

NCERT Solutions for 11th Class Biology:Chapter 6- Anatomy of Flowering Plants



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Class 11: Biology Chapter 6 solutions. Complete Class 11 Biology Chapter 6 Notes.

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NCERT 11th Biology Chapter 6, class 11 Biology chapter 6 solutions

Page No: 99

<https://www.indcareer.com/schools/ncert-solutions-for-11th-class-biologychapter-6-anatomy-of-flowering-plants/>

Exercises

1. State the location and function of different types of meristem.

Answer

Meristems are specialised regions of plant growth. The meristems mark the regions where active cell division and rapid division of cells take place.

Meristems are of three types depending on their location.

→ Apical meristem: These are found at the tips of roots and shoots. The shoot apical meristem is present at the tip of the shoots and its active division results in the elongation of the stem and formation of new leaves. The root apical meristem helps in root elongation.

→ Intercalary meristem: These occurs between the mature tissues present at the bases of the leaves of grasses. It helps in the regeneration of grasses after they have been grazed by herbivores.

Both, apical meristems and intercalary meristems are primary meristems because they appear early in life of a plant and contribute to the formation of the primary plant body.

→ Lateral meristem: These occurs in the mature regions of roots and shoots of many plants and helps them in adding secondary tissues to the plant body and in increasing the girth of plants. It is called the secondary meristem as it appears later in a plant's life.

2. Cork cambium forms tissues that form the cork. Do you agree with this statement? Explain.

Answer

When secondary growth occurs in the dicot stem and root, the epidermal layer gets broken and need to be replaced to provide new protective cell layers. Hence, sooner or later, another meristematic tissue called cork

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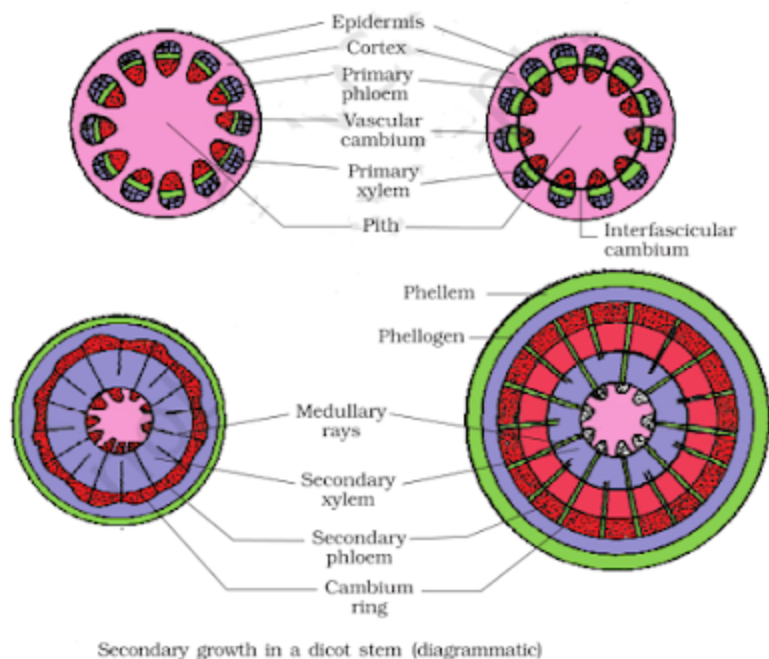
cambium or phellogen develops, usually in the cortex region. Phellogen is a couple of layers thick. It is made of narrow, thin-walled and nearly rectangular cells. Phellogen cuts off cells on both sides. The cells on the outer side get differentiated into the cork or phellem, while the cells on the inside give rise to the secondary cortex or phelloderm.

3. Explain the process of secondary growth in stems of woody angiosperm with help of schematic diagrams. What is the significance?

Answer

In woody dicots, the strip of cambium present between the primary xylem and phloem is called the interfascicular cambium. The interfascicular cambium is formed from the cells of the medullary rays adjoining the interfascicular cambium. This results in the formation of a continuous cambium ring. The cambium cuts off new cells toward its either sides. The cells present toward the outside differentiate into the secondary phloem, while the cells cut off toward the pith give rise to the secondary xylem. The amount of the secondary xylem produced is more than that of the secondary phloem. The secondary growth in plants increases the girth of plants, increases the amount of water and nutrients to support the growing number of leaves, and also provides support to plants.

