## In-Text Solutions

# Exercise 6.1

1. **What is a tissue?**

**Answer:** A group of cells that are similar in structure and work together to do a peculiar function is called tissue.

2. **What is the utility of tissues in multicellular organisms?**

**Answer:** Tissues in multicellular organisms are differentiated to perform a specific function at a given location, a process known as division of labor. Nerve cells, for example, make up the neurological tissue that aids in message transmission. In contrast, muscular cells make up the muscle tissue and muscle tissue is a type of tissue that aids movement.

# Exercise 6.2

**3. Name the types of simple tissues.**

**Answer:** Parenchyma, Collenchymas, and Sclerenchyma are the three forms of simple permanent tissues. Aerenchyma and chlorenchyma are two types of parenchyma tissue.

4. **Where is apical meristem found?**

**Answer:** The apical meristem is present at the growing tips of stems and roots.

5. **Which tissue makes up the husk of a coconut?**

**Answer:** Sclerenchyma tissue is a form of simple permanent tissue that makes up the husk of the coconut. These tissues cause the plant to become stiff and hard. The cells of this tissue are dead and their cell walls are thickened because of the presence of lignin.

6. **What are the constituents of phloem?**

Answer: The food-conducting tissue of plants is termed as phloem. The phloem consists of the following four elements, they are:

