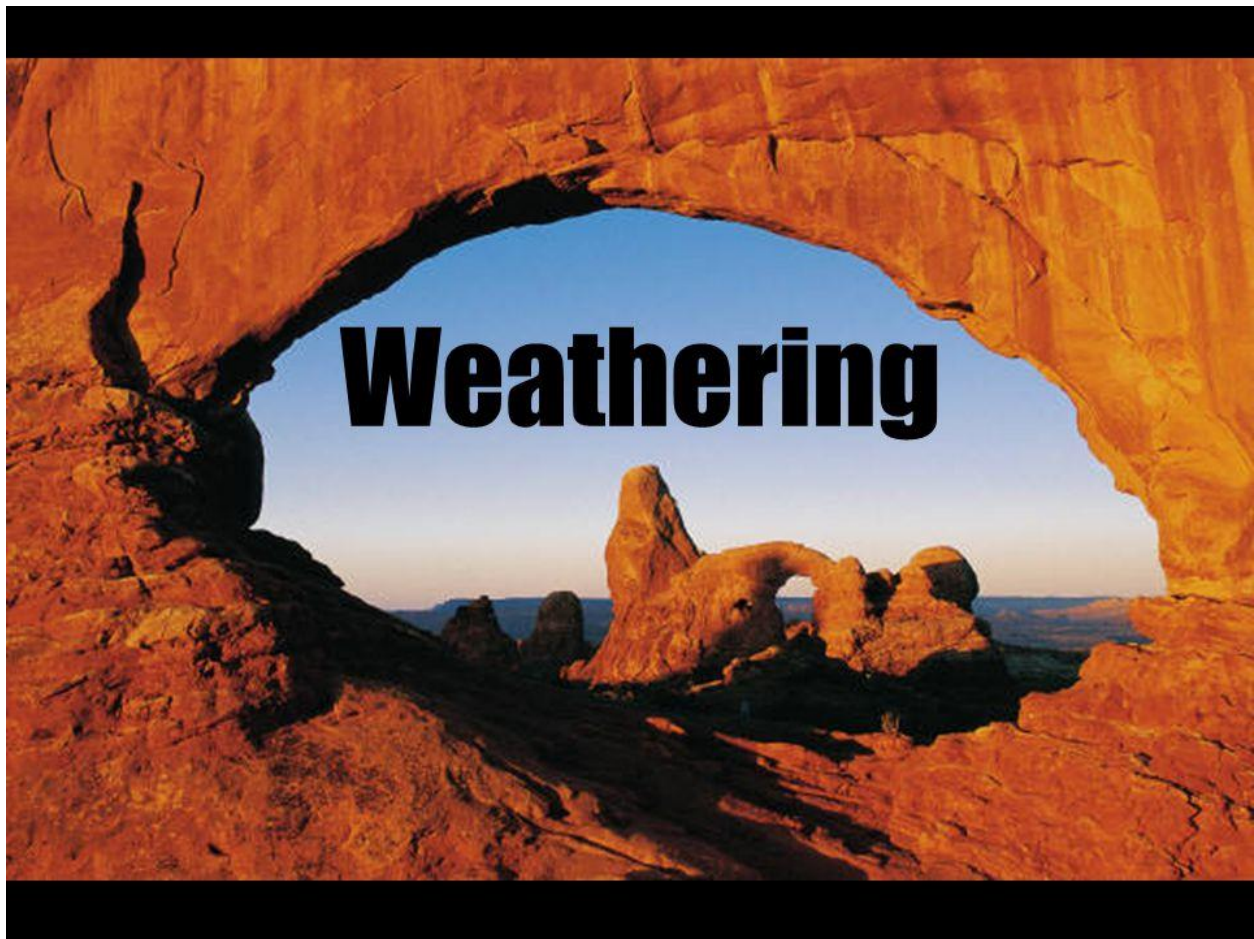




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Social Sciences – Geography
Grade 9
Term 3 Content



UNIT1.

- INTRODUCTION (PURPOSE OF THE TRAINING)
- LEGISLATIVE FRAMEWORK
- THE CONCEPT GEOGRAPHY

Each unit is arranged as follows:

- ❖ Overview
- ❖ Aims and skills
- ❖ Assessment strategies
- ❖ Activities and
- ❖ Notes
- ❖ Annexures : Assessment exemplars

For the user:

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- ❖ *Some of the activities in this training manual will be performed during the training sessions in pairs, individually and in class discussions. It is up to the discretion of the facilitator which of the exercises to emphasise and which to complete in the time allocated to the session.*
- ❖ *Additional notes in this manual will help educators to develop their own class activities*
- ❖ *It is advised that educators read the notes in the manual privately to save time during the training session.*

Resources needed:

- ❖ Any of the prescribed Grade 9 textbook and educator's guide.
- ❖ Social Sciences CAPS document.
- ❖ Annual Teaching Plan.
- ❖ Pen and paper.
- ❖ Projector
- ❖ Lap top

INTRODUCTION

Dear Social Sciences Practitioners

Welcome to the CAPS Geography Grade 9 Content knowledge training session. This manual has been developed to assist you follow all geographic concepts critically to every topic. In order for learners to apply enquiry skills, they will need to have a full grasp and understanding of the content.

REMEMBER memory skills remain important.

Ice – breaker (inspiration)

Read through the PPT presentation on Mrs Thompson perfume as inspiration for teaching.

LEGISLATIVE FRAMEWORK

(10 minutes)

As stipulated in the Social Sciences CAPS:

Both History and Geography should be taught and assessed during every term of the year...

Learners are trained to speculate, to debate, to make connections, to select, to prioritise and to persist, in tackling real issues and important questions.

Learners are encouraged to ask questions: Who? Where? What? Why? When? How? Should? Could? Is \ Are? The questions learners ask give teachers a good indication of prior knowledge, perceptions, interests, insights and concerns.

Different forms of text (oral, written and visual) are central to both disciplines

Learners should write regularly, with a clear progression in length and complexity throughout.

Concepts in Geography

Geography is the study of the human and physical environment. Geography is an integrated discipline that examines both physical and human processes over space and time. Geography helps us to understand our complex world. It offers us a bridge between the human and physical sciences.

There are many branches of Geography. Physical Geography examines natural processes and features, including the atmosphere, landforms and ecosystems. Human Geography is concerned with the activities and impact of people on the earth.

The concept that unifies Geography is space. All geographical phenomena have a spatial dimension. They also operate in a continuously changing environment.

Geography therefore includes the study of:

- spatial patterns and trends: the location of people and places in the world;
- similarity and difference: how environments and lifestyles compare and the reasons for similarities and differences;
- movement: how and why people, goods, water, land and air move and change;
- Planet Earth: land, water and air;
- human settlement: where people live and why;
- human activities: what people do, how the environment affects them and how they affect the environment;
- interdependence: the links between climate, vegetation, wildlife, resource distribution, and human settlement and activity; and
- Change: the changing nature of people and places.
- Geographical education contributes to literacy, numeracy and graphicacy or spatial literacy. It also supports the development of personal and social competence.

UNIT 1:

TIME: 1 hour, 30 minutes

SURFACE FORCES THAT SHAPE THE EARTH: CONCEPT OF WEATHERING

Outcomes: at the end of the activity you will;

- define the following concepts: weathering, physical weathering, chemical weathering and biological weathering
- identify examples of different types of weathering
- Describe/determine the impact of human activities on weathering.

Term 3:

Week 1

1. WHAT IS WEATHERING?

Weathering is the process by which rocks are broken down into small particles OR is the breakdown of rock into smaller pieces through exposure to wind, water, heat, and cold (concept).

