Core Unit One

Patterns & Processes in the Physical Environment

Examining the relationship between the tectonic & rock cycles, the processes of landform development &human interaction

The New Approach

A change from existing practice with an almost exclusive focus on landform development

Landform development firmly tied to the rock & tectonic cycles.

The Unit is mainly concerned with the study of landform development with the emphasis on processes rather than the description of the end product

Statements 1.3., 1.4, 1.5 & 1.6 are based on the students understanding of both the rock and tectonic cycles (1.1 & 1.2)

SYLLABUS, Page 11

Integrated Skills

- Map Interpretation
- Figure Interpretation
- Photograph Analysis
- Statistical Analysis
- Figure Drawing
- I.T.

Learning Outcomes – O.L. p. 9

- ***Explain*** **plate tectonic theory**
- ***Understand*** **the** ***processes*** **of rock formation, weathering and erosion**
- ***Explain processes*** **of landform development**
- **Show how** ***human activities can affect*** **these processes**
- ***Understand and use*** **the** ***skills*** **listed to describe the physical environment**

Learning Outcomes – H.L.

- ***Detailed understanding*** **of plate tectonic theory**
- ***Illustrate*** **how crustal structures are created, modified and destroyed by the tectonic cycle**
- ***Explain & illustrate*** **the continual process of rock formation, change & destruction**
- ***Explain & illustrate*** **landform development**

- ***Illustrate how*** **landforms present a balance through time, between endogenic & exogenic forces**
- ***Assess*** **the impact of human activity on the physical process at work on the landscape**
- ***Understand & use*** **skills to interpret the physical environment**

O.L.	H.L.
1. Explain Plate Tectonic Theory ----------	Detailed understanding
2. Understand processes of rock ----------	Creation, modification
formation, weathering & erosion	& destruction of crustal structures
3. Explain processes of landform devpt-----	Explain & illustrate
4. Human activities affect processes -------	Assess the impact of human activity on physical processes
5. Understand & use skills to describe ----------	Understand and use skills to interpret
	6. Effects of endogenic & exogenic forces on landforms over time

7 Statements

p.10-12

1.1 The Tectonic Cycle

1.2 The Rock Cycle

1.3 Landform Development (i)

1.4. Landform Development (ii)

1.5. Landform Development (iii)

1.6. Landform Development (iv)

1.7 Human Interaction

Regional Settings

Landforms & processes should be explained by using local examples as much as possible.

Examples can also be tied to selected regional settings

Syllabus Language!

☹ ***tfk***

☺ ***tfu***

Multiple Intelligences

- Debating
- Problem solving
- Mapwork
- Role-play
- Paired learning
- Reflection
- Fieldwork
- Brainstorming
- Pattern recognition
- Photographs / Diagrams
- Hands-on learning
- Co-operative group-work
- Individual research

Active Approaches to River Processes

Elements of an approach

- **Understanding goals**
- ***Determine previous experience & knowledge***
- ***Images & Examples***
- ***New Information***
- **Understanding Performances**

Understanding Goals

Students will be able to –

- **Identify the main processes of erosion & deposition at work in a river basin**
- **Identify and understand the development and evolution of the resulting landforms**
- **Explain how these processes can vary due to slope, rock type and climate**
- **Link to influence of tectonic cycle**

UnderstandingPerformances:

- **Draw diagrams to illustrate main landforms**
- **Identify these landforms on OS Maps**
- **Draw a long profile of a river**
- **Discuss & differentiate between the different processes at work**
- **Link the topic to 1.2 (Rock Cycle) to identify & discuss the processes of weathering at work in the different stages of the river basin**

Typical understanding performances would include an ability to……

- ☺ **Explain in your own words**
- ☺ **Analyse the controlling factors**
- ☺ **Debate or argue different point of view**
- ☺ **Use skills to deal with different forms of spatial information**
- ☺ **Apply the topic or issue to another setting**

Active Approaches to Rivers

Understanding Goals

OOOOOOOO

Understanding Performance

Previous Knowledge/Experience

- Students visualise ‘rivers’ with closed eyes
- Class brainstorms ‘rivers’ and students call out the terms
- Teacher records terms on OHP or blackboard
- Teacher checks understanding of terms
- Class sorts terms into groups e.g. processes, landforms etc.

Previous Knowledge/Experience

- Matching exercises - match descriptions, photographs or diagrams with river terms
- Sequencing exercises - put terms or diagrams into sequence
- Worksheets on rivers
- Visit a local river, if convenient
- Observe and measure elements of the river such as bed, banks, landforms, speed, depth, width, discharge - (H/O)

Images and Examples

- Flooding activity examine photographs (ground and aerial) of the Lynmouth flood
- Group activity - put Lynmouth photographs onto a large sheet of paper - students annotate them with questions and comments
- Individual activity - answering questions e.g.
  What happened before the photograph was taken?
  What happened after it was taken?

