

# CORAL CAY CONSERVATION & JFA EDUCATIONAL AIDS

## UPPER PRIMARY SCHOOL WORKBOOK

ECOLOGY, RELATIONSHIPS AND INTERACTIONS

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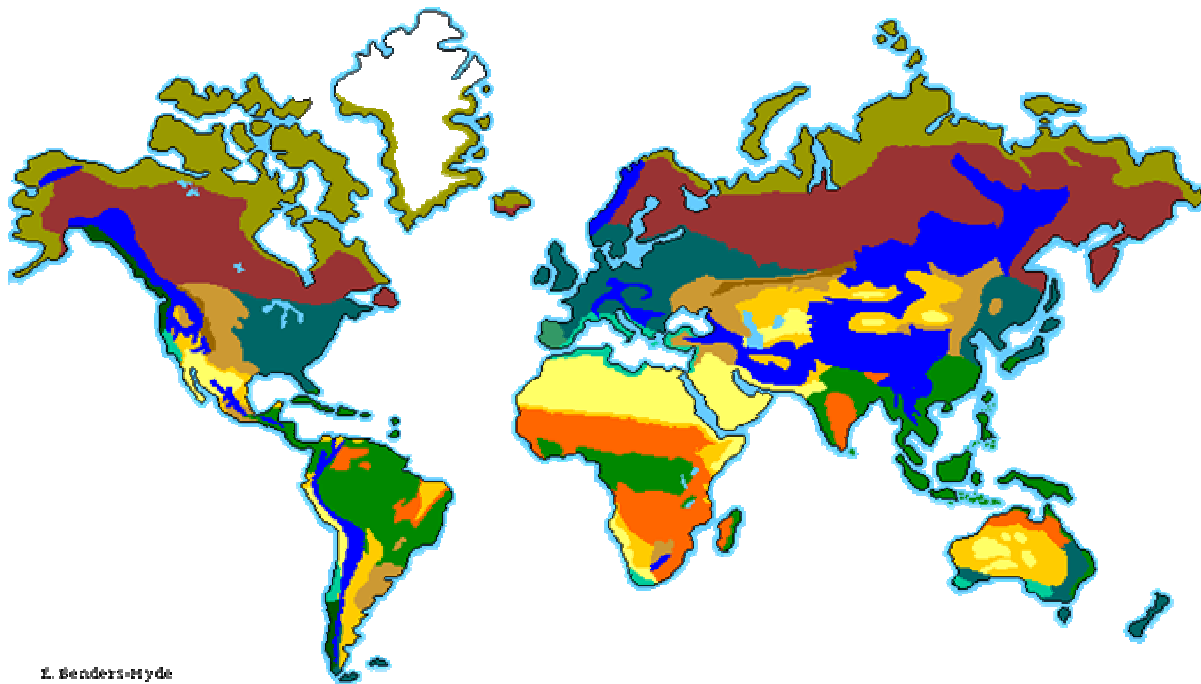
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## THE WORLD AROUND US

Identify the major zones of the world:

1. The tropical zone
2. The hot desert zones
3. The cold snow covered zones
4. Where you live
5. The major oceans of the world



L. Benders-Hyde

 <b>Tundra</b>	 <b>Deciduous Forest</b>	 <b>Savanna</b>
 <b>Taiga</b>	 <b>Chaparral</b>	 <b>Rainforest</b>
 <b>Grasslands</b>	 <b>Desert</b>	 <b>Alpine</b>
	 <b>Desert-scrub</b>	

These zones are called BIOMES. A biome is a large geographical area of distinctive plant and animal groups, which are adapted to that particular environment. The climate and geography of a region determines what type of biome can exist in that region. Major biomes include deserts, forests, grasslands, tundra, and several types of aquatic environments. Each biome consists of many ecosystems whose communities

