

Chapter 1: Characteristics and classification of living organisms

IGCSE Biology



1.1 Characteristics of living organisms

Objectives:

Describe the characteristics of living organisms by defining the terms: *movement, respiration, sensitivity, growth, reproduction, excretion, and nutrition*

Characteristics of living things

- In groups of approximately 5, create a list of characteristics of living organisms
 - Hint: what are things that all living organisms do?

Characteristics of living things

- In your group of approximately 5, come up with a definition for each of the 7 characteristics of living organisms
 - *Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion, Nutrition*

Movement

an action by an organism causing a change of position or place

- **Plants move when they grow**
 - Roots move down into soil, leaves and stems move up toward light
- **Animals move to obtain food/avoid being caught**

Respiration

the chemical reactions in cells that break down nutrient molecules and release energy

- Involves chemical reactions happening in cells to breakdown glucose
 - Oxygen is usually needed
- Glucose + oxygen → carbon dioxide + water
- Use energy for movement, growth, repair and reproduction

Sensitivity

the ability to detect and respond to changes in the environment

- Plants respond to the sun by moving leaves to face the light
 - Some flowers open/close at day/night
- Animals have sense receptors (cells) for detecting light, sound, touch, pressure, and chemicals in the air and in food

Growth

permanent increase in size

- Involves making more complex molecules such as proteins
- Plants grow throughout their lives
- Animals stop growing when they reach a certain size

Reproduction

the processes that make more of the same kind of organism

- Asexual reproduction involves one parent giving rise of offspring that are often identical to each other and to the parent
- Sexual reproduction involves two parent organisms producing **gametes** (sex cells) which fuse to give rise to the next generation
 - Offspring show **variation** - they are not identical to each other or to their parents

Excretion

removal from organisms of toxic materials and substances in excess of requirements

- **Metabolism** is all the chemical reactions that occur in an organism
- Plants store waste substances in their leaves so they are removed when leaves fall off
- Animals breathe out carbon dioxide; other wastes leave the body in the urine

Nutrition

taking in of materials for energy, growth and development

- **Green plants - photosynthesis**
 - energy from sunlight is absorbed and used to turn CO_2 and water into simple sugars
- **Animals**
 - eat plants/animals to gain energy and nutrients
 - process of taking in food is called **ingestion**

Acronym to remember

Movement

Respiration

Sensitivity

Growth

Reproduction

Excretion

Nutrition

1.2 Classification

Objectives:



Classification

- Living organisms can be classified into 5 *major* groups called **kingdoms**:
 - Animals
 - Plants
 - Fungi
 - Protists
 - Prokaryotes (bacteria)
- Organisms in each kingdom show similar features

Classification

- Smallest grouping of organisms: **species**
- Kingdoms are subdivided into **phyla**
(singular: **phylum**)
- Kingdom, **Phylum**, **Class**, **Order**, **Family**,
Genus, **Species**