

Tissues, Organs and Systems
(pages 62 to 65)

1. Arrange the following elements of the hierarchical organization of life in increasing order of complexity:

- a) Organ
- b) Cell
- c) System
- d) Tissue

Answer: *b, d, a, c*

2. Indicate which level of the hierarchical organization of life each of the following statements corresponds to (choose your answers from the four elements listed in Question 1):

- a) A group of several different tissues that are organized in a specific way and carry out specific functions
Organ
- b) A group of specialized cells that have the same structure and function
Tissue
- c) The basic unit of life *Cell*
- d) A series of organs that perform a common task in a coordinated manner *System*

3. Match each statement in the left-hand column with a type of tissue from the right-hand column.

- a) The most common tissue found in organisms 2
- b) Lines the internal surfaces of organs 1
- c) Type of tissue found in the brain 4
- d) Connects other tissues 2
- e) The cells of this tissue are able to contract 3

- 1) Epithelial tissue
- 2) Connective tissue
- 3) Muscle tissue
- 4) Nerve tissue

4. Identify the system of the human body that corresponds to each of the following functions:

- a) Makes thought and memory possible
The nervous system
- b) Transforms food into particles that can be used by the body's cells
The digestive system
- c) Eliminates nitrogenous waste (urea)
The excretory (urinary) system
- d) Produces gametes
The reproductive system

Section 2 • Nutrition

Types of Nutrients (pages 68 to 71)

1. What is the main function of the following types of nutrients?

- a) Carbohydrates *Provide short-term energy*
- b) Fats *Provide long-term energy (energy reserves)*

- c) Proteins *Provide material for building and repairing tissues*
- d) Water *Regulates metabolism*
- e) Vitamins *Regulate metabolism*
- f) Minerals *Regulate metabolism*

2. Indicate the *main* type of nutrient found in the following foods:
 - a) Butter *Fats*
 - b) Grape juice *Water*
 - c) Eggs *Protein*
 - d) Spaghetti *Carbohydrates*
 - e) Trout *Protein*
 - f) Green beans *Water (and also vitamins and minerals)*
 - g) Cake *Carbohydrates*
 - h) Milk *Water (and also vitamins and minerals)*
 - i) Lentils *Protein*
 - j) Rice *Carbohydrates*
 - h) Olive oil *Fats*

The Energy Value of Nutrients

(pages 72 to 75)

3. What is the average amount of energy (in kJ) that adolescents need to carry out their daily activities? *10 500 kJ*
4. a) What do we call the energy the body needs for its basic functions when it is at rest? *Basal metabolism*
 b) What is the average amount of this energy requirement? *7000 KJ for men and 5500 KJ for women*
5. Laurianne is a very active adolescent. She trains several times a week with her swim team. Her average daily energy expenditure is 13 200 kJ. Explain what will happen to her weight in the long term if the food she eats each day provides her with:
 - a) 15 700 kJ *She would gain weight.*
 - b) 10 300 kJ *She would lose weight.*
 - c) 13 200 kJ *There would be no change in her weight.*

The Anatomy of the Digestive System

(pages 75 to 80)

6. List the parts of the digestive tract in the order in which food passes through them. *Mouth, pharynx, esophagus, stomach, small intestine and large intestine (colon)*

7. Identify the glands and organs described below:

- a) The gland that produces bile *Liver*
- b) It runs along the vertebral column and is connected to the stomach *Esophagus*
- c) Digestive glands that produce saliva *Salivary glands*
- d) Entrance to the digestive tract *Mouth*
- e) Last section of the digestive tract, ending in the anus *Large intestine (colon)*
- f) J-shaped pocket located on the left side of the abdomen *Stomach*
- g) They are dispersed throughout the inner surface of the stomach *Gastric glands*
- h) Organ common to the digestive and respiratory tracts *Pharynx*
- i) Leaf-shaped gland located beneath the stomach *Pancreas*
- j) A long tube that is folded several times and is located in the abdomen *Small intestine*
- k) Digestive glands located at the bottom of the villi of the small intestine *Intestinal glands*

The Physiology of the Digestive System

(pages 80 to 86)

8. When food passes through the digestive system, it undergoes two types of digestion. Name these two types. Explain what happens to the food during these two types of digestion. *Mechanical digestion: The nature of the food remains the same; only its physical appearance changes. The food is ground, mixed and crushed. Chemical digestion: The bonds of the molecules are broken, which gives rise to new substances. Chemical digestion therefore breaks down the complex molecules contained in food into simple molecules.*

9. Identify the structures or processes described below:
- Main actors in chemical digestion and are contained in digestive juices *Enzymes*
 - Simple molecules produced by the chemical digestion of proteins *Amino acids*
 - Chemical secretions produced by the pancreas *Pancreatic juices*
 - Contractions of the digestive tract allowing food to advance *Peristalsis*
 - Secretion that acts mechanically on fats *Bile*
 - They aid in the chemical digestion of proteins in the stomach *Gastric juices*
 - Passage of nutrients from the digestive tract to the blood or lymph *Absorption*
 - Simple molecules obtained from the chemical digestion of carbohydrates *Glucose*

10. Indicate in which digestive organ(s) each of the following phenomena occurs. Explain whether it is a mechanical or chemical transformation.
- Peristalsis *Esophagus, small intestine and colon*
Mechanical transformation
 - Chewing *Mouth*
Mechanical transformation

- Action of gastric juices
Stomach
Chemical transformation
- Action of bile *Small intestine*
Chemical transformation
- Churning *Stomach, small intestine, colon*
Mechanical transformation
- Action of salivary amylase
Mouth
Chemical transformation

11. In which organ does the chemical digestion of the following types of nutrients occur? In which organ does it end?
- Carbohydrates *Begins in the mouth and ends in the small intestine*
 - Proteins *Begins in the stomach and ends in the small intestine*
 - Fats *Occurs entirely in the small intestine*
12. In which organs are the following nutrients absorbed in the greatest quantities?
- Water *Large intestine*
 - Glucose *Small intestine*
 - Minerals *Large intestine*
 - Glycerol *Small intestine*
 - Vitamins *Large intestine*

Student textbook, page 98

The Dual Role of the Respiratory System (pages 89 and 90)

- Which gas, referred to as an oxidizing agent, makes the combustion of nutrients possible? *Oxygen (O_2)*
- Is there more carbon dioxide in the air we inhale or in the air we exhale? Where does it come from? *The air we exhale has more carbon dioxide. It is a by-product of cellular respiration.*

3. Compare inhaled air with exhaled air using a comparative table like the one below. Enter the names of the gases.

Inhaled air		Exhaled air	
Proportion	Gas	Proportion	Gas
78%	<i>Nitrogen</i>	78%	<i>Nitrogen</i>
21%	<i>Oxygen</i>	16%	<i>Oxygen</i>
0.04%	<i>Carbon dioxide</i>	5%	<i>Carbon dioxide</i>