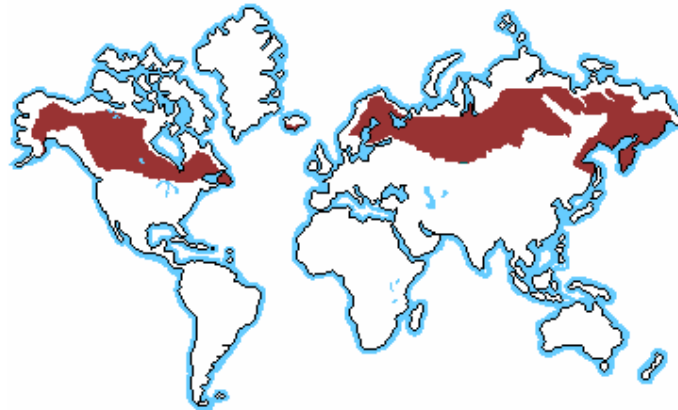
have adapted to the small differences in climate and the environment inside the biome. Each of the illustrated biomes are described below:

**Tundra:** the tundra is a vast and treeless land that covers about 20% of the Earth's surface, circumnavigating the North Pole. It is usually very cold, and the land is stark.



Map to show the location of the Tundra regions.

**Taiga:** The taiga is the biome of the needleleaf forest. It stretches over Eurasia and North America. The taiga is located near the top of the world, just below the tundra biome.



Map to show the location of the Taiga regions.

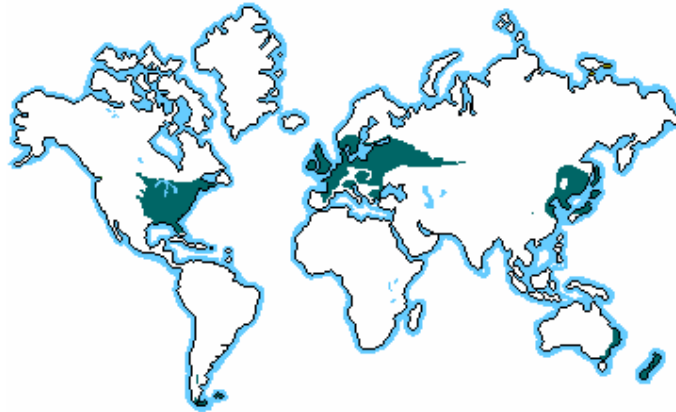
**Grasslands:** Grassland biomes are large, rolling terrains of grasses, flowers and herbs. A grassland is a region where the average annual precipitation is great enough to support grasses, and in some areas a few trees.



Map to show the location of the Grassland regions.

**Deciduous Forest:** Deciduous forests can be found all over the world.

The deciduous forest has four distinct seasons, spring, summer, autumn, and winter. In the autumn the leaves change colour. During the winter months the trees lose their leaves.



Map to show the locations of deciduous forests.

**Chaparral:** The chaparral biome is found in a little bit of most of the continents. Chaparral is characterized as being very hot and dry.



Map to show the locations of the Chaparral biomes.

**Deserts/Desert scrub:** Deserts cover about one fifth of the Earth's land surface. Most Hot and Dry Deserts are near the Tropic of Cancer or the Tropic of Capricorn. Cold Deserts are near the Arctic part of the world.



Map to show locations of the cold and hot desert biomes.

**Savannah:** A savannah is a rolling grassland scattered with shrubs and isolated trees, which can be found between a tropical rainforest and desert biome.



Map to show the locations of the savanna biomes.

**Rainforests:** The tropical rain forest is a forest of tall trees in a region of year-round warmth. An average of 50 to 260 inches (125 to 660 cm.) of rain falls yearly.

Rainforests now cover less than 6% of Earth's land surface. Scientists estimate that more than half of the entire world's plant and animal species live in tropical rain forests.



Map to show locations of the rainforests biomes.

**Alpine:** Alpine biomes are found in the mountain regions all around the world. They are usually at an altitude of about 10,000 feet or more.



Map to show locations of alpine biomes.