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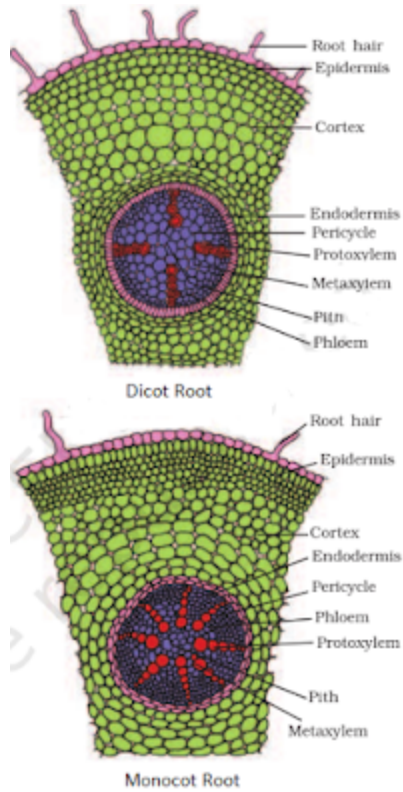
4. Draw illustrations to bring out anatomical difference between

(a) Monocot root and dicot root

(b) Monocot stem and dicot stem

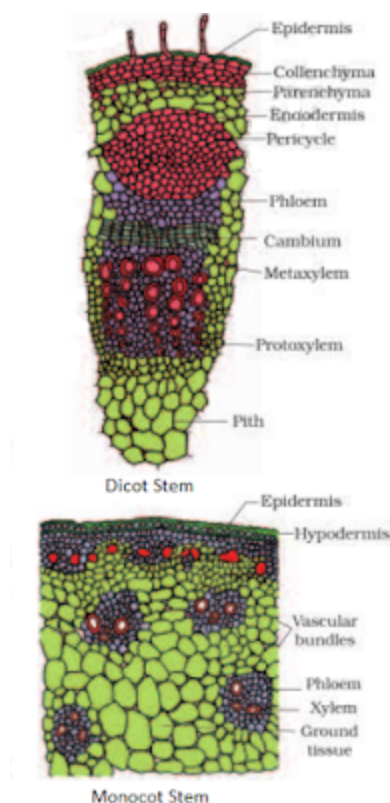
Answer

(a)



(b)

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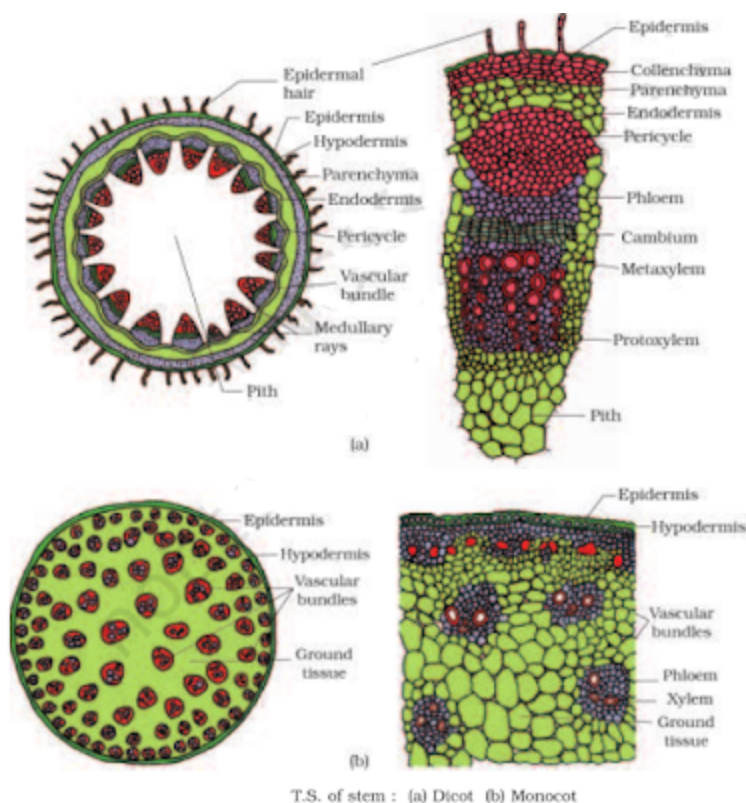


5. Cut a transverse section of young stem of a plant from your school garden and observe it under the microscope. How would you ascertain whether it is a monocot stem or dicot stem? Give reasons.

