The Living World - Ecosystems

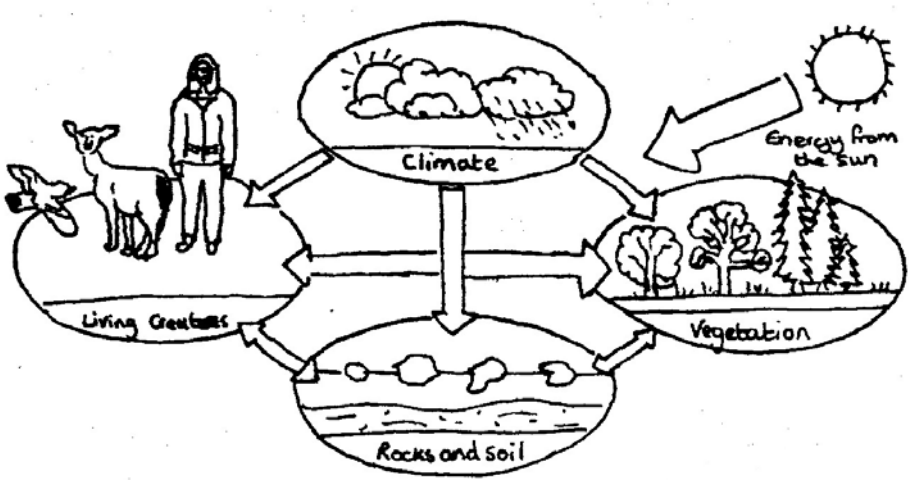
What is an ecosystem?

Food chains show…

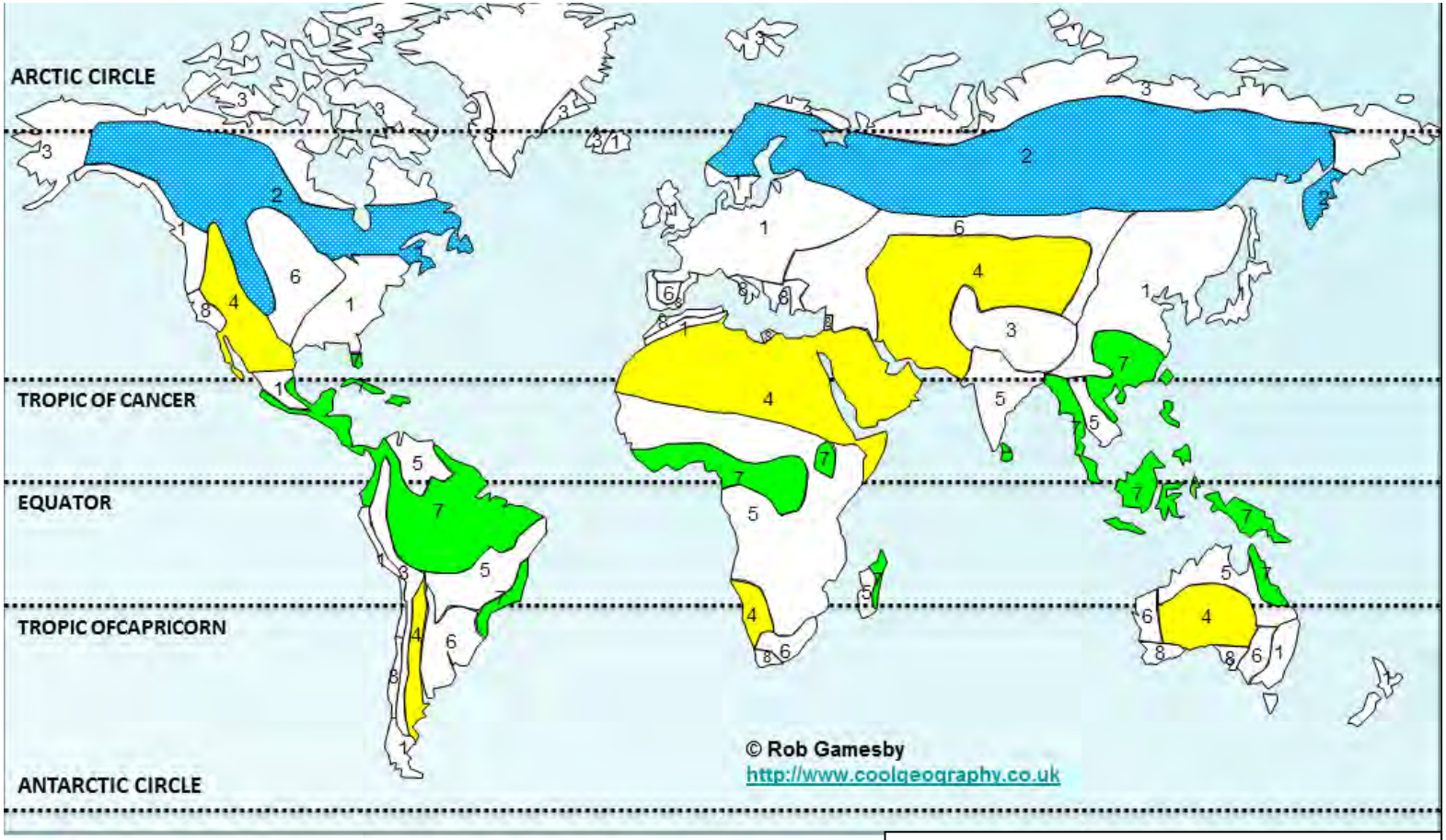
Within a food chain there are various stages. Draw a mon-living / living organism:

Decomposer	Primary producer	Primary consumer	Secondary consumer	Tertiary consumer

Around the diagram showing the different factors within an ecosystem label the arrows to show the relationship between the living and non-living components.



