

Living Britain - Climate and ecosystems in the British Isles.

Students must be able to:

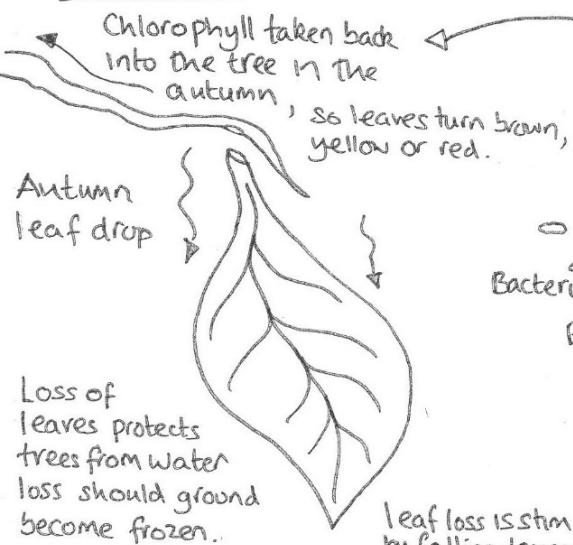
- ☐ Construct and describe the features of a climate graph.
- ☐ Recognise the key factors affecting the different climatic regions of the British Isles and parts of Europe.
- ☐ Define both ecosystem and biome.
- ☐ Identify the living and non-living elements of an ecosystem.
- ☐ Describe the elements of simple food webs, including food chains and trophic levels.
- ☐ Describe the basic elements of nutrient cycling within the temperate deciduous woodland biome.
- ☐ Describe how deciduous trees and some animals have adapted to the features of the temperate deciduous woodland biome.

Key knowledge:

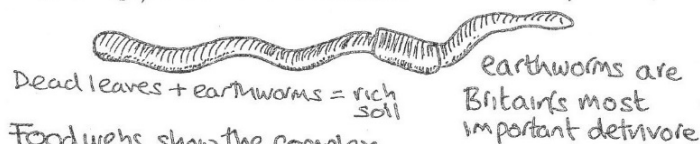
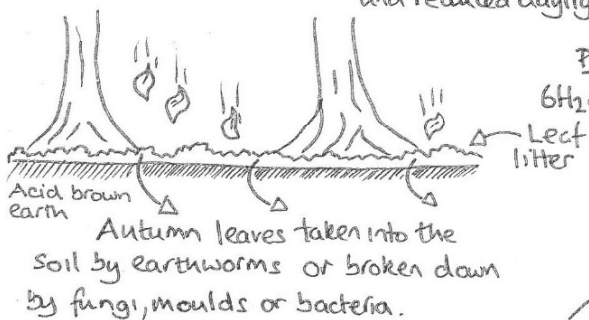
1. **Climate is the average weather of a place, usually measured over thirty years. There are several key factors affecting climate such as latitude, prevailing winds, distance from the sea and altitude.**
2. The climate of a location is presented using a climate graph. This is a dual graph which shows monthly mean temperatures in degrees centigrade (red line) and monthly mean rainfall in millimetres (blue bars). Climate graphs allow a quick visual comparison of different climates.
3. **The complex climate of the British Isles is determined by a range of factors such as latitude, relief, sea temperature and ocean currents and air masses. Know that summer climate is most influenced by latitude and winter is most influenced by the North Atlantic Drift current.**
4. Europe has many different climates depending on the physical geography of each region. This has led to the development of a wide variety of traditional foods and local houses most appropriate to the climatic conditions of the region.
5. **An ecosystem is a bio-geographical unit consisting of the living (biotic) and non-living (abiotic) elements of an environment. An ecosystem can range in scale from the microscopic to the global.**
6. Energy and nutrients pass through an ecosystem via food chains. Food chains have multiple links which connect with other chains to create food webs.
7. **The living elements of any ecosystem are linked together by complex feeding relationships between plants and animals. These feeding relationships can be shown in food chains, food webs and trophic pyramids.**
8. Before humans settled in the British Isles the majority of these islands was covered in forest, with pine and birch forests in the north and mixed oak woodlands in the south.
9. **Trees have adapted to the climate of the British Isles and evolved over millions of years to cope with cold winters and mild wet summers.**
10. Bears, squirrels and deciduous trees have all had to adopt a seasonal lifestyle/adaptations. One of the most important animals in the deciduous forest biome is the common earthworm.
11. **The world has several major terrestrial and aquatic ecosystems that cover vast areas but have similar characteristics. These global-scale ecosystems are known as biomes.**

