Science 8

Unit B: Cells and Systems

Student Name:

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

When trying to decide what is living and non living, you have to find common characteristics for all forms of life. Although they are still debating, most scientists agree on these six characteristics of living things.

1.1 The Characteristics of Living Things

6 Characteristics of Living Things

1. are made of cells
2. need energy
3. grow and develop
4. respond to the environment
5. reproduce
6. have adaptations for their environment

Organisms:

"All living things"

Cells:

The cell is the basic unit of life. A cell can perform all the processes that life depends on. All organisms are made up of at least one cell, and every cell comes from another cell.

Energy:

Everything an organism does requires ENERGY. Organisms get energy from the environment. (example: sun-energy needed for plants to grow)

Responding to the Environment:

Stimulus – is anything that causes a response in an organism.

Response – is a reaction to a stimulus.

Growth and Development:

Growth does not end when a plant reaches full height – parts of any living thing wear away or get damaged – trees grow new leaves each year. Human body – skin replaces itself as it gets worn away. (it may involve a change in structure)

Reproduction:

All living things come from other living things, this process is called REPRODUCTION.

Adaptations:

An adaptation is a characteristic that allows an organism to live in its environment. Animals and plants have many adaptations.

1.2 Structure and Function

Structures: parts of an organism that perform specific tasks.(ie: Webbed foot)

Function: purpose or specific task.(ie. To swim faster in water)

Different Structures for Similar Functions

Plants and animals have developed different structures for doing similar functions: Food gathering structures – birds –bills, insects – have very complicated mouth parts, mammals – have different types of teeth to help them chew their food.

Variations in Structures

Similar organisms often have slight variations in their structures. (example: Birds – different Bill structures to perform the function of food gathering)

Variations in Bill Shape

Finches – different bill structures to perform the function of food gathering.

Darwin's finches evolved different bill shapes based on the type of food available where they lived. (Galapagos Islands). Nut / berry eaters evolved larger, stronger bills, where insect eaters evolved sharp pincers at the end of their beaks. Hundreds or thousands of generations.

1.3 Organs and Organ System

Organ: group of tissues that work together to perform a specific function.
Organ system: group of organs that work together to perform a certain task, such as digestion or breathing.
An example of some of your body's organ system:
Circulatory System: --Pg. 93 – 95
Structure: Function:
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Topic 2.0

Cells play a vital role in living things.

All living things are made up of cells
Capillaries: tiny blood vessels that connect arteries to veins; one cell layer thick and extremely narrow
Microscope: optical device used for viewing very small objects; has at least 2 lenses

2.1 The Microscope extends the Sense of Sight

Any microscope that has 2 or more lenses is a compound microscope.

Microscope Parts and their Functions

1. eyepiece
2. coarse adjustment knob
3. fine adjustment knob
4. revolving nosepiece
5. objective lenses
6. stage
7. stage clips
8. diaphram
9. lamp
10. arm
11. base

2.2 The Cell is the Basic Unit of Life

CELLS: are the smallest known functioning units of life.

TISSUES: are a group of similar cells working together to perform a specific function.

The parts of the Cell Structure Include:

1. cell membrane
2. cell wall
3. cytoplasm
4. nucleus
5. vacuoles

Viewing Plant and Animal Cells

The Vital Roles that Cell Structures Play

Organelles: structures in cells that perform a certain function.

Please DO NOT draw a diagram of the following: (Page 109)

ANIMAL CELL **PLANT CELL**

You do not need to draw the cells at this time

2.3 Organisms can be Single-celled or Multicelled

Mycoplasma: type of microscopic organism (these are so small that they need to be magnified many times to be seen)

Multicellular: this means that they are made up of 2 or more cells. (plants and animals are examples of multicellular organisms)

Unicellular: This means that they are made up of only a single cell.

Micro-organisms: usually uni-cellular organisms that can be seen only through a microscope.

Unicellular VS. Multicellular

Unicellular organisms often have specialized structures to help them perform different functions. Multicellular organisms rely on many very specialized cells to perform functions such as feeding, moving and so on.

Common Unicellular Organisms

Amoeba is a common unicellular organism that lives in water. They move around using foot-like projections called pseudopods.

Paramecium unlike amoeba, a paramecium move swiftly through the water. They are covered with "cilia". (hair-like structures that act like oars)

2.4 **How Substances Move into and Out of Cells**

The bringing in and removal of water, gases and food is important for survival. The cell has a structure that permits this vital exchange of substances.

Diffusion: the movement of particles of a substance from an area of higher concentration to an area of lower concentration.

The Cell Membrane and Diffusion – Diagram (page 115)

Selectively Permeable: describes a membrane with very small openings that allow particles of some substances, BUT NOT others to pass through.

The Cell Membrane and Osmosis

Osmosis: is the diffusion of water through a selectively permeable membrane.

- if water concentration inside the cell gets too low, water from outside moves in. If the water inside gets to high, water diffuses out of the cell.

2.5 **Cells in Multicellular Organisms combine to form**

Tissues and Organs

Cell Reproduce

Unicellular organisms grow and develop. For example, an amoeba, once it reaches a certain size it divides into 2 resulting in an identical copy.

Multicellular Organisms Have Specialized Cells

Specialized Cells: Cells that have specific structures that help them perform particular functions.

Red Blood Cells: small, pliable cells that have no nucleus and are specialized for carrying oxygen to all the cells of the body.

Marrow: type of connective tissue found in the bones that make or reproduce red blood cells.

Similar Cells combine to form Tissue

4 Different tissue types: connective tissue, epithelial tissue, nervous tissue, and muscle tissue.

Tissues in Plants

Plants have 3 tissue types: (1) photosynthetic / storage (2) Protective (3) transport. These tissues are organized into the three organs that make up plants: the leaves, the roots and the stems. (See figure 2.37 2.38 2.39)