The distribution of large scale global ecosystems



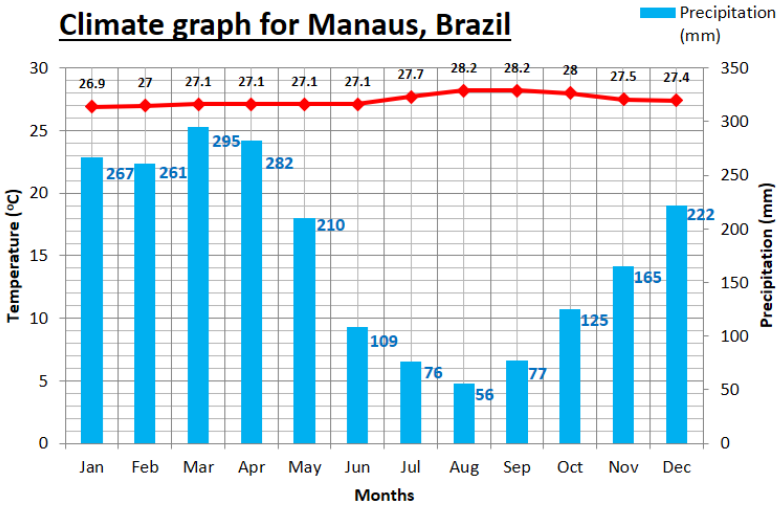
7	Tropical Rainforest
5	Tropical Savannah
4	Desert
8	Chaparral (Mediterranean)
6	Grassland
1	Temperate Deciduous Forest
2	Temperate Boreal Forest
3	Arctic and Alpine Tundra

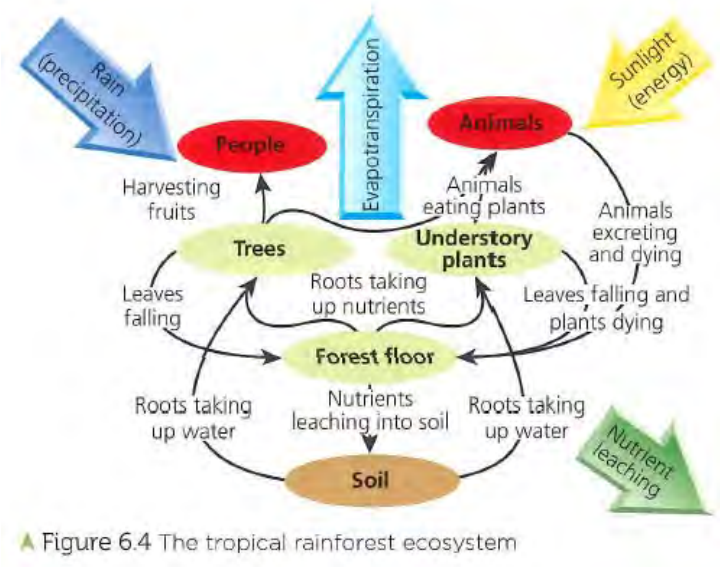
Describe the distribution of the highlight ecosystems.

Describe the different types of ecosystems:

1. Temp deciduous forest
2. Temp boreal forest
3. Arctic and Alpine Tundra
4. Desert
5. Tropical Savannah
6. Grassland
7. Tropical Rainforest
8. Chaparral

Tropical Rainforest





▲ Figure 6.4 The tropical rainforest ecosystem

What are the 3 physical characteristics of the Tropical rainforest?

Climate

Soil

Vegetation

Looking at the diagram and referring to the 3 characteristics above – why is there a lot of biodiversity in tropical rainforests?

How have plants adapted to survive?

Factors that help poor soils

In Section 6.1, the soils of the tropical rainforest were described as being very poor. Not good news for plants! So how do they manage to survive and prosper? The answer lies mainly in four factors:

