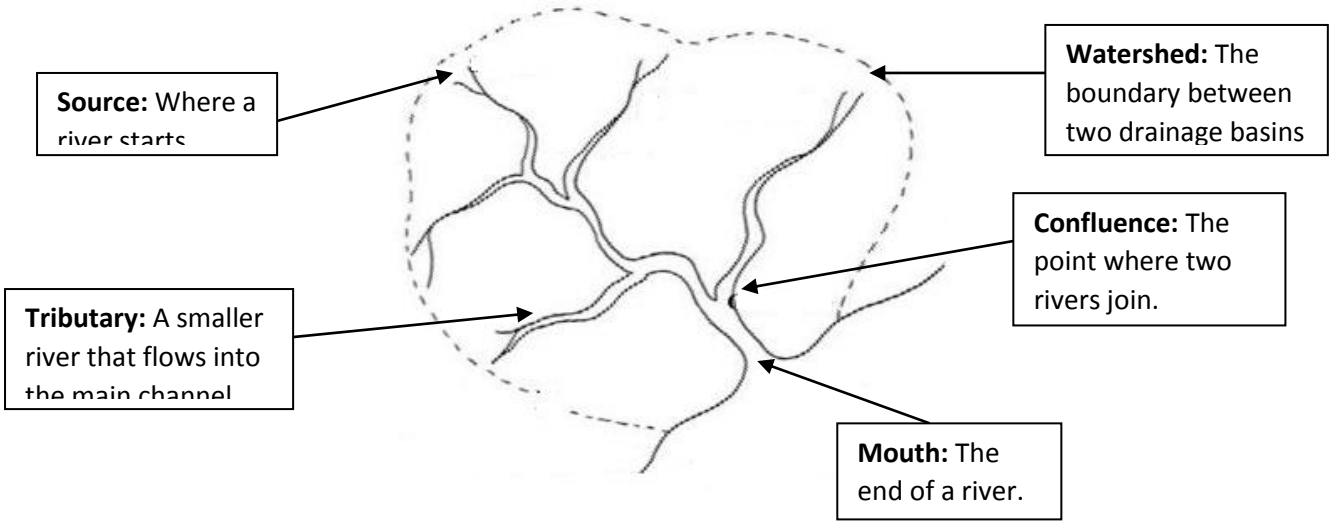
1.1 River Processes and Landforms (Foundation)

SPECIFICATION TARGET: 2.1a know the meaning of the following drainage basin terms: watershed, confluence, tributary, source and mouth.



SPECIFICATION TARGET: 2.1b The impact of weathering, erosion and mass movement on river landscapes.

Key Point

Rivers are channels of water which drain the land's surface. They erode, transport and deposit materials, creating steep valleys and wide floodplains. As river's cut into the landscape they uncover bedrock, leading to further change through weathering and mass movement.

Weathering

(e.g. freeze-thaw) breaks up the hillsides and weakens the bedrock.

Mass movement (e.g. slumping) causes the loosened material to move down slope.

The weathered rock is picked up by the river and leads to **erosion** (e.g. abrasion).

In areas of low energy the river **deposits** its load, creating beaches.

Processes of Movement	
Soil Creep	Surface runoff slowly moving soil downhill.
Slumping	Area of saturated land slips downhill.
Processes of Weathering	
Physical (Freeze-Thaw)	Rock breaks due to changes in temperature
Biological	Plants and animals break-up the rock.
Chemical	Acid in rainwater dissolves the rock.
Processes of Erosion	
Corrosion (Solution)	Material dissolved by the river
Abrasion (Corrasion)	Load wears away river channel
Hydraulic Action	Force of current dislodges loose material
Attrition	Load collides

SPECIFICATION TARGET: 2.1c Understand how river characteristics change.

Source → Middle → Mouth

Large / Angular Bedrock

Eroded bedrock – smoother and smaller

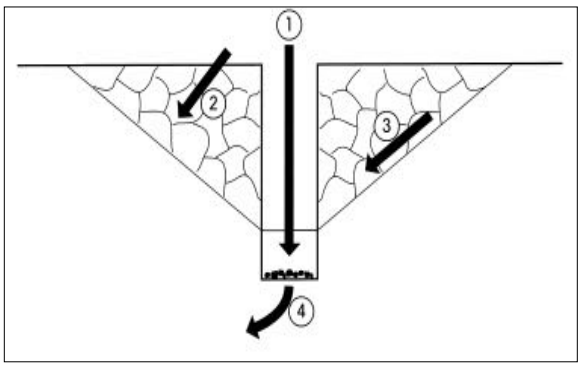
Bedrock eroded into fine silt and sand

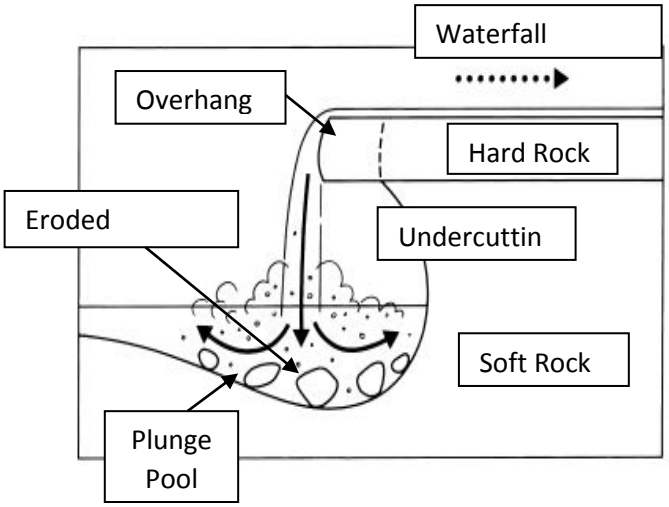
SPECIFICATION TARGET: 2.1d The formation of interlocking spurs, waterfalls, meanders, river-cliffs, oxbow lakes, flood plains and levees.