1) Sieve tubes
2) Companion cells
3) Phloem parenchyma
4) Phloem fibers

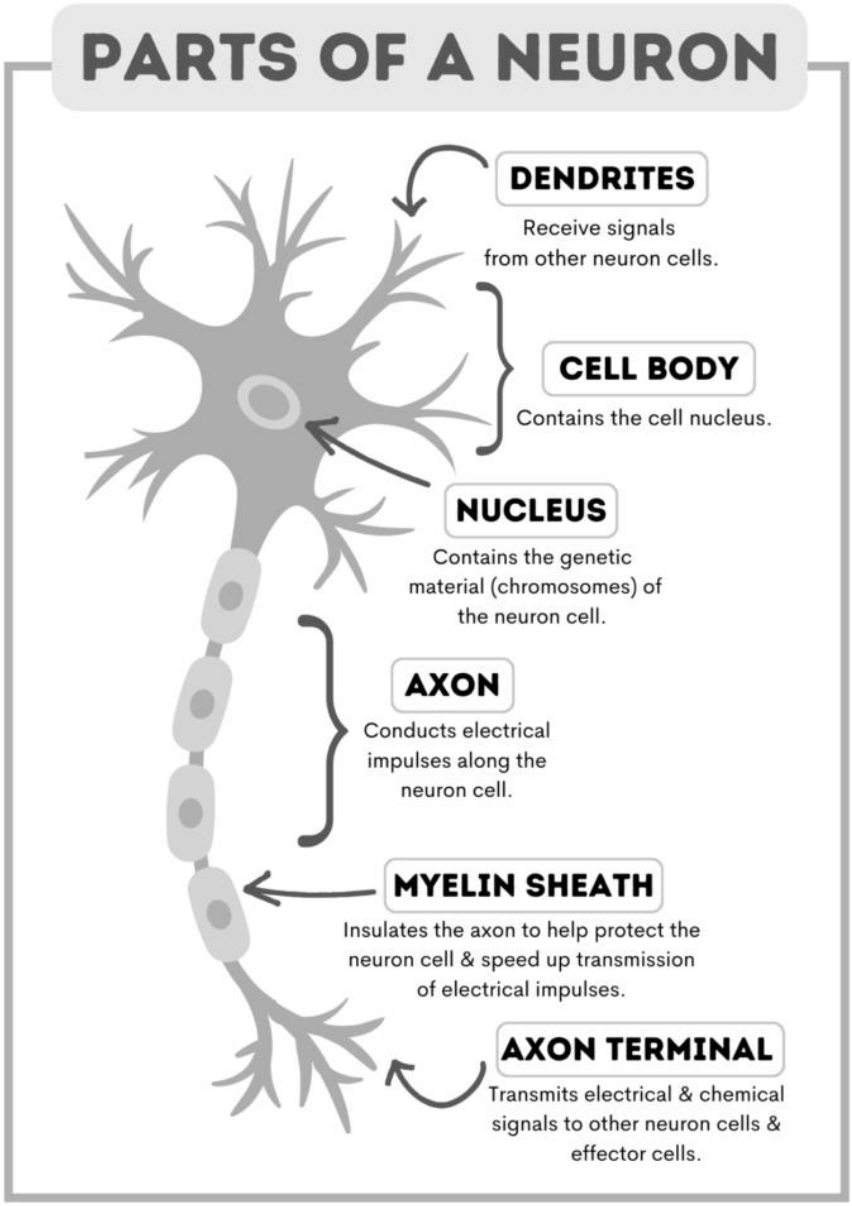
# Exercise 6.3

7. **Name the tissue responsible for the movement of our body.**

**Answer:** Muscle Tissues are responsible for movement. Muscular tissue and nervous tissue combination are responsible for movement in our body.

**8. What does a neuron look like?**

**Answer:** A neuron is made up of three parts: the cell body, the axon, and the dendrites. Dendrites are a significant number of extensions that stretch outward from the cell body and resemble branches. A nucleus and other cell organelles make up the cell body. An axon is a tube-like structure that transports an electrical impulse from the cell body to the neuron's opposite end structures.




**9. Give three features of cardiac muscles.**

**Answer:** Cardiac muscles are specialized tissues that have evolved to pump blood throughout the body.

The following are the features of cardiac muscles:

- They are cylindrical in shape.
- Striated muscle fibers.
- They are unnucleated and branched.
- These muscles are involuntary in nature. Throughout their lives, they exhibit cyclic contraction and relaxation.

**10. What are the functions of areolar tissue?**

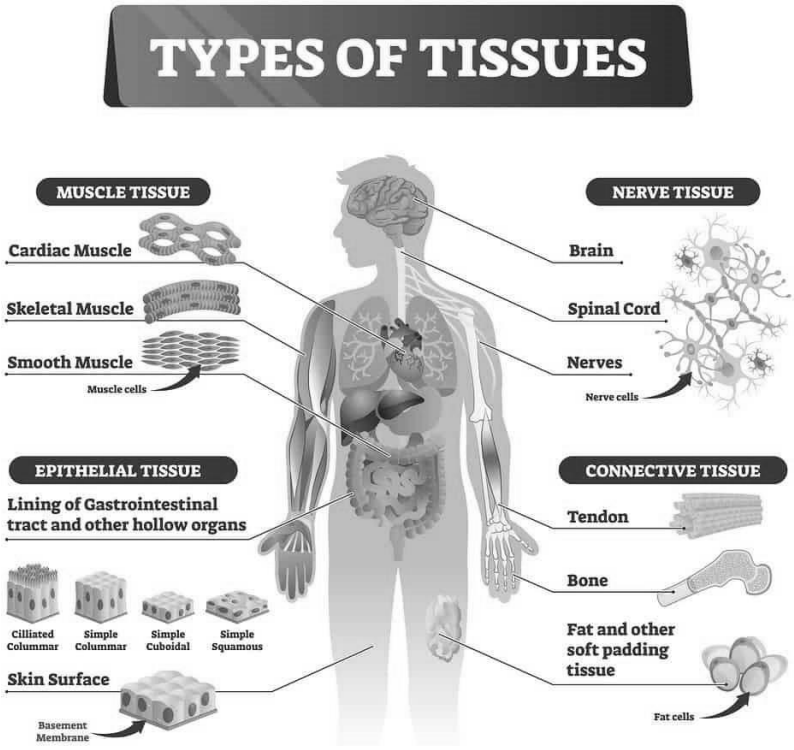
**Answer:** Areolar tissues are connective tissues found in animals. It is found between skin and muscles, around blood vessels and nerves, and in the bone marrow. It fills the space inside the organs, supports internal organs, and helps in the repair of tissues.