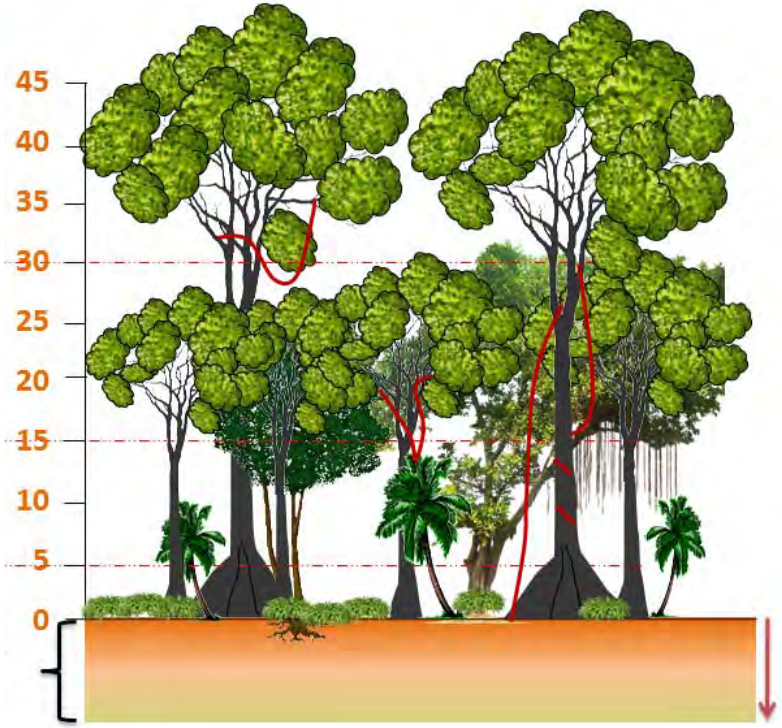
- a rapid cycling of nutrients through the ecosystem (see Figure 6.3) – a sort of fast-food delivery
- the absorption of sunlight, leading to photosynthesis
- the warm, humid climate, which is ideal for plant growth throughout the year
- the ability of plants to adapt as they compete for sunlight and nutrients.

Heat and humidity

The nutrient cycle is one way in which the three components of an ecosystem work together. Another is the water cycle (Figure 6.5). This constant recycling of water occurs every day.

The leaves of many trees are waxy and have tips that allow water to run off them. Leaf stems are also flexible to allow leaves to move with the Sun to maximise photosynthesis. Therefore, vegetation copes with both heat and heavy rainfall by:

- using the circulating water as a sort of cooling system
- passing water to the soil or returning it to the atmosphere
- having leaves that can cope with the large amounts of water falling on them.



Competition for sunlight

Although photosynthesis is important for plant growth, plants still need minerals and these come mainly from the soil. The dense vegetation of the tropical rainforest shows four distinct layers (Figure 6.6). In each layer, the plants have adjusted to the physical conditions, particularly to available sunlight. Most sunlight is received by the tops of tall trees and, due to a shading effect, the least sunlight is received close to the forest floor.

In the lowest two layers there is little photosynthesis to convert the small amount of sunlight into plant food. So plants have to rely on other ways of getting their food supply. In most cases, this means from the soil. In some cases, a different strategy is used. For instance, parasitic plants have developed a way of attaching themselves to a host tree or shrub and sharing its supply of food and water.

Task –

Label the layers of the rainforest

How does the rainforest adapt to its climatic conditions?

Around the adaptions include a diagram and a description.

Drip-tip

Buttress roots

Epiphytes

Lianas

Emergent

Leaves with flexible bases

Thin smooth bark

Mind map - How have animals adapted to survive in the Tropical Rainforest?

Case study - Amazon Rainforest - Deforestation

Who 'own' most of the world's tropical rainforest?

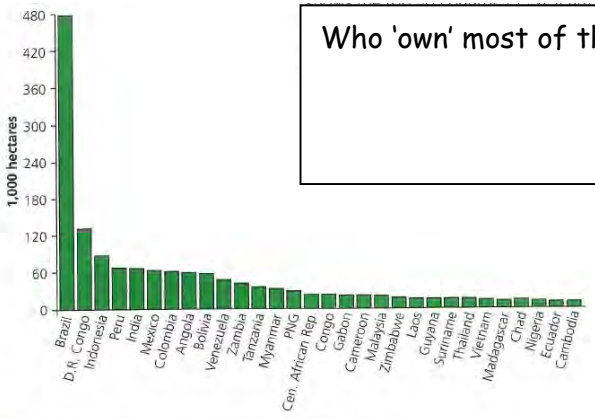


Figure 6.8 The leading 'owners' of tropical rainforest

Rates of deforestation

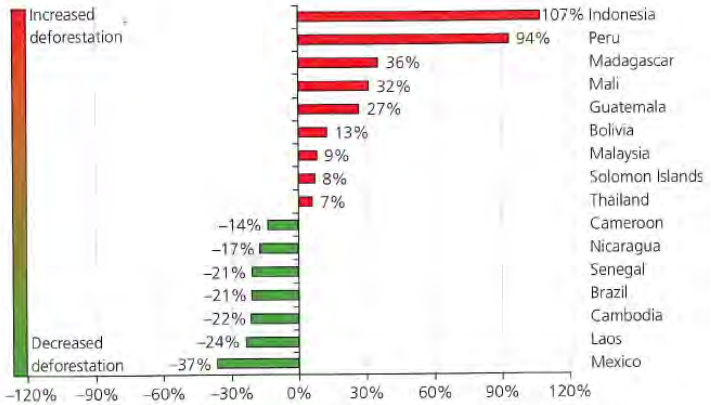
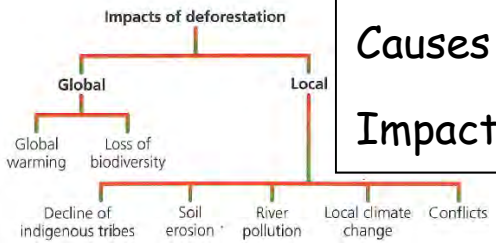


Figure 6.9 Change in the annual deforestation rate (2000–2010)

Deforestation



Rank and describe the causes and their effects along the opinion line.

Causes - Settlement, Cattle ranching, Mining, Logging, Energy

Impacts – Loss of biodiversity, Soil erosion, River pollution, Tribes, Conflicts

Remember to add facts and figures.

