Rivers

River profiles (P47)	Long Profile: Characteristics: Upper course: **Steep gradinet** Middle course: **Medium gradient** Lower course: **Gentle gradient.**	Cross Profile Characteristics: Upper course: **Steep sides, narrow shallow channel** Middle course: **Gentle sloping valley sides, wider valley.** Lower course: **Very wide almost flat valley, very wide deep channel.**

Fluvial processes (P48)

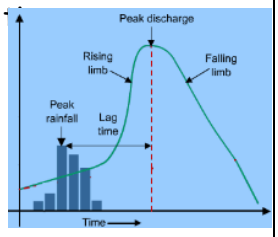
Erosion	Upper course: **Vertical Erosion**		Lower course: **Lateral Erosion**	
	Hydraulic Action	Abrasion	Attrition	Solution:
	What is it? **Force of water breaks rock particles away from the river.**	What is it? **Eroded rock picked up by the river scape along the river bed.**	What is it? **Eroded material smashes against each other.**	What is it? **River water dissolves some types of rock.**
Transport -ation	Traction:	Saltation	Suspension	Solution
	What is it? **Large particles pushed along the river bed.**	What is it? **Pebble sized particles bounced along the river bed.**	What is it? **Small particles like silt carried along by the water.**	What is it? **Soluble materials a dissolved in the water and carried.**
Deposition	Why? Four reasons: 1. **Volume of water falls.** 2. **Amount of eroded material increases.** 3. **The water is shallower eg on the inside of the bend.** 4. **The river reaches its mouth.**			

Landforms

Erosional (P49)	1 Waterfalls and gorges Formation: 1. **Waterfalls form when a river flows over an area of hard rock above softer rock.** 2. **Softer rock eroded more quickly than harder rock.** 3. **Water goes over the step it erodes more of the softer rock.** 4. **A steep drop created called a waterfall.** 5. **The hard rock is unsupported and eventually collapses.** 6. **Over more undercutting leads to more collapsing.** 7. **Waterfall retreats upstream creating steep sided gorge.**		3 Interlocking Spurs Formation: 1. **Most erosion in upper course of river is vertical creating steep sided v shaped valleys.** 2. **River not powerful enough to erode laterally (sideways) so wind around hillsides in their path.** 3. **The hillsides interlock like a zip.** 4. **These are called interlocking spurs.**
Erosion + Deposition (P50)	1 Meanders Formation: 1. **The current is faster on the outside of a river bend because river channel deeper so less friction.** 2. **More erosion therefore on outside of bend forming river cliffs.** 3. **Current slower on inside of the bend because shallower so more friction.**	2 Oxbow lakes Formation: 1. **Erosion causes outside of meander bends to get closer.** 2. **Until there is only a small bit of land left called a neck.** 3. **The river breaks through neck during a flood.** 4. **River flows along the shortest course.** 5. **Deposition cuts off meander.** 6. **Oxbow lake formed.**	

		4. Eroded material deposited on inside of bend forming slip off slopes.					
	Depositional (P51)	1 Flood Plain Formation: 1. Flood plains is wide valley floor which occasionally get flooded. 2. When river floods the flood plain water slows so material is deposited. 3. This makes the floodplain higher. 4. Meanders move across the floodplain making it wider.		2 Levees 1. Levees are natural embankments along edge of river channel. 2. During flood eroded material deposited across floodplain. 3. Heaviest material deposited closest to river. 4. Overtime deposited material builds up creating a levee.		3 Estuaries. 1. Estuaries are found at the mouth of the river. 2. Water is tidal near the mouth so river level rises and falls each day. 3. Water floods over banks of river carrying silt onto valley floor. 4. When tide reaches highest point, water is travelling slowly so sediment deposited. 5. Over time more sediment builds up creating mudflats. 6. At low tide mudflats are exposed.	
	Example(P53): River Clyde	E Waterfall gorge at the Falls of Clyde.	E Interlocking Spurs at Crawford.	E Gorge at the Falls of Clyde.	ED Oxbow Lake at New Lanark.	ED Meanders between Motherwell and Glasgow.	D Glasgow built on a floodplain.

Flooding (P54)	Factors affecting flood risk	Physical Prolonged rainfall Why? Soil becomes saturated so no more infiltration possible.	Physical Heavy rainfall: Why? Rainwater arrives to rapidly for infiltration so more surface run off.
		Physical Relief: Why? Water flows more quickly on steep slopes	Human Land use: Why? Tarmac is impermeable so surface run off increases rapidly.

Hydrographs (P 54)	More Surface Run off reduces/ increases lag times 

Management (P55)	Hard	1 Dams are reservoirs Advantage Store water during heavy rain and used for HEP. Disadvantage Very expensive to build so less money for public services.	2 Channel straitening Advantage Water moves out of flood effected area more quickly. Disadvantage Flooding more likely downstream as water travels there faster.	3 Embankments Advantage River can hold more water so flood less frequently. Disadvantage Very expensive to build so less money for public services.	4 Flood relief channels Advantage Flooding prevented because discharge is reduced. Disadvantage Increased discharge where flood relief channel rejoins river.

	Soft	1 Flood warnings Advantage: **People able to evacuate themselves and possessions.** Disadvantage: **People may not hear warnings.**	2 Preparation Advantage: **When buildings are modified eg: put on stilts effects reduced.** Disadvantage: **Its expensive to modify homes and businesses.**	3 Flood plain zoning Advantage: **Risk of flooding reduced because no impermeable surfaces or important buildings at risk.** Disadvantage: **Does not help in areas that have already been built on.**	4 Planting trees Advantage: **Provides natural habitats for local wildlife.** Disadvantage: **Less land is available for farming.**

Example- Boscastle (P56)	Reasons for…	Steep Sided valley	Land upstream cleared of vegetation.	Old bridge had a low arch.
	Management	Hard Old bridge replaced with a higher arch so water could flow through more quickly when high discharge.	Soft Dead trees and vegetation removed to stop them blocking the river channel during flooding.	
	Effects	Social: Many residents do not like the bridge because it does not maintain character of village so less tourists might visit. Economic: Homes and business now less at risk of flooding so insurance costs reduced. Environmental: Biodiversity and river habitats have been improved which attracts tourists.		