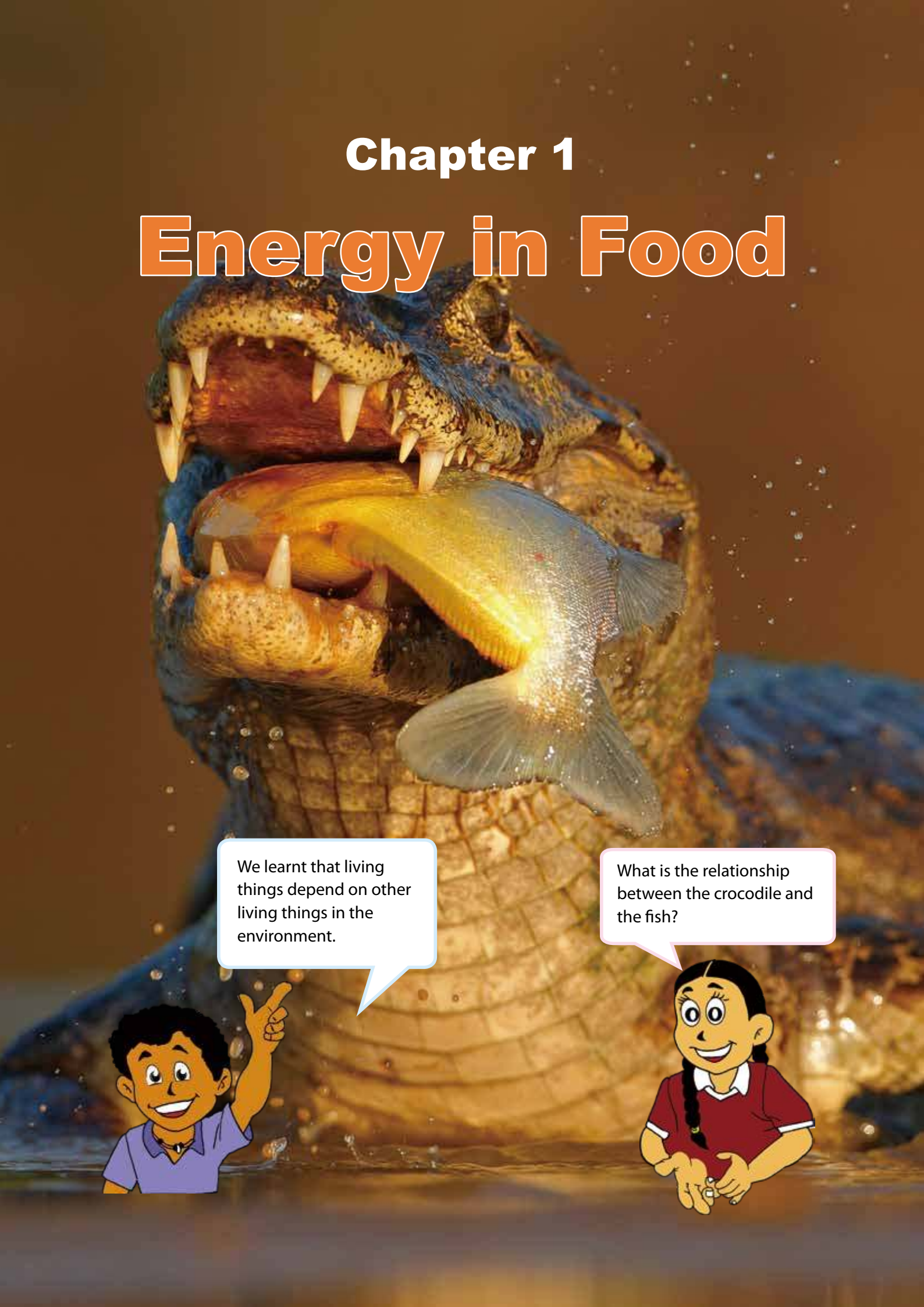
Chapter 1

Energy in Food



1.1 Energy from Food

Lesson 1 Source of Energy in Food

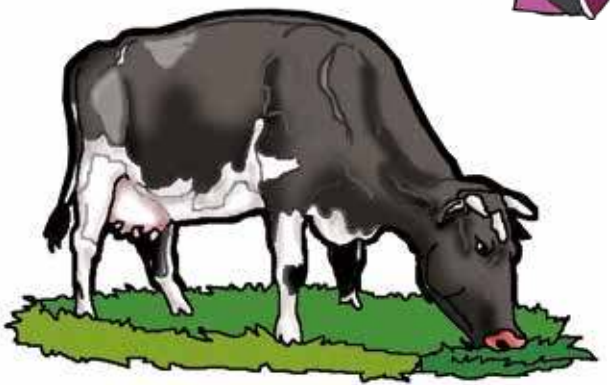
All living things need food. Food provides them with energy. Where does the energy in food come from?

What is the source of energy in food?

Activity : Finding the source of energy in food

What to Do:

1. Study the pictures below. A girl is drinking a glass of milk and is getting energy from the milk.
2. Think about the following questions:
   (1) Where does energy in the milk come from?
   (2) Where does a cow get its energy from?
   (3) Where does the grass get energy from?
3. Share your ideas with your classmates. Discuss where the energy in food comes from.



Summary

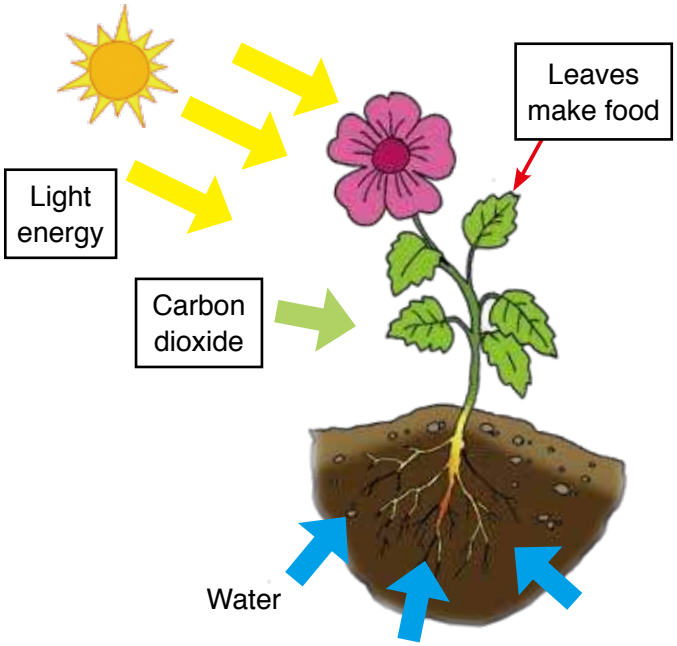
Almost all energy on Earth comes from the Sun.

Our food comes from plants. It is not only human beings who depend on plants directly or indirectly to get energy, but other animals too.

The Sun provides light and heat energy to the Earth. Almost all energy on Earth comes from the Sun.

Energy that comes from the Sun is called **solar energy**.

Plants do not eat food like animals. Plants make their own food by using water, carbon dioxide and light energy from the Sun. **Carbon dioxide** is a colourless and odourless gas produced by people or animals breathing out.



Plants make food by using water, carbon dioxide and light energy.

Plants use some energy in the food they make to survive and grow. Some are stored in the roots, stems and leaves.

Animals cannot make food like plants. They must eat food in order to get energy. Some animals get energy by eating plants as food. Some animals eat other animals that eat plants.

A horse eats plants.

A lion eats a zebra.

Plants get energy from the Sun. Some animals eat plants or animals as food to get energy. The source of energy in food comes from the Sun.