Important facts about weathering:

- It is caused by the action of moving water, air, chemicals, plants, or animals and changing temperature.
- It is usually a very slow and invisible process.
- Weathering of rocks occurs in the same place and rocks are not moved.

- Soil is produced as a result of weathering.
- It wears away exposed surfaces over time and smoothens sharp, rough areas on rocks.
- There are three types of weathering, namely, physical, chemical and biological.

1.1 PHYSICAL (MECHANICAL) WEATHERING

Is the breakdown of rock into smaller fragments by natural physical forces without changing its chemical composition (concept).

EXAMPLES OF PHYSICAL WEATHERING

- Freeze-thaw/frost shattering/frost wedging
- Exfoliation
- Thermal expansion
- Salt wedging
- Abrasion

Freeze-thaw/frost shattering: occurs when water freezes between the cracks and holes in a rock. The frozen water will expand and forces the cracks in the rock to widen, eventually breaking the rock apart.



Exfoliation: is the process by which the outer layers of rock slowly peel away due to pressure changes. The rock layers peel off due to contraction (very cold) and expansion (very hot) as temperature changes.



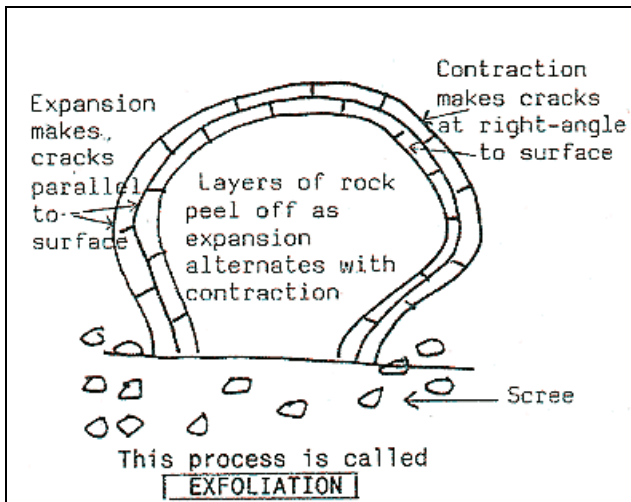
The rock expands as it warms up



The rock contracts as it cools down



Repeated expanding and contracting causes pieces to flake off



Thermal expansion: is the breaking down of rocks due to expansion and contraction of rocks as a result of extreme range of temperatures. This process is common in desert environments. Repeated swelling and shrinking of minerals with different expansion rates will also shatter rocks.



Salt wedging: occurs when salts crystallize out of solution as water evaporates. As the salt crystals grow, they apply pressure to the surrounding rock weakening it, until it eventually cracks and breaks down. Salt wedging is most common in drier climates, such as deserts.



Abrasion: is the breaking down and wearing away of rock material by the mechanical action of other rocks. Three agents of physical weathering that can cause abrasion are moving water, wind, and gravity.



ACTIVITY 1.1: MECHANICAL WEATHERING

DURATION: 15 MINUTES

In pairs answer the following questions;

1.1.1 Identify different types of mechanical weathering from pictures labeled A to C

A



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B



C



1.1.2 Discuss how exfoliation, thermal expansion and frost wedging are examples of mechanical weathering

FEEDBACK

1.2 CHEMICAL WEATHERING

Chemical weathering is the breakdown of rocks by chemical reactions or decomposes, dissolves, alters, or weakens the rock through chemical processes to form residual materials. Chemical weathering changes both the composition and appearance of rocks.

EXAMPLES OF CHEMICAL WEATHERING

- Carbonation
- Hydrolysis
- Hydration
- Oxidation
- Solution

Carbonation: is a process by which carbon dioxide and rainwater or moisture in the surrounding environment chemically react to produce carbonic acid, a weak acid that reacts with carbonate minerals in the rock.

Simplified definition: Chemical weathering happens when the minerals that make up a rock are changed, leading to the disintegration of the rock

(When water vapour (from rain water) reacts with carbon dioxide it forms **carbonic acid**)

Chemical weathering happens quickly in warm, moist environments (both on and beneath the surface) because water is needed for the chemical reactions.

It occurs with limestone or dolomite rocks and usually produces very fine, clay particles/material.



Hydrolysis: combination of hydrogen and oxygen in water with rock to form new substances

The reaction creates new compounds which tend to be softer and weaker than the original rock material. The hydrolysis of feldspars produces kaolinite, which is clay.



Hydration: is a process where mineral structure in the rock forms a weak bond with water which causes the mineral grains to expand, creating stress which causes the disintegration of the rock.

Hydration often produces a new mineral compound that is larger than the original compound. The increased size expands (widens/spreads) the rock and can lead to decay. Once hydration begins, it accelerates other weathering processes and may also be accompanied by hydrolysis and oxidation.

Oxidation: is a chemical reaction between some minerals in rocks and the **oxygen** in the air. Oxidation changes iron minerals in rocks from a light grey colour to a brown-red colour. This is called **rusting**. The change in colour shows the change in the composition of the rock. This chemical reaction causes the rock to break up.



Solution: is a process by which rock is dissolved in water.

Solution most commonly occurs on rocks containing carbonates such as limestone, but may also affect rocks with large amount of halite, or rock salt. Solution of large areas of bedrock may cause sinkholes to form, where large areas of the ground subside or collapse forming a depression.



ACTIVITY 1.2: CHEMICAL WEATHERING

15 MINUTES

- 1.2.1 Carefully study each photograph A to F, showing weathered rocks and describe how chemical weathering affected each rock.
- 1.2.2 What is the main agent of weathering that was common in the photographs?



FEEDBACK

1.3 BIOLOGICAL WEATHERING

Biological weathering is the disintegration (breaking down) or decay of rocks and minerals caused by chemical or physical agents of organisms.

EXAMPLES BIOLOGICAL WEATHERING

Organic activity from lichen and algae
 Rock disintegration by plant growth
 Burrowing and tunneling organisms
 Secretion of acids

Organic activity from lichen and algae:

Organisms such as lichen and algae often live on bare rock and extract minerals from the rock by ion-exchange mechanisms. This bio-chemical weathering process leaches minerals from the rock causing it to weaken and breakdown.

The decaying of plant materials can also produce acidic compounds which dissolve the exposed rock. The presence of organisms growing, expanding, or moving across the surface of the rock also exerts a small amount of abrasion and pressure that gradually cause the mechanical weathering of the rock as the organisms extract various minerals.



Rock disintegration by plant growth: The most common form of biological weathering is when plant roots penetrate into cracks and crevices of rocks and cause the rock to split or break into smaller particles through mechanical weathering.

Although, this process is gradual, it can be fairly effective at breaking apart rocks that may already have a pre-existing weaknesses such as fractures, faults, or joints.



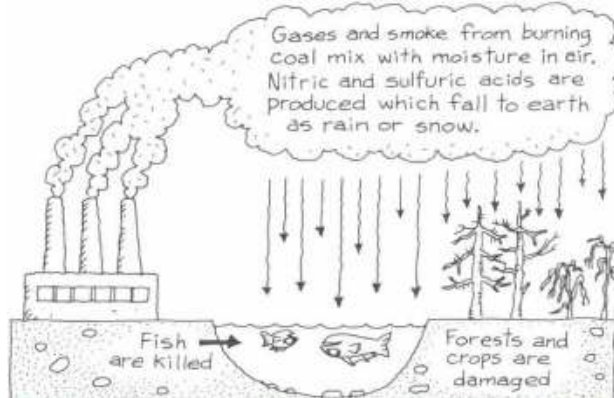
Burrowing and tunneling organisms: Some animals may burrow or tunnel into rocks or cracks in rocks and cause the rock to break down and disintegrate. Ants, earthworms, rabbits, woodchucks, and other animals dig holes in the soil. These holes allow air and water to reach the bedrock and weather it.