The Upper Course

The V-Shape Valleys & Interlocking Spurs

1. The river erodes downwards.
2. The exposed sides are attacked by freeze-thaw weathering.
3. Mass movement (e.g. slumping) causes the loosened material to move into the river.
4. The river carries its new load downstream creating a v-shaped valley.
5. In places, bands of hard rock force the river to 'wiggle', these outcrops are known as spurs and they usually form an interlocking pattern.





Waterfalls and Gorges

1. Waterfalls form where there are layers of hard and soft rock.

2. The weaker rock is eroded leaving the hard rock undercut.

3. Eventually the hard rock will collapse due to a lack of support, moving the waterfall backwards.

4. Over time the moving waterfall creates a steep rocky valley known as a gorge.

6

support
l to

and

Exam Question: Explain how gorges form (6 marks).

Grade C Response

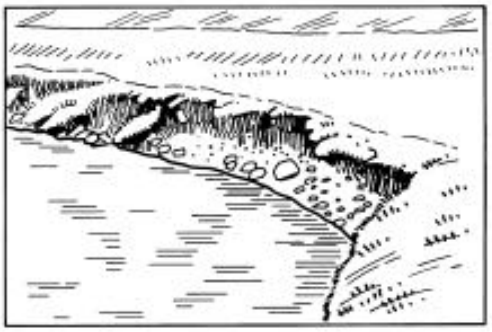
The soft rock at the bottom of the waterfall is rapidly eroded by hydraulic action. As the soft rock is eroded the hard rock becomes undercut creating an overhang. The overhang will become too heavy and will break off. This process will repeat itself again and again, causing the waterfall to move back which makes a gorge.

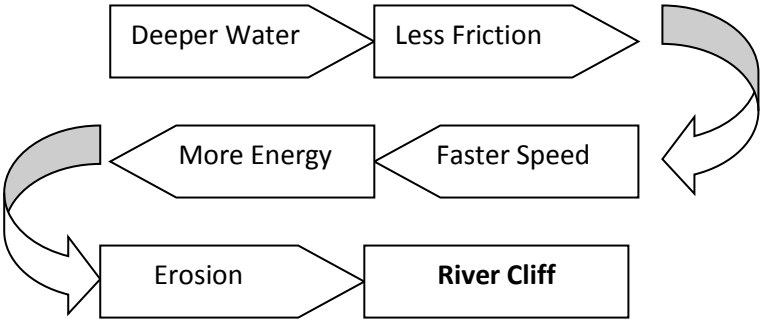
Level 3 – 6 marks. Refers to the entire process and

The Middle Course

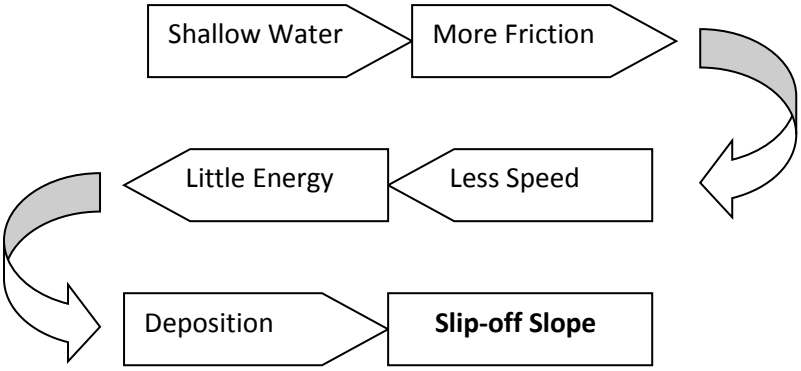
As a river moves into its middle course it begins to erode laterally, leading to the formation of meanders and the creation of a floodplain.

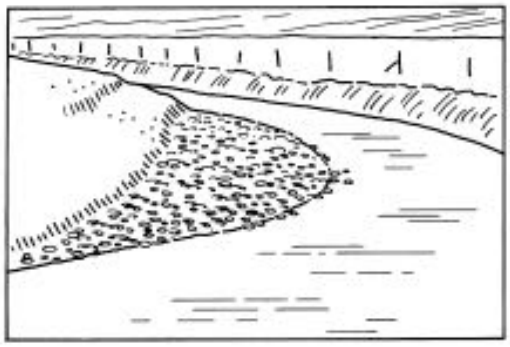
The Outside of a Meander





The Inside of a Meander





Floodplains

In a river's middle course the river begins to meander. As the river erodes and deposits is creates an area of flat land known as a floodplain. When a river floods, water covers this flat area and drops a layer of silt, which builds-up over time to form a fertile soil known as alluvium. As the river flows towards its mouth, it meanders more and more and the floodplain becomes larger and larger.

The Lower Course

Ox-bow lakes form when meanders loop back on themselves (forming an almost closed curve). Erosion cuts through the narrow meander neck whilst deposition blocks off the entrance to the old meander, separating the ox-bow lake from the river.

Levees form during times of flood. As the river leaves its channel there is a sudden loss of energy, resulting in the river depositing much of its load immediately next to the main channel. Overtime this deposition builds up creating a natural embankment called a levee.

EXAM PRACTICE

1. What term is used to describe the boundary between two drainage basins?

a) Watershed

b) Confluence

c) Source

d) tributary

2. What term is used to describe how a rock can be broken down by nature without moving?

a) Erosion

b) Abrasion

c) Deposition

d) Weathering

3. Use the wordbox to complete the following statements. (2)

Wordbox Gorge Mass Movement Flood Plain

At a waterfall the soft rock is eroded by abrasion and ..... .