Key terms	Definitions
Ecosystem	the living and non-living elements of an environment linked together by transfers of nutrients and energy.
Biome	an ecosystem on a global scale, such as tropical rainforests or savannah grasslands.
Biotic	living elements.
Abiotic	non-living elements.
Deciduous	a plant or tree which loses its leaves, eg. during the winter.
Temperate	region between 40 and 60° of latitude with mild to warm summers and cold to mild winters.
Photosynthesis	the process by which plants convert solar energy, carbon dioxide and water into carbohydrates.
Chlorophyll	the green substance in plants where photosynthesis takes place.
Producer	the plants which create the building blocks of the trophic pyramid through photosynthesis. Produce food from the Sun's energy, water and carbon dioxide.
Consumer	animals which consume either producers or other consumers.
Decomposer	animals, such as earthworms, which eat dead matter.
Predator	an animal which hunts and eats other animals.
Herbivore	an animal which eats vegetable matter.
Carnivore	an animal which eats other animals.
Hibernation	when animals go into a suspended state (deep sleep) to conserve energy during the winter.
Migration	where animals move to another location for better food, water or breeding conditions.
Adaptation	the ways that plants and animals have evolved to cope with certain environmental conditions.

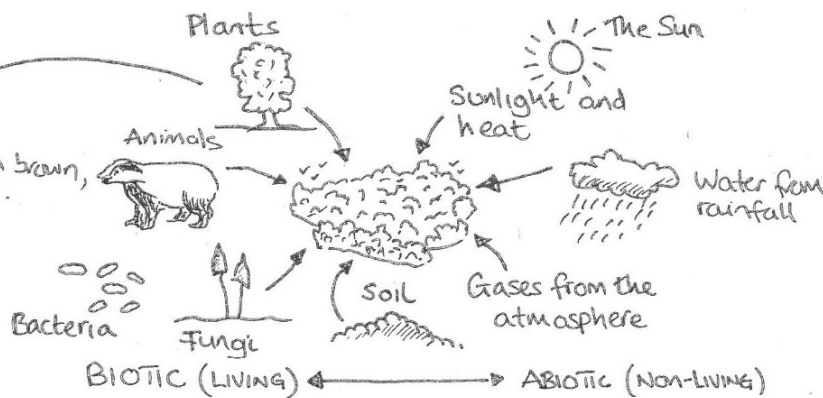
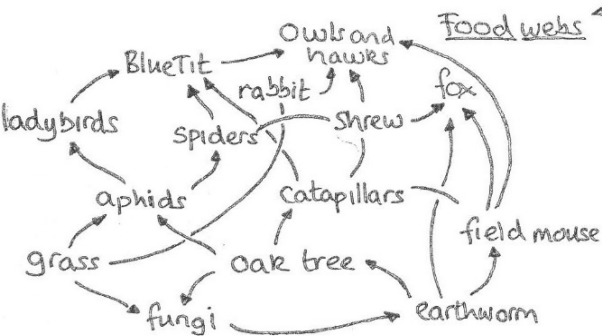
ABSCISSION



Leaf loss is stimulated by falling temperature and reduced daylight hours.



Food webs show the complex feeding relationships in an ecosystem.

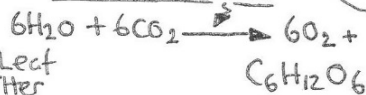


Ecosystems

the living and non-living elements of an environment linked by transfers of nutrients and energy.



PHOTO SYNTHESIS



LIVING BRITAIN

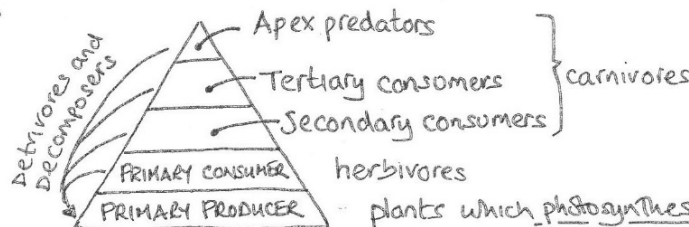
CLIMATE

The average weather of a place measured over thirty years.

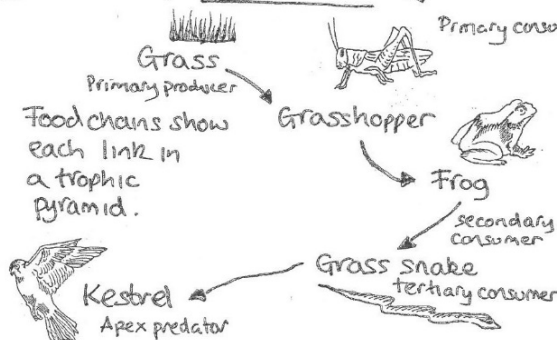
FACTORS AFFECTING CLIMATE

- Latitude
- Distance from the sea
- Prevailing winds
- Altitude

Feeding relationships - the Trophic Pyramid.