Lynmouth

A&B

Images and Examples

- Rivers on atlas and OS maps
- Locate important rivers in chosen regions e.g Ganges and Brahmaputra
- Locate features, watershed, basin, source, tributaries etc.
- Calculate area of a drainage basin
- Rank order the streams

Images and Examples

- Do contour pattern recognition activities -use a melon to show contours - (H/O)

CP&LFS

- Look at profile section of Shannon video
- Draw simple profiles - (H/O)
- Draw a profile from an OS map
- Examine the profile
- Identify different parts of the profile

PFS

Images and Examples

PHOTOGRAPH ACTIVITY

- Group examines a selection of photographs of river landforms - v-shaped valley, waterfalls, meanders, floodplains, levees and deltas
- Group decides where each landform is likely to be located on the profile
- Group gives reasons for their choices using evidence from the photographs
- Features in photographs are named if not known

New Information

- Formation of landforms – texts, diagrams and videos used as references extensively
- Emphasis on processes
- Practical demonstrations for processes of erosion
- Dirty milk bottle cleaned with sand and water to show abrasion
- Jif to clean graffitti from a desk
- Rubex in water to show solution

New Information

- Water dripping from school roof to show hydraulic action
- Handling gravel and scree to show effects of attrition
- Sand on a board tilted to show mass movement of debris
- Practical demonstrations of processes of deposition
- Use a jar with water and sand - shake the jar and the sand moves stop and it is deposited

New Information

- Add more sand and you get more deposition
- Add barium sulphate to a cloudy solution to clear it and show flocculation

Bed & Bank friction vs Stream Velocity

- Two pieces of guttering
- Sandpaper glued to one
- A jar of dry sand

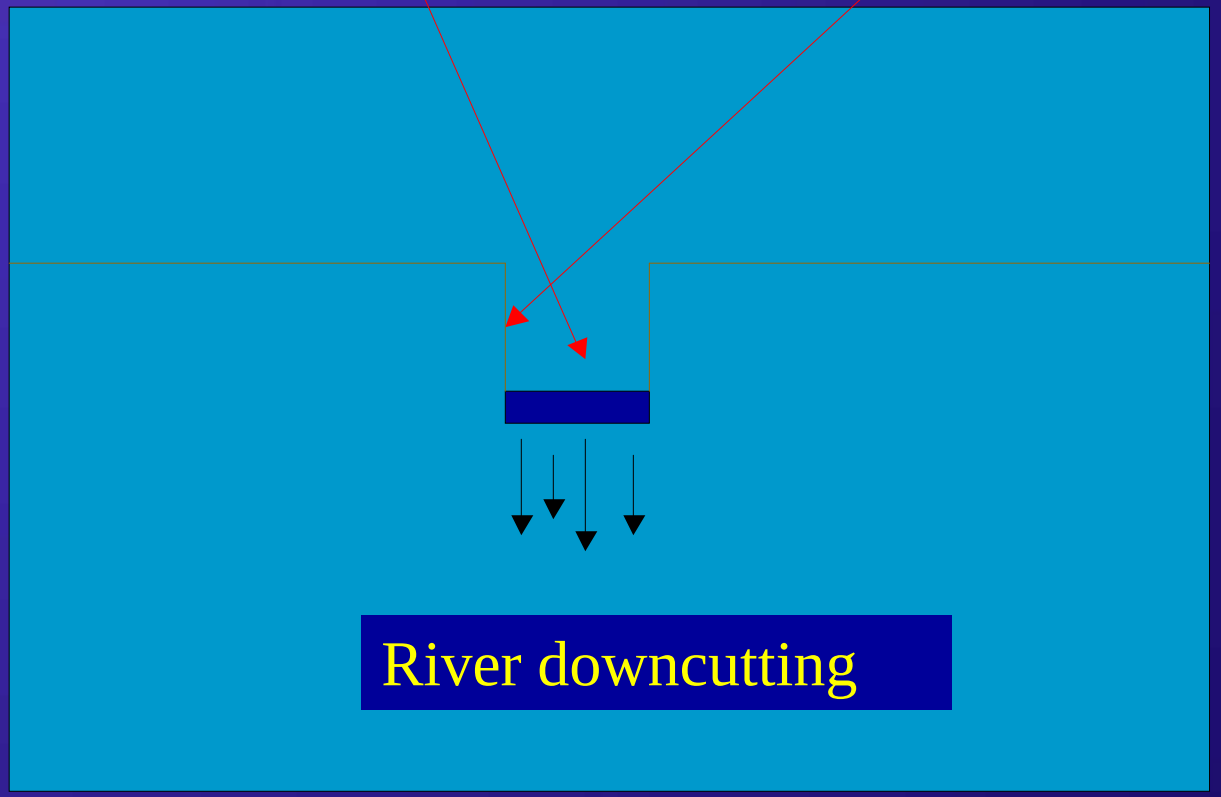
New Information

- Landform formation shown through a succession of simple diagrams as follows:
- Examples of the formation of a V-shaped valley and a waterfall follow