As the soft rock erodes the overlaying hard rock becomes undercut and eventually collapses, causing the waterfall to move upstream.

As the waterfall retreat, a steep rocky valley known as a ..... is created.

4. **Describe** ONE process of mass movement. (2)

5. **Identify** the features A and B (2)

6. **Outline** how a river's characteristics change between its source and mouth. (4)

7. Using diagrams to help you, **describe** why waterfalls retreats. (6)

Getting the C: Always read questions carefully and pay particular attention to command terms. A describe question requires extending statements for full marks.

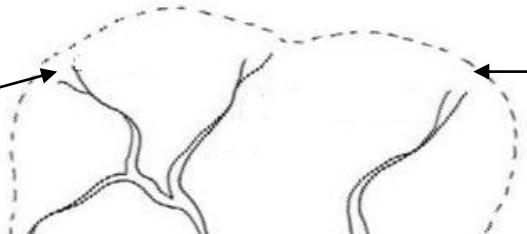
Getting the C: If you include a diagram in your answer make sure it is clear and easy to follow. Use labels, annotations and colour coding to highlight key features.

SPECIFICATION TARGET: 2.1a know **sin** **ter** **ce, trib**

Getting the C: On multi-choice and fill the gap activities, if you don't know – guess!

Getting the C: On Paper Two you maybe required to identify landforms on maps, photographs and diagrams. On map based questions contour lines are often helpful; ng vall lains.

Source: Where a river starts



Watershed: The boundary between two drainage basins

Confluence: The

SPECIFICATION TARGET: 2.1b The impact of weathering, erosion and mass movement on river landscapes.

Key Point

Rivers are channels of water which drain the land's surface. They erode, transport and deposit materials, creating steep valleys and wide floodplains. As river's cut into the landscape they expose bedrock, leading to further change through weathering and mass movement.

Weathering breaks up the hillsides near the river's source.

Mass movement causes the weathered material to fall into the river.

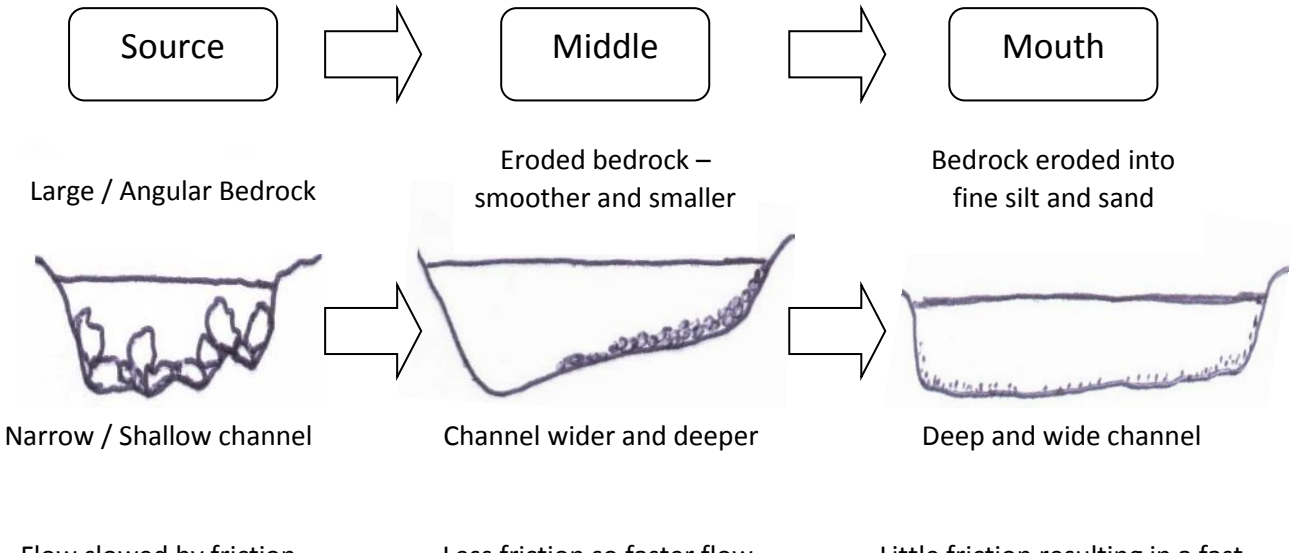
The weathered rock is picked up by the river and hit against the channel sides (**erosion**).

Weathered and eroded material is rolled and carried downstream (**transport**).

In areas of low energy the river **deposits** its load, creating point bars and beaches.

Processes of Movement	
Soil Creep	Surface runoff slowly moving soil downhill.
Slumping	Area of saturated land slips downhill.
Processes of Weathering	
Physical (Freeze-Thaw)	Rock breaks due to changes in temperature
Biological	Plants and animals break-up the rock.
Chemical	Acid in rainwater dissolves the rock.
Processes of Erosion	
Corrosion (Solution)	Material dissolved by the river
Abrasion (Corrasion)	Load wears away river channel
Hydraulic Action	Force of current dislodges loose material
Attrition	Load collides
Processes of Transportation	
Traction	Rolling of large load
Saltation	Bouncing of smaller load
Suspension	Fine material held within the water
Solution	Rocks dissolved within the water

SPECIFICATION TARGET: 2.1c Understand how river characteristics change.