## Exercise Questions

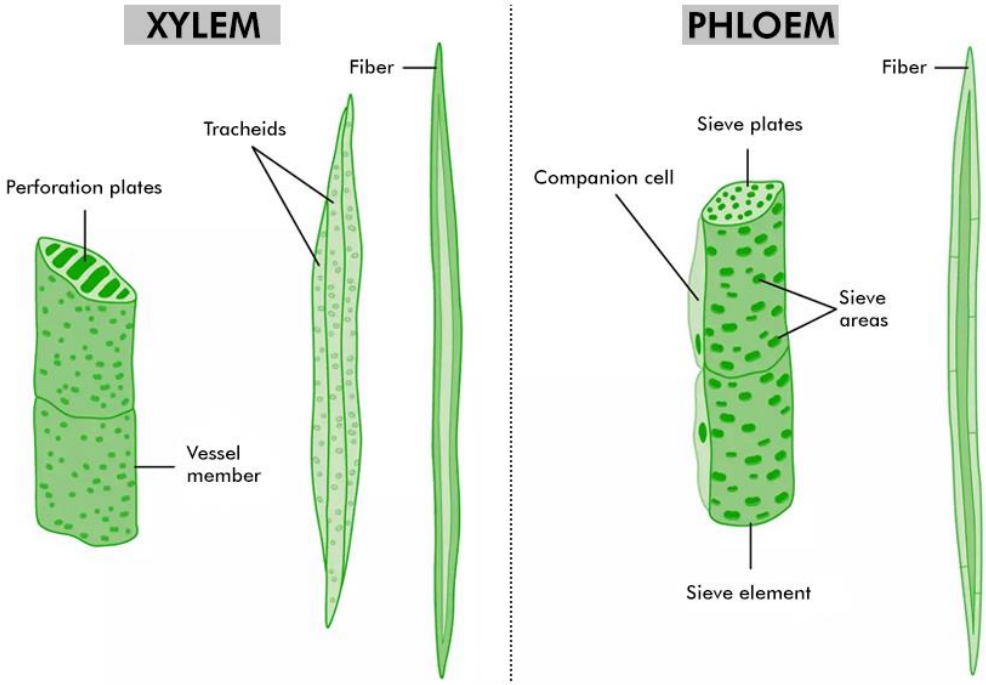
**1. Define the term 'tissue'.**

**Answer:** A group of cells that are similar in structure and perform the same function is called a tissue.

**Animal Tissues**



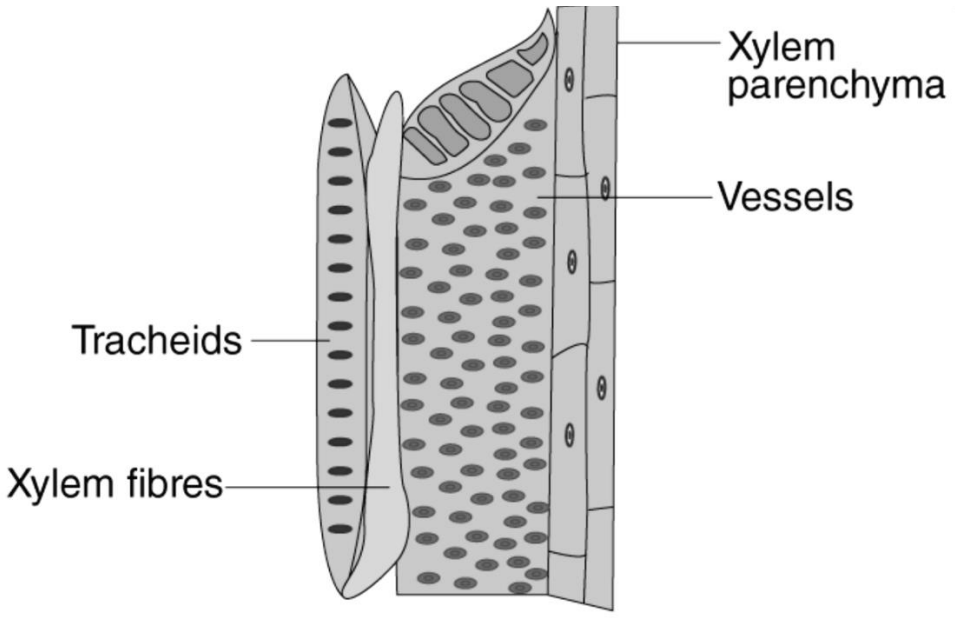
**Plant Tissues**




**2. How many types of elements together make up the xylem tissue? Name them.**

**Answer:** The xylem tissue is made up of four main elements as mentioned :

- Vessels
- Tracheids
- Xylem fibers
- Xylem parenchyma



**3. How are simple tissues different from complex tissues in plants?**

**Answer:**

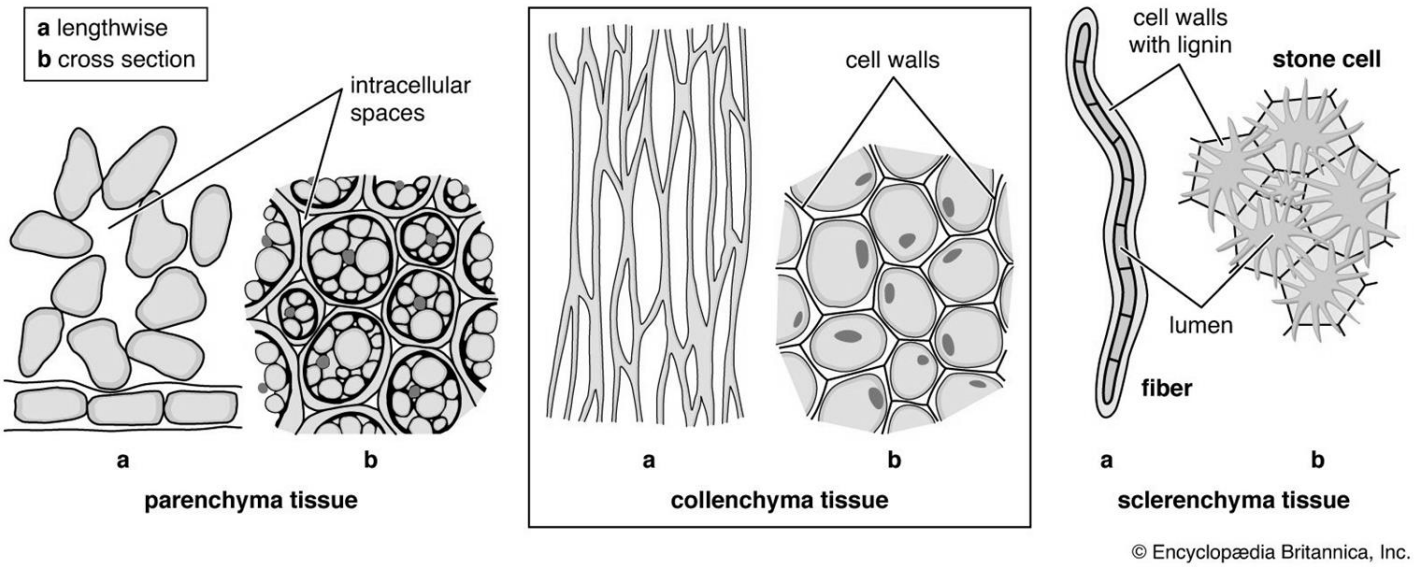
| Simple Tissues | Complex Tissues |
|---|---|
| Simple tissues consist of only one type of cell. | They are composed of various types of cells |
| The structures of all the cells are similar, and they perform similar duties. | The roles and structures of different types of cells vary. |
| Plants have three types of simple tissues: parenchyma, collenchyma, and sclerenchyma. | Xylem and phloem are two types of complex permanent tissues found in plants. |

4. Differentiate between parenchyma, collenchyma, and sclerenchyma on the basis of their cell wall.

**Answer:**

| Parenchyma | Collenchyma | Sclerenchyma |
|---|---|---|
| Thin cell walls, cells are loosely packed. | The cell wall is thickened irregularly at the corners, and there is very little space between the cells. | There are no intercellular spaces because the cell walls are evenly thickened. |
| The cell wall is made up of cellulose. | Pectin and hemicellulose are the two most important components of the cell wall. | There is an extra layer of the cell wall that is mostly made up of lignin. |

**The three basic types of plant tissue**




**5. What are the functions of the stomata?**

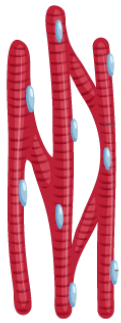
**Answer:** Stomata functions include the exchange of gases with the atmosphere. The stomata are responsible for transpiration.