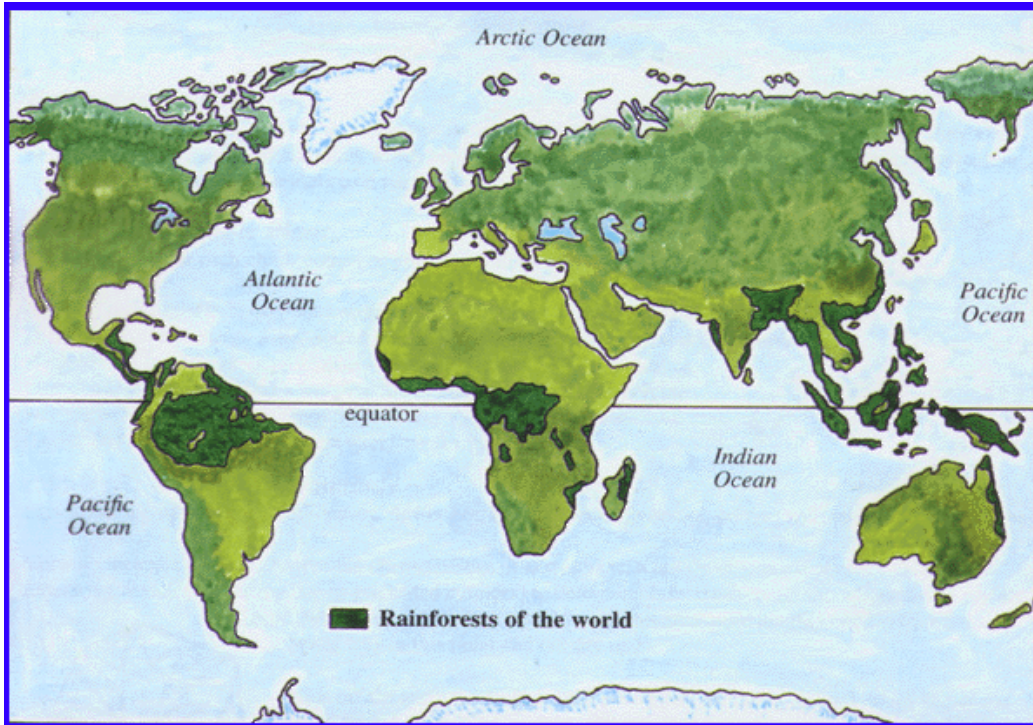
Can you now show where the major biomes of the world are found?

Explain 'biomes' to a friend.

## TROPICAL RAINFORESTS

Where are the tropical rainforests found in the world?

1. ....
2. ....
3. ....
4. ....



What are the environmental features of a tropical rainforest?

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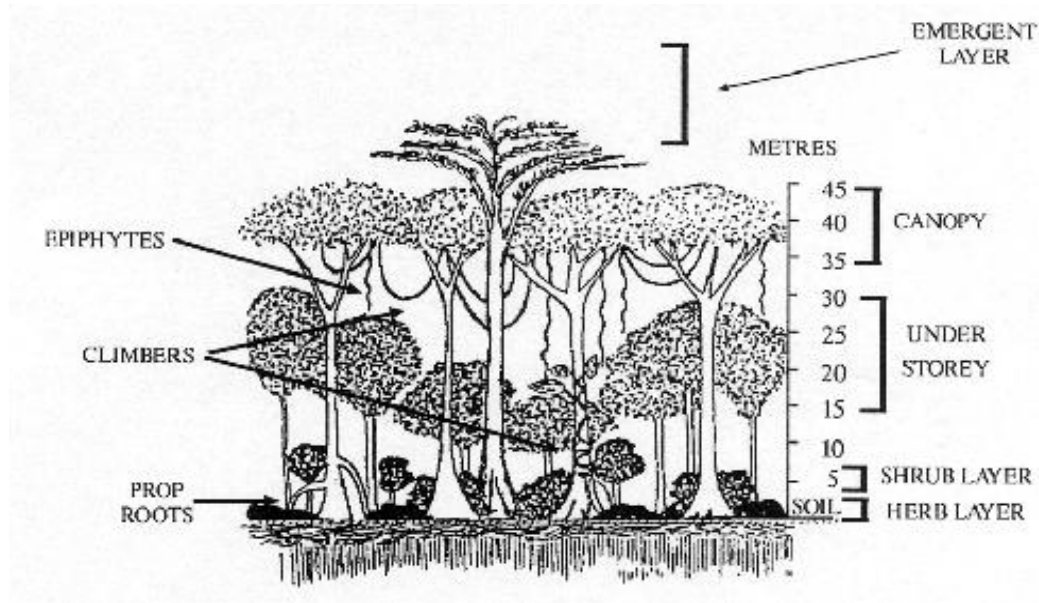
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Rainforests have a unique structure:



Layers of trees are present in the rainforest. These layers have been identified:

- The emergent trees. These trees are the tallest trees in the rainforest.
- A closed canopy of 45-foot to 80-foot trees.
- Under storey. This layer is just below the canopy and consists of smaller trees forming an additional layer.
- Shrub/sapling layer: This is a layer of young trees that are capable of a rapid surge of growth when a gap in canopy above them opens and the light reaches them. Gaps will form when trees fall over.
- Herb/Ground layer: sparse plant growth. Small plants that are used to living in the darkness live at this level. They are specially adapted to live here.

Scientists believe there are over 260,000 species of plants. Some plants are so small they can barely be seen. Some stand over 290 feet (88 meters) high and measure over 30 feet (9 meters) wide. The most diverse areas of the world for plants are the tropical rainforests.

What type of animals would live in each of the different layers?

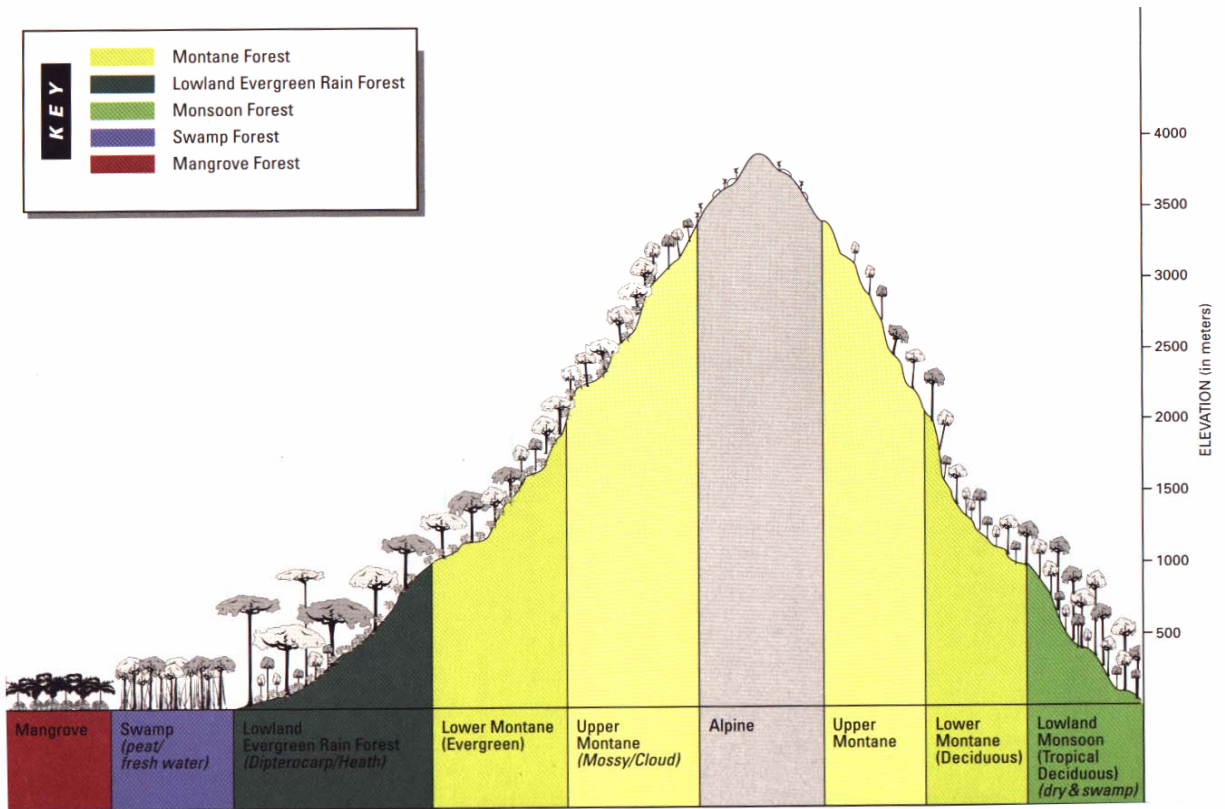
(For example, tree kangaroos, sugar gliders, fruit bats, hornbills, birds of paradise, echnidas)