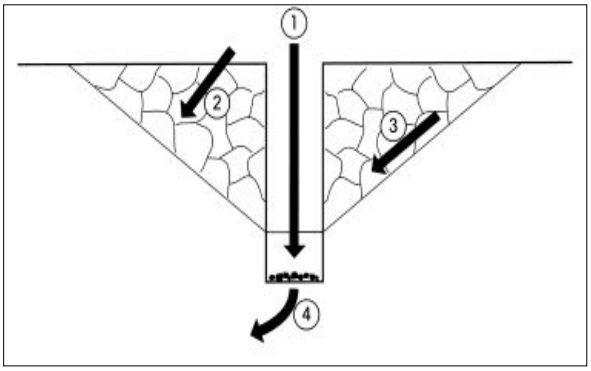


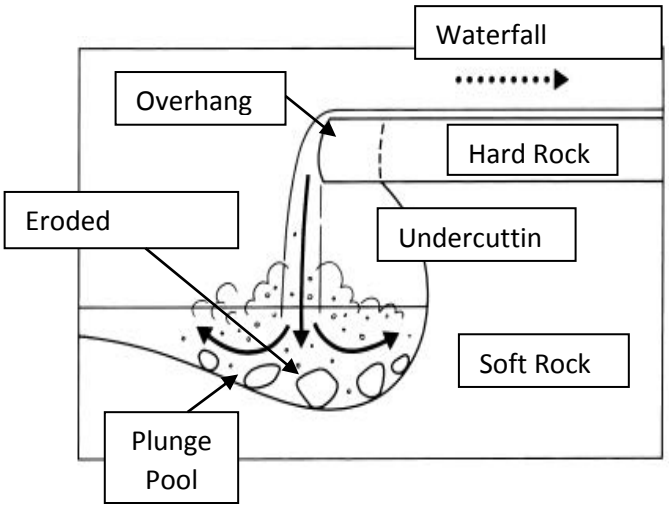
SPECIFICATION TARGET: 2.1d The formation of interlocking spurs, waterfalls, meanders, river-cliffs, oxbow lakes, flood plains and levees.

The Upper Course

The V-Shape Valleys & Interlocking Spurs

6. The river erodes vertically into the bed through corrosion and hydraulic Action.
7. The exposed channel sides are attacked by freeze-thaw weathering.
8. Mass movement (e.g. slumping) and overland flow causes the loosened material to move into the river channel.
9. The river transport's its new load downstream through traction and saltation.
10. In places, bands of hard rock force the river to 'wiggle', these outcrops are known as spurs and usually form an interlocking pattern.





Waterfalls and Gorges

1. Waterfalls and rapids usually form where bands of harder rock cross the channel.

2. The weaker rock is eroded by abrasion and hydraulic action, undercutting the hard rock whilst deepening the plunge pool.

3. Eventually the over hanging hard rock will collapse due to a lack of support, causing the waterfall to move back.

4. This process has happens again and again, as the waterfall retreats upstream a steep rocky valley is created, known as a gorge.

Exam Question: Explain the formation of ox-bow lakes (6 marks).

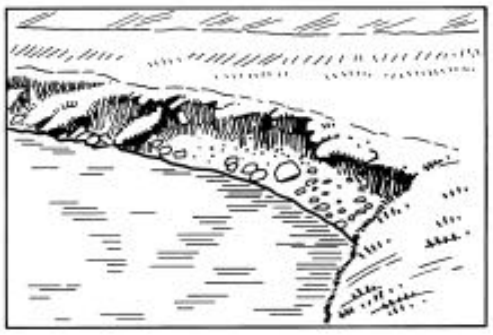
Grade A Response

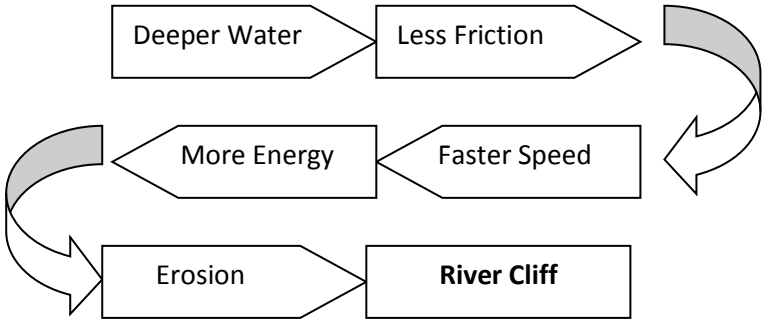
Due to erosion (abrasion) on the outside and deposition on the inside, meanders migrate over their floodplain. In places they migrate towards each other, forming a meander neck. The neck is eventually eroded creating a faster, straighter route for the river. As little water now flows around the loop, deposition blocks off the old bend, forming a oxbow lake.

The Middle Course

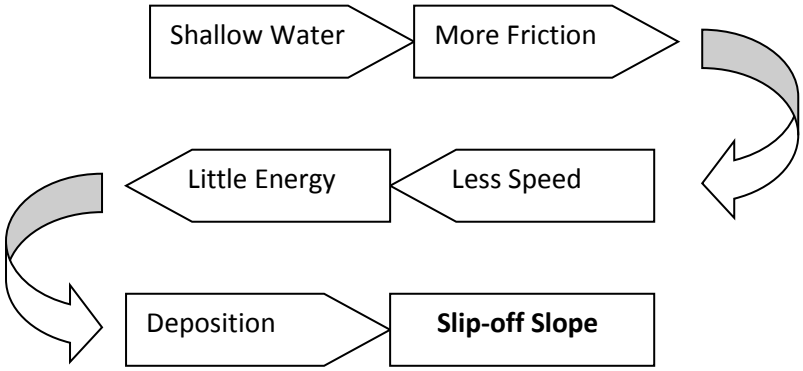
As a river moves into its middle course it begins to erode laterally, leading to the formation of meanders and the creation of a floodplain.

