

**AUSTRALIAN HOMESCHOOLING SERIES**

# Biology

## Secondary Science 7B

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# Science for Secondary Students 7B

## Biology

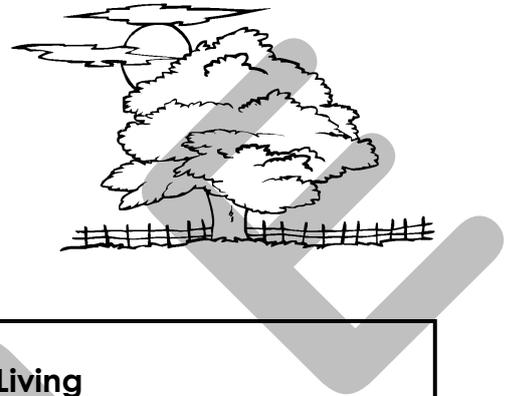
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# Living and Non-Living Things

To understand the differences between living and non-living things we need to understand what makes a thing living. If we know the characteristics of living things we will be able to tell the difference between living and non-living things.

A **characteristic** is a feature of a group of things that is found in all members of that group. We may say that a living thing is anything that shows the characteristics of living now, in the past, or sometime in the future.



Using the definition of a characteristic, place the following into groups of living and non-living: humans, tables, rocks, trees, dust, rope, glass.

Living	Non-Living
_____	_____
_____	_____
_____	_____
_____	_____

The characteristics by which we know that most animals are alive are: they move about, they feed, they have young and they respond to the changes in their surroundings. These features are less obvious in plants. In organisms like bacteria and viruses, identifying the difference between living and non-living requires trained scientists.

A summary of the main differences between living and non-living objects are:

## 1. Respiration

**Respiration** is the production of energy by burning food in the body. Living things are continuously active. Their activities need energy. Living creatures take in air, remove some of the oxygen from it and produce carbon dioxide. This results in a rise in temperature, which is more easily seen in animals than plants. The commonest form of respiration is the chemical decomposition of food as a result of its combination with oxygen.

## 2. Excretion

**Excretion** means the removal of waste. Living involves a vast number of chemical processes, including respiration, many of which produce substances that are poisonous when in concentration. These need to be removed from the body of the organism by excretion. An example in your own body is the excretion of carbon dioxide from the lungs.

### 3. Feeding

All living things need energy. Their energy needs to come from food. All animals take in food from their environment. Most plants make their own food. Feeding must take place before respiration can occur since energy is released from the food. The feeding of a tree is much less obvious than that of an animal.

### 4. Growth

All living things grow at some stage. This is a result of feeding. Strictly, growth is simply an increase in size but it usually implies that the organism is becoming more complicated and efficient. An example of this is an animal, like a butterfly, that changes from a larva to an adult butterfly.



### 5. Movement

A living thing uses some of the energy that it gets from respiration for movement. Movement can be a small change in the shape of an organism, e.g., a dog wagging its tail. It can also be the whole animal or plant moving position, e.g., a person running. An animal can generally move its whole body, whereas the movement of many plants are usually restricted to certain parts, e.g., opening and closing of petals or movements of parts as a result of growth.

### 6. Reproduction

Reproduction is producing new organisms of the same kind. Living things can only live for a short period of time so it is essential for them to reproduce themselves. Although individuals must die sooner or later, their life is handed on to new individuals by reproduction. This results in the continuation of the species.

### 7. Sensitivity

Sensitivity is also referred to as **irritability**. Sensitivity is the ability to respond to a stimulus. Obvious examples of sensitivity are the noises animals make as a result of being touched or at the approach of an enemy. The more highly developed an animal, the greater is the range of sensitivity to such circumstances as heat, light and chemicals. Fully grown plants respond to the direction of light, gravity and moisture.

**Complete these definitions:**

1. A characteristic is \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. Respiration is \_\_\_\_\_  
\_\_\_\_\_
3. Excretion is \_\_\_\_\_

4. Reproduction is \_\_\_\_\_  
\_\_\_\_\_
5. Sensitivity is \_\_\_\_\_  
\_\_\_\_\_

**Answer these questions:**

1. List the difference between living and non-living objects:

- a. \_\_\_\_\_ b. \_\_\_\_\_  
c. \_\_\_\_\_ d. \_\_\_\_\_  
e. \_\_\_\_\_ f. \_\_\_\_\_  
g. \_\_\_\_\_

2. Give an example of the differences you listed.

- a. \_\_\_\_\_  
b. \_\_\_\_\_  
c. \_\_\_\_\_  
d. \_\_\_\_\_  
e. \_\_\_\_\_  
f. \_\_\_\_\_  
g. \_\_\_\_\_

## Varieties of Living Organisms

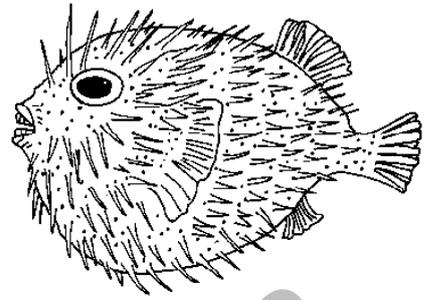
**Biology** may be described as the study of living organisms. It comes from the Greek, *bios* meaning life and *logos* meaning knowledge. All living things are called **organisms**. Since there is such a large collection of organisms, it is necessary to sort them into groups with similar characteristics. We call this **classifying** them.

These characteristics are not always immediately obvious, but they become clear when we know the characteristics of the group.