Lesson 2 Food Chains

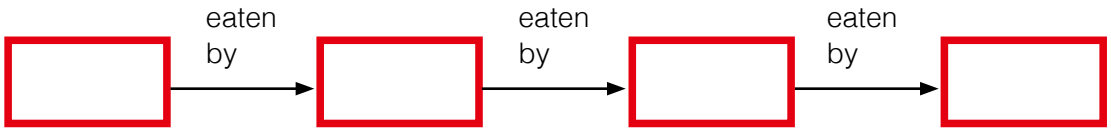
Plants make food by using sunlight. Animals eat the plants to get energy. How do living things depend on each other to get energy in nature?

How does energy flow through food?

Activity : Eat and eaten by

What to Do:

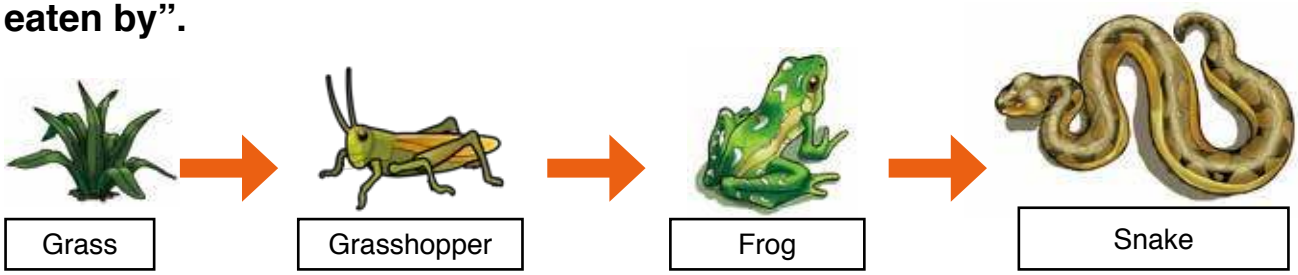
1. Draw a diagram like the one shown below.



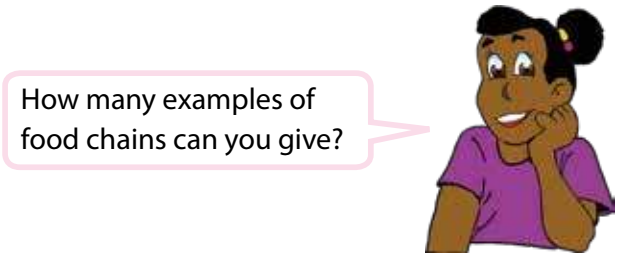
2. Study the picture below and write the name of a living thing in the box, in the order of which living thing is eaten by another living thing.
3. Share your ideas with your classmates. Discuss how living things depend on each other and how energy is transferred in living things.

Result

We found out that grass is eaten by the grasshopper. The grasshopper is eaten by the frog and the frog is eaten by the snake. The arrow means **"is eaten by".**