**6. Show the difference between the three types of muscle fibres diagrammatically.**

**Answers:** There are three types of muscle fibres, they are:

**1. Cardiac muscles**

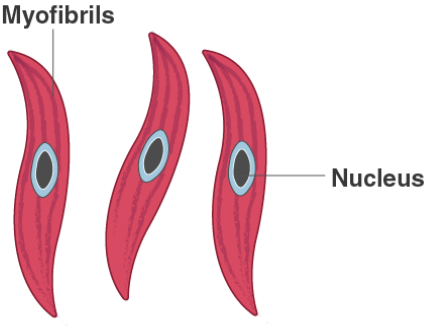
- Present in the heart.
- Involuntary in nature.
- They have 1 nucleus.
- The muscle fibers are branched.



Cardiac Muscles

**2. Smooth muscles**

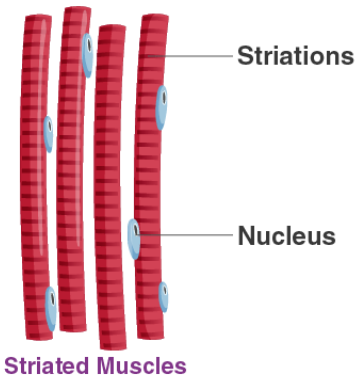
- Found in lungs and alimentary canal.
- Involuntary in nature.
- They have 1 nucleus.
- They are spindle-shaped.




Smooth Muscles

**3. Striated muscles**

- They are connected with bones
- Voluntary in nature.
- They are long and cylindrical muscle fibers.
- They possess many nuclei.
- Striated muscles are unbranched.



Striated Muscles

**7. What is the specific function of the cardiac muscle?**

**Answer:** The cardiac muscle is responsible for controlling the heart's contraction and relaxation.

**8. Differentiate between striated, un-striated, and cardiac muscles on the basis of their structure and site/location in the body.**