Formation of a V-shaped Valley

Little load so hydraulic action and solution

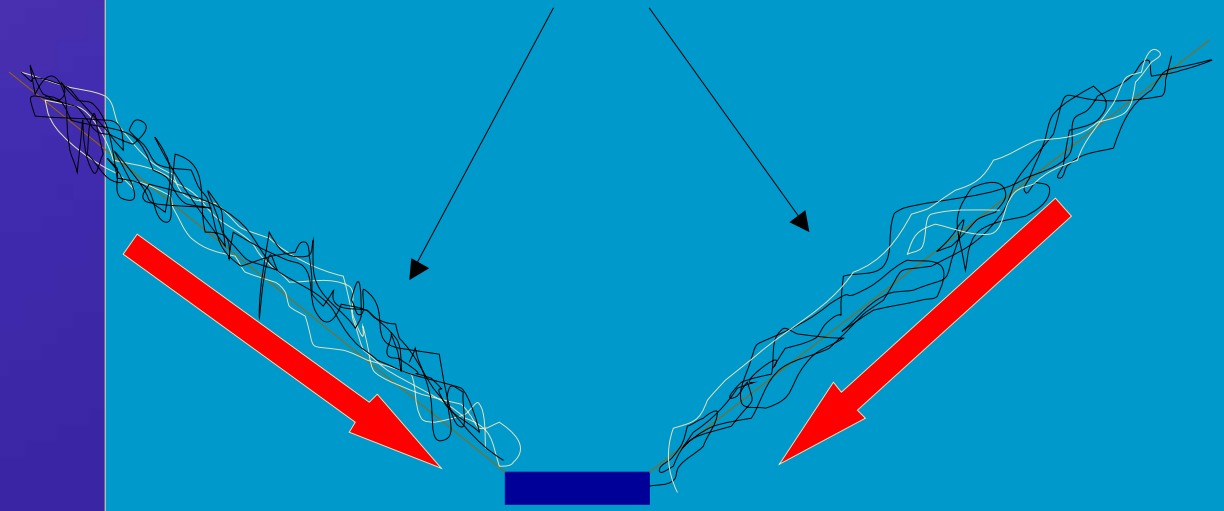
Valley sides exposed to weather



River downcutting

Formation of a V-shaped Valley

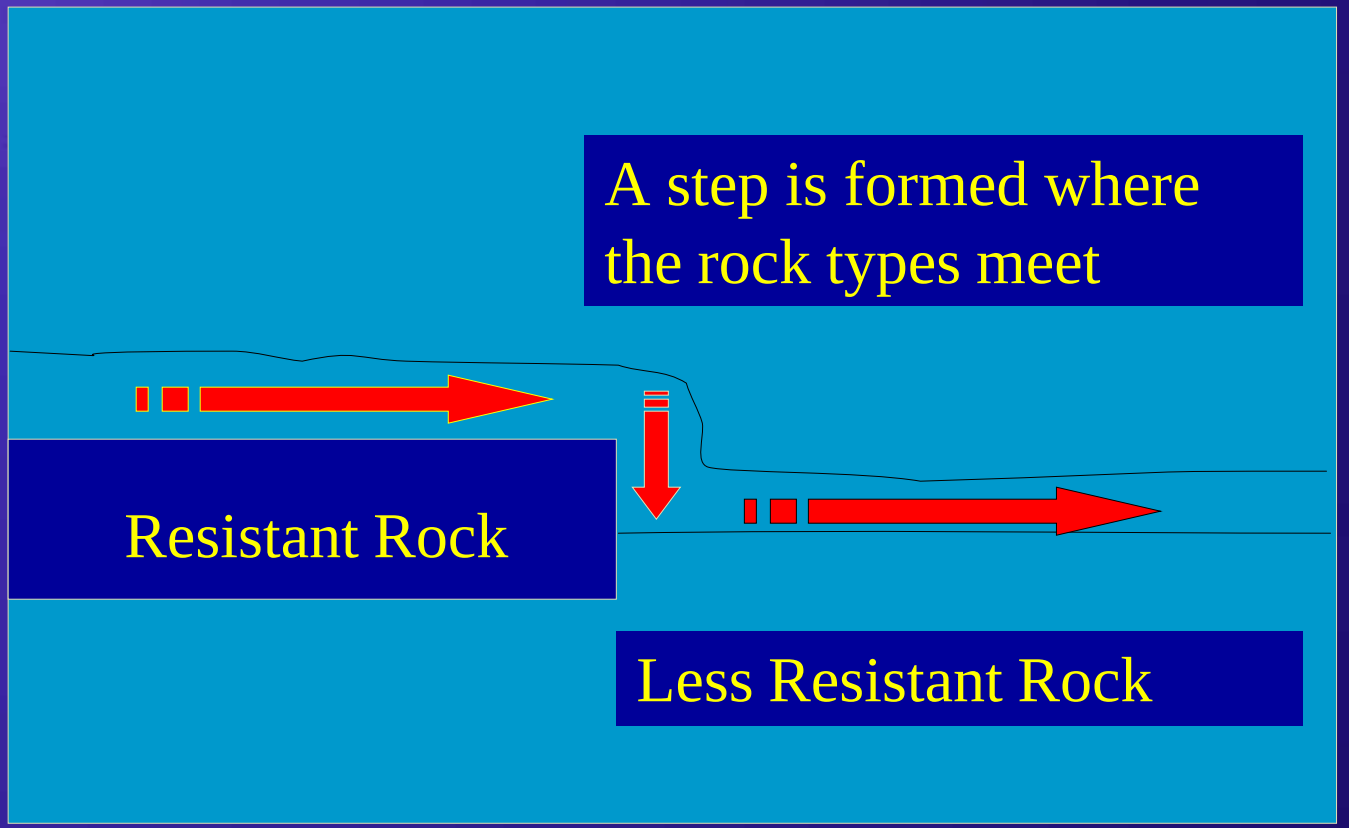
Weathering breaks up exposed rock and debris moves downslope