Secretion of acids: Some organisms, such as snails, barnacles, or limpets, attach themselves to rocks and secrete acid acids that chemically dissolve the rock surface.

1.4 IMPACT OF HUMAN ACTIVITIES ON WEATHERING

- Burning of fossil fuels/pollution makes air to be acidic, which leads to acid rain that eats away some softer rocks.

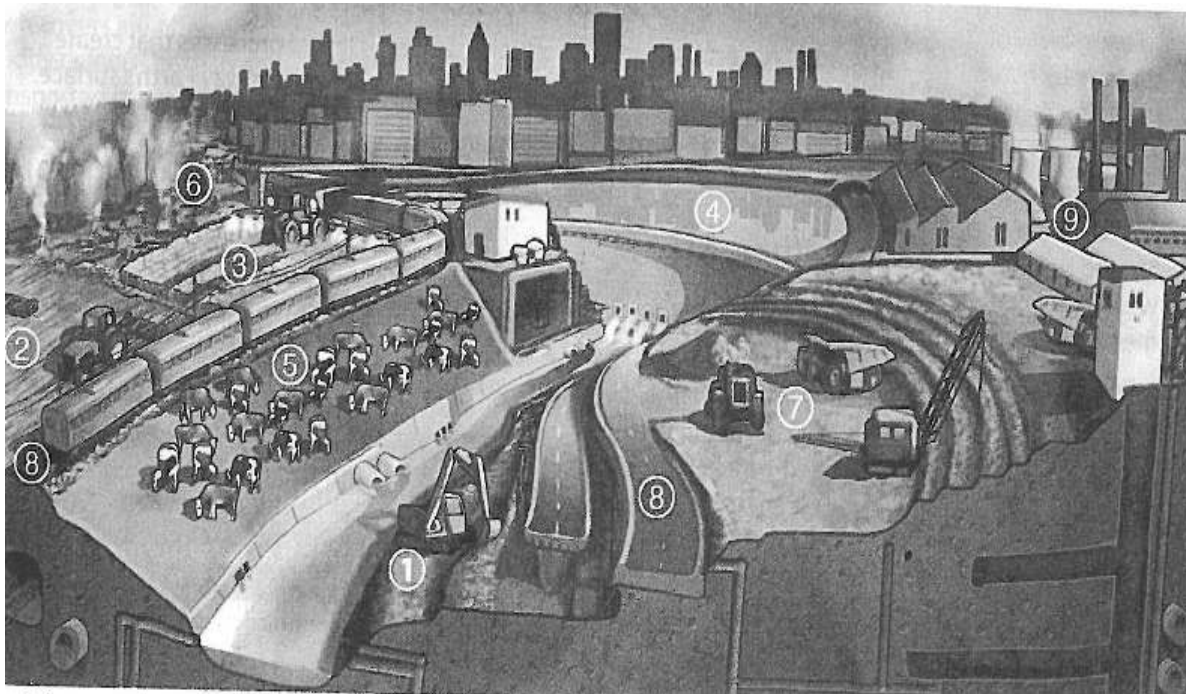


- Removal of vegetation led to the decrease in chemical and biological weathering
- Use of dynamites to blast large rocks (along the mountain side) to build roads
- Diggings of tunnels for mining operations/quarries used for construction
- Use of nitrogen fertilizers

ACTIVITY 1.3 SUMMATIVE

TIME: 30MINUTES

- 1.3 Study the diagram below, showing ways in which human activities impact on weathering and in your groups answer the questions below



Key

1. New rocks exposed to weathering by roads
2. Vegetation removed and soil exposed by machines
3. Human activities add chemicals to the air, soil and water
4. Dams take up land which could have been used for farming
5. Animals change the soil and rocks when they burrow, walk and spread their waste
6. Heat from fires changes the physical and chemical composition of soil
7. Underground tunnels weaken rocks and soil
8. Roads and railways bring pollution to the countryside
9. Human settlements pollute the air and water

- 1.3.1 Identify ONE example from the diagram where each kind of weathering is taking place:
- physical
 - chemical
 - biological
- 1.3.2
- Name some ways that human activities expose soil and rocks.
 - How can exposing soil and rocks increase physical weathering?

- 1.3.3 a. Describe ONE way that human activities contribute to increased chemical weathering.
- b. What effect could increased chemical weathering have on the environment?
- 1.3.4 a. What human activity has greatly increased biological weathering, as you can see from the diagram?
- b. Describe the effects of this activity on the earth's surface.

FEEDBACK

UNIT 2

TIME: 6 hours

SURFACE FORCES THAT SHAPE THE EARTH: EROSION AND DEPOSITION

Outcomes: at the end of the activity you will;

- Identify features of erosion and deposition by;
 1. rivers
 2. sea
 3. moving ice and
 4. wind

Term 3:

Week 2 – 3

2.1 RIVERS – FEATURES OF EROSION AND DEPOSITION ALONG A RIVER COURSE

Features of erosion and deposition along a river course

Waterfall and rapids
 Braided stream
 Meander stream & bend
 Oxbow lake
 Levee
 Floodplain
 Delta

WATERFALL AND RAPIDS

Waterfall is when water flow over a steep/high lying area in a river/steep descent of the water of a river.

Rapids are areas of rough water, where a river tumbles over hard rock.

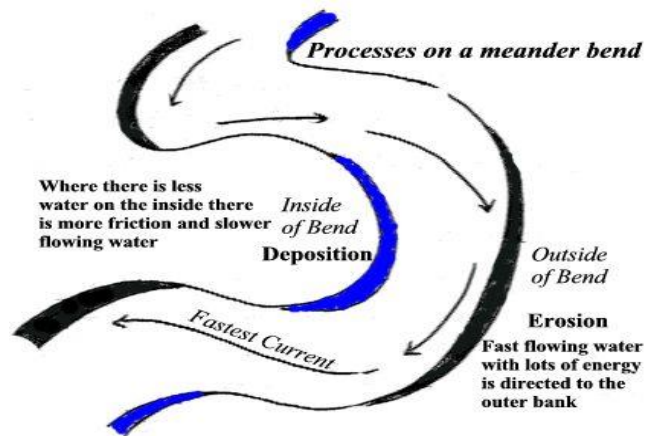
BRAIDED STREAM/CHANNEL

A stream consisting of multiple small, shallow channels that divide and recombine numerous times forming a pattern of strands of braids.