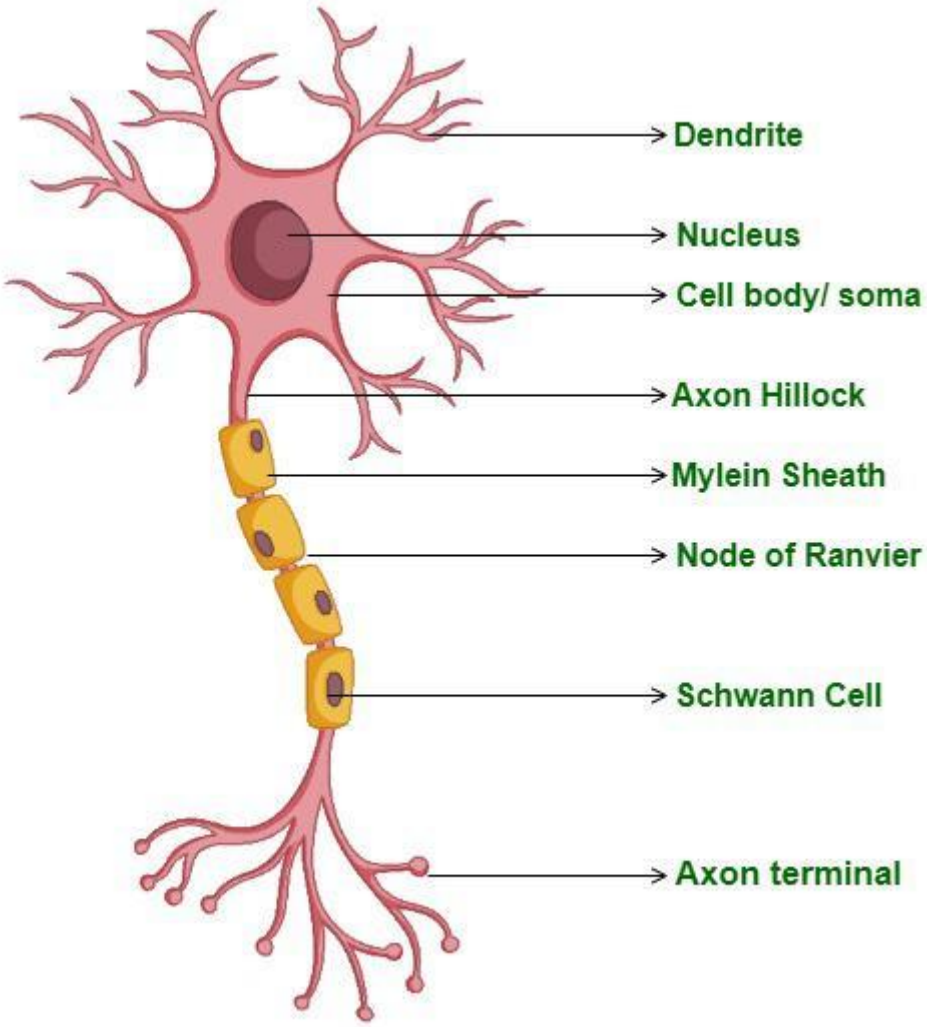
**Answers: Differences between striated, unstriated, and cardiac muscles are:**

| Striated Muscles | Unstriated Muscles | Cardiac Muscles |
|---|---|---|
| **Based on Structure:** | | |
| **Cylindrical** | **Long** | **Cylindrical** |
| Not branched | Not branched | Branched |
| Multinucleate | Uninucleate | Uninucleate |
| Its ends are blunt | Its ends are tapering | Its ends are flat and wavy |
| Colored alternate light and dark bands | There are no bands present | Faint bands are present |

| **Based on Location:** | | |
|---|---|---|
| These muscles are present in different body parts such as hands, legs, tongue, etc. | The contraction and relaxation of blood vessels, as well as the movement of food in the alimentary canal, are all controlled by these muscles. | These muscles control the heart's contraction and relaxation. |

**9. Draw a labeled diagram of a neuron.**

**Answer:**



**10. Name the following.**

(a) Tissue that forms the inner lining of our mouth – The epithelial tissue, Squamous epithelium.

(b) Tissue that connects muscle to bone in humans – Tendon

(c) Tissue that transports food in plants – Phloem

(d) Tissue that stores fat in our body – Adipose tissue

(e) Connective tissue with a fluid matrix – Blood, it is a fluid connective tissue

(f) Tissue present in the brain – Nervous tissue

**11. Identify the type of tissue in the following:**

**Skin, bark of tree, bone, lining of kidney tubule, vascular bundle.**

**Answer:**

Skin: Stratified squamous epithelial tissue

The bark of tree: Protective tissue and cork

Bone: Connective tissue

The lining of kidney tubule: Cuboidal epithelial tissue

Vascular bundle: Conducting tissue (xylem and phloem), complex permanent tissue

**12. Name the regions in which parenchyma tissue is present.**

**Answer:** The parenchyma is found in:

- The pith of stems and roots
- When parenchyma contains chlorophyll it is called a chlorenchyma. It is found in green leaves
- Parenchyma found in aquatic plants have large air cavities which enables them to float, and are hence called aerenchyma.

