Wonderful Water

An Environmental Education Programme

A Watery World

Mangrove Ecosystems in TCI

7. Classification of Organisms in a Mangrove Ecosystem

Pupils' Text

Plant Kingdom

Animal Kingdom

TCI
Education Department

Wonderful Water

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Pupils' Text

This environmental education programme has been produced by the UK Overseas Territories Conservation Forum (UKOTCF) and the Turks and Caicos Department of Education.

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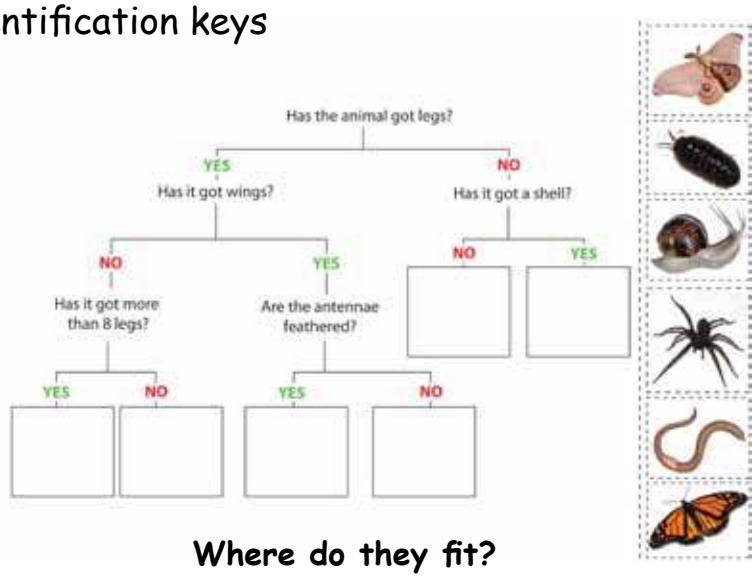
The project was developed from an original idea by Mr Edgar Howell, Director of Education, Turks and Caicos Islands, and these materials developed by a team co-ordinated by Ann Pienkowski, Environmental Education Co-ordinator, UKOTCF. In particular, thanks to Bryan Naqqi Manco for his input to this unit.

It is hoped that through the teaching materials developed for this project, students in TCI will gain a greater understanding of the importance of the water ecosystems in TCI, and the need to conserve these.

Contents



Where do they fit?
Which groups do these animals belong to?

Introduction

We have learnt that there are many different kinds of living organisms in a mangrove ecosystem. In this section we will learn some of the ways in which they can be grouped and classified.

Objectives

These lessons and activities will help you to understand how and why living things are put into groups, and get to know more about some of the plants and animals found in TCI wetlands, including mangroves.

You will:

- learn how scientists classify living things by organising them into species and larger groupings
- learn about some of the major groups of plants and animals, and say how some locally occurring plants and animals fit into these groups.
- sort living things into groups by obvious similarities and differences.
- use and construct identification keys.

The Variety of Life

There is a huge variety of living things in the mangrove forest, from tiny microbes too small to see, to large birds and the different mangrove trees. To understand the variety of life, scientists put living things in groups. Plants and animals can be divided into groups by looking at the similarities and differences between them.This is called classification.

Species are the smallest groups. A species consists of all the animals or plants of the same type, who are able to breed and produce young of the same kind. Each species is given a scientific name, in Latin. This is so that everyone all around the world will use the same name for a species. Animals and plants, of course, often have a local name, which can be different in different places, even though the animal or plant is the same one.

The **Scientific Latin Name** of a species is in two parts, the **Genus** and the **Species** name.

The largest groups are the **Kingdoms**. All the animals are in one Kingdom, the Animal Kingdom. All the plants are in another, the Plant Kingdom. There is also a Fungi Kingdom, and two more kingdoms for different kinds of micro-organisms. The Fungi Kingdom includes mushrooms and yeast.

Almost all the large living things we see around us belong to the Plant Kingdom or the Animal Kingdom. But microbes are more numerous.

Animal Kingdom

The **Animal Kingdom** is divided into two groups – **Vertebrates** and **Invertebrates**.

Vertebrates have a backbone, and invertebrates do not.