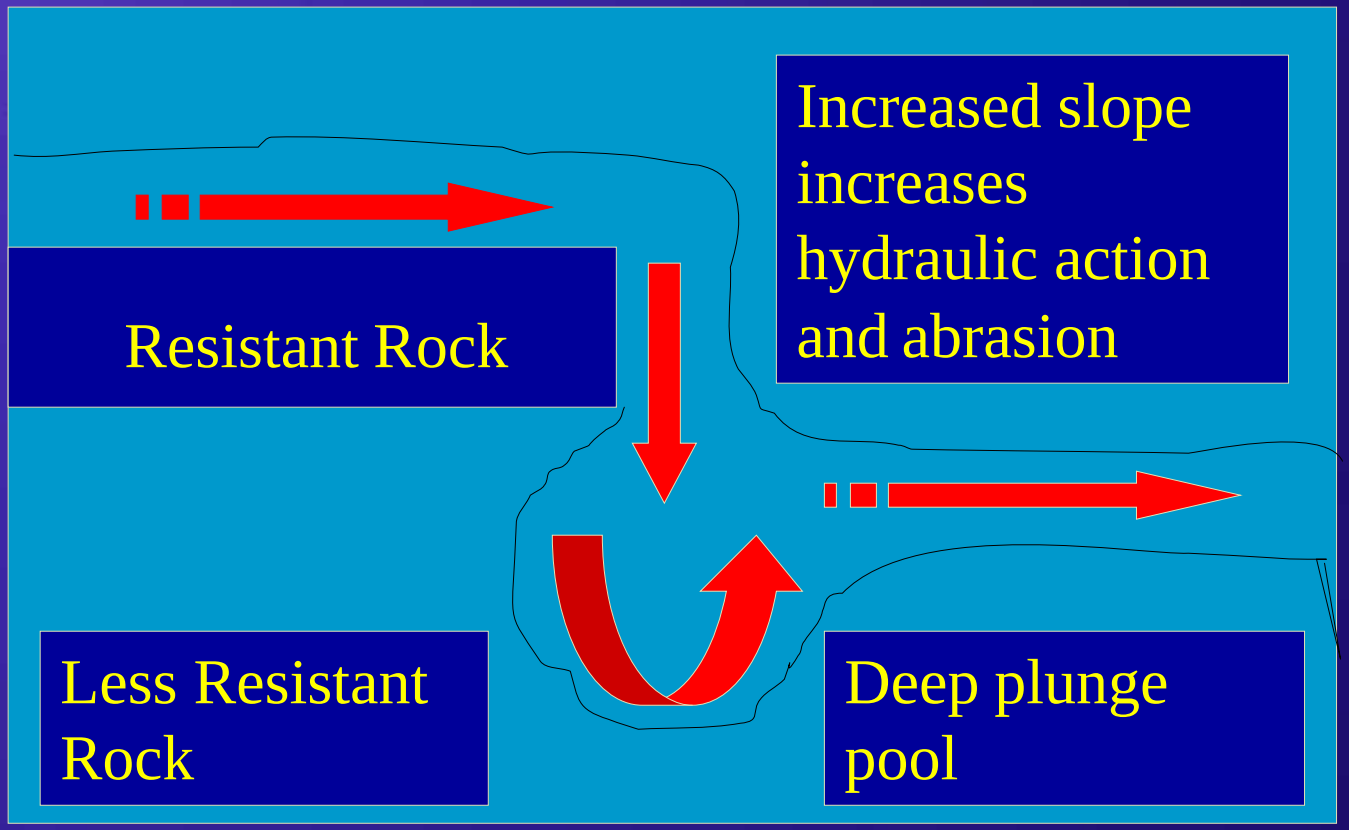
River now has load for abrasion

Formation of a Waterfall

How rock type and slope affect processes



Formation of a Waterfall



Understanding Performances

- Map reading skills - feature recognition - profile drawing - identifying different stages
- Being able to discuss and differentiate between different process at work
- Group work - a pack is given to each group which contains an OS map and photographs
- The group must identify the features in the photographs

Understanding Performances

- The group must classify each of them as either erosional or deposional features
- The group must explain the process involved in the formation of each of the features
- The group must identify and locate the features on the OS map
- Each group must report back to the class with individuals taking responsibility for different features

Understanding Performances

D

C

Understanding Performance

Human Interference

SEQUENCING

Sort the following statements into a logical order . Justify decisions.

A: The ground became saturated.