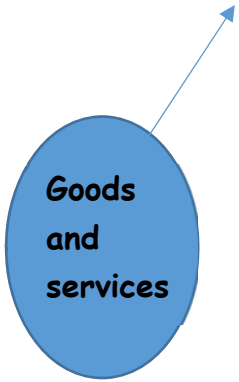
Least severe

Worst cause

Worst impact

Why are Tropical Rainforests important?

.



Strategies for managing the tropical rainforest sustainably.

Sustainable forest management:

_____

_____

_____

_____

_____

Why does the rainforest need to be managed sustainably?

_____

_____

_____

_____

_____

Levels of Management:

International

National

Local

International and National Level

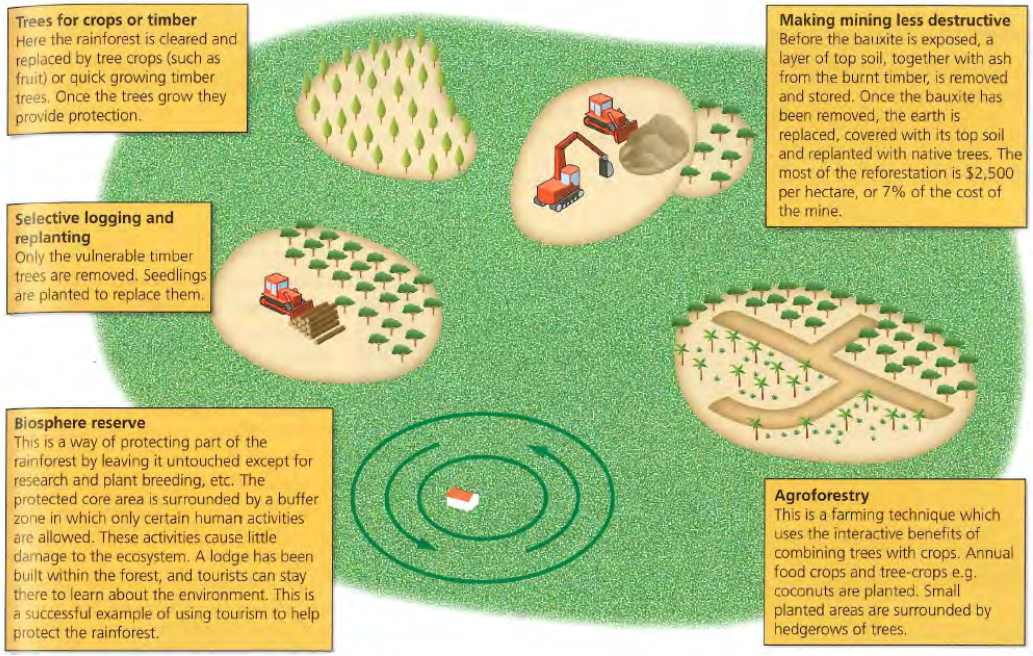
Sustainable use of the rainforest	What it is	Positives	Negatives
International Tropical Timber Agreement (2006) The CITES			
Debt reduction			
Conservation groups and NGO's			

National:

Governments			

Local

Around the local strategies annotate how effective them are in protecting the tropical rainforest.

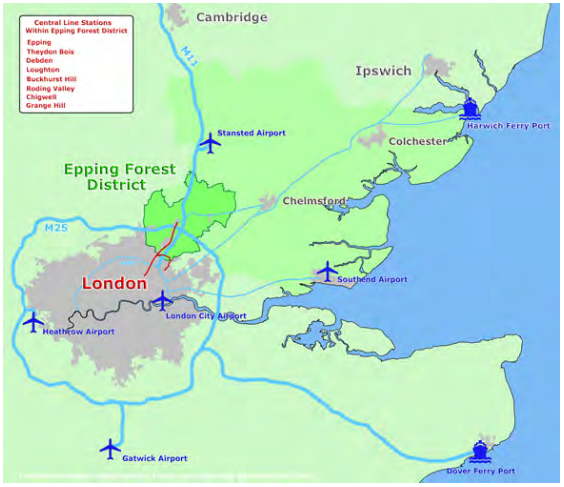


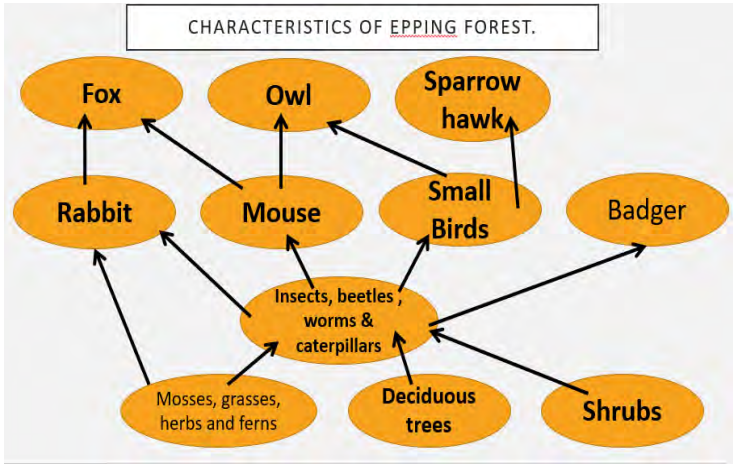
Ecotourism – How can this help?