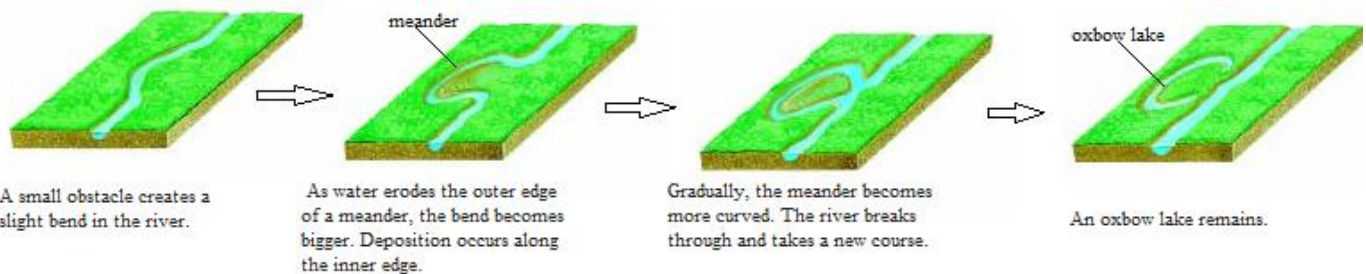
MEANDER STREAM

When a river follows a winding and turning course. At the bend of a meander, erosion occurs in the outer bank and deposition occurs on the inner bank



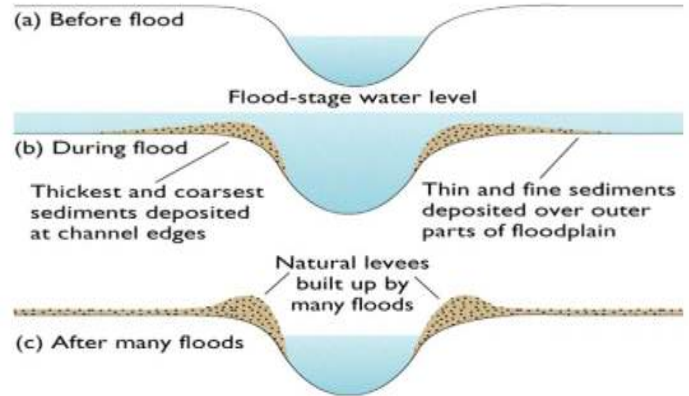
OXBOW LAKE

An oxbow lake is a meander cut off from the river by deposition of sediment/ a lake formed by a U-shaped curve in a stream that was cut off from the rest of the stream.



LEEVE

Ridges found along the sides of the stream channel composed of sand or gravel.



FLOODPLAIN

The flat, wide area of land along a river is a **flood plain**. A river often covers its flood plain when it overflows its banks during floods.



Photo Source: L. Crisp - on www.geographyphotos.com

DELTA

Is a triangular plain, usually at the mouth of the river, where alluvial soil/sediments are deposited



Three types of delta

• **Aracuate or fan-shaped**
e.g. the Niger (Nigeria)



• **Cuspate**
e.g. the Ebro (Spain)



• **Bird's foot**
e.g. the Mississippi (USA)



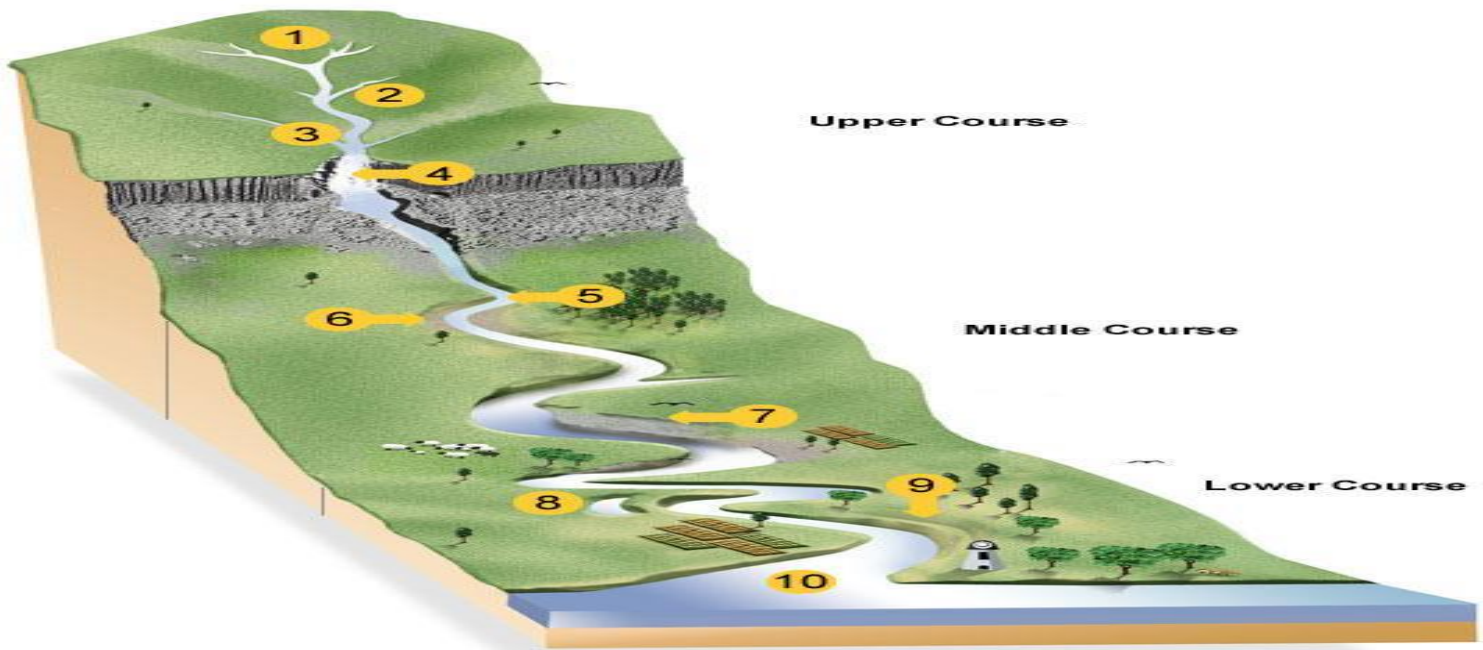
ACTIVITY 2.1:

TIME: 30 minutes

2.1 Refer to the diagram below showing the features along course of the river from the source to its mouth.

2.1.1 Choose the terms from the box to identify the features labeled 1 to 10

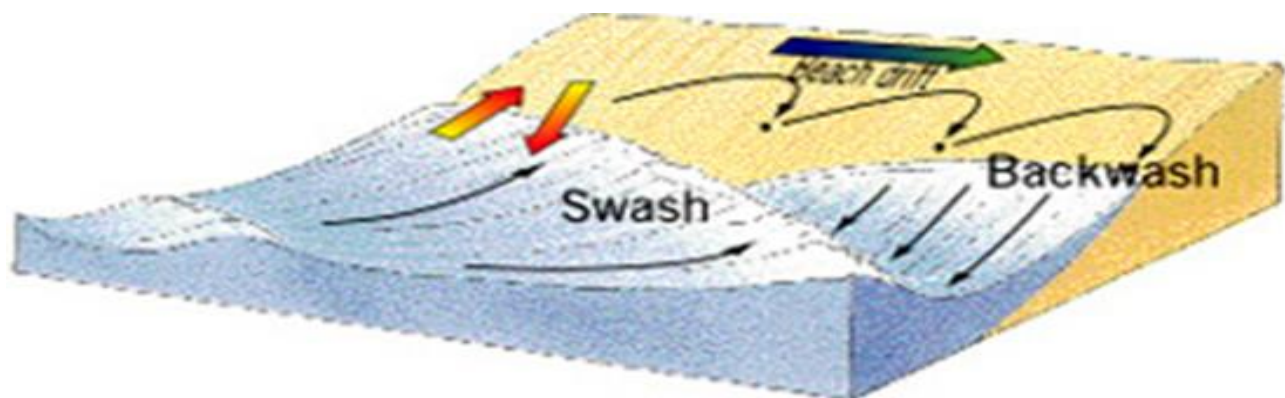
Interlocking spurs	levee	estuary	tributary
Oxbow lake	floodplain	source	waterfall
Meander	river cliff (outside meander bank)	slip-off slope (inside meander bank)	



2.2 SEA – FEATURES OF EROSION AND DEPOSITION ASSOCIATED WITH WAVE ACTION: THE POWER OF WAVE ACTION AND TYPICAL LANDFORMS

THE POWER OF WAVE ACTION

- Waves are caused by blowing winds over the sea
- The size of the wave depends on the distance a wave travels (fetch) and the strength of the wind.
- The greater the fetch the stronger the wind, the bigger the waves
- Forward movements of waves towards the beach/the waves that wash on the beach are called swash.
- Backward movement of the waves returning from the beach/ the wave return down the beach into the sea are called backwash.
- Larger waves are more powerful; wave power is determined by wave speed, wavelength and water density.

