Topic:

• The Introduction of Biology
• Defining of life

• **Basic chemistry, the chemistry of organic molecules**
• Classification of living things
• History of cells and Cells structures and functions
• Photosynthesis and cellular respirations
• Darwin evolutions
• Ecosystem and human interferences
**Element** – a substance that cannot be broken down to other substances by any chemicals means

Exp: FE (needed for any forms of life)
   I (required only by certain sp.)

**Compound** - groups of two or more elements that are bonded together

Types of bonding between compounds:
- **Covalent** compounds happen when the atoms share the electrons
- **Ionic** compounds happen when electrons are donated from one atom to another.

The elements Hydrogen (H) and oxygen (O) exist as gases – the most abundant compound on earth (H₂O)
Living organism???

Are composed of matter (occupied space and has mass)
A definition of "matter" that is based upon its physical and chemical structure is: *matter is made up of* [atoms][1] and [molecules][2].
Chemical Bonds

**Ionic (donate)**
Attractions between ions of opposite charge
- Exp NaCl

**Covalent (share)**
Two atoms share one or more pairs of outer-shell electrons
- form a molecule
- Exp H₂
Unique properties result from how H\textsubscript{2}O molecules interact with each other.

Bonding electrons are shared unequally by the hydrogen and oxygen atoms:
- partial negative charge (-) forms at _______ end
- positive charge (+) forms at _______ end

When the electrons in a covalent bond are not equally shared, the molecule is _______.

Exists in liquid (water), solid (ice cube, snow), and gaseous (water vapour) states

Essential for all living things.

“Universal solvent” because many substances dissolve in it.
Cohesion

- The attraction water to itself – H bonds
Adhesion

• The attraction of water to other surfaces/substances
Surface Tension

- Interaction between hydrogen bonding and the earth’s gravitational pull
Capillary Action

• “Wettable” surfaces cause a film of water to partially pull away from other water molecules and cling to the surface.

• Capillary action is important in soil and plant/water relations.
Solutions are mixtures in which one substance is dissolved in another.

Solutions have two parts: **solute** and **solvent**
- The ________ is the substance that is dissolved.
- The ________ is the substance that does the dissolving

*(remember water, the ‘universal solvent’?)*
Osmosis

- Osmosis is the net movement of water across a selectively permeable membrane driven by a difference in solute concentrations on the two sides of the membrane.
- The water moves from the area of higher solute concentration to the area of lower solute concentration until equilibrium is reached.
pH: Alkalinity/Acidity

• The measurement of the H+ ions found in that particular substance
• The scale goes from 0 to 14
• 7 is neutral
• Below 7 is acidic
• Above 7 is alkaline (or basic)
• One pH unit represents a ten-fold change in H+ concentration
Transpiration—Cohesion Hypothesis

Evaporation (the driving force)
The lower water potential of air causes evaporation from cell walls.
This lowers the water potential in cell walls and in cytoplasm.

Cohesion (in xylem)
Cohesion holds water columns together in capillary-sized xylem elements.
Air bubbles block movement of water to next element.

Water uptake (from soil)
Lower water potential in root cells draws water from soil.
The absorptive surface increases with the production of more root hairs.
Water moves through endodermis by osmosis.