UK ECOSYSTEMS
EPPING FOREST

- _____ of the forest has remained naturally high, thanks to careful management, so there is a complex foodweb composed of thousands of . Epping forest is home to:
- 20 species of dragonfly
- A large number of native _____ species including _____, Elm, Ash and _____.
- A lower _____ layer of Holly and Hazel at 5m overlying a field layer of grasses, brambles, bracken, fern and flowering plants, ____ species of moss and _____grow at Epping Forest.
- Mammals, amphibian and species call Epping Forest their home.
- 38 species of _____
- 700 species of _____ can be found at Epping forest.

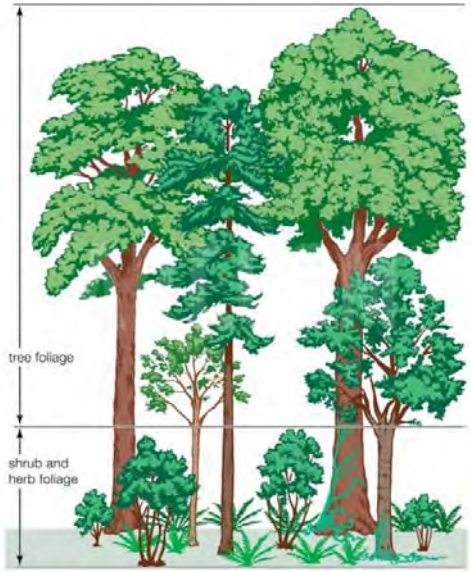
BIODIVERSITY, FUNGI, REPTILE, 177, LICHEN, TREE, SPECIES, BEECH, SHRUB, OAK, BIRDS





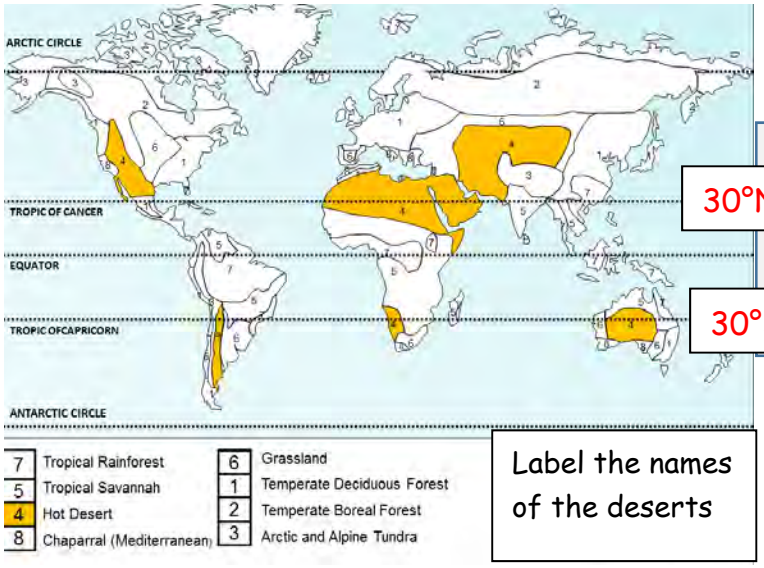
Deciduous forest profile

Label the profile of Epping forest

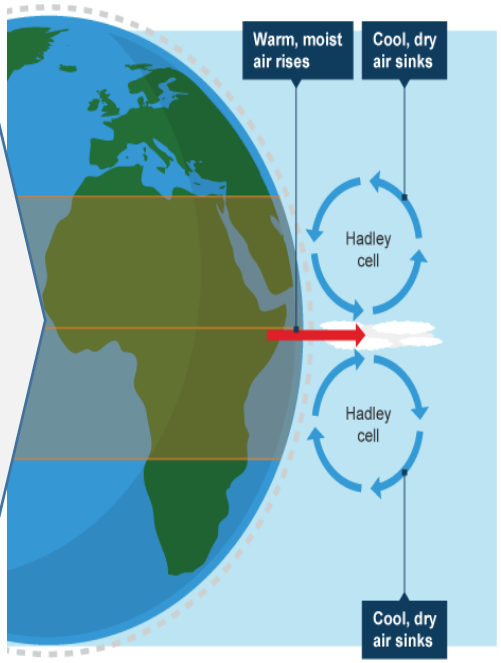


How have deciduous trees adapted?

Hot Deserts



Label the names of the deserts



Why are droughts found here?

Air around the Tropics of Capricorn and Cancer is dry. This is a zone of high air pressure where the air ____. Air at the _____ rises and cools - condensation then forms ____. The air then moves north and south until it gets to about 30° _____ and _____ of the equator, where it sinks. This air is dry and no _____ can form, so there is no rain. This is known as the **Hadley Cell**. It shows how air moves around the _____ near the equator and tropics.

condensation rain north equator south atmosphere sinks

Hot Desert climates

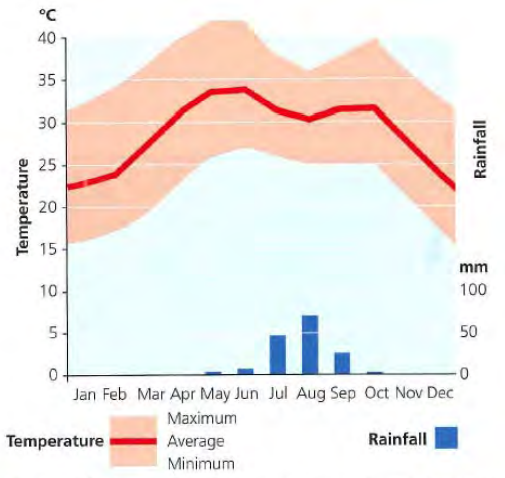


Figure 7.2 The climate graph and monthly temperature data for Khartoum, Sudan

What is the typical annual climate of desert like?