- Emergent layer: .....
- Canopy: .....
- Under storey:.....
- Shrub/sapling layer:.....
- Herb/Ground layer:.....

## DIFFERENT RAINFOREST TYPES

Can you name the different rainforest types? The diagram below can help you.

1. ....
2. ....
3. ....
4. ....
5. ....



Why are there different rainforest types?

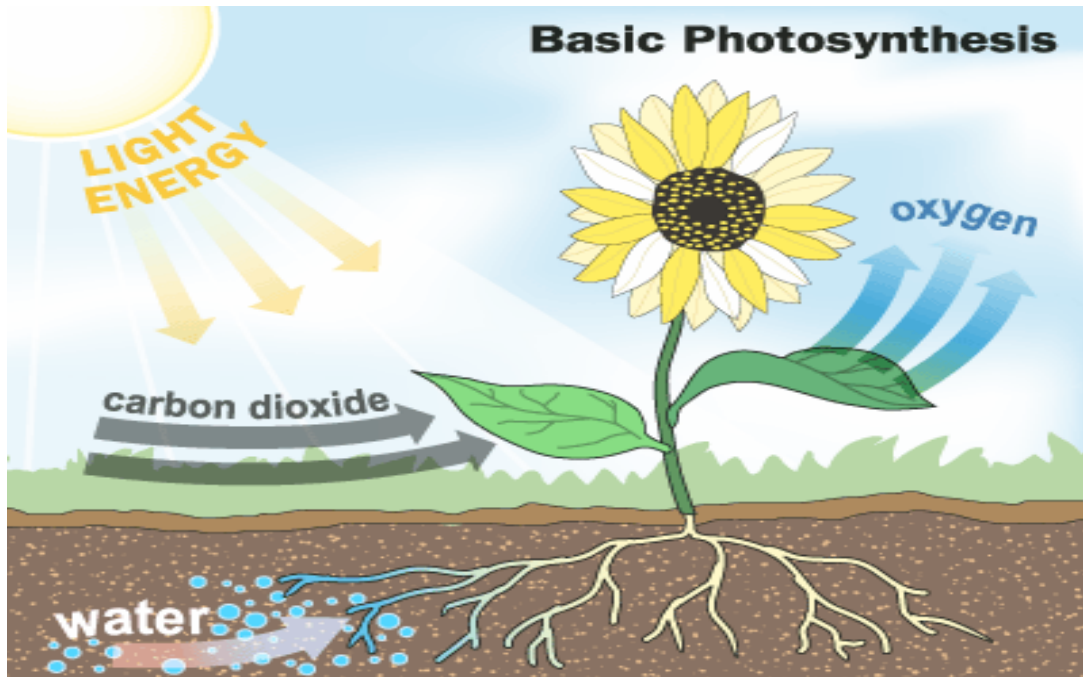
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How does the rainforest structure change between the rainforest types?