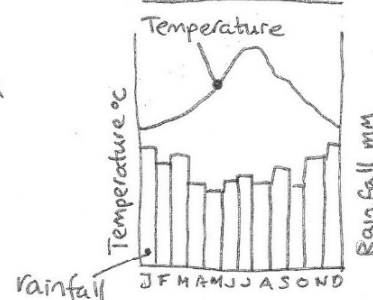
Food chains



Global Biomes - Terrestrial large-scale ecosystems

- Tropical Rainforest
- Hot Deserts
- Tropical grasslands
- Tropical Monsoon woodlands
- Mediterranean
- Temperate woodlands
- Temperate grasslands
- Alpine
- Boreal Forest
- Tundra
- Cold Deserts
- Polar Ice

CLIMATE GRAPHS



MILD SUMMERS
COOL WINTERS
VERY WET

COOL SUMMERS
COLD WINTERS
DRY

UK CLIMATES



WARM SUMMERS
MILD WINTERS
WET

WARM SUMMERS
COOL WINTERS
DRY

Temperate maritime
Cold continental
Tundra

EUROPE'S CLIMATE ZONES



Humid continental
Alpine
Mediterranean

Coast and Coral Reefs

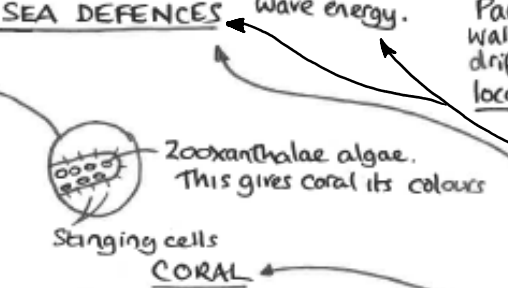
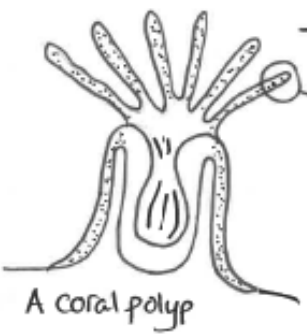
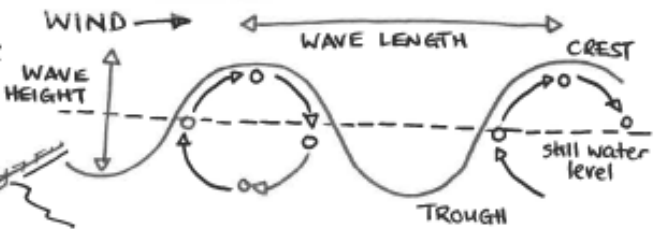
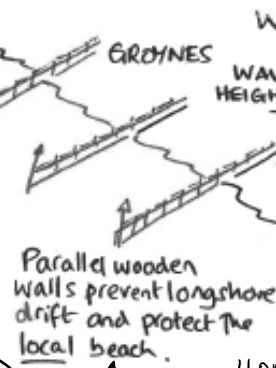
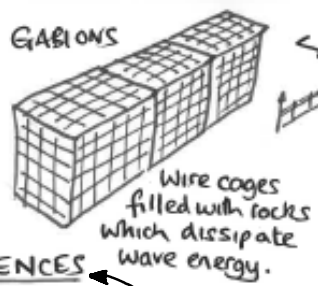
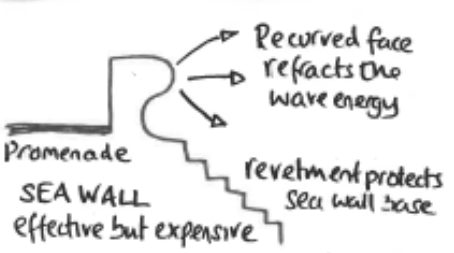
Students must be able to:

- ☐ Explain the importance of our oceans to our planet and its people.
- ☐ The location and reasons for the locations of coral reefs, including conditions for healthy coral growth.
- ☐ The ecological importance of coral reefs for biodiversity and its importance to humans.
- ☐ The recognition of different types of coral reefs and reasons for their evolution.
- ☐ Evaluate current threats to the coral ecosystem and link to their specific location.
- ☐ Give examples of management of coral reefs and consider the contributions individuals can make to the future of coral reefs.

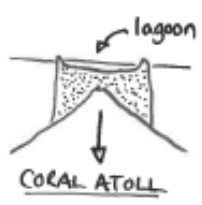
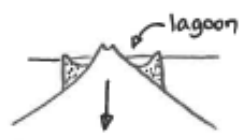
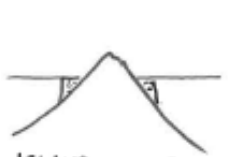
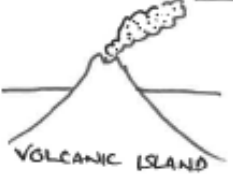
Key Knowledge:

- Waves and tides create constant movement on the surface of the world’s seas and oceans and along their coastlines. They derive their energy from the wind and the moon.**
- Waves convert the energy of the wind into the circular motion of water. This energy travels through the surface of the sea and can **erode** the coastline. Waves carry sediment to be deposited elsewhere.
- Geology can have a major influence on rates of erosion and therefore the landforms they create. Resistant rocks may form headlands while less resistant rocks may erode into bays.**
- Waves refract (bend) around headlands to concentrate their erosive power at the headland creating dramatic coastal scenery including caves, arches, and stacks. Wave energy is spread out in bays where material is deposited to form beaches.
- All the material eroded from the coastline must be transported elsewhere and ultimately deposited. Beaches are made up of eroded material. Longshore drift transports sediment along a coast in a zig-zag motion. Spits form where there are large amounts of sediment carried by longshore drift to a break in the direction of the coastline.**
- Nearly three quarters of the Earth’s surface is covered by ocean which makes the Earth appear blue from space. The five oceans give us food, create our weather patterns, moderate our climate and act as a global carbon sink.
- Most of the islands found in tropical seas have an intimate relationship with coral – a tiny colonial animal, related to jellyfish, which has a hard calcium carbonate shell.**
- Many of the tropical islands of the South Pacific, along with the Caribbean and Indian Ocean began life as volcanoes but have been transformed by plate movement and the growth of coral reefs. Some are still active volcanoes (Montserrat) while other have become coral atolls (Tuvalu).
- There are many threats to the health of the ecosystems of the South Pacific, as well as to human populations. Most are caused by the unsustainable use of natural resources such as over-fishing and climate change linked to the burning of fossil fuels.**
- As many of the problems facing tropical seas are anthropogenic (man-made), so the solutions to these issues can also be found in the people of the world working to saving our natural environments. These solutions include designating marine reserves, controls on fishing and reducing pollution.

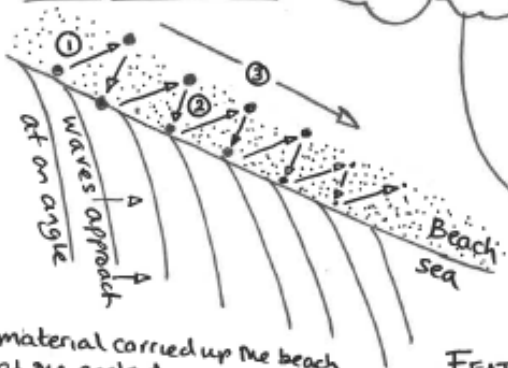
Key term	Definition
Erosion	The wearing away of the land by movement.
Hydraulic Action	erosion through the breakdown of rock through the sheer impact force of waves.
Abrasion	erosion through the scraping away of rocks as material carried by the waves crash in to the land.
Attrition	erosion as sediments collide and become smaller and more rounded.
Solution	erosion as material is dissolved by the water at the coastline
Destructive waves	a steep, short wave-length and high frequency wave which causes a net loss of material from the beach as the backwash is stronger than the swash
Constructive waves	a relatively low-height, long-length, low-frequency wave where the net movement of material is up the beach because the swash is stronger than the backwash
Fetch	the distance wind has travelled over open water to create waves.
Longshore Drift	the movement of sediment along a coast. The swash is often at an angle to the coastline, while the backwash brings material down at 90° to the beach slope. Sediment is thus moved in a zig zag motion along the beach.
Swash	the movement of water up a beach with the breaking of a wave.
Backwash	the movement of water down a beach to the sea after having run up the beach in the swash.
Hard engineering	solutions to problems of resource management involving building of structures e.g. sea walls.
Soft engineering	solutions to problems of resource management involving working with nature.
Coral	tiny animal (polyp) which lives in large colonies in warm, shallow, clear and pollution-free salt water.
Coral Reef	offshore accumulation of dead coral, usually with live coral growing on top.
Polyps	tiny, soft-bodied organisms related to sea anemones and jellyfish. At their base is a hard, protective limestone skeleton, which forms the reef.
Zooxanthellae	algae that are able to live in symbiosis with marine invertebrates such as corals, jellyfish, and sea anemones.
Fringing Reef	growing along the coastline around islands and continents, fringing reefs are the most common type of reef.
Barrier reefs	reef running parallel the coastline but are separated by deep, wide



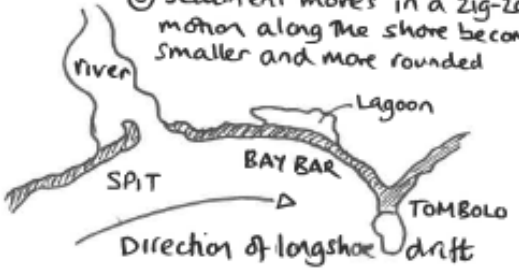
CORAL ISLAND FORMATION



LONGSHORE DRIFT



- 1 material carried up the beach at the angle of swash.
- 2 sediment rolls down the beach in the backwash at 90° to the slope
- 3 sediment moves in a zig-zag motion along the shore becoming smaller and more rounded