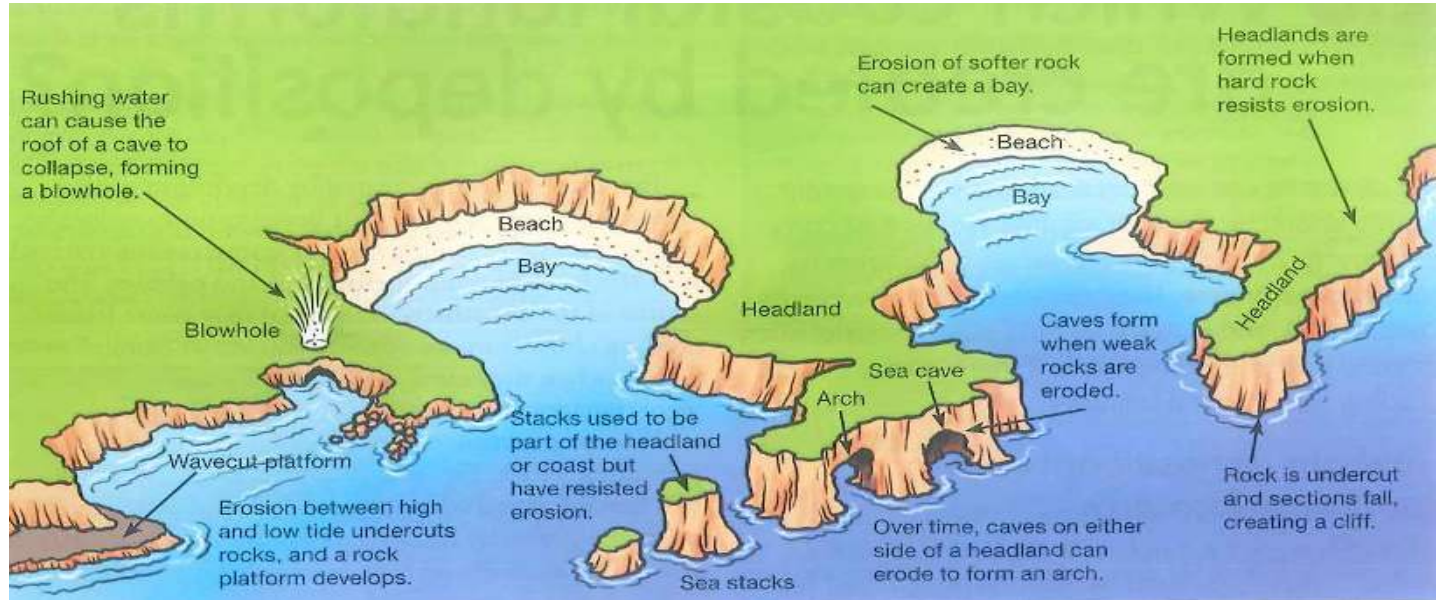


TYPICAL SEA LANDFORMS DUE TO EROSION AND DEPOSITION

Sea features due to erosion and depositions as a result of wave power

Headlands, Cliff, Beach, Bay
Wavecut platform, Blowhole

Sea cave, Arch, Stack
Sand spits, Lagoon
Tombolo



Sea cliffs: a high, steep, overhanging face of the rock along the seashore.



Sea wave can lead to cliff retreat/movement. See example below.

Isla Vista Beach, October 2001

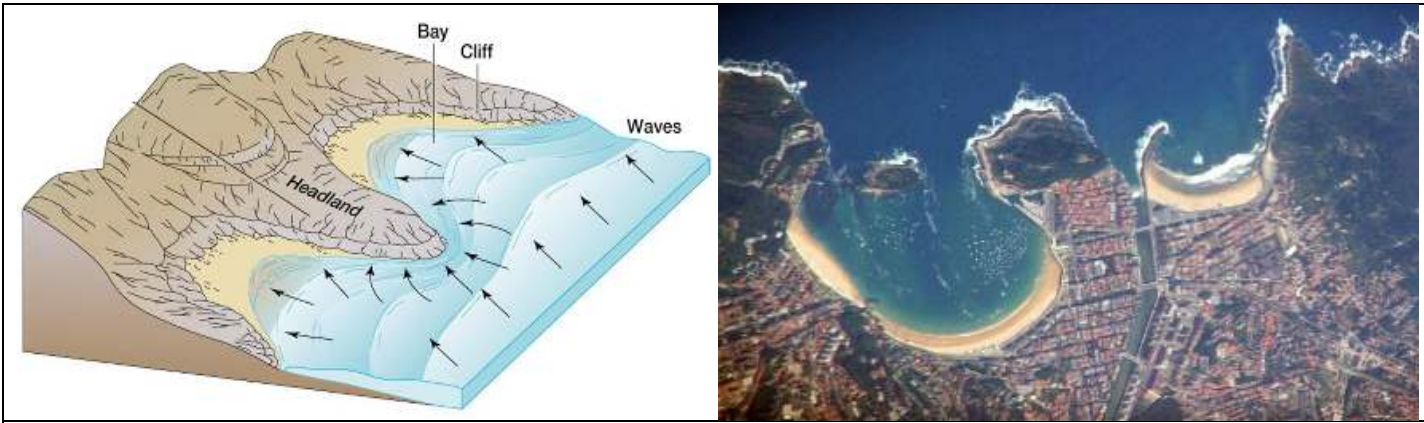


Isla Vista Beach, December 2002



Headlands: a narrow piece of land that projects from the coastline into the sea. It is surrounded by water.

Bay: a body of water partially surrounded/enclosed by land, with a wide outlet to the sea. It is surrounded by headlands.



Bluffs or beach ridge: a high, steep bank as by a river or the sea/a cliff with a broad face



Sea stacks: a steep, vertical column or columns of rock in the sea near the coast. It is formed by erosion when the badland is being eroded.



Natural bridges/arch: a remnant arch-shaped formation developed through erosion surrounding bedrock.



Sea cave: a split/hollow opening, usually at the sea level, in a base of a sea cliff.



Development of cave, arch and stack. It starts on a headland with a fault/crack, the power of the wave erodes the headland forming a cave, further erosion leads to an arch and further a stack and stump.



**STAGE 1
GEOLOGICAL
WEAKNESS: CRACK**



**STAGE 2
CAVE APPEARS**



**STAGE 3
FORMATION OF
AN ARCH**



**STAGE 4
FORMATION OF
A STACK**



**STAGE 5
FORMATION OF A STUMP**

Beaches: an area covered with sand/small rocks that are next to an ocean/lake. Beaches made up of gravels and pebbles are called shingle beaches while beaches made up of sand are called sandy beaches.



sandy beach



shingle beach

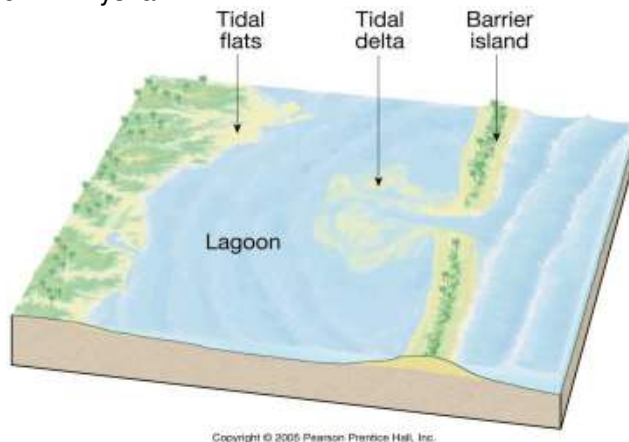
Sand spits: is an area of sandy deposit built up into a landform which projects a body of water/sea.



