

Wonderful Water

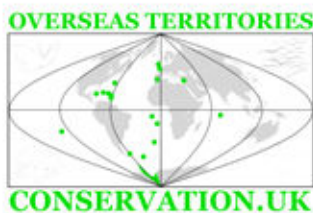
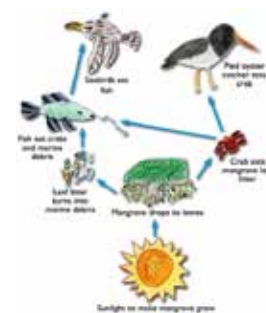
An Environmental Education Programme

A Watery World

Mangrove Ecosystems in TCI

3. Feeding Relationships in a Mangrove Ecosystem

Pupils' Text



TCI
Education Department



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

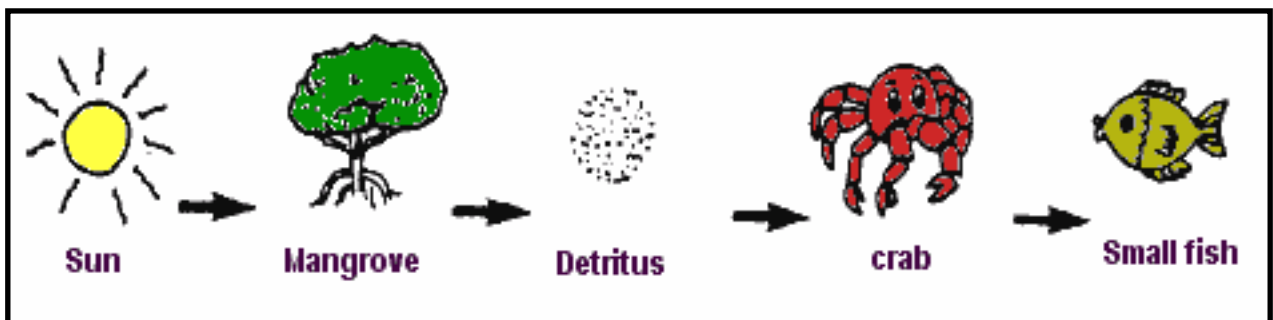
It was part-funded by the Overseas Territories Environment Programme (OTEP) of the UK Department for International Development and the Foreign and Commonwealth Office.

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.

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This diagram show a typical simple mangrove food chain.

The arrows in a food chain always show the direction the energy flows in.

Introduction

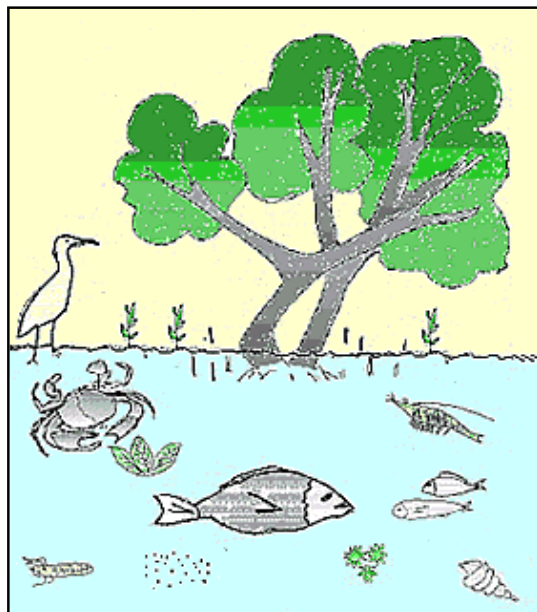
Nearly every living thing on our planet is dependent on energy from the sun. The links from the sun's energy to ourselves are very complex. We describe these links as food chains and food webs. Studying food chains and food webs will help you to understand the importance of energy flow, and start to think about the effects of upsetting the natural balance.

Objectives

These materials will help you to understand some of the food chains and food webs which describe energy flow through the mangrove ecosystems in TCI.

You will:

- Find out that animals eat plant material, and some animals eat other animals
- Learn how the feeding relationships of different living organisms in a mangrove ecosystem are described, and how these are connected.
- Describe some of the food chains in the mangrove ecosystem, and how these show how energy from the sun flows through the system.
- Find out how important decomposers are in a mangrove ecosystem.
- Find out that different food chains combine to make food webs.



