

LIVING CHARACTERISTICS

Organization - Living organisms are made of cells – each cell can perform all the processes of life.

Energy - Living organisms need energy, which is obtained from the environment

Environment - Living organisms respond and adapt to stimulus in their environment

Reproduction - Living organisms reproduce to maintain the species, however not every individual needs to reproduce for the species to continue

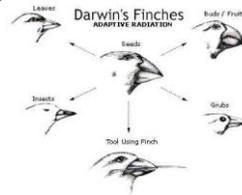
Growth - Living organisms grow and develop by consuming nutrients enabling them to change their body size and shape

Wastes - Living organisms produce wastes and get rid of wastes (solid, liquid and gas)

STRUCTURE

The structures (body parts) organisms have developed to perform life processes and tasks have different functions.

Structural variations - Similarity in structure with some variability can be seen among animals living in the **Galapagos Islands**. Charles Darwin studied many of the animals on the Galapagos Islands and determined the **'Origin of the Species'** as a result of his observations. Darwin's 13 closely related species of finches have different bill structures to perform the function of gathering food.



FUNCTION

All organisms have to perform certain tasks or functions to stay alive, but different plants and animals have developed different structures for doing similar functions.

Function	Plant	Animal
moving	Most plants don't move from place to place	wings, legs, fins, tails
food gathering	roots	claws, hands, tentacles, mouths, tongues
breathing	leaves, needles	gills, lungs, spiracles, skin

MICROSCOPE

An object made to appear larger than its actual size, is said to be **magnified**. A microscope magnifies (enlarges) images of small objects. Microscopes come in many shapes and sizes, including two types of electron microscopes:

TEM (transmission electron microscope) and **SEM** (scanning electron microscope)
Medical researchers use fiber optics to create microscopes that can be used to see inside the body.

Micro-organisms were first discovered by **Anton van Leeuwenhoek**. **Robert Hooke** observed small honeycombed holes in a tiny piece of cork. He used the word **cellulae** to name them (Latin form of 'cell').

Identify the parts, function and handling hints of the **Compound Light Microscope**

CELL

A cell is the basic unit of life performing life functions for living things. Two scientists (Matthias Schleiden and Theodore Schwann) combined their observations of cells to make a hypothesis ... **all living things are made up of cells**.

Rudolf Virchow contributed his observation and together the **Cell Theory** was formulated:

... all living things are composed of one or more cells

... cells are the basic units of structure and function in all organisms

There are certain factors that can affect what you are able to see inside a cell, including:

- ... the type of microscope you use
- ... the power of the lenses
- ... the quality of the prepared slides

CELL

To carry out their work, cells need a constant supply of materials, such as oxygen, water and food particles and they also need to get rid of waste products, all these materials must pass through the cell membrane, most cells fall into a very narrow range of size between 10 - 50 micrometers.

The cells of an organism all work together to help perform the various functions that need to occur if the organism is to live. The specialized cells of the body perform task that enable the organism to survive on a daily basis.

All cells, plant and animal, have structures and each structure performs a specific function in order for the cell to maintain life. The specialized structures inside the cell are called **organelles** and they carry out specific functions

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CELL STRUCTURES (found only in plant cells)

Cell Wall - are much thicker and more rigid than membranes, providing support for the plant or fungi

'Frame'

Chloroplasts - are the structures in which photosynthesis takes place

'Solar Panels'

CELL STRUCTURES

(found in both plant and animal cells)

Cell Membrane - surrounds and protects the contents of the cell

'Controlled Gateway'

Cytoplasm - distributes materials to different parts of the cell.

'Kitchen'

Nucleus - controls the cell's activities

'Command Center'

Vacuoles - is a membrane-bound sac acting as a storage space for surplus food, wastes and other substances the cell is unable to use immediately

'Storage Rooms'

Mitochondria - chemical reactions occur that convert energy into useable forms

'Powerhouse'

MULTI-CELLULAR organisms can:

- live in a wide variety of environments
- grow very large
- obtain their energy from a wide variety of foods
- have complex bodies
- specialize functions and work in harmony with other cells

UNICELLULAR Organisms can perform all life functions in a single cell.



Amoeba move around using foot-like projections called **pseudopods** (false feet).



Paramecium are covered in hair-like structures called **cilia**, which move back and forth