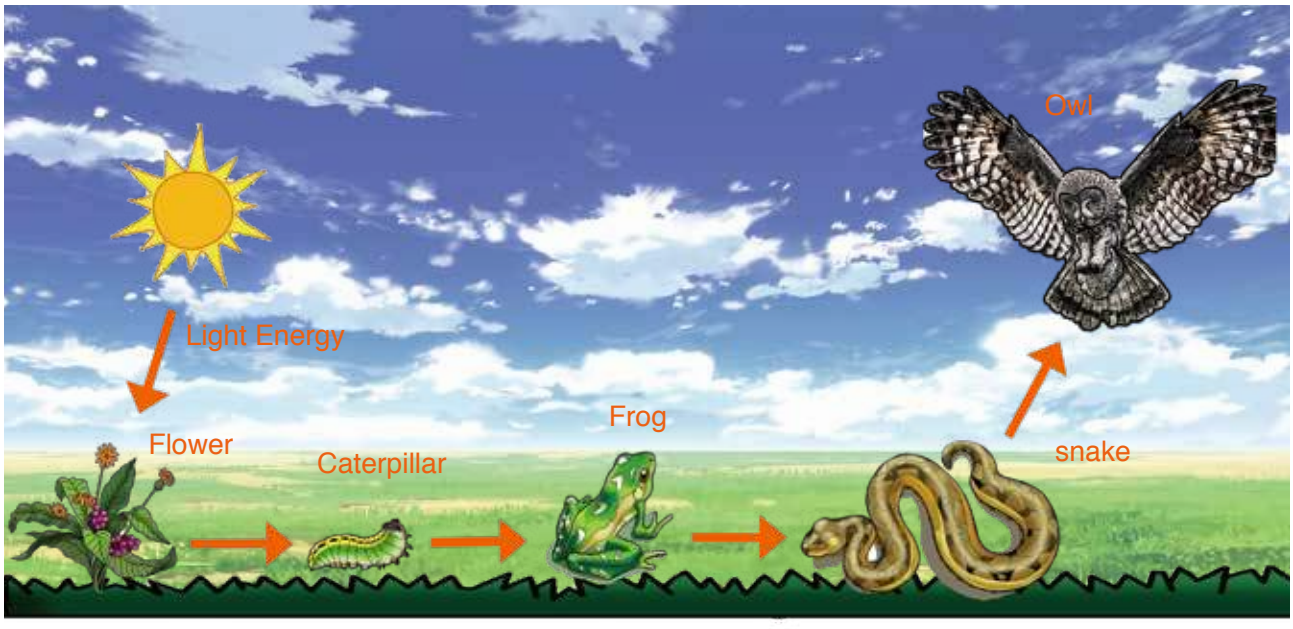


Energy in food is transferred from the grass, to the grasshopper, to the frog and to the snake.



Summary

Plants and animals are linked by the energy they need. For example, plants are eaten by insects. The insects are eaten by frogs and then finally the frogs are eaten by snakes. At each link, energy is being transferred from plants to animals. The path of food energy from the plants to animals is called a **food chain**. In a food chain, the energy flow begins with the Sun because plants get their energy by converting solar energy into food. Food chains only go in one direction. The arrow shows the direction of energy flow.



Lesson 3 Food Webs

A food chain only shows one path of food energy from plants to animals but an environment contains many different types of living things.

How do living things in an environment interact with each other?

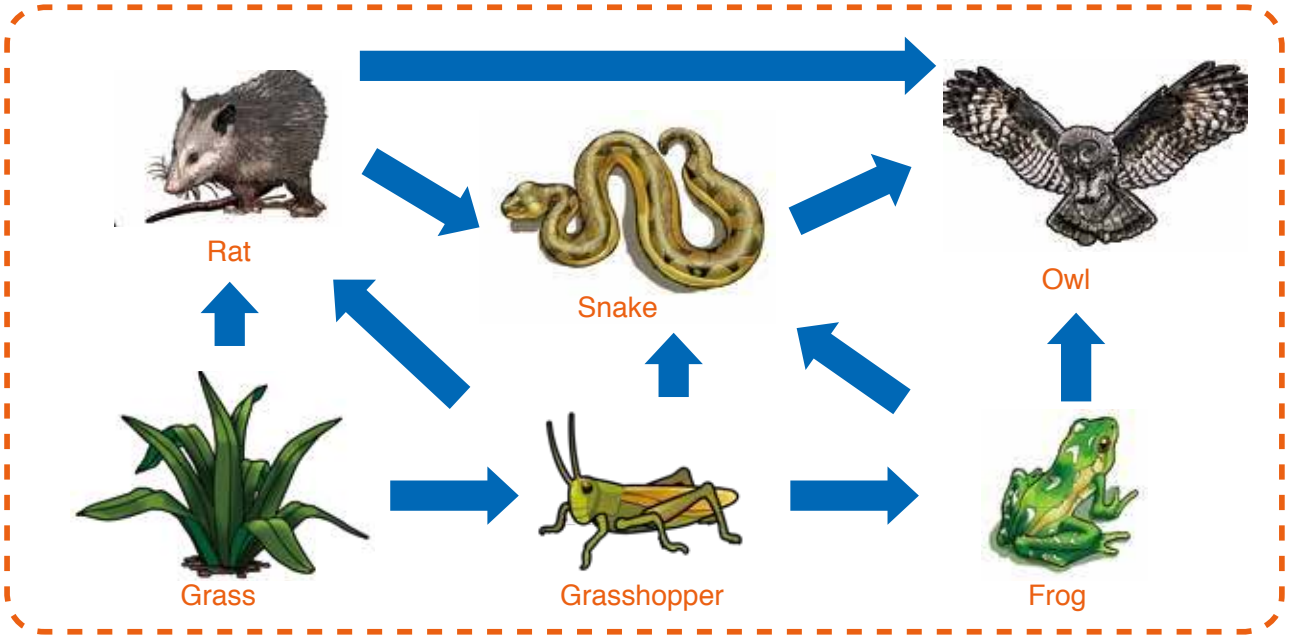
Activity : Who eats what?

