# SUMMARY OF CHAPTER 1

## THE HUMAN ORGANISM AND THE ORGANIZATION OF MATTER

### 1. WHAT IS MATTER?

- Matter is anything that has volume and mass (p. 6).
- The particle model is a scientific model based on the idea that matter is made up of small particles (p. 6).
- The particle model helps to illustrate the three states (or phases) of matter (solid, liquid and gas) (p. 6).
- The atomic model is a scientific model that represents matter as molecules and atoms (p. 7).
- Matter can be divided in two categories: mixtures and pure substances.
  - A mixture contains at least two types of particles (p. 9).
  - A pure substance contains only one type of particle (p. 9).

### 2. MIXTURES

- Mixtures may be heterogeneous or homogeneous (p. 10).
- A heterogeneous mixture is made up of at least two substances that can be distinguished with the naked eye (p. 10).
- A homogeneous mixture is made up of at least two substances that cannot be distinguished with the naked eye (p. 11).
- Homogeneous mixtures can be divided into colloids and solutions.
  - A colloid is a homogeneous mixture in which at least two different substances can be distinguished under a magnifying instrument (magnifying glass, microscope) (p.11).
  - A solution is a homogeneous mixture in which it is impossible to distinguish its constituent parts, even under a magnifying instrument (p. 12).
- A solution is made up of a solute (dissolved substance) and a solvent (substance in which solute is dissolved) (p. 12).
- Concentration, dilution and solubility are properties of solutions (p. 13).
- The concentration of a solution corresponds to the quantity of dissolved solute in a given quantity of solution (p. 13).
- The concentration of a solution can be determined using the formula $C = m/V$ (p. 13).
- Dilution is a laboratory technique that involves decreasing the concentration of a solution by adding solvent (p. 15).
- A change in the concentration of a solution can be calculated using the formula $C_1V_1 = C_2V_2$ (p. 16).
- Solubility is the maximum amount of solute that can be dissolved in a given amount of solvent (p. 17).
- Solubility depends on the nature of the solute, the nature of the solvent, temperature and pressure (p. 17).
- Mixtures exist everywhere in nature. To obtain pure substances, different techniques of physical separation need to be applied (p. 19).

### 3. PURE SUBSTANCES

- Pure substances can be divided into compounds and elements.
  - An element is a pure substance that is impossible to separate into other substances using techniques of chemical separation (p. 21).
  - A compound is a pure substance that contains at least two types of atoms (p. 21).
- Elements are the building blocks of matter. There are more than 100 kinds of elements. They are classified in the periodic table of elements (p. 21).
- Pure substances can be distinguished using their characteristic properties (p. 22).

- There are characteristic physical properties and characteristic chemical properties (p. 23).
- Melting point, boiling point, density and solubility are some characteristic physical properties (p. 23).
- Most characteristic chemical properties are reactions to indicators (p. 24).
- To identify a pure substance, tests need to be performed to determine its characteristic properties. Results obtained can then be compared with tables that list the characteristic properties of different substances (p. 25).
- Understanding of the properties of matter permits the manufacturing of objects that meet human needs (p. 25).