Living things share certain characteristics and have structures to perform functions.

The Characteristics of Living Things

When trying to determine what is living and non-living, most scientists agree on these ***six characteristics*** that are common to all living organisms:

Organization - Living organisms are made of cells
Energy - Living organisms need energy
Environment - Living organisms respond and adapt to their environment
Reproduction - Living organisms reproduce
Growth - Living organisms grow and develop
Wastes - Living organisms produce wastes

Cells
The cell is the **basic unit of life**. It can perform all the processes that allow life to happen. All organisms are made up of at least one cell and every cell comes from another cell.

Energy
Energy is the ability to make things move and change. Everything that an organism does needs energy. Energy is obtained from the environment. Plants and animals differ in how they obtain their energy. Plants use the energy of the sun to make their own food, whereas animals get their food from the environment around them. **Nutrients** are substances that provide the energy and materials that organisms need to grow, develop, and reproduce. All of the processes that occur inside the organism to sustain its life are called the organism's **metabolism**.

Responding To The Environment
A **stimulus** is anything that causes a response in an organism. The organism's reaction to this stimulus is called a **response**.

Growth and Development
Organisms have the ability to replace some cells that are worn out or damaged. As organisms grow and develop their body size and shape can change. This is called **development**.

Reproduction
All living things come from other living things. **Reproduction** is not necessary for the organism to survive (because it will eventually die), but it is necessary for the species to survive.

Spontaneous generation was mistakenly thought to explain how living things could come from non-living things (eg. flies from meat).

Adaptations
An adaptation is a characteristic that allows an organism to survive in its environment. Organisms adapt to their environment for survival. There are two types of adaptations:

- structural – in which organisms have a structural feature that is a part of them that enables them to adapt
- behavioral – is an action the organism does to survive

Structure and Function

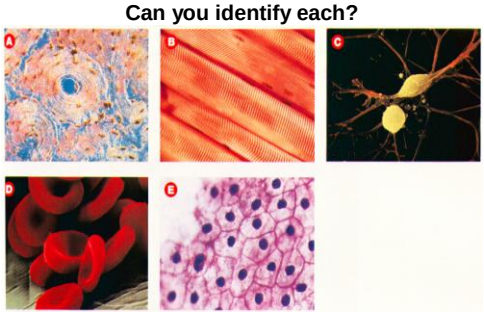
Organisms have developed many different ways of doing the things that keep them alive. The structures (body parts) they have developed to perform these tasks have different functions.

Spiracles are holes on the sides of the abdomen on some insects. The insect can adjust the size of the spiracle to control the amount of air entering their body.

Different cells have different *structures and functions:*

Type of Cell	Shape (Structure)	Function
Muscle	Elongated and tapered on either end	Move parts of the body
Skin	Flat and thin, brick-shaped or honeycomb	Fit closely together to form a continuous protective layer
Nerve	Long branched fibers running from the main part of the cell	To carry nerve signals from one part of the body to another
Blood	Thin, disc-like	Carry oxygen in the bloodstream (giving them a large surface area to collect oxygen)
Bone	Thick, mineral matrix	To provide support

Can you identify each?



Different Structures For Similar Functions

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

Variations In Structure

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.

Variations In Bill Shape

Describe the type of bill shape each is designed for …