**13. What is the role of epidermis in plants?**

**Answer:** Role of the epidermis:

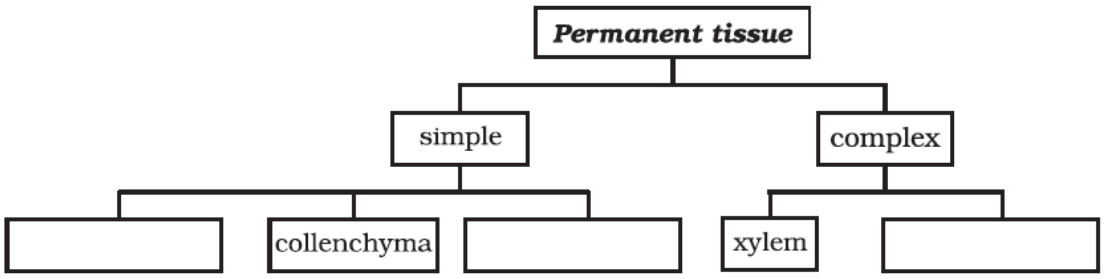
- Protection of different parts of the plant.
- Epidermal cells present in roots, help in the absorption of water.

- For protection against loss of water, mechanical injury, and parasitic fungus by producing a waxy, water-resistant covering called the cuticle, which is made of cutin, on the outer surface of the plant.

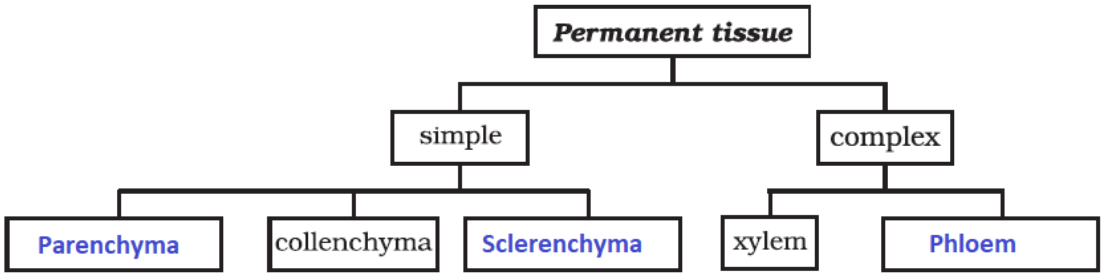
**14. How does the cork act as a protective tissue?**

**Answer:** The cork, which is made up of dead cells, is the bark of a tree. It protects the plant from mechanical damage and temperature extremes, as well as it prevents water loss through evaporation.

**15. Complete the following chart.**




**Answer:** The completed chart is as follows:




**Quick Overview of Detailed Structure of Topics**

| Topic for Tissues | Subtopic for Tissues |
|---|---|
| **Are Plants and Animals Made of the Same Types of Tissues?** | • Understanding Plant and Animal Tissues |
| **Plant Tissues** | • Meristematic Tissue<br>• Permanent Tissue |

| | |
|---|---|
| | • Simple Permanent Tissue<br>• Complex Permanent Tissue |
| **Animal Tissues** | • Epithelial Tissue<br>• Connective Tissue<br>• Muscular Tissue<br>• Nervous Tissue |

**Tissues - Important Points**

- Tissues are groups of cells with similar structures and functions. They work together to perform specific tasks in an organism.
- **Plant Tissues:** Plant tissues are categorized into two types:
    - **Meristematic Tissues:** These tissues are responsible for the growth of the plant. They are found at the tips of roots and shoots.
    - **Permanent Tissues:** These tissues are further classified into three types:
        - **Simple Permanent Tissues:** Parenchyma, Collenchyma, and Sclerenchyma
        - **Complex Permanent Tissues:** Xylem and Phloem
- **Animal Tissues:** Animal tissues are categorised into four types:
    - **Epithelial Tissue:** Covers the body surfaces, lines the body cavities, and forms glands.
    - **Connective Tissue:** Provides support, protection, and structure to the body. Examples include bone, cartilage, blood, and adipose tissue.
    - **Muscular Tissue:** Responsible for movement. There are three types: skeletal, smooth, and cardiac muscle.
    - **Nervous Tissue:** Transmits and receives nerve impulses. It consists of neurons and neuroglia.
- **Functions:**
    - Plant tissues are mainly involved in providing support, conducting water and nutrients, storage, and photosynthesis.

- Animal tissues perform various functions such as protection, support, movement, and coordination of body activities.