.....  
 .....

## ECOLOGY

Photosynthesis is a process in which green plants use energy from the sun to transform water, carbon dioxide, and minerals into oxygen and organic compounds. It is one example of how people and plants are dependent on each other in sustaining life.



The oxygen we breathe comes from plants. Through photosynthesis, plants take energy from the sun, carbon dioxide from the air, and water and minerals from the soil. (Photosynthesis is the complicated word that describes the action of plants turning sunlight, water and carbon dioxide in to food). They then give off oxygen gas in to the air. Animals and other non-producers take part in this cycle through respiration. Respiration is the process where oxygen is used by organisms to release energy from food, and carbon dioxide is given off. The cycles of photosynthesis and respiration help maintain the earth's natural balance of oxygen, carbon dioxide, and water.

Leaves are the main food-making part of most plants. They capture energy from sunlight, and turn water and carbon dioxide into sugar and starch. This sugar and starch becomes the food that provides plants with energy to grow, to produce flowers and seeds, and carry on their other life processes.

Plants play the most important part in the cycle of nature. Without plants, there could be no life on Earth. They are the primary producers that sustain all other life forms. This is so because plants are the only organisms that can make their own food. Animals, incapable of making their own food, depend directly or indirectly on plants for their supply of food. All animals and the foods they eat can be traced back to plants

Why are plants always at the bottom of the food chain?

.....  
.....

Why are they called ‘the producers’?

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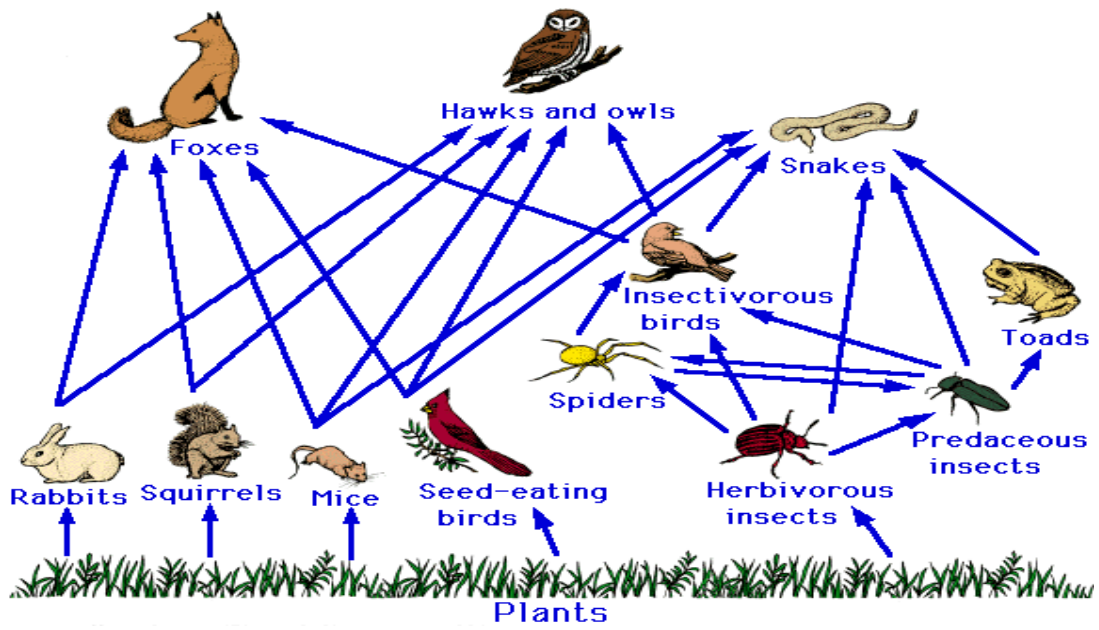
What is a food chain?

.....  
.....

Give an example of a food chain.