B: Sand bags were sent out by the council.

C: People were killed and injured.

D: A lot of people did not hear the flood warning because it was at night

E: There was a very heavy thunderstorm on the night of 15th Aug. 1952

F: The discharge of the River Lyn rose gradually

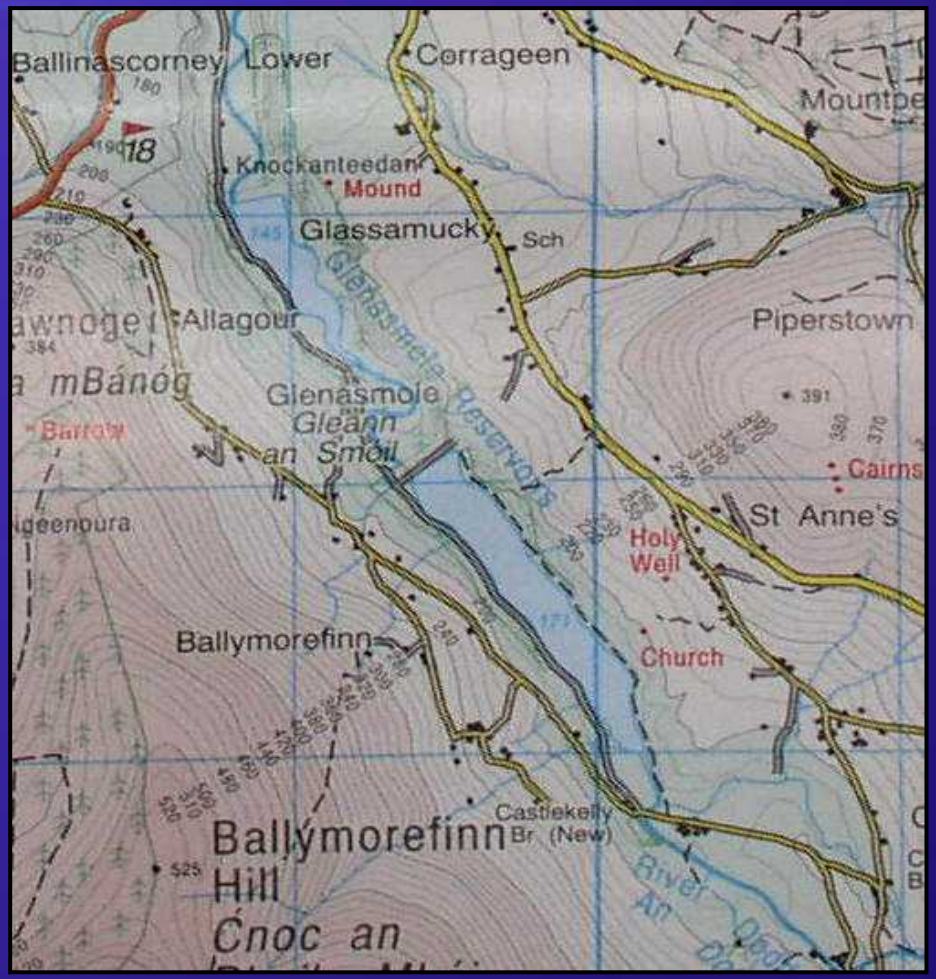
G: The River Lyn reached it's peak discharge

H: A heavy thunderstorm was forecast by the Met. Office

I: The force of the river knocked down bridges and houses were destroyed

J: The discharge of the river Lyn rose rapidly.