Tombolo is sandbar connecting an island with the main land.



Lagoon is an enclosed water body. When sandbar develops along the coast and encloses the sea water leaving a small inlet through which water can move in or out. Lagoon in Knysna.



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ACTIVITY 2.2

2.2 Read the case study below and answer the following question.

TIME: 25 minutes



Couple's garden falls into the sea as they sleep

A couple got the shock of their lives after waking up to find 6m of their back garden had quietly slipped into the sea. While they slept, thousands of tonnes of cliff face slid away, leaving their house just 40m away from the edge. One patch of ground now reclaimed by the sea had been prepared just hours earlier to plant potatoes. The couple said they had lost about 9m of land in the past few years.

Read more: <http://metro.co.uk/2010/04/25/couples-garden-falls-into-the-sea-as-they-sleep->

- 2.2.1 What is feature the house built on?
- 2.2.2 Explain what has caused the back garden to slip into the sea.
- 2.2.3 What do you think will happen to the house in the future? Explain why you think so.
- 2.2.4 What colour is the sea near the land? Give the reason for your answer.
- 2.2.5 Demonstrate with a diagram how a sea cave, sea arch, sea stack develop.

2.3 MOVING ICE – FEATURES OF EROSION AND DEPOSITION ASSOCIATED WITH GLACIATED LANDSCAPES

Basic concepts

Glacier: is a slow moving river of crystalline ice masses found in high altitude and latitude areas.

Ice sheet: a layer of ice covering an extensive tract of land for a long period of time.

Erosional features in glaciated landscapes

Cirque

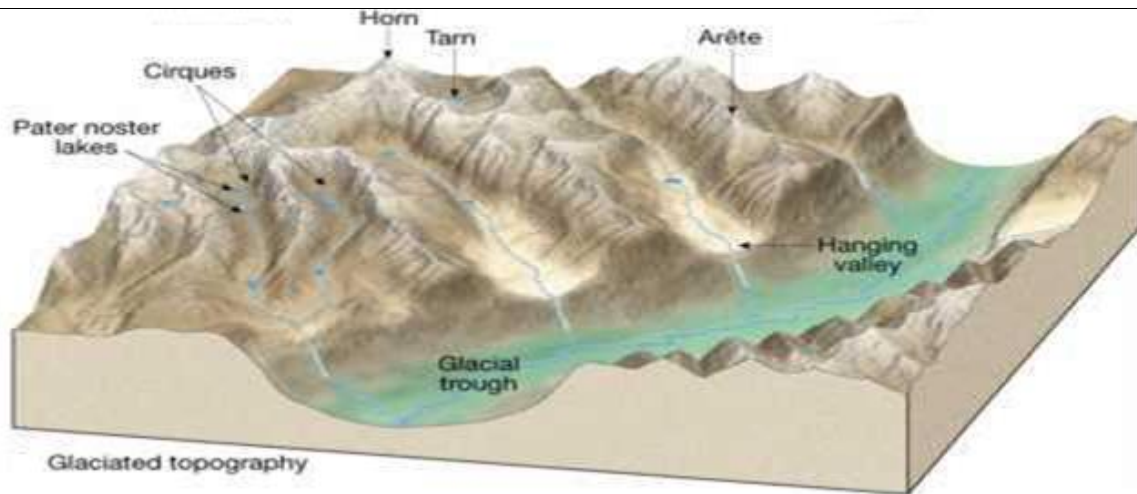
Tarn

Col

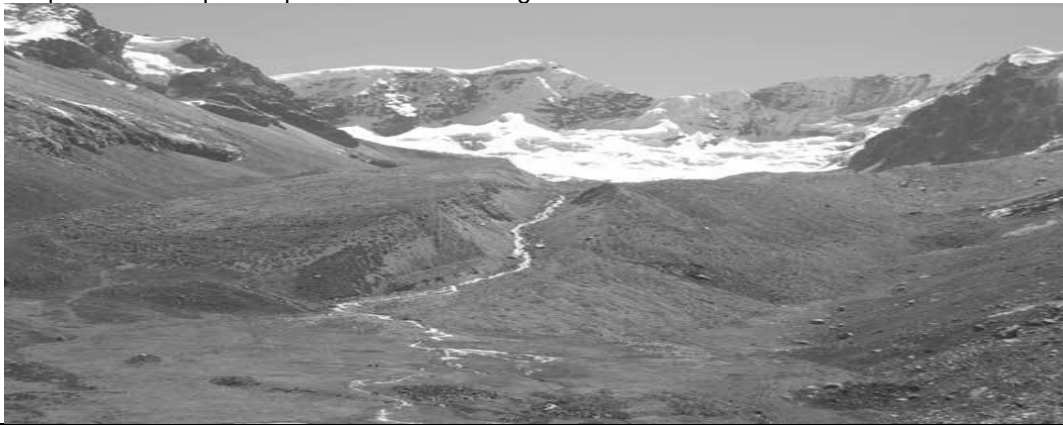
Arêtes and Matter horns:

Hanging valleys

Roche Moutannee



Cirque: bowl shaped depression/hollows in glacialized mountain areas



Bergschrund: deep cracks of advancing glacier on a glacialized mountain. These form when a crevasse or wide crack opens along the headwall of a glacier; most visible in the summer when covering snow is gone.



Tarn: lakes formed after the melting of snow at the bottom of the cirques/Tarns: A small mountain lake especially one that collects in a cirque basin behind risers of rock material or in an ice gouged depression.



Col: when two cirques are formed back to back/A saddle-like narrow depression formed by two headward eroding cirques that reduce an arête.



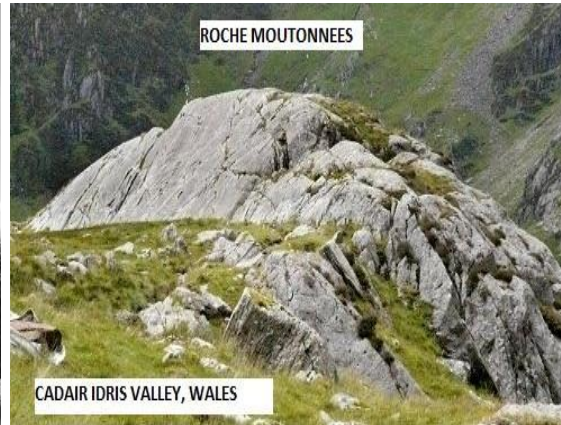
Horn: pyramid shaped/sharp edged ridges resembling a knife, surrounded by cirques.



Hanging valleys: valleys formed at the confluence points of the main glaciers and its tributary glaciers



Roche moutannee: streamlined valleys on the rocky surface formed by glacial abrasion on the smooth side of the mountain



Fjord: A drowned glaciated valley or glacial trough along a seacoast.



Depositional glaciated landform

Till
Erratics
Moraines
Drumlins
Kame
Eskers
Outwash plain

Concept: Till: is unsorted and unlayered rock debris carried and deposited by glaciers/ poorly sorted deposits

Erratics: When boulders of considerable size are deposited far from their origin, they called **erratics**.