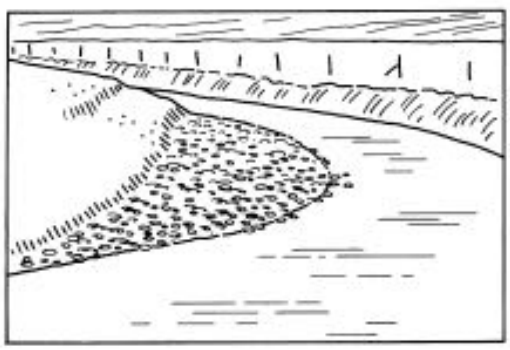
The Outside of a Meander





The Inside of a Meander





A* Knowledge: The force that pushes the river's water towards the outer bank on a bend is called **centri-fugal** force. It's the same force that throws you outwards on a fairground ride or roundabout.

A* Knowledge: Eroded material on one meander is transported across the channel to be deposited on the beach of the next meander by **helicordial flow**. This is 'cockscrew' motion, sometimes creates little whirlpools on the river's surface.

Floodplains

In a river's middle course lateral erosion causes the river's meanders to migrate. As the river erodes and deposits is creates an area of flat land, known as a floodplain. When a river floods, water inundates this flat area and deposits a covering of silt. Over time thick layers of silt can build-up leading to the creation of alluvium soil. As the river moves towards its mouth, it meanders more and more and the floodplain becomes larger and larger.

The Lower Course

Ox-bow lakes form when meanders loop back on themselves (forming an almost closed curve). Erosion cuts through the narrow meander neck whilst deposition blocks off the entrance to the old meander, separating the ox-bow lake from the river.

Levees form during times of flood. As the river leaves its channel there is a sudden loss of energy, resulting in the river depositing much of its load immediately next to the main channel. Overtime this deposition builds up creating a natural embankment called a levee.

A* Knowledge: can you explain why levee collapse can often lead to devastating flooding?

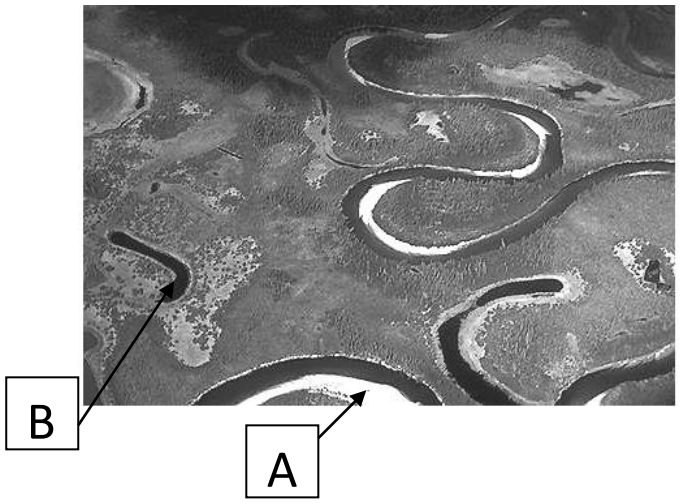
EXAM PRACTICE

1. **What is meant by** the following terms?

(i) Confluence (1)

(ii) Watershed (1)

2. **Describe** ONE way a river can erode its channel. (2)



3. (a) **Identify** the feature A. (1)

(b) **Explain** how it was formed (3)

4. **Describe** how a river's characteristics change between its source and mouth. (4)

5. Using diagrams to help you, **explain** how landform 'B' has been created. (6)

A* Tip: Always read questions carefully and pay particular attention to command terms. A describe question requires extending statements for full marks.

A* Tip: If you include a diagram in your answer make sure it is clear and easy to follow. Use labels, annotations and colour coding to highlight key features.

g (Foundation)

A* Tip: When a landform question has the 'explain' command term you need to identify the main processes of change and link these to landform development.

A* Tip: On Paper Two you maybe required to identify landforms on maps, photographs and diagrams. On map based questions contour lines are often helpful; particularly when identifying valley features, such as floodplains

SPECIFICATION TARGET: 2.2a The physical and human causes of river flooding.

A flood is when a river bursts its banks and water inundates the surrounding land. Flooding can be caused by both human and physical factors:

Physical Factors

- **Heavy** or **continuous** rainfall
- **Impermeable surfaces**, such as dry or frozen soil.
- **Snow melt** in spring
- **steep gradients** shorten lag time.

Human Factors

- **Deforestation** reduces transpiration and increases surface runoff.
- **Urbanisation** – building new houses and roads leads to the land being covered in impermeable materials, such as tarmac and concrete. As rainfall is unable to soak into the surface, water flows into the drains and directly to the river.
- **Climate change** has lead to more unpredictable rainfall patterns and more extreme weather events, such as strong storms.

SPECIFICATION TARGET: 2.2b The effects of river flooding on people and the environment.

Effects on People

1. Property damaged
2. Lives threatened
3. Businesses Affected
4. Transport disrupted
5. Farming affected
6. Loss of Power
7. Phone service down
8. Increased insurance

Effects of Flooding

Effects on the Environment

1. Habitats destroyed
2. Wildlife endangered
3. Food chains disrupted
4. Silt fertilises soil
5. Soil eroded

SPECIFICATION TARGET 2.2c Prediction and prevention

Forecasting Flooding

- The MET Office uses satellites to forecast future storms.
- When heavy rain is predicted the MET Office issues a weather warning.
- River levels are also monitored by the Environment Agency.
- Flood warnings are issued when high water levels are predicted.
- Warnings are broadcast on radio and television, given out in local newspapers and are available through various websites.
- Local authorities have emergency action plans, these often involve the putting the emergency services on alert.