Understanding Performances



OS Maps: Sheet 37

X-sn

Matching cards

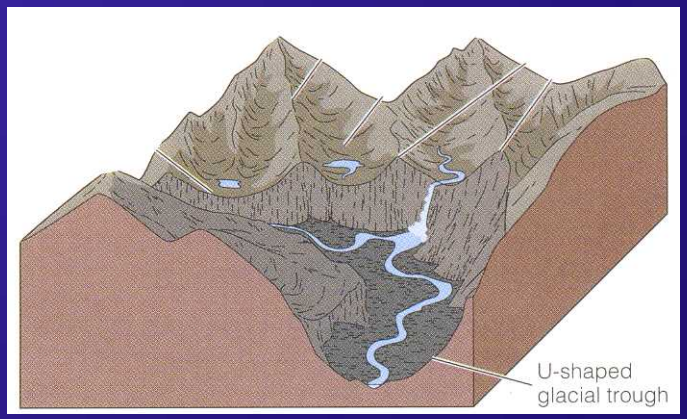
This feature has a steep backwall ……etc

Weathering

Nivation

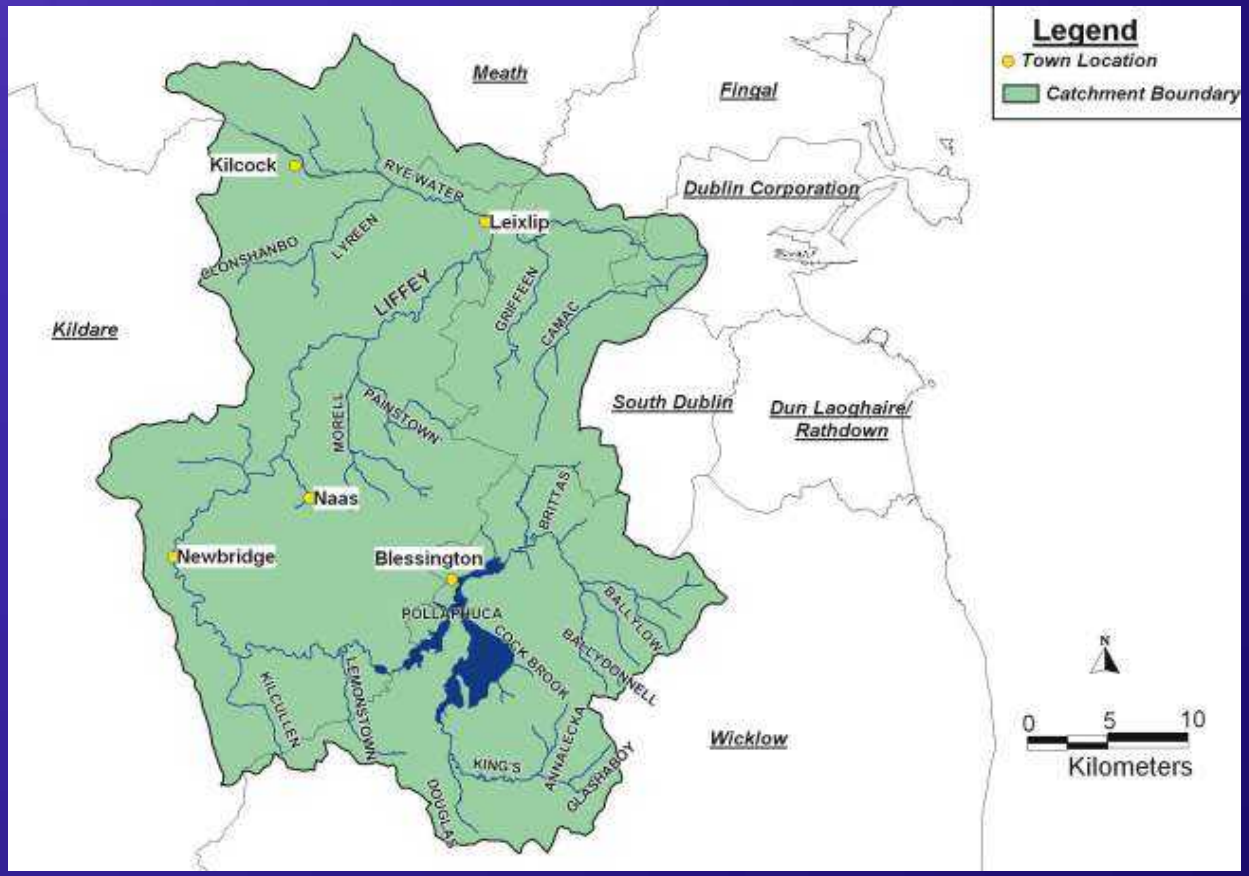
Plucking

Abrasion

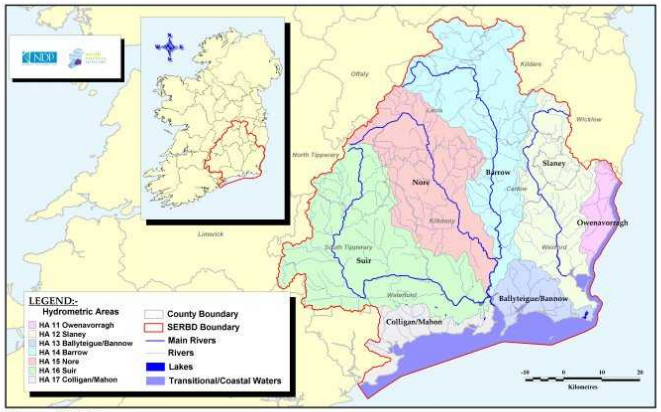


Cirque / Tarn / Arete

threeriversproject.ie

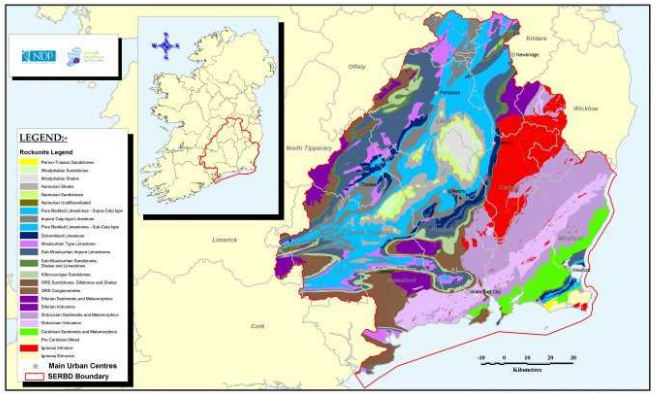


www.serbd.com/serbdmaps.htm



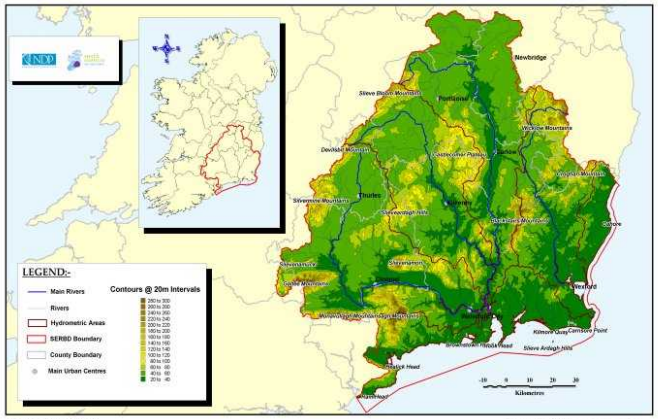
Source: OSI, EPA