Bees and butterflies, for example, though differing in appearance, belong to the same group. This is because they both have hard outer skeletons, three divisions to their bodies, six legs and two pairs of wings.



The two most obvious groups which living things can be divided into are plants and animals. This is the first level, called a **kingdom**. Roses, gum trees and grass belong to the plant kingdom. Fish, birds, bees and worms belong to the animal kingdom.



All the plants have plant-like characteristics such as green leaves, stems, roots and the inability to move.

All animals have animal-like characteristics such as legs, sight and hearing, brains and the ability to move. There is a third group, the bacteria & viruses, which may be classified in either group.

We may subdivide these groups further. Animals are divided into **invertebrates**, i.e., animals without vertebrates (backbones) and animals with **vertebrates**. Plants may be divided into **non-flowering**, and **flowering**.



Animals and plants may be divided into sub-categories.

## Animals

### Animal without Vertebrae

1. Single celled animals
2. Colenterates: jelly fish, anemones
3. Flatworms
4. True worms
5. Crustacea: crayfish, crabs, prawns
6. Insects
7. Spiders
8. Molluscs: snails, squid, octopus
9. Echinoderms: starfish, sea urchin

### Animal with Vertebrae

#### **Cold-blooded**

1. Fish
2. Amphibia
3. Reptiles

#### **Warm-blooded**

1. Birds
2. Mammals



## Plants

### Plants that do not flower

1. Single celled plants
2. Algae
3. Liverworts & Mosses
4. Ferns
5. Coniferous Trees
6. Lichen
7. Fungi



### Plants that flower

1. Monocotyledons: grasses, reeds, cereals
2. Dicotyledons: daisy, shrubs, deciduous trees.



## Definitions

<b>amphibian</b>	animal living both on land and in water
<b>asexual reproduction</b>	reproduction with only one parent
<b>biology</b>	the study of living organisms
<b>characteristic</b>	a feature of a group of things that is found in all members of the group
<b>chlorophyll</b>	green pigment which gives green plants their colour and which can absorb energy from the sun and make food from it
<b>chloroplasts</b>	small, disc like bodies made of protein and containing chlorophyll
<b>classify</b>	sort into groups with similar characteristics
<b>cold blooded</b>	the temperature of cold blooded vertebrae change with their surroundings. It is not constant.
<b>concentrate</b>	increase in strength
<b>cuticle</b>	a continuous waxy layer which may be secreted by epidermis of the plant
<b>cytoplasm</b>	protoplasm other than the nucleus
<b>deciduous</b>	plants that shed their leaves during winter
<b>dicotyledon</b>	broad-leaved plant with two cotyledons in their seeds
<b>diffuse</b>	send abroad, spread through (cell wall). Opposite of concentrate
<b>epiphytes</b>	a plant that attaches itself to another plant and grows on it but does not take anything from the host plant
<b>evergreens</b>	plants that shed their leaves throughout the year
<b>excretion</b>	the removal of waste
<b>exoskeleton</b>	external bony or leathery skeleton
<b>fission</b>	splitting of cells into two to make more cells
<b>guard cells</b>	form the stomata and according to their internal pressure can increase or reduce size of the stomata or close it completely
<b>hermaphrodites</b>	able to produce sperm and eggs at the same time
<b>invertebrate</b>	animals without vertebrates or backbones
<b>irritability</b>	is the ability to respond to a stimulus
<b>metamorphosis</b>	change of form from one thing to another, e.g., caterpillar to butterfly, tadpole to frog
<b>monocotyledons</b>	narrow leaved plants with only one cotyledon in their seed, e.g., grasses, reeds, rushes, cereals, iris and daffodils.

# Answers

## Page 3

**Living:** humans, tables, trees, rope

**Non-Living:** rocks, dust

## Page 4

1. A characteristic is a feature of a group of things that is found in all members of the group.
2. Respiration is production of energy by burning food in the body.
3. Excretion is the removal of waste.

## Page 5

4. Reproduction is producing a new organism of the same kind.
5. Sensitivity is the ability to respond to a stimulus.

### Answer these questions:

1. a. respiration  
b. excretion  
c. feeding  
d. growth  
e. movement  
f. reproduction  
g. sensitivity
2. a. respiration - chemical decomposition of food as a result of its combination with oxygen.  
b. excretion - excretion of carbon dioxide from the lungs.  
c. feeding - plant make their own food, animals eat other plants or animals.  
d. growth - butterfly changes from a larva to an adult.  
e. movement - dog wagging tail, opening and closing of petals on a plant.  
f. reproduction - birth of baby; production of seed in plant.  
g. sensitivity - plants respond to light by moving towards it; an animal may yelp when touched or hurt.

## Page 7

### Definitions

1. Organisms - individual living organisms or plants
2. Classify - to group together organisms with common characteristics
3. Invertebrate - animal without a back bone
4. Vertebrate - animal with a backbone

### Answer these questions:

1. We classify them because there is such a large collection of organisms that it is necessary to sort them into smaller groups to study them.

## Page 8

2. a. crocodile - cold blooded animal, reptile  
b. pine tree - non-flowering plant, coniferous tree  
c. mushroom - non-flowering plant, fungi  
d. starfish - animal without vertebrae, echinoderm  
e. parrot - warm blooded animal with vertebrae, bird  
f. whale - warm-blooded animal with vertebrae, mammal  
g. wheat - plant that flowers, monocotyledon  
h. butterfly - animal without vertebrae, insects  
i. marigold - plant that flowers, ledon

## Page 10

### Give examples of each phylum.

1. Single celled animals
  - abundant, microscopic animals
  - one celled
  - living in water or inside other animals