Building Design

Planning

Local authorities also try to limit flood damage by imposing planning restrictions on areas prone to flooding, or areas which could increase the flood risk elsewhere. Unfortunately, due to high demand for new housing, some authorities have agreed to new building programmes on floodplain land.

Engineering

The impact of flooding can be reduced by engineering – flood defence programmes are described as being either hard or soft:

- **Hard** defences make significant changes to the natural river channel. They are costly to build and maintain but most are long lasting and effective.
- **Soft** defences are less expensive, however they often require large areas of land. Although soft defences reduce the risk of flooding, they are normally less effective than hard techniques.

Flood Protection Measure				
Type	**Hard**		**Soft**	
Strategy	**Dams**	**River Channel Modification**	**Afforestation (Planting trees)**	**Washlands**
Benefits 	**1.** Stop floods by controlling the amount of water released. **2.** Can be used to generate electricity **3.** Recreation opportunities.	**1.** Straightening and deepening the channel allows a large amount of water to flow quickly through the river.	**1.** Intercepts rainfall; **2.** Holds soil in place reducing erosion; **3**. Relatively cheap; **4.** Creates habitats for wildlife; **5.** Recreation opportunities.	**1.** Allowing some parts of the river to flood naturally reduces risk in urban areas; **2.** Flooding leads to marshlands – important ecosystems.
Drawbacks 	**1.** Expensive; **2.** Soil can be trapped **3.** May spoil the view	**1.** Expensive; **2.** Costs a lot to maintain; **3.** Destroys habitats; **4.** Looks ugly and Un-natural; **5.** Moves flood risk downstream.	**1.** Floods still occur; **2.** Large areas of land needed; **3.** Forests need to be carefully managed to maximise effect.	**1.** Floods still occur; **2.** Productive farmland may be lost; **3.** Local residents may have to move.

EXAM PRACTICE

1. Which of the flooding flood impacts effected the environment? (1)

    a) Increased insurance premiums

    b) Businesses forced to close

    c) Habitats destroyed

    d) Furniture damaged

2. **State** TWO physical causes of flooding (2)

3. **Outline** why building new houses may increase the risk of flooding. (3)

4. **Give** two effects of flooding on people (2)

5. **Name** TWO forms of hard flood defences. (2)

6. **Describe** how building design can reduce flood damage. (4)

7. **Outline** the advantages of using soft techniques to prevent flooding. (3)

Getting the C: There is no need to provide extending statements when the command word is either: Name, Give or State.

Getting the C: The command term 'outline' requires you to '*give the main points*'. Although this usually involves a list of statements, try to avoid bullet-points. On 'outline' questions you will be rewarded for including extending statement.

Getting the C: Take care with spelling and grammar. Literacy is becoming a more important element of the exam process. Careless spelling errors could cost you important points.

A flood is when a river bursts ... land. Flooding can be caused by both human and pl...

Physical Factors

- Severe weather such as **heavy** or **continuous precipitation** (rainfall) is the most common cause of river flooding in the UK.

- Impermeable surfaces, such as **baked** or **saturated soil**, increases surface flow and the amount of water entering the river system.

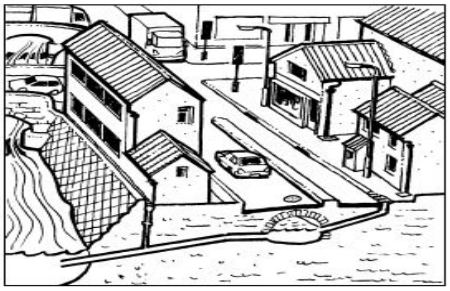
- **Snow melt** in spring can lead to flooding in mountainous regions where thick layers of snow have built-up over the winter.

- In upland areas with **steep gradients** there is little time for water to infiltrate into the soil, shortening lag time.

Human Factors

- In wooded areas trees may intercept rainfall, trapping rainwater on their leaves. Additional rainwater may be absorbed by their roots and released back to the atmosphere through transpiration. When forests are cut down (**deforested**) less rainwater is intercepted and transpired so more water reaches the river and gets their quicker.

- In urban areas, the landscape is made up of mainly **impermeable** surfaces. As rainfall is unable to penetrate the surface, water flows into the drains and directly to the river. Sloping roofs also increased run-off and reduce surface storage.



- Changing farming techniques have lead to increased surface runoff. **Up-and-down ploughing** channels rainwater quickly downhill shortening lag time.

- The extensive use of fossil fuels and changing farming practices, have increased the amount of greenhouses (e.g. carbon dioxide and methane) in our atmosphere. These gases 'trap-in' the sun's heat warming our climate. **Higher global temperatures** have lead to an increase in extreme weather conditions, such as hurricanes and droughts, and increasingly unpredictable rainfall patterns.

SPECIFICATION TARGET: 2.2b The effects of river flooding on people and the environment.

Effects of Flooding

Effects on People

9. Property damaged
10. Lives threatened
11. Businesses Affected
12. Transport disrupted
13. Farming affected
14. Loss of Power
15. Phone service down
16. Increased insurance

Effects on the Environment

1. Habitats destroyed
2. Wildlife endangered
3. Food chains disrupted
4. Silt fertilises soil
5. Soil eroded

SPECIFICATION TARGET 2.2c Prediction and prevention

Forecasting Flooding

In Britain, satellites and sophisticated modelling software are used to forecast future weather events. When flood conditions are predicted the **MET Office** issues a weather warning to alert people of potential future problems.

River levels are also monitored by the **Environment Agency** who issue flood warnings when river levels are high. Hydrographs are used by the environment agency to help them predict flood risk. On a hydrograph both rainfall and discharge are plotted. The distance between the heaviest rainfall and the peak discharge is known as the **lag time**. The shorter the lag time the more likely a flood.

