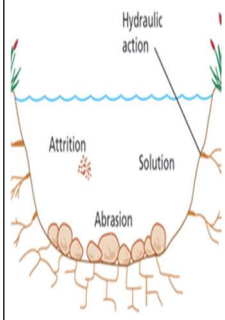
The Knowledge – Physical Landscapes – Rivers

Subtopic	Key knowledge/processes	Diagram
Hydrological / Water Cycle	1. **Evaporation** → Water vapour rises. 2. **Transpiration** → Evaporation from trees. 3. **Condensation** → Water cools into cloud. 4. **Precipitation** → Clouds release rain. 5. **Surface run-off** → Water flows on ground. 6. **Groundwater flow** → Water underground.	
Drainage Basin System (DBS)	1. **Watershed** → Boundary between two DBS. 2. **Source** → Point where river begins. 3. **Tributary** → Small river than joins larger one. 4. **Confluence** → Point where two rivers meet. 5. **Mouth** → Point where river meets the sea.	
Fluvial Processes	1. **Erosion** → Removal of material by water (ie: hydraulic action, abrasion, attrition, solution). 2. **Weathering** → Breakdown of rock by day-to-day changes in atmosphere (ie: freeze-thaw action). 3. **Transportation** → Material carried by the river (ie: traction, suspension, saltation, solution). 4. **Deposition** → Material dropped by river as low energy. Heaviest to lightest.	
River Characteristics	1. **Long profile** → Shows gradient of river. 2. **Cross profile** → Shows shape of valley.	
Upper Course	1. **Features** → Steep valley, narrow/shallow river channel, fast flowing water. 2. **Erosion** → Vertical = v-shaped valley. 3. **Erosional landforms** → Interlocking spurs, waterfalls, gorges.	
Middle Course	1. **Features** → Gentle gradient, shallow valley, less turbulence, less friction. 2. **Erosion** → Lateral = wider/deeper river channel. 3. **Erosional and depositional landforms** → Meanders, Ox-bow lakes.	
Lower Course	1. **Features** → Very gentle gradient, wider open valley floor. 2. **Erosion** → Lateral = widest/deepest part of river. 3. **Depositional landforms** → Estuary, floodplains, levees.	
Case Study: River Severn	1. **Location** → Longest river in UK. Source in mid Wales in Plinlimon Hills. Estuary near Bristol and Gloucester. 2. **Course** → V-shaped valley = rapids/waterfalls in upper course. Meanders/ox-bow lakes in middle course. Estuary 2nd largest tide in world (19m) in lower course. 3. **Management** → Urbanisation increase flood risk. Dams and reservoir have built. Monitory systems have improved.	
Storm Hydrographs	1. **Definition** → Show how a river changes after a storm and can be used to predict floods. 2. **Flood** → Occurs when river discharge is greater than channel's capacity. 3. **Discharge** → Volume of water in river channel. 4. **Peak discharge** → Highest level of discharge. 5. **Peak rainfall** → Highest amount of rainfall. 6. **Lag time** → Delay between peak rainfall & discharge. Short = high flood. 7. **Rising limb** → Increasing river discharge 8. **Falling limb** → Decreasing river discharge.	
Causes of Flooding	1. **Physical** → Rainfall intensity, geology, relief, size of DBS, soil moisture. 2. **Human** → Land use (ie: urbanisation/tarmac reduces infiltration into soil).	

Management Hard Engineering	1. **Dam & reservoir →** Use to regulate flow of the river. 2. **Channel straightening →** Speeds up flow of the river. 3. **Embankments →** Raising banks to increase capacity = man-made levees. 4. **Flood relief channels →** Diverts water.	
Management Soft Engineering	1. **Afforestation →** Planting trees along river. 2. **Wetlands →** Land next to river allowed to flood. 3. **Floodplain zoning →** Land has different uses according to risk of flooding. 4. **Rive restoration →** Return river to original course reduces risk. 5. **Planning →** Monitor river to assess risk of flooding.	
Case Study: Boscastle	1. **Location →** North Cornwall, UK. 2. **Date →** August 2004, 7 inches of water fell in a few hours resulting in discharge of 140 cumecs. 3. **Causes →** Steep valley sides, high relief rainfall, confluence, urbanisation, deforestation. 4. **Impacts →** 80 homes/businesses destroyed, 50 cars into sea, sewage burst. 5. **Management →** Channelisation, bridge widened, car park moved, banks raises, overspill channel, gauges installed.	

The Knowledge – Physical Landscapes – Coasts

Subtopic	Key knowledge/processes	Diagram
UK Physical Landscape	6. **Upland →** North West Scotland, 600m+ peak and ridges, cold, misty, snow. **7. Lowland →** South East England (Fenns), 200m hills, warmer weather, dry.	
Waves Types	1. **Constructive →** Swash stronger than backwash. Builds coastline. 2. **Destructive →** Backwash stronger than swash. Erodes coastline.	
Coasts Processes	5. **Erosion →** Removal of material by water (ie: hydraulic action, abrasion, attrition, solution). 6. **Mass movement →** Rockfall, Landslide/Mudflow, Rotational Slip/Slumping. 7. **Weathering →** Mechanical (ie: freeze-thaw action), Chemical (ie: carbonisation), Biological (ie: burrowing animals). 8. **Transportation →** Material carried by waves (ie: traction, suspension, saltation, solution). Longshore drift carries sediment along beach in zig-zag. 9. **Deposition →** Material dropped by waves as they loses energy. Heaviest at the back of the beach.	
Geology / Rock Type	3. **Discordant coastline →** Alternation between bands of hard/soft rock. 4. **Concordant coastline →** Coastline that has only one type of rock.	
Erosion	4. **Landforms →** Headlands and bays, cliffs and wave-cut platforms, caves, arches, stacks, and stumps.	
Deposition	4. **Landforms →** Beaches, sand dunes, split, bars, and tombolos.	
Management Hard Engineering	5. **Groynes →** Wood barriers that prevent longshore drift and builds beach. 6. **Sea walls →** Concrete walls break up the energy of waves. 7. **Gabions →** Cages of rock/boulders that absorb the energy of waves. 8. **Rock armour / rip rap →** Barrier of rock/boulders at the back on beach.	
Management Soft Engineering	6. **Beach nourishment →** Build-up of sand on beach to increase protection. 7. **Managed retreat →** Low value areas of coast is left to erode over time. 8. **Sand dunes →** Natural barrier that protects cliffs from erosion.	
Case Study: Porlock and Minehead	6. **Porlock Village →** Groynes. No maintenance. High costs. Increase sediment further down coastline (Porlock Marsh). Lower value land. 7. **Porlock Marsh →** Managed retreat. Salty marsh. Low value land. 8. **Minehead →** Sea wall, rock armour, groynes. High value land.