Vertebrates

Vertebrates are divided into smaller groups. These are mammals, birds, reptiles, amphibians and fish. Here are some of the characteristics of these groups.

Mammals feed their young on milk. They are warm blooded (they control their body temperature).

Humans are mammals. Humans catch fish for food from the mangrove ecosystem.

Bats are also mammals.

Bats eat insects, and there are lots of insects in the mangroves

Birds have feathers and lay eggs. They are warm blooded. A heron is a bird. The Yellow Crowned Night Heron catches crabs.

Reptiles have a dry scaly skin and lay eggs on land. They are cold blooded (they take on the temperature of their environment). Turtles and lizards are reptiles.
Young turtles find a safe place to live amongst the mangroves.

Tree Frog from Haiti

Amphibians can live on land or in water, but they must keep their skin moist. They are cold blooded. They lay their eggs in water, and their young live in water as tadpoles. Frogs and toads are amphibians. You do not usually find amphibians in the mangroves, because salt water and amphibians do not go well together. But many Caribbean countries with rain forest have tree frogs. .

Fish live in water, and have fins and gills. They are cold blooded. A Nurse Shark is a fish.

Invertebrates

The **invertebrates** are also divided into smaller groups. Some of these groups are Arthropods, Annelids and Molluscs.

Arthropods

The word **Arthropod** means jointed legs, so in this group are animals like insects, spiders, crabs, lobster, isopods. Arthropods are divided into smaller groups, often depending on their legs. Here are some characteristics of different groups of arthropods.

Mosquito

Spider

Crab

Centipede

These animals all belong to the Arthropod group.

Adult **insects** have six legs
Spiders (Arachnids) have 8 legs
Crustaceans have 10 or more legs. Crabs, lobsters and isopods are crustaceans.
Centipedes have a long body, divided into parts (segments) with 1 pair of legs on each segment

Millipedes are also arthropods. They have a long body, divided into parts (segments) with 2 pairs of legs on each segment

Queen Conch

The **Molluscs** are animals like conch, snails and slugs. They have a soft body, sometimes protected by a hard shell, like Queen Conch.

Lettuce leaf sea slug

Slugs do not have shells.
Sea slugs found amongst the mangroves include the lettuce leaf sea slug which looks a bit like a lettuce.

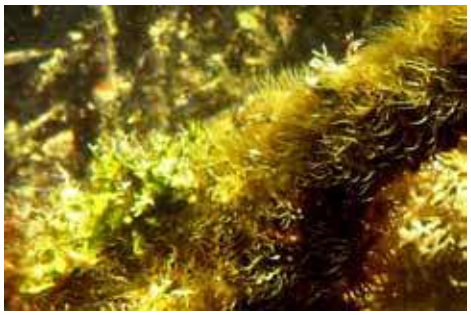
Annelids are animals with their bodies divided into parts (segments). Worms are annelids. In the mangroves you can find polychaete worms. Poly means "many" and chaeta means "bristles". The bristles help them move about. Some live in tubes, using feathery-looking bristles on their heads for filter feeding.

Drawings of some bristle worms

The Plant Kingdom

The Plant Kingdom is also divided into many different groups. Some of these groups which you might have heard of are algae, mosses and ferns.

Algae include the seaweeds. Many algae grow on red mangrove prop roots.



Two other groups are the flowering plants and plants which do not flower.

The **Caicos Pine** is in the non-flowering plant group, and its group of trees are called **conifers**. Conifers have male and female cones. The male cones release pollen grains which are blown by the wind. If pollen lands on the female cones, it fertilizes the female egg cells. The fertilized eggs develop into seeds.

In Middle Caicos the Pine Yards are found further inland from the mangroves.

Mangroves trees are in the flowering plant group.

In the Cayman Islands the importance of Red Mangroves was celebrated with a stamp showing the flowers.

Red Mangrove seeds develop from the pollinated flower.

Classification Information Table

The table below shows you the classification and naming of some TCI mangrove and other wetland species.

Many of the species in TCI have not been studied much by scientists, so some of them have not been properly identified, so do not have a full specific name. The correct way of highlighting Latin names is to write them in ***Italic*** script, as shown in the table.

