# SUMMARY OF CHAPTER 3

## THE HUMAN ORGANISM AND THE BEHAVIOUR OF FLUIDS

### 1. WHAT IS A FLUID ?

- A fluid is a substance that has the capacity to flow and assume the form of the container into which it is poured (p. 66).
- The particle model explains the capacity of fluids to flow and assume different forms:
  - The particles of a liquid are close together and held by forces of attraction that are relatively weak. In this way, the particles can slide over each other and take on the form of any container (p. 66).
  - The particles of a gas are much farther apart and are not bound by forces of attraction. They can move in every direction and occupy all available space (p. 66).
- There are two types of fluids: compressible fluids and incompressible fluids (p. 68).
- A compressible fluid is a fluid with a volume that can vary. Gases are compressible fluids (p. 68).
- An incompressible fluid is a fluid with a volume that almost cannot vary. Liquids are incompressible fluids (p. 69).

### 2. WHAT IS PRESSURE ?

- Pressure (P) is the result of a force applied in a perpendicular fashion to a surface (p. 70).
- Force (F) is an action that modifies the movement of an object or causes the shape of an object to change (p. 70).
- Surface area is the surface dimension of an object (p. 70).
- The stronger the force exerted, the greater the pressure (p. 71).
- The greater the surface area to which a force is applied, the less the pressure (p. 71).
- In the International System of Units, pressure is measured in pascals (Pa) (p. 72).
- Pressure corresponds to the force (newtons) applied per unit of surface area in square metres (A). The formula used is P = F/A (p. 72).

### 3. THE PRESSURE EXERTED BY FLUIDS

- In a fluid, pressure is exerted equally in all directions (p. 73).
- In an incompressible fluid, the pressure exerted depends on the depth of the object in the fluid and the density of the fluid (p. 74).
- In a compressible fluid, pressure depends on the number of collisions of fluid particles (p. 75).
- Factors that affect the number of collisions are:
  - number of particles: the more particles, the greater the number of collisions (p. 75)
  - temperature: the speed of particles varies according to temperature—the higher the temperature, the higher the speed of the particles and the greater the number of collisions (p. 75)
  - volume of fluid (p. 75)
- When the temperature and the number of particles are constant, the pressure of an incompressible fluid is inversely proportional to its volume (p. 77).
- At a constant temperature, the volume of a compressible fluid is inversely proportional to the pressure. If the pressure increases, the volume decreases and vice versa (p. 78).
- Atmospheric pressure is the pressure exerted by the atmosphere. It is measured by an instrument called a barometer (p. 79).

### 4. THE MECHANISMS RELATED TO VARIATIONS IN THE PRESSURE OF FLUIDS

- A fluid moves naturally from a zone of high pressure toward a zone of low pressure (p. 81).
- Pressure applied to the surface of a fluid inside a closed container is distributed uni-

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formly to all of the fluid (p. 81).

- A transfer of pressure in a fluid can increase force (p. 82).
- Blood circulation and breathing are two examples of natural mechanisms where the principles related to pressure apply (p. 83).