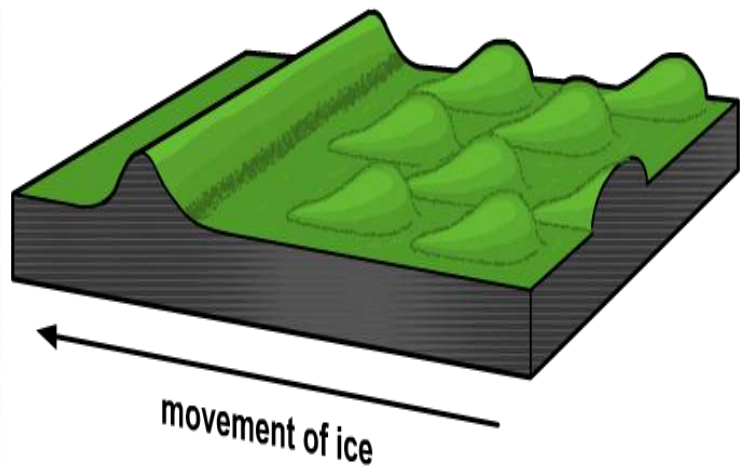
Moraines: is a landform where a glacier deposits the material (till) that it has been transported, and is made up of unsorted angular rocks.

Moraines have been classified into several categories (lateral, medial, ground, recessional, terminal); few are limited to mountain valleys, whereas others are associated with both ice sheets and valley glaciers.



Drumlins: Drumlins are formed of **till**. They are elongated features that can reach a kilometre or more in length, 500m or so in width and over 50m in height.

It is common to find several drumlins grouped together. **A collection of drumlins is called a swarm.**



Outwash Plains: Are Glacial stream deposits of stratified drift from melt-water, braided, and overloaded. They occur beyond a glacial morainal deposit.



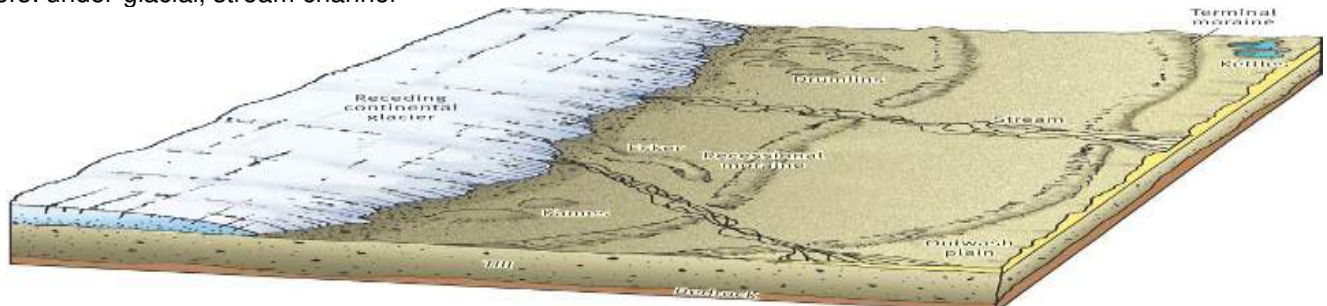
Kettles: Forms when an isolated block of ice persists in a ground moraine, an outwash plain or valley floor after a glacier retreats; as the block finally melts, it leaves behind a steep sided hole that frequently fills with water



Kame: rounded hill of sediment



Eskers: under-glacial, stream channel



ACTIVITY 2.3

TIME: 23 minutes

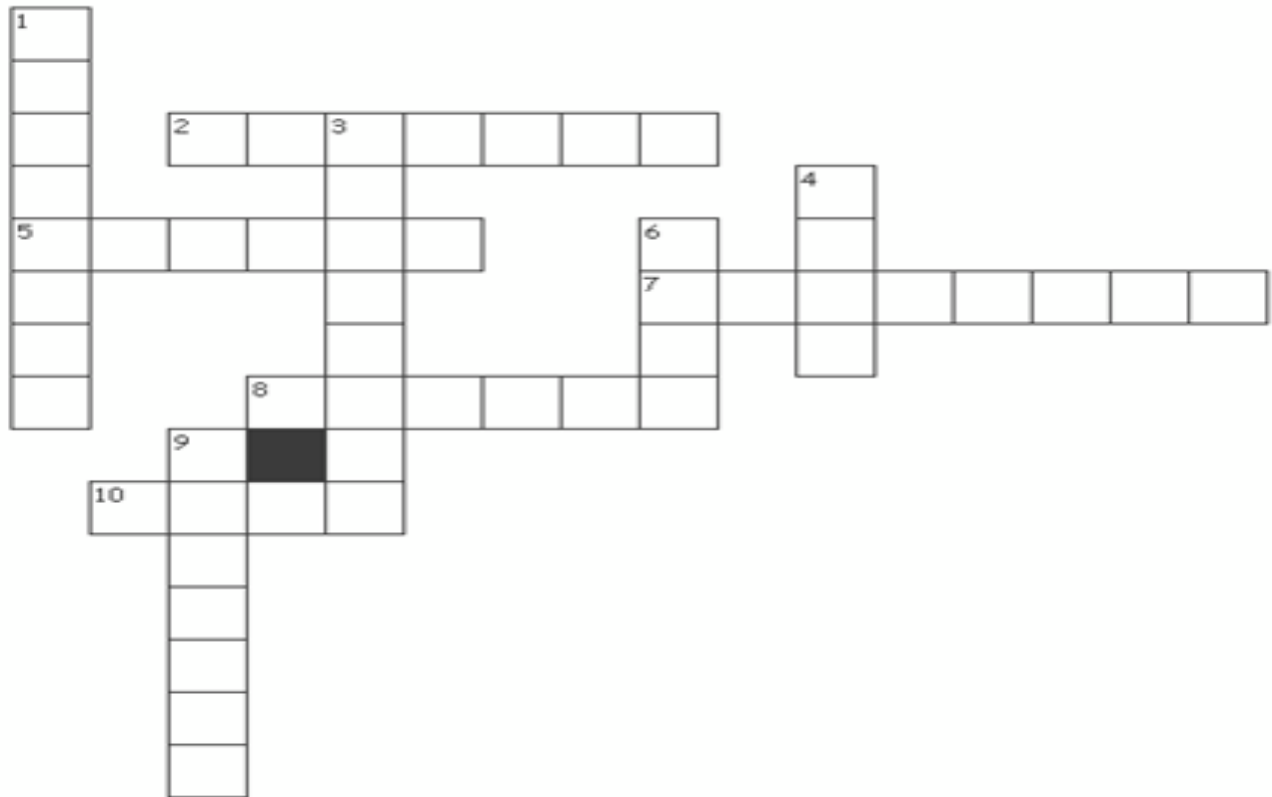
2.3.1 Complete the cross word with the clues provided below