Information about flood and weather warnings is often broadcast on radio and television or given in local newspapers. More detailed information is available through various websites.

Local authorities have **emergency action plans** which are implemented when flooding warnings are issued. Emergency services are put on alert and in severe situations regions prone to flooding are evacuated. Transport connections may be closed and local schools may be closed.

Building Design

Planning

Local authorities also try to limit flood damage by imposing planning restrictions on areas prone to flooding, or areas which could increase the flood risk elsewhere. Unfortunately, due to high demand for new housing, some authorities have agreed to new building programmes on floodplain land.

Engineering

The impact of flooding can be reduced by engineering – flood defence programmes are described as being either hard or soft:

- **Hard** options tend to involve making significant changes to the natural river channel. These are usually costly to build and maintain but most are long lasting and effective.
- **Soft** options (sometimes referred to as natural) tend to be far less expensive and rarely involve changes to the river channel. However, they often require large areas of land and as such the

overall cost can still be large. Although soft engineering reduces the risk of flooding, they are normally less effective than hard techniques.

Flood Protection Measure				
Type	**Hard**		**Soft**	
Strategy	**Dams**	**River Channel Modification**	**Afforestation**	**Washlands**
Benefits 	**1.** Discharge regulated – floods prevented; **2.** HEP potential; **3.** Recreation opportunities.	**1.** Straightening and deepening the channel allows a large amount of water to flow quickly through the river.	**1.** Intercepts rainfall; **2.** Holds soil in place reducing erosion; **3**. Relatively cheap; **4.** Creates habitats for wildlife; **5.** Recreation opportunities.	**1.** Allowing some parts of the river to flood naturally reduces risk in urban areas; **2.** Flooding leads to marshlands – important ecosystems.
Drawbacks 	**1.** Expensive; **2.** Sediment trapped possibly leading to problems downstream; **3.** Spoils the view **4.** Flood prevention may lead to fertility problems.	**1.** Expensive; **2.** May require regular maintenance; **3.** Destructions of habitats; **4.** Un-natural look;	**1.** Floods still occur; **2.** Large areas of land needed; **3.** Forests need to be carefully managed to maximise effect.	**1.** Floods still occur; **2.** Productive farmland may be lost; **3.** Local residents may have to move.

		5. Moves flood risk downstream.		

EXAM PRACTICE

1. **Outline** how urban growth can lead to more frequent flooding (3)

2. **Give** two effects of flooding on people (2)

3. **Describe** how soft flood defences can be used to reduce flood risk. (4)

4. **Explain** why soft forms of flood defence are becoming more popular (3)

5. **Outline** how houses can be designed to limit flood damage (4)

A* Tip: There is no need to provide extending statements when the command word is either: Name, Give or State.

A* Tip: The command term 'outline' requires you to '*give the main points*'. Although this usually involves a list of statements, try to avoid bullet-points. On 'outline' questions you will be rewarded for including extending statement.

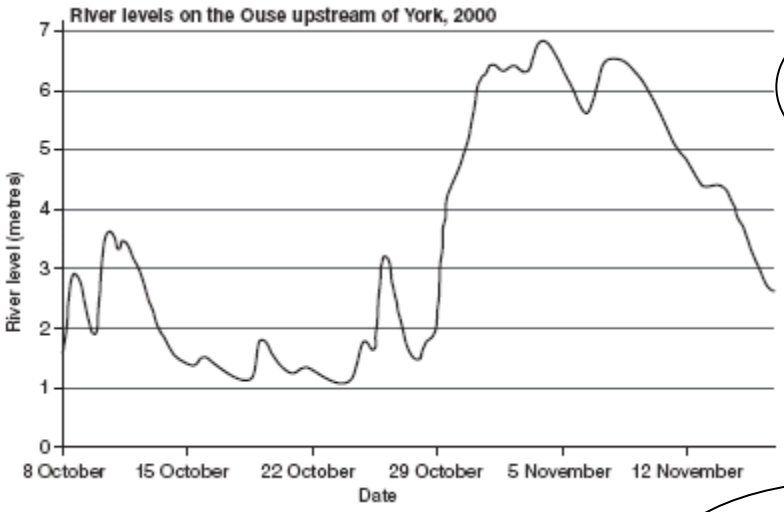
A* Tip: Take care with spelling and grammar. Literacy is becoming a more element of the exam process.

Wettest Autumn on record

Deforestation in drainage basin

250mm of rain fell in two weeks.

The removal of peat has increased surface runoff



River Ouse has a large drainage basin.

The Ouse starts in the steep slopes of the Yorkshire Dales and Moors

York and other nearby towns have grown.

The river Ouse has a large number of tributaries.

Changing farming methods have shortened the lag time.

York is sited at the confluence of the Ouse and the Foss

Effects of the 2000 flood

- 450 houses damaged
- Riverside businesses closed
- Road and Rail links closed.
- Insurance prices increased
- House prices fell
- Historical buildings (e.g. the castle) were damaged.
- Parks and playing fields were submerged
- New flood defences were planned

How has York **responded** to the threat of flooding?

Warning Systems

- River levels in the York region are closely monitored by the MET Office and the Environment Agency.
- When heavy rain is predicted weather warnings are issued to ensure local people have the time to prepare and evacuate.

Planning

- **Clifton Ings** : The council has made this area of farmland and playing fields into a washland. Planning laws will prevent any future construction in this area.

Engineering –

- **Bootham**: Houses have been fitted with Flood gates
- **North Street**: The flood has been heighten
- **Confluence of Ouse and Foss**: Foss Barrier has been built to keep the two rivers apart during periods of high rainfall preventing the water from 'backing-up' and flooding.

Exam Question: For a chosen region, outline the measures which have been taken to reduce flood risk.