COASTS AND CORAL

Features of a sea wave

WAVES

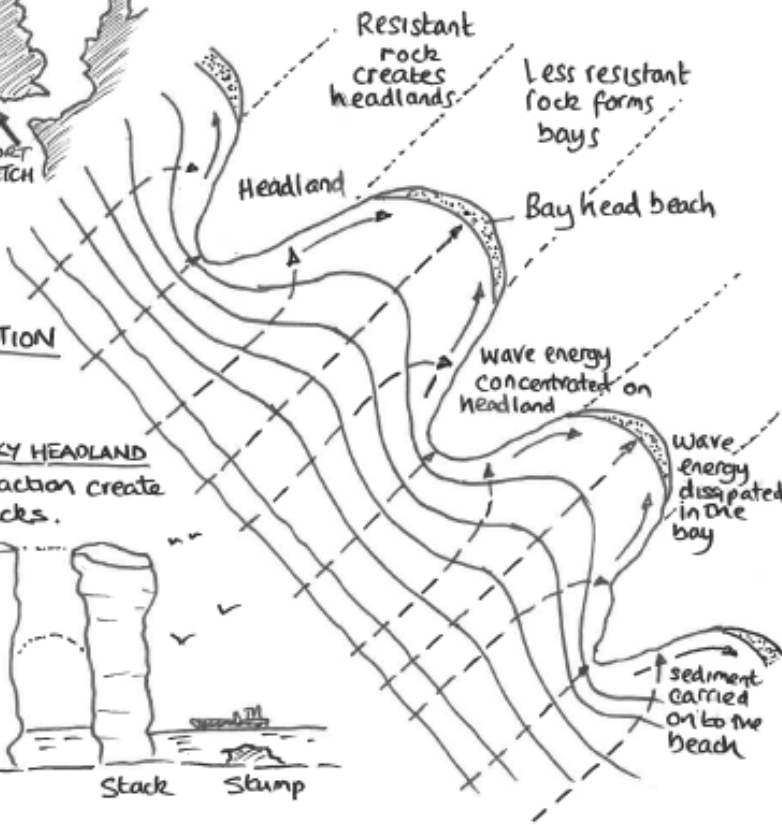
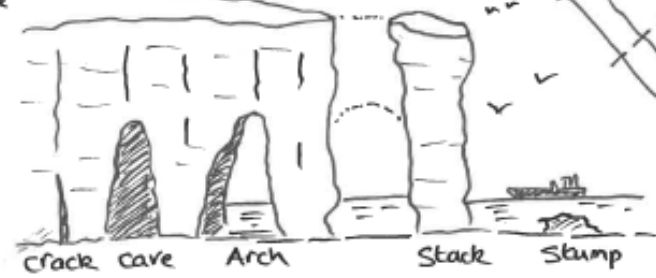
Created from the friction between wind and the surface of the sea

Fetch - the distance and direction a wind can blow over the sea to create waves.



WAVE REFRACTION

FEATURES OF A ROCKY HEADLAND
Erosion and wave refraction create caves, arches and stacks.



African Biomes

Students must be able to:

- ☐ Identify simple links between the distribution of global biomes, latitude and atmospheric circulation.
- ☐ Recognise the main features of the tri-cellular models of atmospheric circulation.
- ☐ Describe the basic climatic features of equatorial rainforests, hot deserts and savannah grassland.
- ☐ Describe and explain some vegetation and animal adaptations to the climate of their biomes.
- ☐ Describe some of the features of the traditional societies in rainforests, deserts and savannah.

Key Knowledge:

8Ci: The continent of Africa has a diverse range of biomes – global scale ecosystems - from hot desert to tropical rainforest – whose distribution of mostly determined by the availability of water for plants to grow.

8Cii: The lower atmosphere of the Earth contains within it six circulatory cells – 3 each north and south of the Equator. The two Hadley, two Ferrell and two Polar Cells each have a significant impact on climate of the ecosystems over which they pass.

8Ciii: The regions of West and Central Africa close to the Equator experience an ‘Equatorial climate’ of high and stable temperatures and heavy rainfall throughout the year.

8Civ: Rainforest plants have adapted to the all year growing season and heavy rain with many adaptations, including growing tall with a high canopy, leaves with drip tips and wide buttress roots to support the tall trunk.

8Cv: While the rainforest is a very productive ecosystem for plants, life there for humans is very difficult. The forest dwellers of the Congo rainforest – often referred to as Pygmies - have some of the lowest life expectancies on Earth.

8Cvi: Hot deserts have annual rainfall below 250mm. They experience temperatures as high as 50+°C during the day but can become cold at night. Most hot deserts are located under the descending limbs of the two Hadley cells.