Map 3.1 South Eastern River Basin District



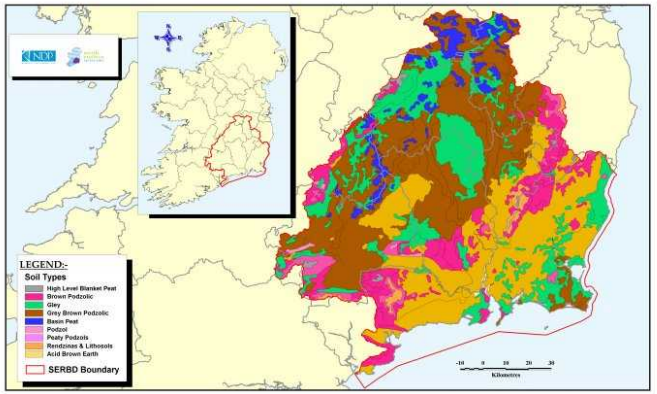
Source: Geological Survey of Ireland

Map 3.7 Bedrock Geology



Source: EPA, OSI

Map 3.6 Topography



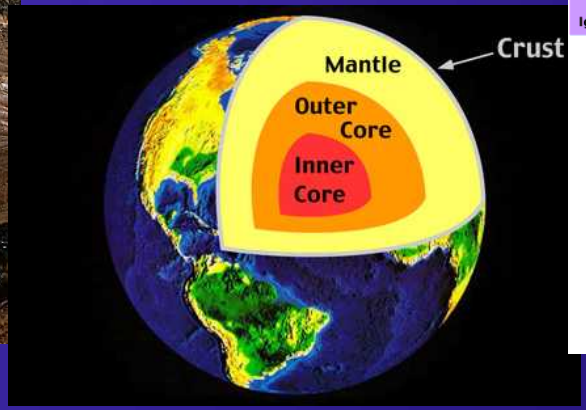
Source: Teagasc

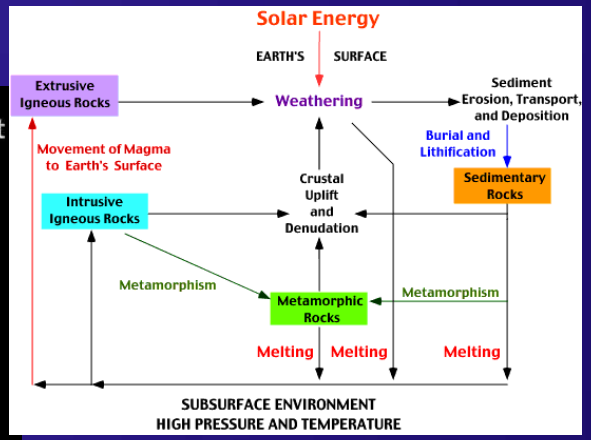
Map 3.9 Soils by Association

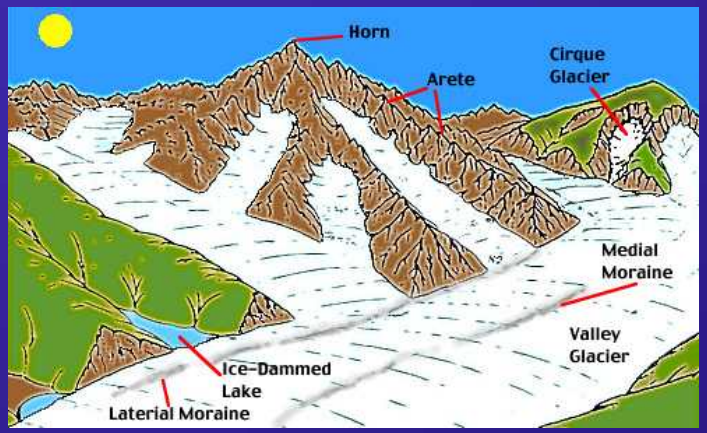
www.marine.ie/ncs

www.physicalgeography.net

Fundamental Online Textbook (Chapter 10)







EXAMINATION QUESTIONS

Some possible examples!