Grade E Response

Chosen Region: York

In York a big barrier was built to stop floods. The sides of the river were made higher and some playing fields were allowed to flood.

Level 2 – 3 marks. For a stronger score the candidate needed to use more geographical terms

Exam Question: For a chosen region, outline the measures which have been taken to reduce flood risk.

Grade C Response

Chosen Region: York

The Foss Barrier was built at the confluence of the rivers Ouse and Foss to stop flood water building up. Houses in areas that have been affected by flooding have had flood gates fitted to keep the water out and the river banks have been raised in important places, such as North Street.

EXAM PRACTICE

1. Using examples, **give** three impacts of flooding. (4)

2. For a flood you have studied, **outline** the causes. (4)

3. Using examples, **describe** how the impact of flooding can be minimised. (4)

5. For a chosen river, **outline** the measures taken to reduce the flood risk (6)

Getting the C: Take care with spelling and grammar. Literacy is becoming a more important element of the exam process. Careless spelling errors could cost you important points.

Getting the C: To achieve a high score on a levelled questions (one worth 6 marks or more) you will need to need to include subject specific terms in your answer.

Getting the C: When your exam is marked, correct statements will score points whilst incorrect comments will be 'overlooked'. No points are taking off for giving the wrong answer. Even crossed out work is credited if it's correct!!!

Getting the C: When a question asks for examples, or requires you to include case study knowledge, the examiner wants you to include some location specific detail in your answer. Generic statements won't achieve full marks.

1.3a Case Study: River Ouse (York) (Higher)

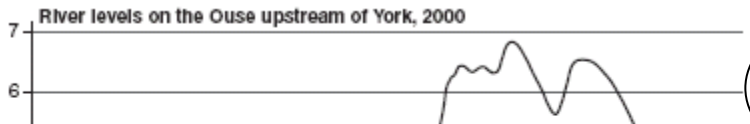
Causes of the 2000 flood

Wettest Autumn on record

Deforestation in the catchment zone has lowered rates of evapotranspiration

Between the 26th Oct and the 8th Nov 250mm of rain fell

Removal of peat in upland areas has reduced infiltration



Ouse catchment area covers 3000sqkm

Effects of the 2000 flood

- 450 properties damaged
- Riverside businesses, including several popular tourist facilities, were temporarily closed.
- Stock damaged and contracts lost.
- Access routes cut off (Road and Rail)
- Insurance premiums rose, whilst some properties were left with no insurance.

- House prices fell
- Historical buildings, including the castle's foundations, were damaged and required expensive restoration work.
- Sewage facilities overwhelmed, contaminated water left a sticking sludge behind
- Parks and playing fields were submerged
- New flood defences were planned

How has York **responded** to the threat of flooding?

Warning Systems – Like the rest of the UK, weather conditions and river levels in the York region are closely monitored by the MET Office and the Environment Agency. When heavy rain is predicted weather warnings are issued and when river levels rise flood warnings are given to ensure local people have the time to prepare and evacuate.

Planning – Local authorities have designated rural areas prone to flooding as over spill areas. These regions have tough planning laws preventing the construction of new buildings. Some of these 'washlands' (e.g. Clifton Ings) have been enhanced, through the building of embankments and sluice gates, to control the movement of flood water.

Engineering – A number of hard flood defences have been built to protect the city's historical centre and important residential areas. A series of flood gates, earthen embankments and concrete walls have been built to hold back flood waters near North Street and in Bootham.. There has also been an attempt to manage flow rates through the construction of the Foss Barrier at the confluence of the Ouse and Foss. The Foss Barrier separates the flow of the two rivers during periods of high discharge preventing the water from 'backing-up' and flooding neighbouring districts. Excess water is pumped to rural regions downstream of the town.

Exam Question: For a chosen region, explain how the consequences (impacts) of flooding have been reduced.

Grade C Response

Chosen Region: York

In York the Foss Barrier was built to control the flow of the two rivers. Embankments were also constructed in the town centre and some playing fields next to the river were allowed to flood.

Level 2. Identifies three actions but includes little extension. Most development is description, not explanation

Exam Question: For a chosen region, explain how the consequences (impacts) of flooding have been reduced.

Grade A Response

Chosen Region: York

The Foss Barrier was built at the confluence of the rivers Ouse and Foss. It reduces the flood risk by blocking off the Foss and pumping excess water downstream. This stops the Foss from backing-up and flooding the surrounding area. Clifton Ings has also been set aside as a washland. When the river is likely to flood, excess water is channelled onto the Ings, reducing the river's discharge and lowering the flood risk elsewhere in York.

EXAM PRACTICE

1. Using examples, **outline** the impact of flooding. (4)

2. For a flood you have studied, **outline** the causes. (4)

3. Using examples, **describe** how the impact of flooding can be minimised. (4)

5. For a chosen river, **explain** the measures taken to reduce flood risk (6)

A* Tip: Take care with spelling and grammar. Literacy is becoming a more important element of the exam process. Careless spelling errors could cost you important points.

A* Tip: The command term 'outline' requires you to '*give the main points*'. Although this usually involves a list of statements, try to avoid bullet-points. On 'outline' questions you will be rewarded for including extending statement.

A* Tip: An example is not a detailed case study. Examples may refer to a country, region, town or even a specific building. When a question asks for examples, you could use several examples from one case study region, or give examples from a number of different locations.

A* Tip: When your exam is marked, correct statements will score points whilst incorrect comments will be 'overlooked'. No points are taking off for giving the wrong answer. Even crossed out work is credited if it's correct!!!

A* Tip: When a question asks for examples, or requires you to include case study knowledge, the examiner wants you to include some location specific detail in your answer. Generic statements won't achieve full marks.