Ecosystem Connections

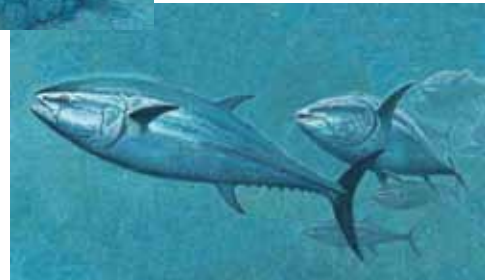
Some plants and animals live in more than one place. Many young fish live and grow in the protected mangrove forests, and then move onto the coral reef or into deeper sea. Pelicans fish in the open sea, but use the mangroves to rest and nest. In TCI herons and egrets feed in the mangroves and in the salinas. The interdependence of organisms and ecosystems is like a jig-saw puzzle with many pieces. It is important that we look after all the pieces.



Mangroves



Coral Reef



Deep Sea

Interdependence of organisms

The organisms in an ecosystem depend on each other. Plants need animals to pollinate their flowers. The flowers of the Red Mangrove tree are pollinated by insects, including honey bees. Some birds, like Bananaquits, also visit the mangrove flowers to lap the nectar and pollinate the flowers. Animals need plants for shelter from the weather, and as hiding places from predators. Some birds need plants to support and hide their nests. Some insects lay their eggs on leaves.

Animals also need plants for food. This unit looks more closely at the feeding relationships of organisms within the mangrove ecosystem.

Producers, Consumers, Decomposers



All creatures need a source of energy to stay alive. Plants get their energy from the sun and animals get energy from eating plants or other animals. Plants use the energy from sunlight to make food in their leaves by a process called photosynthesis. They are called **producers** because they produce their own food.

Mangrove leaves produce their own food, using energy from the sun. So the mangrove, like all plants, is a producer.

Animals cannot make their own food. They must eat something else in order to get the energy to live and grow. They are called **consumers**.



Small fish feed on the mangrove leaf detritus. These small fish are consumers.

Decomposers are the living organisms which break down dead animal



The Tricolored Heron feeds on small fish in the water around the mangroves. The Tricolored Heron is also a consumer.

and plant material. These are small organisms like bacteria and fungi. Decomposers are important in any ecosystem, but particularly in the mangroves. Without decomposers to produce mangrove leaf detritus, the nutrients and energy in the mangrove leaf would not be released for other organisms to use.

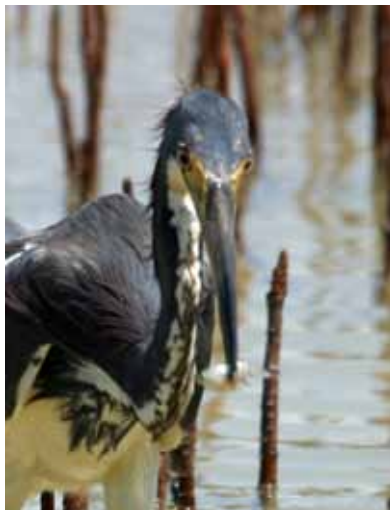


Bacteria

Microscopic bacteria decompose the mangrove leaf when it falls off the tree. Nutrients are released for other organisms to use, and the mangrove detritus is food for other animals.

Prey and Predators

Animals which are caught and eaten by other animals are called **prey**.



Animals which catch other animals for food are called **predators**.

The small fish are prey because they are caught and eaten by the heron. The heron is a predator, because it catches and eats the small fish.

Without plants there would be no prey for the predators to eat.

Is the fish the predator or the prey?

Types of Consumers

Detritivores

Some animals, like crabs, eat bits of plants and animals that are dead, rotten or are other animals' droppings. The organisms that feed directly on the detritus are sometimes called detritivores. Other detritivores in the mangrove ecosystem are small organisms like isopods and worms.



Aquatic Blue Crab

Herbivores

Some animals eat plants. They are called **herbivores**. If you look at the edge of some mangrove leaves, you will see that they look as if they have been nibbled. Perhaps caterpillars have been feeding on them? When you are in the mangroves, look out for butterflies amongst the mangroves - it could be their caterpillars eating mangrove leaves.



Some insects, like Honeybees and some birds, like Bananaquits, feed on the nectar produced by the mangrove flowers. When they do this, they also pollinate the flowers, so that the mangroves can produce seeds.

Carnivores



Animals that eat other animals are called **carnivores**. The Yellow-crowned Night Heron is a carnivore, because it eats crabs and fish.

Omnivores

Omnivores (like humans) eat both plants and animals. The fish and conch which are supported by the mangrove ecosystem are an important food resource for people.