Across

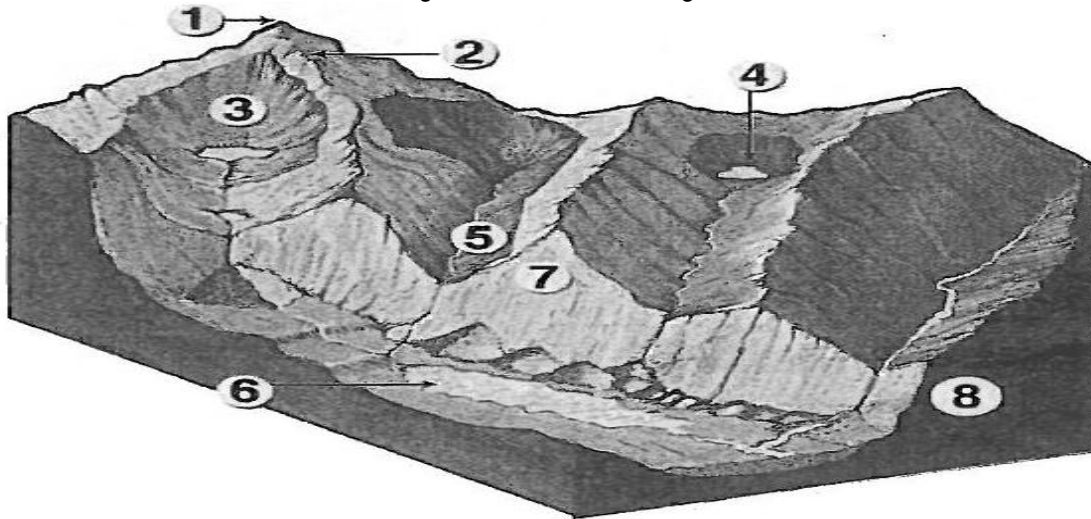
2. Thick mass of ice formed through accumulation, compaction and recrystallization of snow
5. Depression created when blocks of ice become lodged in glacial deposits and subsequently melted
7. Grinding and scraping of rock surface by friction and impact of rock particles carried by ice
8. Broad amphitheatre carved by glacier
10. Pyramidal peak formed by glacial action in three or more cirques surrounding a mountain summit

Down

1. Process by which pieces of bedrock are lifted out of place by glacier
3. Process that removes snow, ice or water from glacier
4. Small lake in cirque
6. Steep sided hill composed of sand and gravel originating when sediment collected in stagnating ice
9. Layers of till deposited by glacier



2.3.2 Label erosion features of a moving ice, 1 to 8 on the diagram below.



Feedback.

2.4 WIND – FEATURES OF EROSION AND DEPOSITION ASSOCIATED WITH WIND

Erosional features of wind

Ventrifacts, Blowout

Mushroom rock

Yardangs, Inselberg

Ventrifacts: Multifaceted, sharp edged pebbles are called **Ventrifacts**. Stone with three facets is called **Dreikanter**.



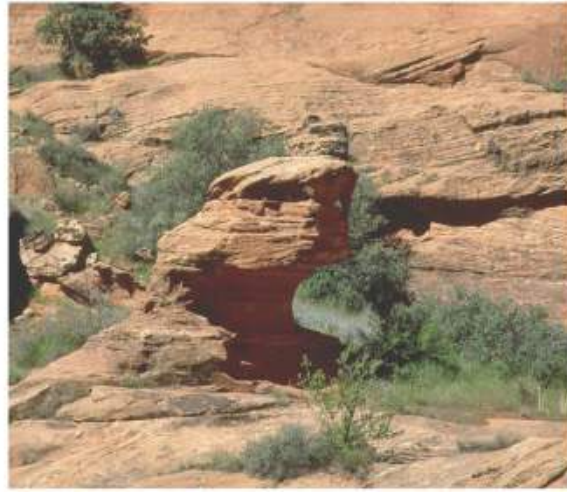
Blowout: In scanty vegetation and loose soil area, strong winds deflate the loose particles.



Mushroom rock/rock pedestal is naturally occurring rock whose shape resembles a mushroom.



Yardangs: is a sharp irregular ridge of sand lying parallel to the prevailing wind in exposed desert regions



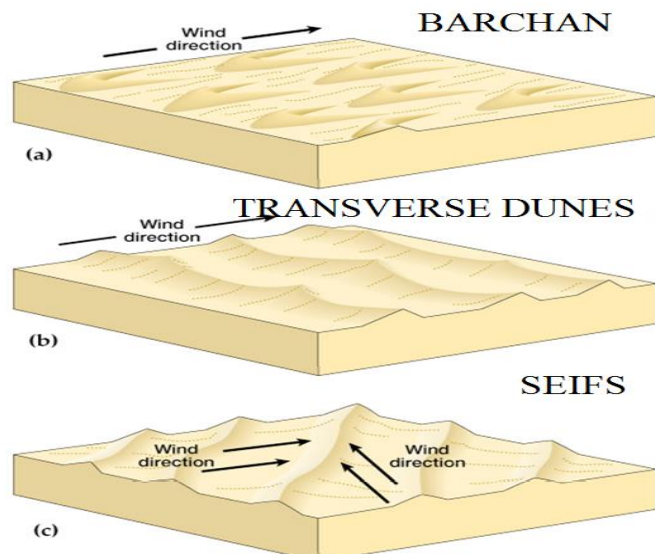
Inselberg: is an isolated hill, knob, ridge, outcrop or small mountain that rises abruptly from a gentle slope/virtually level surrounding plain. A controversial landform of arid region as few such similar structures are seen in glacial areas.



Depositional features of wind

Dunes
Loess

Sand dune: is a hill of loose wind-born sand



Loess: Windblown silt



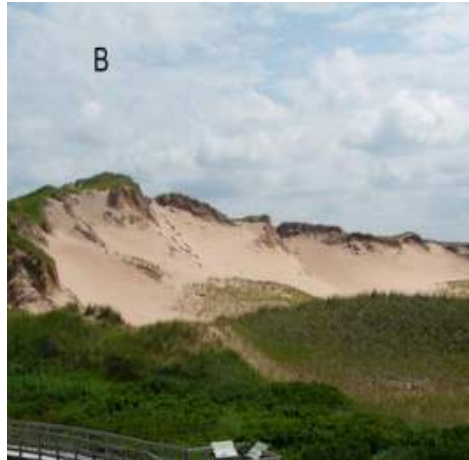
ACTIVITY 2.4

TIME: 10 minutes

2.4.1 Identify the following features labeled A to C



UNIT 3



TIME: 1 hour



SURFACE FORCES THAT SHAPE THE EARTH: THE IMPACT OF PEOPLE ON SOIL EROSION: CASE STUDY – AGRICULTURE AS A CONTRIBUTOR TO EROSION

Outcomes: at the end of the activity you will;

- explain how agriculture contributes to erosion
- study a South African case study on the impact of agriculture on soil erosion
- describe actions taken by people to limit soil erosion in agriculture

Term 3:**Week 4****ACTIVITY 3.1****TIME:** 30 minutes

Work in group, read the case study below about sugar cane farming in Kwazulu Natal and answer the following questions;

CASE STUDY: Sugar cane farming in KwaZulu Natal

Sugar cane is water loving, and so in many places, wetlands have been cleared to grow the cane. In order to use much land as possible, farmers have cleared the indigenous bush along the river courses and planted cane right up to river banks. At planting time, fields are ploughed up by heavy machines. When the cane is harvested, it is burnt to remove the leaves and make cutting easier. The cut cane is loaded into trucks, and taken to the sugar mill for processing. These practices led to massive soil loss, and so some farmers have begun to change their ways. Here is what one member of this group of farmers has to say: *"No sugar cane on my farm grows right up the river banks, or in the wetlands. I have replaced the cane that was once there with thousands of indigenous trees, shrubs and grasses. We no longer burn the leaves of my crops. Instead, we cut them off by hand, and spread them over the soil when we harvest. The rows of cane now go along the contours of the hillsides. We no longer plough deep furrows in the land, but plant using low-till methods that do not disturb the soil as much. It costs money to farm this way – but, if there are floods, I know my farm will be okay. The battle is to convince others."*

(Oxford Successful - Grade 9, page 118)

1. Identify all the practices that contribute to soil erosion
2. Explain why each practice increases soil erosion.
3. Why have some farmers changed their practices?
4. In a paragraph, describe the changes they have made and why each change is helpful
5. What else do you think sugar cane farmers could do to contribute less to erosion?
6. Why do you think some farmers are reluctant to change? Give your own viewpoint on whether you think they should be forced to change

Feedback

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