8Cvii: The extreme aridity of hot deserts makes life a struggle for plants and animals alike. Many have developed xerophytic (drought-tolerant) adaptations including waxy skins, no leaves, spines and thorns for plants and nocturnal behaviour for animals.

8Cviii: The Savannah climate is a transitional one between the rainforests and the hot deserts. The savannah exhibits two seasons – a wet and a dry season. The length of these seasons varies with distance from the Equator or desert margins.

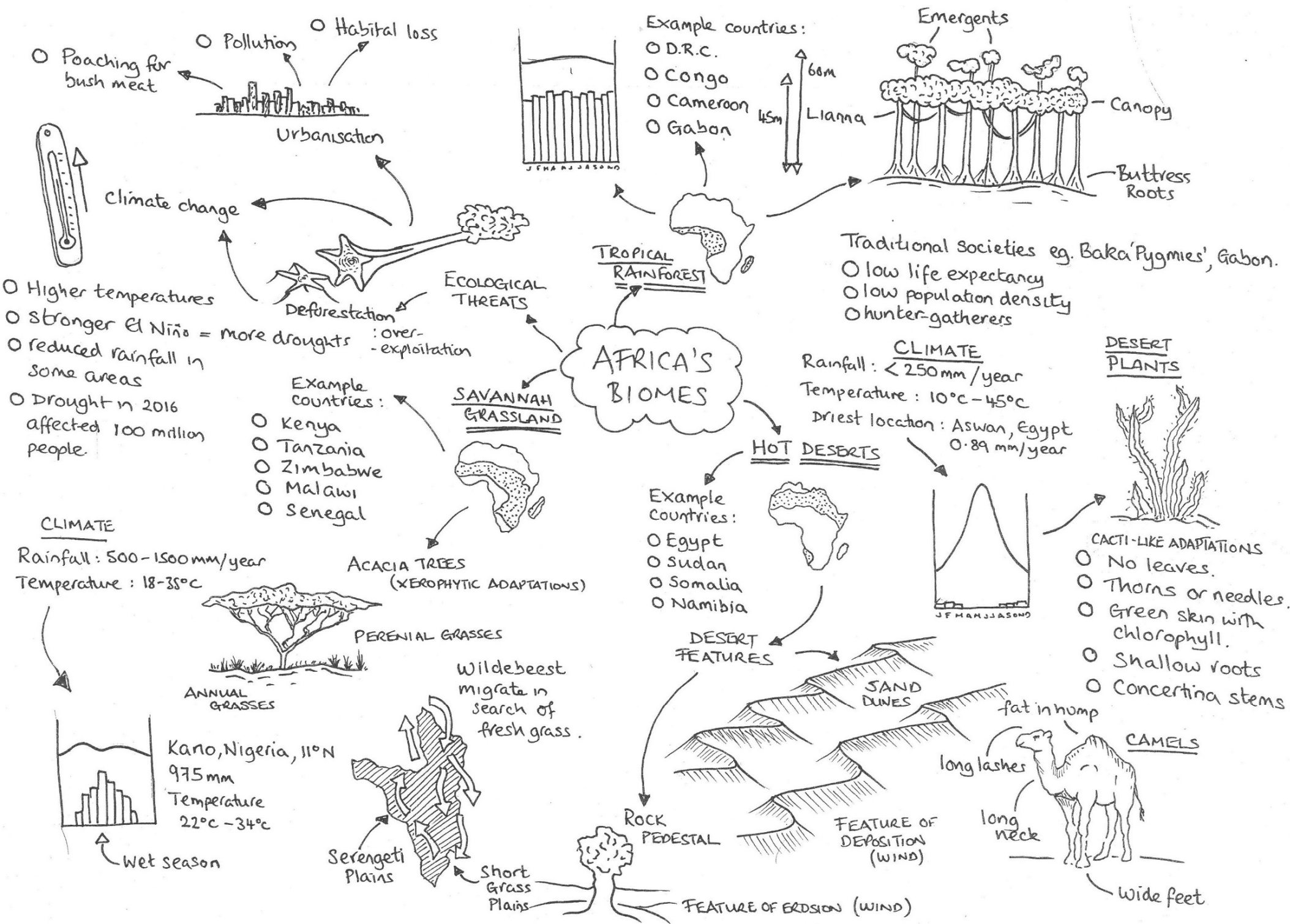
8Cix: Plants have adapted to the dry seasons of the savannah by becoming xerophytic with adaptations including small leaves and being deciduous in the dry season. They also have pyrophytic (fire-tolerant) adaptations including thick corky barks or fire-resistant seeds.

8Cx: Grass or seed eating herbivores such as wildebeest and red-billed quelea have adapted to a wet and dry season climate by becoming migratory. This creates problems for their predators of they are territorial.