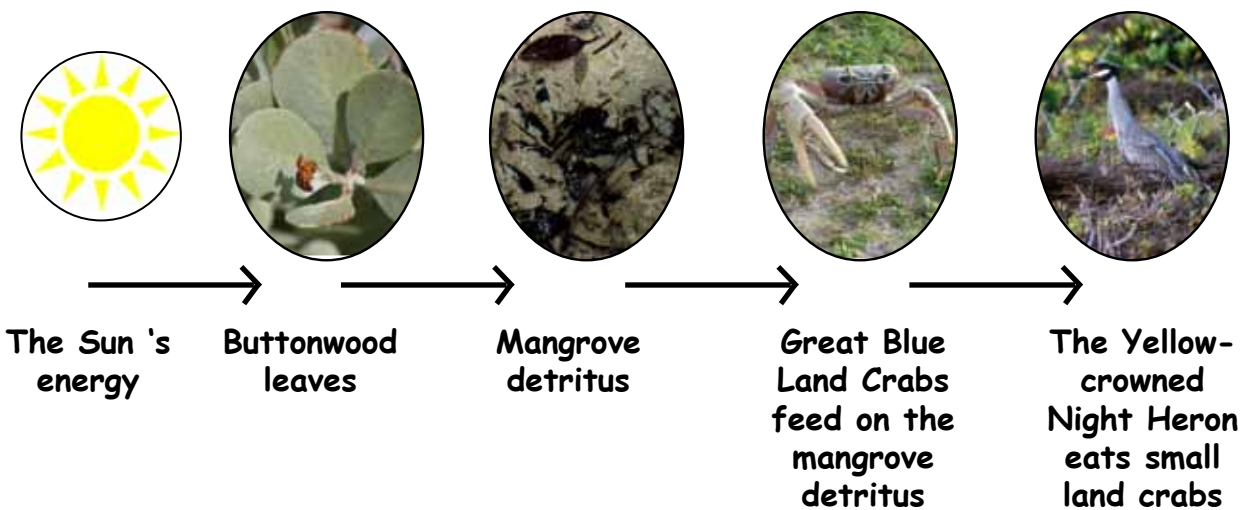
Food Chains

A food chain shows what eats what, how energy flows through the system.

There are many different food chains within a mangrove ecosystem, and these link together to make food webs. All these food chains start, of course, with energy from the sun, but the next most important part is the decaying mangrove leaf.

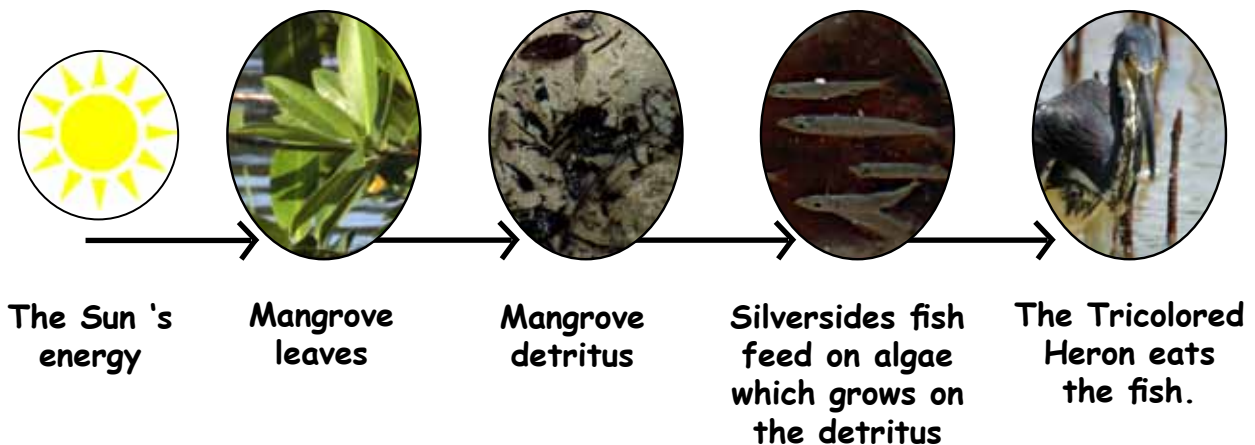
A mangrove forest has land-based and water-based food chains.