Common Name	Kingdom	Other groups	Specific name (Latin name - Genus and species)
Human	Animal	Vertebrate, Mammal	*Homo sapiens*
Yellow Crowned Night Heron	Animal	Vertebrate, Bird	*Nyctanassa violacea*
Green Turtle	Animal	Vertebrate, Reptile	*Chelonia mydas*
Nurse Shark	Animal	Vertebrate, Fish	*Gynglymostoma cirratum*
Great Blue Land Crab	Animal	Invertebrate, Arthropod, Crustacea	*Cardisoma guanhumi*
Aquatic Blue Crab	Animal	Invertebrate, Arthropod, Crustacea	*Callinectes sapidus*
Mosquito	Animal	Invertebrate, Arthropod, Insect	*Anopheles*
Queen Conch	Animal	Invertebrate, Mollusc	*Strombus gigas*
Tube Worm	Animal	Invertebrate, Annelid	
Upside-Down Jellyfish	Animal	Invertebrate, Cnidria (this is the same group as corals and sea anemones)	*Cassiopea frondosa*
Red Mangrove	Plant	Flowering Plant	*Rhizophora mangle*
Black Mangrove	Plant	Flowering Plant	*Avicennia germinans*
White Mangrove	Plant	Flowering Plant	*Laguncularia racemosa*
Buttonwood	Plant	Flowering Plant	*Conocarpus erectus*
Caicos Pine	Plant	Non-flowering Plant, Conifer	*Pinus caribaea*

Characteristics of different kinds of living organisms.

The living organisms which belong to the Kingdoms of Animals, Plants, and Micro-organisms all share some same characteristics.
The characteristics of **animals**:
Animals move around by walking, swimming, flying, slithering or wriggling. They feed on plans and other animals

All animals:
- Have complicated bodies made of tiny cells
- Obtain nutrition by eating other living things (mainly plants and other animals)
- Have a nervous system that send messages around the body.

The characteristics of plants:
Plants move much less than animals. Most plants spend their lives grwoing in one place. Plants feed by spreading green leaves to catch sunlight and take in carbon dioxide from the air. They take up water and minerals through their roots.

All **plants**:
Are made of tiny cells
Use the substanc cellulose to give their bodies shape and strength
Obtain nutrition by photosynthesis, and usually store food in their bodies as starch or sucrose (a kind of sugar)

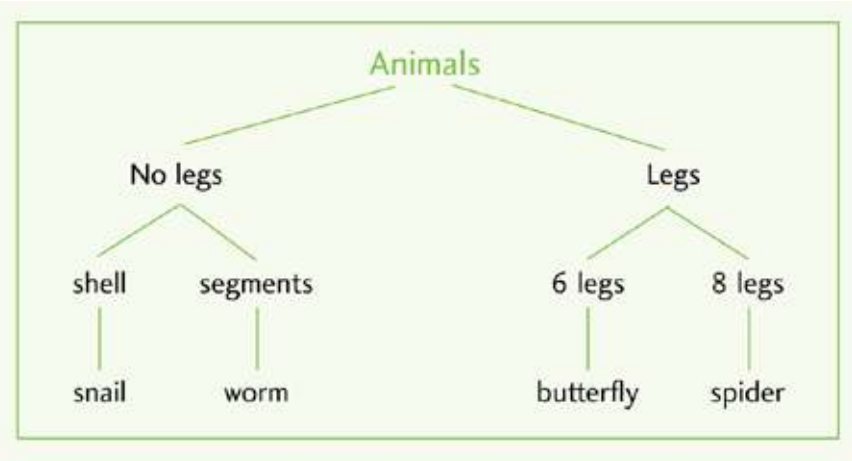
Fungi, such as mushrooms and moulds, are neither plants nor animals - they belong to a kingdom of their own. They feed on the rotting remains of other living things.

There are two kingdoms of microbes. The bacteria that make food rot and may cause disease make up one kingdom. Amoeba, the blood parasites that cause malaria, and similar organisms, belong to the other.

The similarities between living organisms can be used to sort them into groups, and this is how identification keys are made.