How does the temperature range during the day?

Hot Desert soils

In hot climates, soil –forming processes are limited by the shortage of water and vegetation. Over time, weathering creates deep deposits of sand and loose material. There may be little organic content due to the lack of vegetation growing there. These sandy, rocky soils are typically around 1m deep, although in some places, wind action builds tall dunes where deeper soils can potentially develop. Sand dunes should not be classified as soils if there is no organic matter present there at all.

How can plants adapt to the challenges of living in a desert environment?

Around the plants annotate how they have adapted to live in the desert.

Drought resistant trees

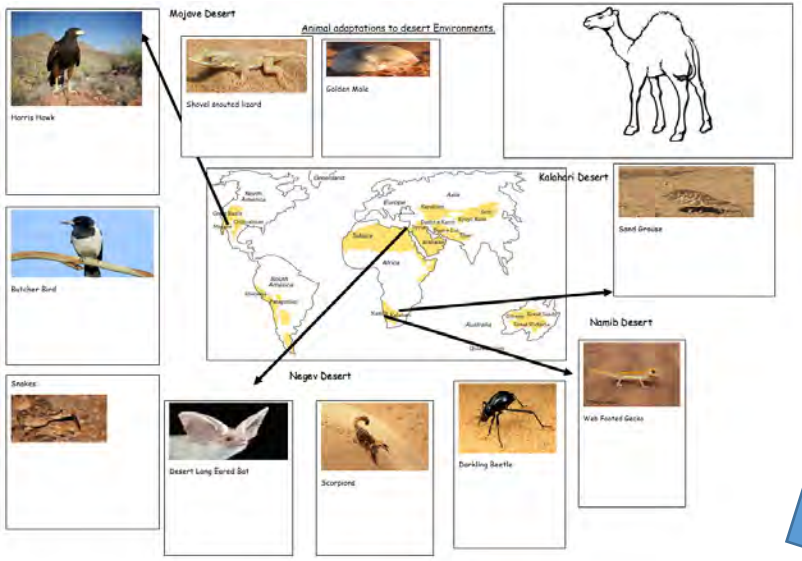
Lichen

Flowering plants

Cactus

How do animals adapt to the challenges of living in a desert environment?

Select 3 animals and draw/ stick on a photo of them. Annotate how they adapt to survive in the desert.



Case study - The opportunities and challenges of development in hot desert environments – The Western Desert

Development opportunity: Tourism	Development opportunity: Farming	Development opportunity: Energy production	Development opportunity: Mineral production
This involves:	This involves:	This involves:	This involves:
Challenges associated with this are:	Challenges associated with this are:	Challenges associated with this are:	Challenges associated with this are:

The USA's Western Desert region is actually made up of 3 different deserts. These are the Mojave, the Sonoran desert and the Chihuahan desert. In total it covers 200,000 square kilometres.

Development challenges in the Western Desert

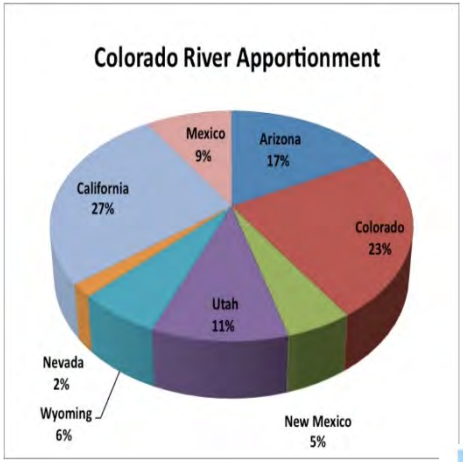
How did Indigenous people adapt to living in the harsh conditions of the Western desert?

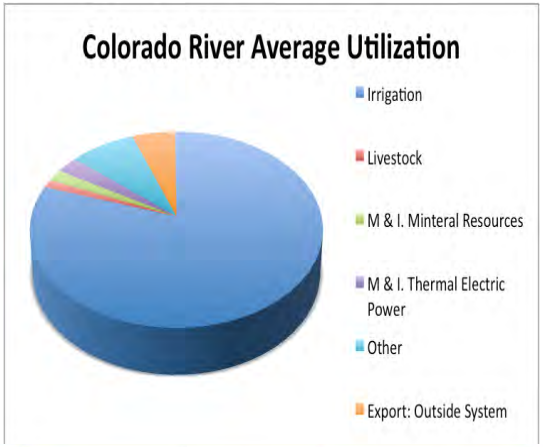
Why is lack of accessibility and infrastructure a challenge to people in the Western Desert?

How have people adapted to the harsh desert environment of the Western Desert?

Case study - Western Desert (USA) Water Crisis

How is water used in the Western Desert?