8Cxi: The short grass plains in the Serengeti are rich in wildlife because of the fertile soils created by the nearby Great Rift volcanoes, such as Ol Doiyo Lengai – the ‘Mountain of God.’

8Cxii: The Maasai people of Kenya and Tanzania have traditionally followed a system of nomadic pastoralism – raising cattle on the grasslands of the Serengeti/Mara eco-region.

Key terms	Definitions
Atmospheric circulation	the global movement of air in circulatory cells through the atmosphere.
Tri-cellular model	a simplification of actual atmospheric circulation to show the main atmospheric movements and influences on climate.
Hadley Cells	the two circulatory cells either side of the Equator meetings at the Inter-Tropical Convergence Zone.
Ferrell Cells	the two cells on the poleward sides of the Hadley Cells. The meeting air of the Hadley and Ferrell cells creates the Sub-Tropical High Pressure.
Dry season	a period of time with little or no rainfall.
Rainy season	a period of time when most rain falls.
Canopy	the zone of maximum leaf growth high above the floor in a tropical rainforest
Emergent	trees rising above the forest canopy.
Buttress roots	wide extensions at the base of rainforest trees to give the very tall trunks added stability.
Drip tips	points at the end of rainforest leaves which aid the shedding of water away from the tree.
Nocturnal	animals which become active during the night.
Migration	the movement of animals from one place to another, often in search of food or water.
Territorial	animals having a restricted area in which they live, which they guard against intrusion by other members of their same species.



Mind the Gap – Development in West Africa.

Students must be able to:

- ☐ Create their own definition of human development.
- ☐ Identify a range of development indicators and describe how they can show development.
- ☐ Describe some of the physical and human causes of uneven and under-development.
- ☐ Describe some of the push and pull factors associated with rural to urban migration.
- ☐ Recognise the different scales at which development aid operates.
- ☐ Describe some of the strengths and weaknesses of international aid.
- ☐ Identify how rapid urbanisation has created a number of problems in Lagos, Nigeria.

Key Knowledge:

Development can mean many different things but in Geography is taken to mean the improvement in the quality of people's lives and their standard of living over time.

Geographers use graphs not only to present data but to identify patterns. Scatter graphs can be used to identify positive and negative correlations between two sets of data.

2000 years ago the richest countries in the world were India and China. In 1500 half of all the goods made in the world came from these countries. Yet, as Europe developed, much of the rest of the world declined.

Ghana is a country in West Africa whose capital is Accra. Despite being rich in natural resources and the world's second largest producer of cocoa, Ghana is still in the poorest 25% of all countries. It has a life expectancy which is 20 years lower than the UK.

Over half of Ghana's population live in rural areas where the majority are subsistence farmers or farm labourers. Many rural villages have no electricity, access to clean water or basic sanitation.

Ghana has some of the best conditions for growing cocoa (a South American forest tree) and has become over the last 130 years the world's second largest grower, after Cote D'Ivoire.

The Akosombo Dam was built in the 1960s by the newly independent Ghana. It was to be a symbol of change and progress in Africa but has also resulted in significant social, economic and environmental problems.

Small-scale development projects that use appropriate technology can help improve the lives of the poor without further damaging the environment.

Rural to urban migration has resulted in the growth of all the world's cities. In recent years pull factors in the city and push factors in the countryside have resulted in rapid urban growth in developing nations.

Megacities are conurbations with over 10 million inhabitants. There are 28 Megacities in the world but just six are in more economically-developed countries.