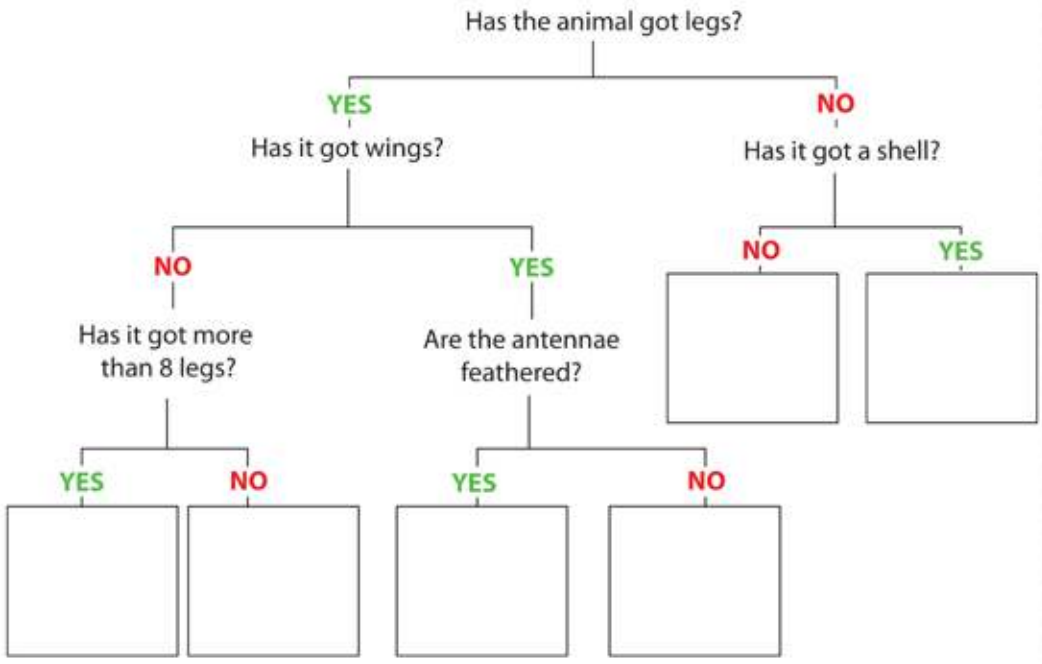
Using identification keys

These types of identification keys are called dichotomous keys. They work by separating organisms into 2 groups, then separating into another two groups, and so on.



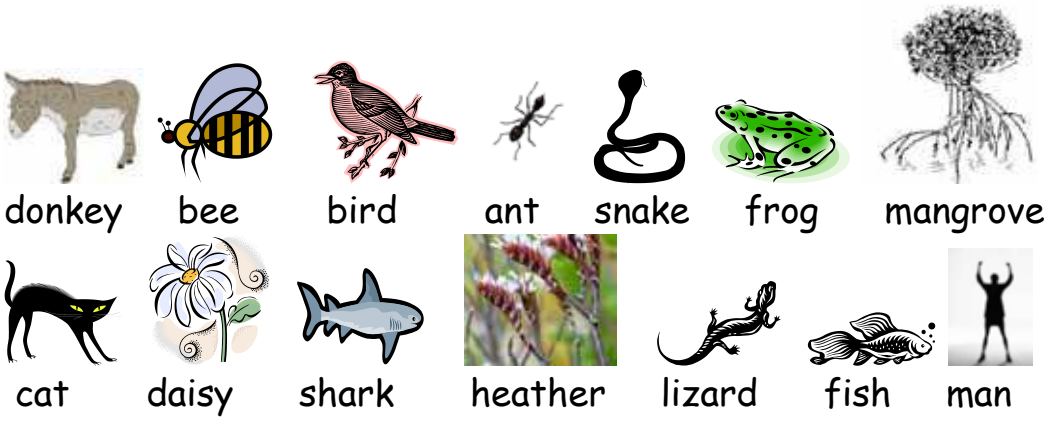
Here is one way of sorting animals using a dichotomous key.

These types of keys can use sets of Yes No questions, to separate the living organisms. Try the key below out, and work out which animal ends up in which box at the bottom.



Making identification keys

To devise a simple key, make up questions that divide the group of living things into two groups. Each questions must have a clear yes or no answer. Keep going until there is only one living thing in each group. Try this example.



Separate into **two** groups.

Group title:	**Group title:**

Now separate the **animals** into **six** groups.

Group title:	**Group title:**
Group title:	**Group title:**
Group title:	**Group title:**