Pressures on water supply	Water supply problems/ Lake Mead problems

Figure 19: The Colorado River basin

What are the issues / solutions around future water supply?

What is meant by the term water security? .....

.....

How could a lack of water cause political conflicts?

.....

.....

.....

.....

How could a lack of water cause conflict between different user groups?

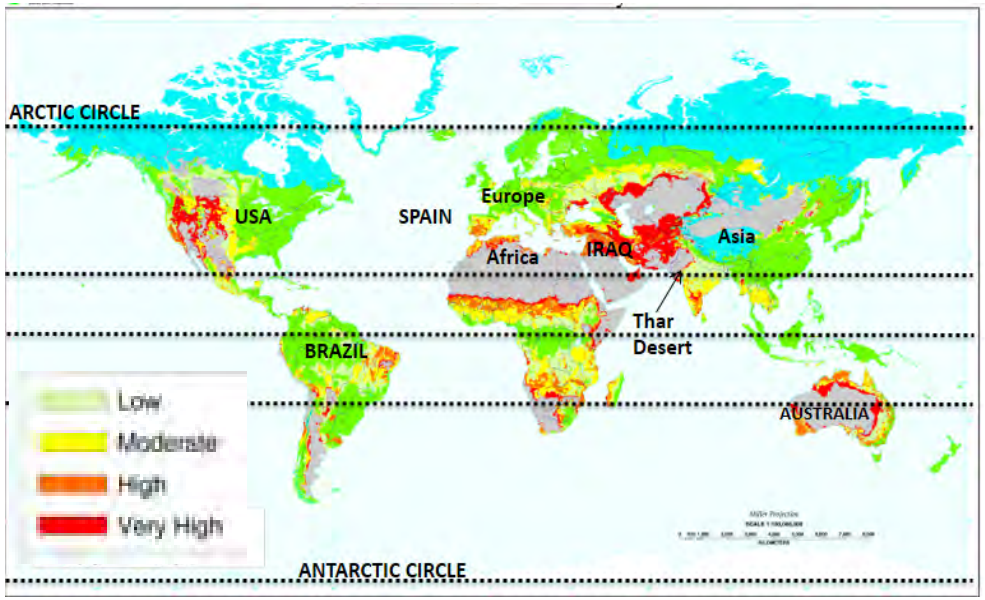
.....

.....