One example of a food chain found on land in a mangrove ecosystem is:

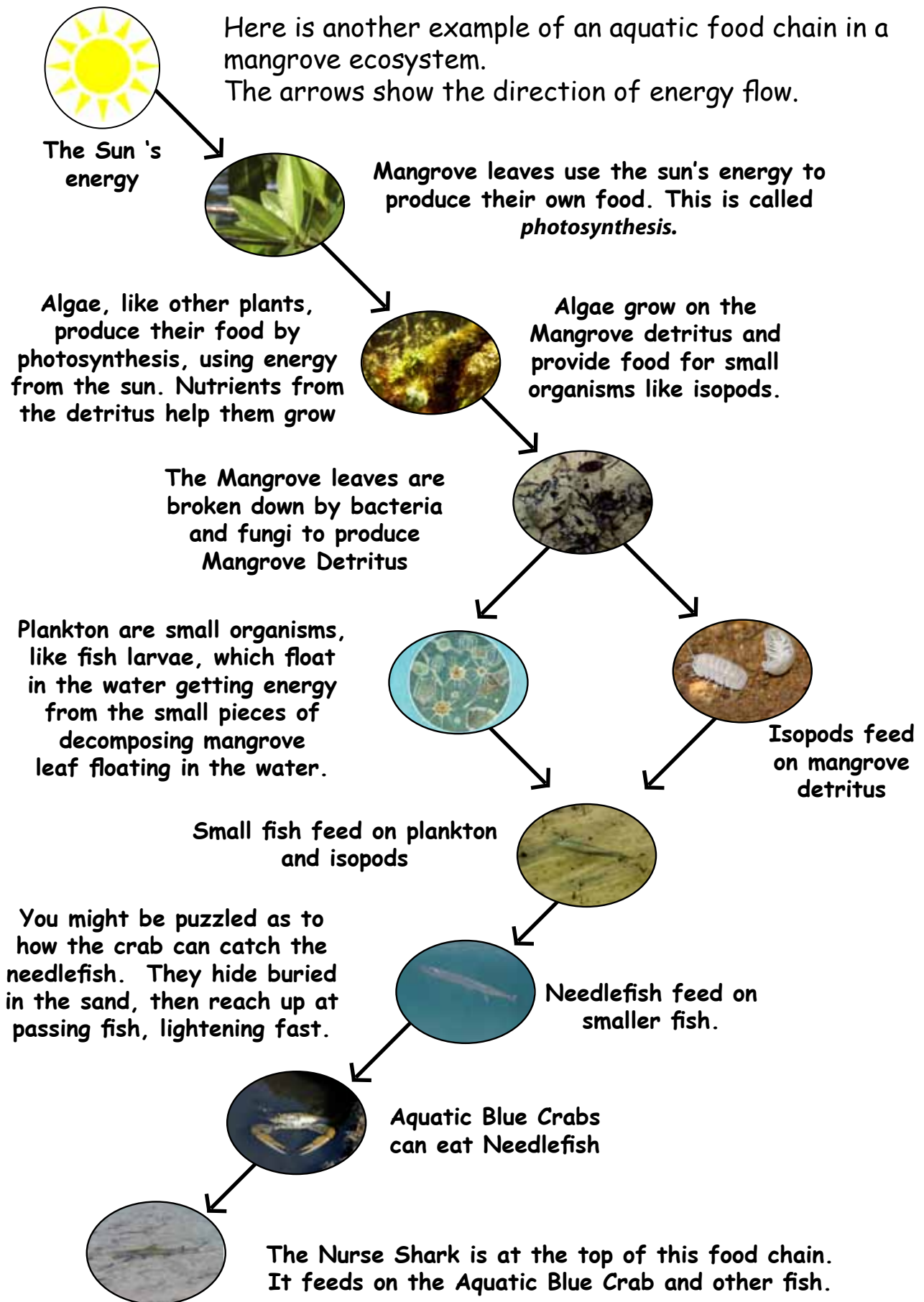


The arrows show the direction of energy flow through the food chain.

One example of a food chain found in the water is:



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You might not know some of these animals.

Plankton are small organism which drift or float in the sea. Plankton is made up of tiny plants (called **phytoplankton**) and tiny animals (called **zooplankton**).



Plankton need to be seen under a microscope.

Phytoplankton



Zooplankton.
This one is a copepod.

Isopods are crustaceans. They have all their legs approximately of the same size (in ancient Greek iso means "equal or similar" and pod means "foot") and they look like tiny armoured vehicles. They are found on land and in water. Some roll into a tight ball when threatened, so their common name is pill bug.



Food chains link together to make part of a mangrove food web.

There is a diagram to show this on the next page.

Part of a Mangrove food web: the arrows show the direction of energy flow.