What to Do:

1. Study the diagram below. Draw arrows to show how one living thing is consumed by another living thing.
2. Share your ideas with your classmates. Discuss how one living thing is interconnected with other living things.

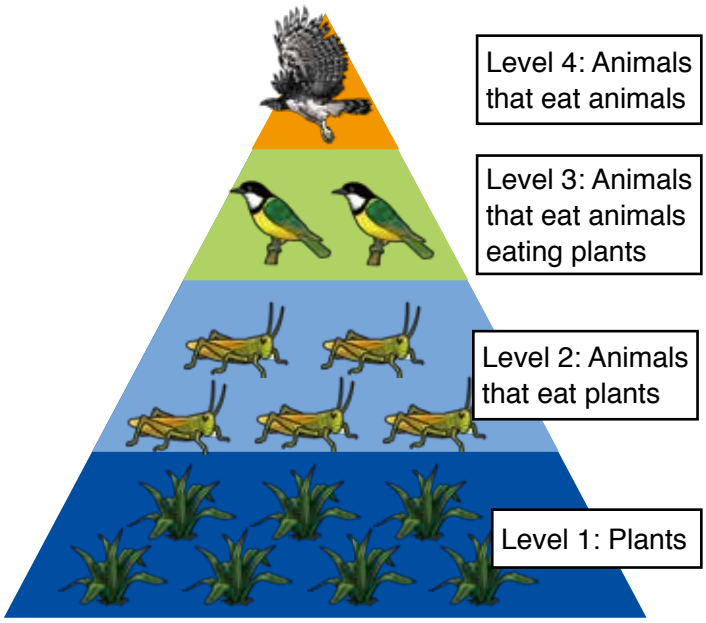
Summary

Most plants and animals are part of several food chains. For example, plants may be eaten by a caterpillar, a cow or some other animals. Snakes may eat a rat, a frog or some other animals. To represent these relationships we use a food web. A **food web** is made up of several food chains linked to each other. A food web shows how plants and animals are interrelated in an environment. It also shows how different food chains interact with one another and overlap.



The food web shows the plant and animals that interact with one another in an environment.

An **energy pyramid** shows the flow of energy from one level to another. Energy flows from the bottom to the top level of the pyramid. Only about 10 percent of the energy is transferred to the next level. Plants make up the base of the energy pyramid. The higher we go up the pyramid, the amount of energy available for use is less and the population of living things or organisms decreases.