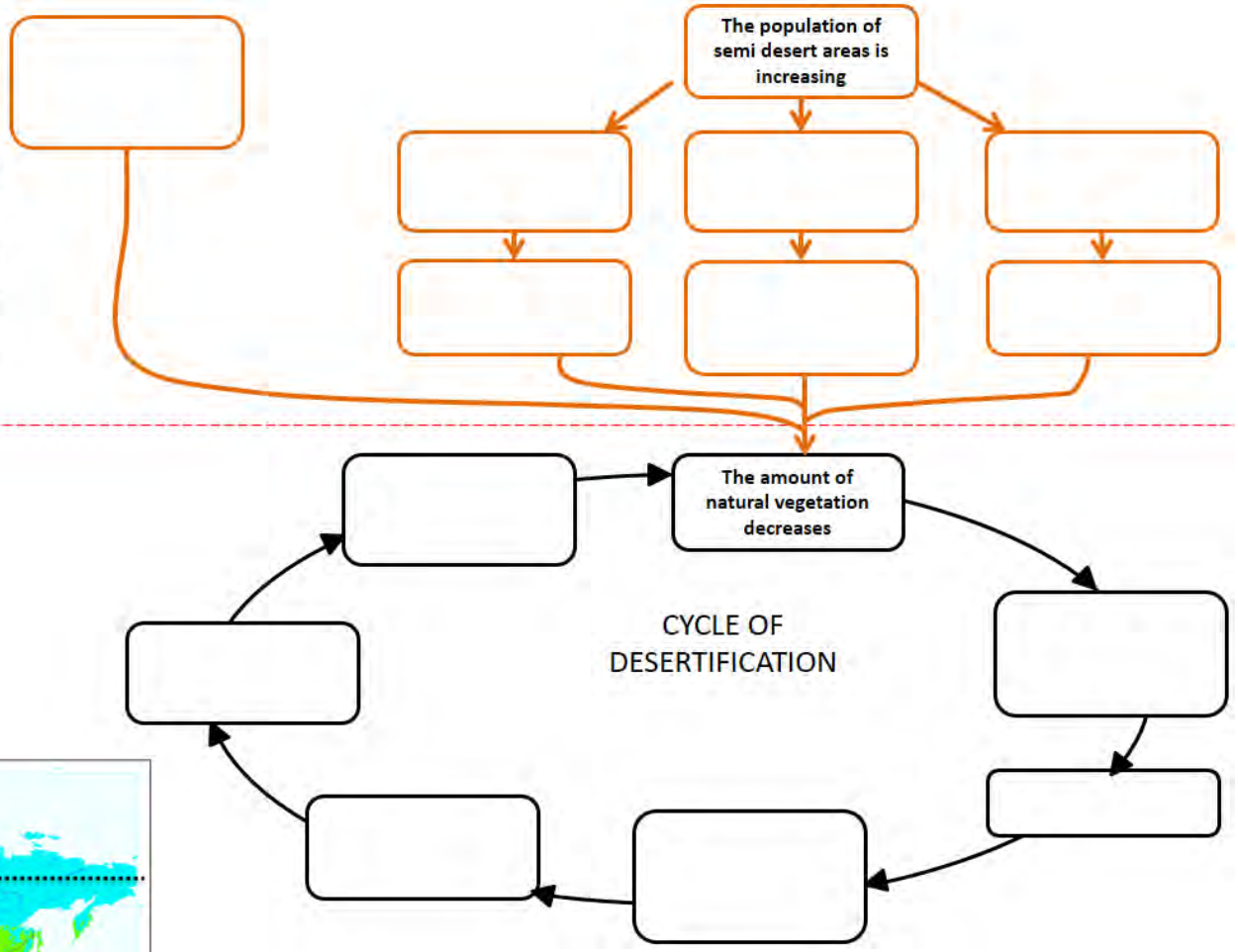
Desertification – causes and effects

What is it?

Where does desertification occur?

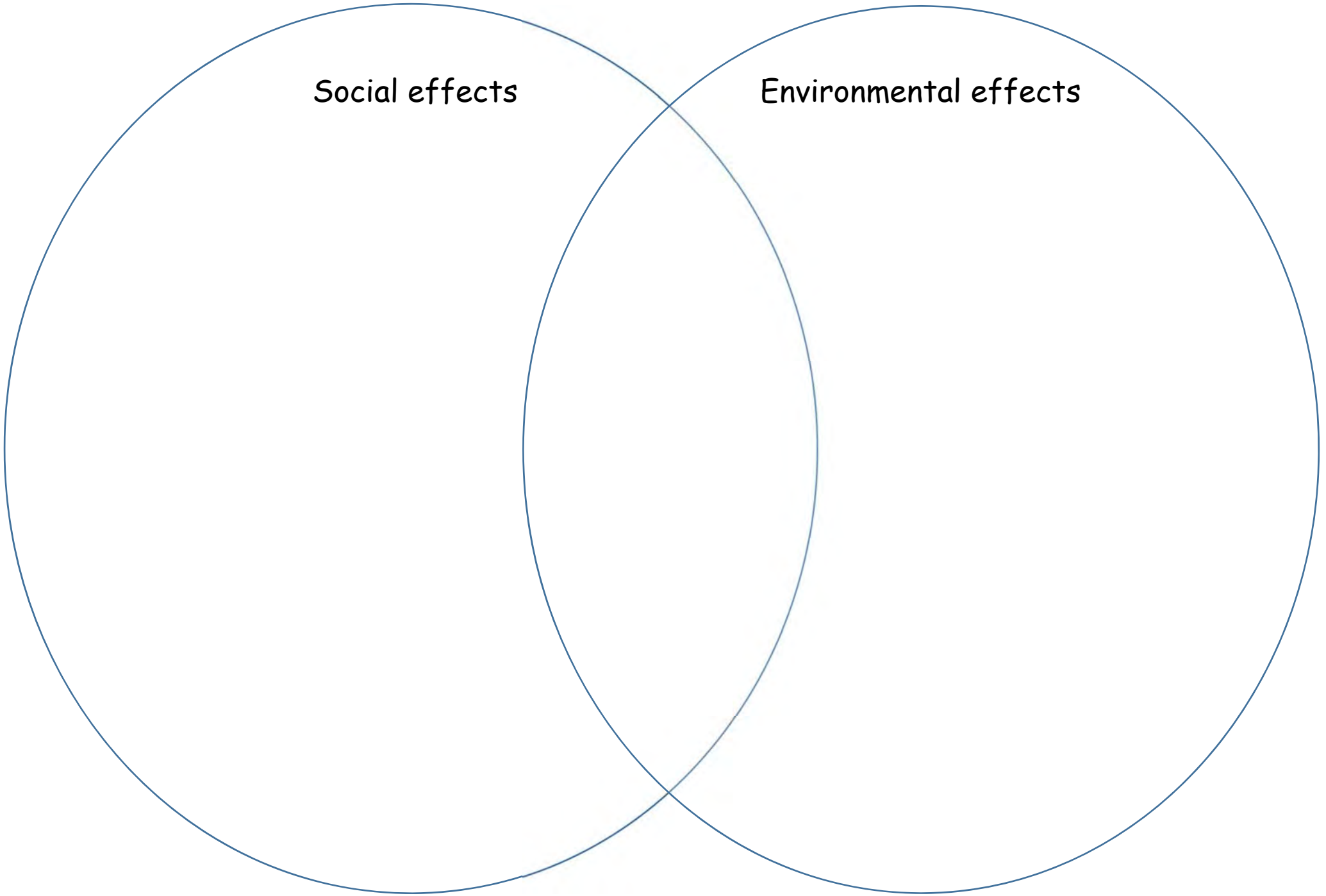


CAUSES



Responses to desertification - Appropriate technology is……

- Appropriate for the **P**eople
- Appropriate in terms of **A**ffordability
- Appropriate to the **P**lace
- Appropriate and **S**ustainable


Social effects
Environmental effects

Strategies to reduce the risk of desertification – Sahel region

Planting Acacia Trees

How it manages water

How it manages the soil

How it is appropriate technology

Stone lines

How it manages water

How it manages the soil

How it is appropriate technology

Planting pits

How it manages water

How it manages the soil

How it is appropriate technology