**2.2 – Multicellular Organisms *(Notes)***

* For a unicellular organism, one cell is able to look after all the basic needs of the cell.
* For a multicellular organism, each cell has a very specialized function.
* Vertebrate – An animal with a backbone and a brain enclosed in a skull
* Invertebrate – An animal without a backbone such as an insect: arachnid, gastropod, crustacean, centipede or worm.
* Specialized Cells – These perform specific functions and these cells must interact with other types of cells in the organism in order to carry out their tasks successfully.
* Unicellular organisms are usually microorganisms but there are a few that you can see with your unaided eye.
* Unicellular organisms are micro sized because the cellular activities are performed most efficiently at that size.
  + The limitation is related to the processes of diffusion and osmosis.
* Even though the surface area of the selectively permeable cell membrane would increase with the increase of cell size, the cell’s volume would increase even more.
* For a cell which is bigger the gasses and water would have to travel much farther to reach all of the organelles in the cytoplasm.
  + This increase in volume as a cell grows is why the organelles in a huge cell would have trouble accessing the resources they need.
* Larger living things tend to be made up of more than one cell.
  + In an organism made up of dozens, thousands or even millions or trillions of cells, diffusion and osmosis can happen in fractions of a second.
* Specialized cells in multicellular organisms
  + One type of cell cannot do all of the different jobs in a complex organism.
  + Just like the community needs specialists, multicellular organisms are made up of specialized cells.
  + While the specialized cells have the same kinds of organelles as other plant or animal cells, the organelles may be better adapted to performing the cell’s tasks.
* Human Being is a complex organism and has hundreds of different types of cells.
  + Skin cells – protectors and gatekeepers (p.45, Fig. 2.21)
  + Digestive cells
  + Bone cells – provides the structure to support the human body (p.45, Fig. 2.22)
  + Muscle cells – Convert lots of energy (p.45, Fig. 2.23)
  + Nerve and Brain cells – Transmit electrical impulses (p.46, Fig. 2.24 and 2.25)
  + Eyes have special cell – These detect light
  + Blood cells – transport oxygen and carry away wastes of cellular processes
  + Storage cells (fat) – keep unused energy on hand and it is released and burned when the need arises. (p.46, Fig. 2.26)
* Specialized Plant cells
  + Leaves - transform the Sun’s energy into sugars (p.46, Fig. 2.27)
  + Stem (p.46, Fig. 2.28)–
    - transport food and water to the rest of the plant
    - store some food
    - support the plant
  + Roots (p.46, Fig. 2.29) –
    - Store food
    - Absorb water from the soil
    - Transport water and nutrients to the stem
* We must understand that that:
  + ***Multicellular*** *organisms rely on a variety of types of cells to perform cellular functions*. These types of cells are called ***specialized cells*.**