- The source of all food is the activity of autotrophs, mainly photosynthesis by plants. They are called **producers** because only they can manufacture food from inorganic raw materials (carbon dioxide, water and sunlight).
- This food feeds **herbivores**, called **primary consumers**.
- **Carnivores** that feed on herbivores are called **secondary consumers**.
- Carnivores that feed on other carnivores are **tertiary** (or higher) consumers.

Many food chains put together are called food webs. These are more complex than a food chain. But they still have producers, herbivores and carnivores.



What are the 'producers' also called?

.....  
 .....

Name all the herbivores from the food web above.

.....  
 .....

Name all the carnivores from the food web above.

.....  
 .....

What do you think would happen if you removed one of the animals from the food chain?

.....  
 .....

## ECOSYSTEMS

Scientists have recognized that life can be organized into several different levels of function and complexity. These functional levels are: *species*, *populations*, *communities*, and *ecosystems*.

What is a species?

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.....

What is a population?

.....  
.....

What is a community?

.....  
.....

What is an ecosystem?

.....  
.....

Species are the different kinds of organisms found on the Earth. Populations comprise all the individuals of a given species in a specific area or region at a certain time. Communities refer to all the populations in a specific area or region at a certain time. Its structure involves many types of interactions among species.

**Ecosystems** composed of the biological *community* and the abiotic environment. An ecosystem's abiotic (non-living) and biotic (living) composition and structure is determined by the number of interrelated environmental factors.

Just as there is an immense diversity of individual species on the planet, so is there a rich diversity of ecosystems, from the icy arctic zones to tropical forests lush with plants and animals.

## BIODIVERSITY

What is biodiversity?

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Biodiversity is of great importance in order to maintain stable and healthy ecosystems. An ecosystem is a group of life forms that live together in a balanced and stable community. If there is a sudden change in that community's environment, the balance of the community may change which may cause it to be destroyed.

How much biodiversity is there?

.....  
.....

Unfortunately we are not sure of how many species there are out there. Estimates of the total number of species range from 7 to 100 million, with a probably good estimate being about 13 to 15 million species. Up to this day, only about 1.75 million living species have been identified and described scientifically. Many new species continue to be discovered each year, most of them invertebrates. During the nineties, the number of newly described species averaged 13,000 per year.

Why is biodiversity important?

1. ....
2. ....
3. ....
4. ....
5. ....

## ENDEMIC SPECIES

What is an endemic species?

.....  
.....

Name some endemic species found in Papua New Guinea.



Flying squirrel

Sugar glider

Why are endemic species more likely to go extinct than other more general species?



## BIOGEOGRAPHY

What is the study of biogeography?

What are the three fundamental processes of biogeography?

1. ....
2. ....
3. ....

Why are there so many different species in Papua New Guinea?

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What type of barriers prevent species moving from place to place



## DEFORESTATION



What effects do you think deforestation has on the environment?

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The world's forests are in grave danger. Over half of the original forest cover has been destroyed, and things are set to deteriorate unless the current alarming rate of deforestation is checked. Every minute an estimated 26 hectares of forest is lost – that's an area equivalent to 37 football pitches - and it is not difficult to see that if this continues we will be left with a planet devoid of forest. This would be catastrophic: not only are forests home to some of the most important and beautiful species on earth, but they also play a vital role in regulating the climate and making the planet habitable.

What causes deforestation?

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How could you and your school help to conserve trees and forested areas?

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.....

## CONSERVATION

The word conservation has been used widely when talking about the environment. But what does conservation actually mean?

*'The preservation and protection of the environment and the wise use of natural resources'*

Conservation can be achieved in many ways and on many scales. Even small amount of change can make a big difference

How do you think you can make a difference?

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.....  
.....

This really means that everyone can make a difference to the world that we live in – one person can make a contribution to the world. This in turn has a positive effect on the global environment.

Conservation can happen at many scales. Setting up national parks and protected areas can mean that areas of the environment are set aside and cannot be used to build on or turn in to farmland. However, even planting local species in your back garden can attract butterflies and birds to the local area.