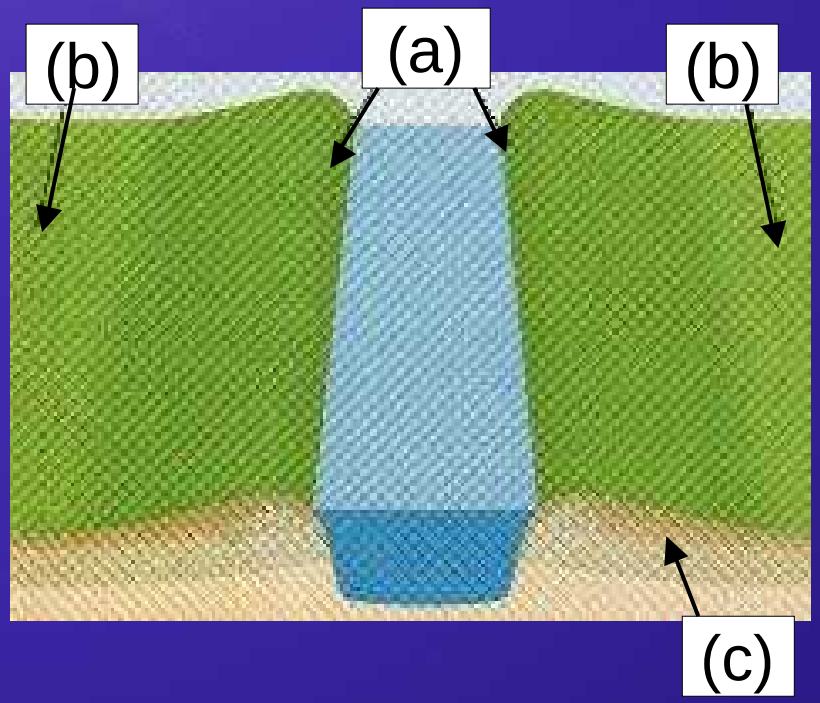
(Based on HL paper @ 80m/qn)

Short Answer Questions

- *Not* “Describe / Explain”
- *Not* “Statement + Development”
- *Not* “folder type question”

- Emphasis on skills
- Command words: “Identify / name / list”
- Brief, focused, constructive response.

Short Answer Question



- Identify the landforms (a) and (b).
- State if they are formed by erosion or deposition.
- Identify the type of material at (c).

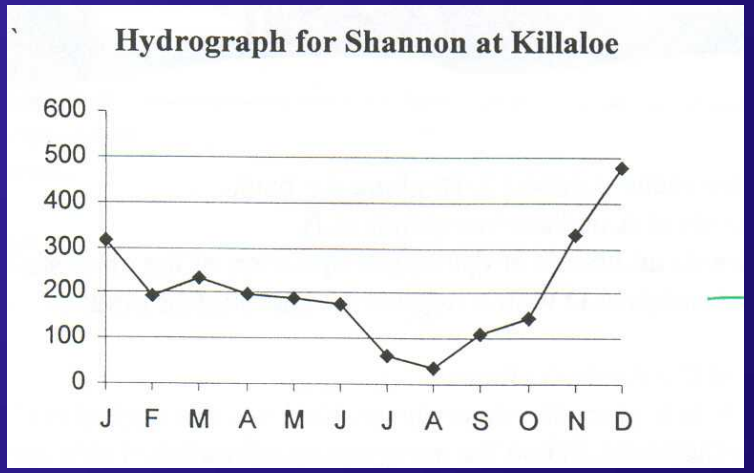
Short Answer Question

Examine the hydrograph for the Shannon.

- Which month has

(i) highest discharge

(ii) lowest discharge



- Calculate

(i) the total annual discharge

(ii) the average monthly discharge

Short Answer Question

- In what direction is the Belderg River flowing?
- Identify the river mouth by a six-figure grid reference.
- Name any two river landforms that you can identify on the map extract.

Structured Multi-part Question

(a) Examine the sketch map *above* and identify the landforms marked A, B, C and D. (8m)

(b) Refer to the OS map and link each of the above features to one of the following grid references:

A 123 456 A 234 567 A 345 678

A 456 789 (12m)

(c) Explain the processes that influence the development of any landform found in the upper course of a river. (20m)

(D) Describe any one way in which a relative change in land or sea level would affect the landscape of the lower course of a river. (20m)

(e) Humans have always tried to control the natural processes active along the course of a river valley. Examine this statement, referring to one example you have studied. (20m)

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Structured Multi-part Question

(a) Examine the Aerial Photograph and answer the following questions

(i) At what stage is the river?

(ii) Identify any two river landforms.

(iii) Identify two ways in which humans have made use of the river. (10m)

(b) Examine the hydrograph of the Lee:

(i) What was the highest discharge ?

(ii) What is the bankful discharge?

(iii) After how many hours rainfall did peak discharge occur?

(iv) Calculate the total rainfall in mms

(10m)

(c) Explain, with the aid of a diagram, the processes involved in the formation of any one landform found along the upper course of a river. (20m)

(d) Examine two ways by which river processes can have a positive economic impact on human economic activities. (20m)

(e) Examine one cause and one effect of flooding on a community. Refer in your answer to an example you have studied. (20m)