Energy pyramid

Summary and Exercise

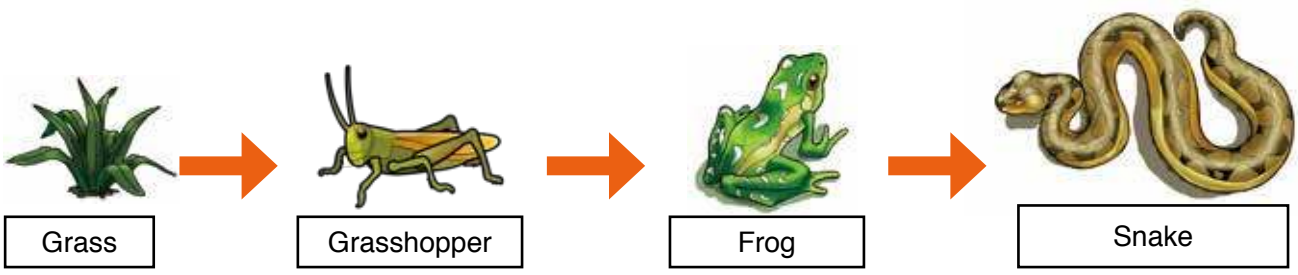
Summary 1.1 Energy from food

Sources of Energy in Food

- Food provides energy to all living things on the Earth.
- The Sun provides light and heat energy to the Earth.
- Plants do not eat food like animals do, but make their own food by using water, carbon dioxide and light energy from the Sun.
- Plants provide food directly or indirectly to animals and humans.
- Animals cannot make food like plants do, so they eat other animals and plants to get energy.

Food Chain

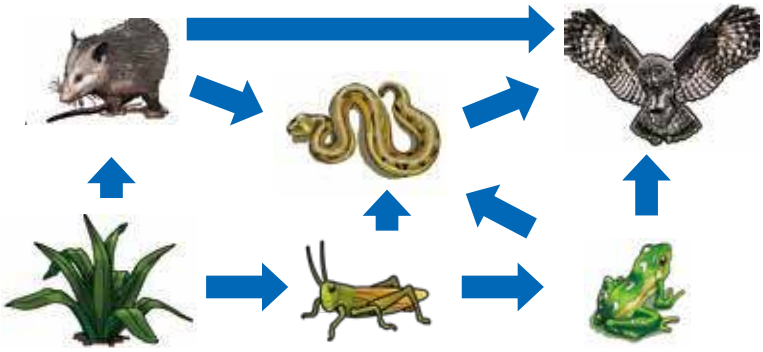
- A food chain is the path of food energy from plants to animals.
- For example, plants are eaten by insects. The insects are eaten by frogs and then finally the frogs are eaten by snakes.



- In a food chain, the path of energy begins with the sun because plants get their energy by converting light energy into food.

Food Web

- A food web is made up of several food chains linked to each other.
- A food web shows how plants and animals are interrelated in an environment. It also shows how different food chains interact with one another.



Summary and Exercise

Exercise 1.1 Energy from food

Q1. Complete each sentence with the correct word.

(1) Food provides _____ for all living things.

(2) Plants get energy from the _____.

(3) The path of food energy from plants to animals is a _____ _____.

(4) A _____ _____shows how plants and animals are interrelated in an environment.

Q2. Choose the letter with the correct answer.

(1) According to the diagram, what does the frog feed on?

A. Grass

B. Grasshopper

C. Snake

D. Snake and grass

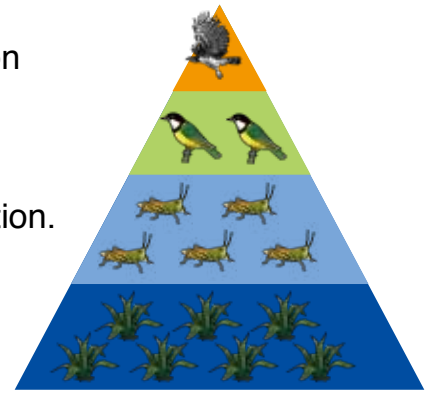
(2) Which of the following is not the correct explanation about an energy pyramid?

A. Plants make up the base of the pyramid.

B. The animals on higher levels are less in population.

C. Energy flows from the bottom to the top level of the pyramid.

D. Snakes are at the bottom level of the pyramid.



Q3. Draw arrows to show the flow of energy in the food chain.

Small birds

Hibiscus

Eagle

Butterfly

Frog

Q4. What is the difference between a food chain and a food web?

What happens if an organism was removed from a food chain?

If this was a food chain in an environment, where plants are eaten by grasshoppers and the grasshoppers are eaten by frogs and the frogs are eaten by snakes.

If frogs were to die because of some diseases caused by some pollution, there would be an increase in the amount of grasshoppers feeding on the producer or green plants.