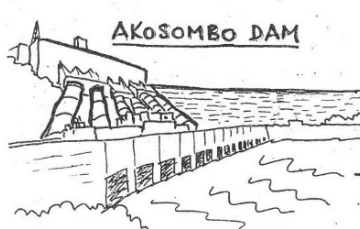
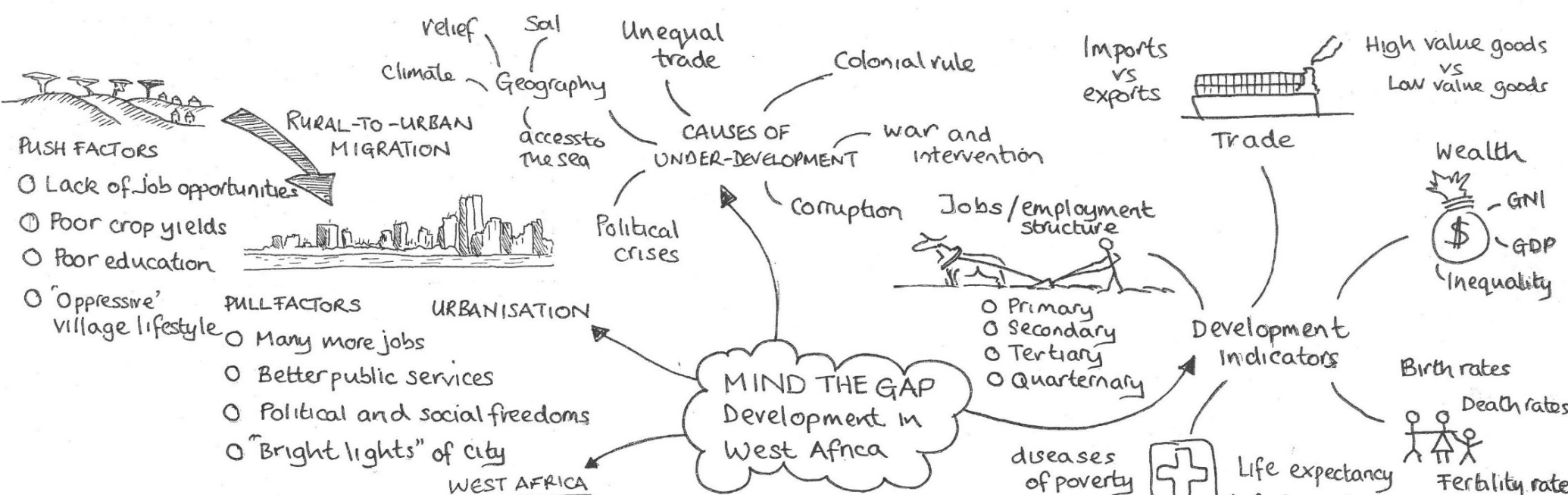
Lagos is the largest city in Nigeria and the fastest growing city in Africa.

Lagos is undergoing rapid urban growth. New arrivals face a daily battle to earn a living in the city and may end up living in slums.

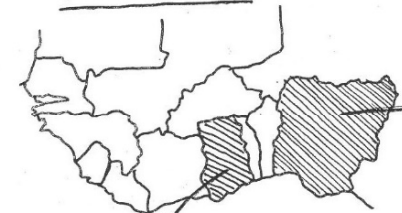
Lagos is undergoing an attempt to clear its slums and improve its image. This is leading to conflict between slum dwellers and the police.

Lagos plans to become the heart of the developing African economy with a new city called Eko-Atlantic built on reclaimed land adjacent to Victoria Island.

Key terms	Definitions
Development	the improvement in people's lives and standard of living over time.
Social	elements of Geography referring to peoples lives and the way they live.
Infant mortality	the rate of deaths amongst children under the age of one.
Gross Domestic Product	the total value of goods, services and raw materials produced in a country each year.
Gross National Income	the value of goods, services and raw materials earned by a country each year including overseas earnings.
Life expectancy	the number of years a person can, on average, expect to live.
Adult literacy	the percentage of adults who can read and write.
Appropriate technology:	technology which meets the needs of a society which is both affordable and sustainable.
Urbanisation	the increase in the percentage of people living in towns and cities.
Rural	the countryside and small villages.
Urban	towns and cities.
Informal settlement	a settlement where poor inhabitants build temporary housing, often illegal.
Slum	common word for informal settlement. Slums may become more permanent over time.
Migration	the movement of people from one place to another to live and work.
Push factor	something negative that encourages a migrant to leave their home region.
Pull factor	something positive that attracts a migrant to a new location.



AKOSOMBO DAM



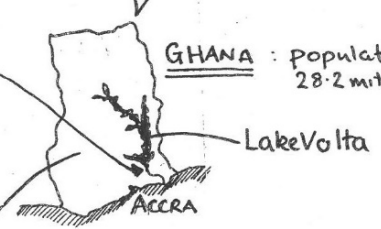
NIGERIA: population 182 million



Lagos is Africa's fastest growing city with a population of over 24 million people.

- Many work in the informal economy.
- Many live in slums.

GHANA: population 28.2 million



- Ghana is world's second largest cocoa producer.
- Employs over 3.2 million workers and farmers.
- Rises and falls in cocoa prices can affect over 6 million people.

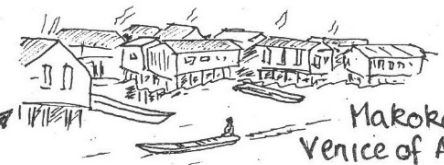


COCOA



Scavengers on the dump

Olushosun dump in Lagos is home to over 1000 people
scavengers collect recyclable waste to sell



Makoko - Venice of Africa?

- Makoko is one of Lagos' many slums
- Many homes are built on stilts or piles of rubbish and sawdust
- Makoko is home to over 100,000.

- ★ **AKOSOMBO PROS**
 - Generates electricity
 - Raises taxes for government
 - Employs well-paid workers
 - Powers aluminium smelter
- ★ **AKOSOMBO CONS**
 - Flooded 4% of country
 - Many villages lost to Lake Volta
 - Silting up of lower Volta
 - Increased bilharzia infections
 - Raised government debt