This would cause a major problem because grasshoppers would be out of control. They would eat plants and the number of plants which are the basis of the food chain would severely decrease.

On the other hand there would be an effect on the consumers of frogs which are the snakes. They would lose an organism that they feed on which can cause their numbers to decrease.

In other cases there may be several interacting food chains in the environment where there are also other predators like birds. They would feed on grasshoppers but in such case if an organism primarily eats one type of organism which is the food source. They would die off and this would lead to the extinction of the consumer of the organism.

Chapter Test

1. Energy in Food

Q1

Complete each sentence with the correct word.

(1) The Sun provides light and _____ energy to Earth.

(2) Plants make their own food by using water, _____ _____ and light energy from the Sun.

(3) The flow of energy from one level to another is shown as a _____ _____ in which the energy flows from the bottom to the top.

(4) A _____ _____ is made up of several food chains linked to each other.

Q2

Choose the letter with the correct answer.

(1) In a food chain where do plants get the energy from?

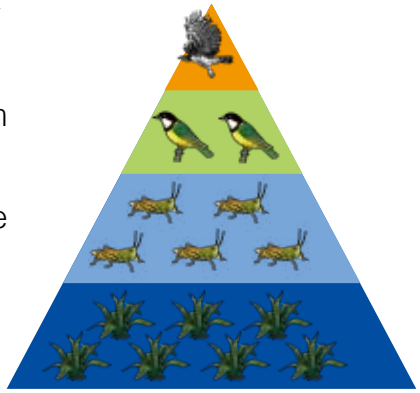
A. Solar energy

B. Animals

C. Insects

D. Other plants

(2) Study the pyramid on the right and identify which statement is true about it.



A. The energy flows from the top to the bottom level of the pyramid

B. Only 10% of the energy is transferred to the next level.

C. Animals make up the base of the pyramid.

D. Plants make up the top of the pyramid.

(3) Which part of the plant makes food for the plant?

A. Root

B. Stem

C. Leaves

D. Flower

(4) Which of the following shows a correct food chain?

A. peanut → rat → snake

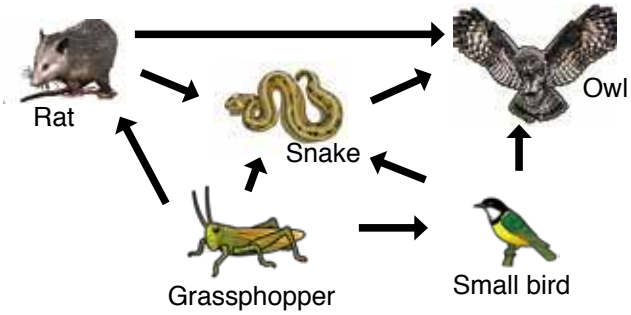
B. grass → snake → eagle

C. peanut → eagle → grasshopper

D. grass → snake → grasshopper

Q3

Study the food web below and answer the following questions.



(1) Which organism eats the snake?

_____

(2) Which organism in the picture would have the largest population?

_____

(3) Which organism in the picture would have the smallest population?

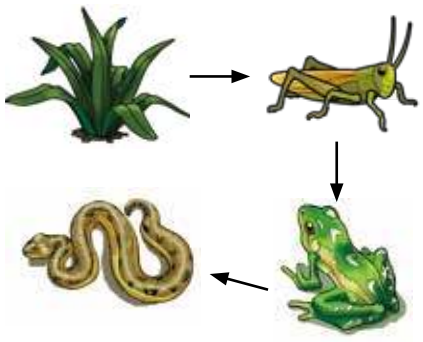
_____

(4) If you are to represent the organisms in the picture as an energy pyramid, what organism would be at the top of the pyramid?

_____

Q4

The picture on the right shows a food chain where a grasshopper feeds on the grass, a frog feeds on the grasshopper and a snake feeds on the frog.



What would happen to the population of grasshopper and snake if all the frogs in the area were killed by chemicals? Write the answer with your reason.

Grasshopper:_____

_____

_____

Snake:_____

_____

_____