Answer

The transverse section of monocot and dicot stem are:

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We can ascertain whether it is a monocot stem or dicot stem through the vascular bundles. In dicot system, they are arranged in ring while in monocot system, they are in scattered arrangement.

6. The transverse section of a plant material shows the following anatomical features, (a) the vascular bundles are conjoint, scattered and surrounded by sclerenchymatous bundle sheaths (b) phloem parenchyma is absent. What will you identify it as?

Answer

The monocot stem is characterised by conjoint, collateral, and closed vascular bundles, scattered in the ground tissue containing the parenchyma. Each vascular bundle is surrounded by sclerenchymatous bundle-sheath cells. Phloem parenchyma and medullary rays are absent in monocot stems.

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7. Why are xylem and phloem called complex tissues?**Answer**

Xylem and phloem are known as complex tissues as they are made up of more than one type of cells. These cells work in a coordinated manner, as a unit, to perform the various functions of the xylem and phloem.

Xylem helps in conducting water and minerals and composed of four different kinds of elements, namely, tracheids, vessels, xylem fibres and xylem parenchyma.

- Tracheids are elongated, thick-walled dead cells with tapering ends.
- Vessels are long, tubular, and cylindrical structures formed from the vessel members, with each having lignified walls and large central cavities. Both tracheids and vessels lack protoplasm.
- Xylem fibres consist of thick walls with an almost insignificant lumen. They help in providing mechanical support to the plant.
- Xylem parenchyma is made up of thin-walled parenchymatous cells that help in the storage of food materials and in the radial conduction of water.

Phloem transports food materials and composed of Sieve tube elements, Companion cells, Phloem parenchyma and Phloem fibres.

- Sieve tube elements are tube-like elongated structures associated with companion cells. The end walls of sieve tube elements are perforated to form the sieve plate. Sieve tube elements are living cells containing cytoplasm and nucleus.
- Companion cells are parenchymatous in nature. They help in maintaining the pressure gradient in the sieve tube elements.

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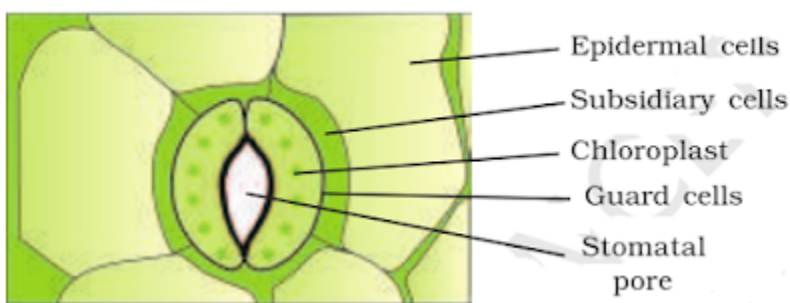
- Phloem parenchyma helps in the storage of food and is made up of long tapering cells, with a dense cytoplasm.
- Phloem fibres are made up of elongated sclerenchymatous cells with thick cell walls.

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8. What is stomatal apparatus? Explain the structure of stomata with a labelled diagram.

Answer

Stomata are structures present in the epidermis of leaves. Stomata regulate the process of transpiration and gaseous exchange. Each stoma is composed of two bean shaped cells known as guard cells which enclose stomatal pore. The inner walls of guard cells are thick, while the outer walls are thin. The guard cells are surrounded by subsidiary cells. These are the specialised epidermal cells present around the guard cells. The pores, the guard cells, and the subsidiary cells together constitute the stomatal apparatus.



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9. Name the three basic tissue systems in the flowering plants. Give the tissue names under each system.

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Tissues present

Epidermal tissue system	Epidermis, trichomes, hairs, stomata
Ground tissue system	Parenchyma, collenchyma, sclerenchyma, mesophyll
Vascular tissue system	Xylem, phloem, cambium

10. How is the study of plant anatomy useful to us?

Answer

The study of plant anatomy is useful in many ways. It helps us understand the way a plant functions carrying out its routine activities like transpiration, photosynthesis and growth and repair. It also helps botanists and agriculture scientists to understand the disease and cure for plants. The study of plant-structure allows us to predict the strength of wood. This is useful in utilising it to its potential. The study of various plant fibres such as jute, flax, etc., helps in their commercial exploitation.

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11. What is periderm? How does periderm formation take place in dicot stem?

Answer

Periderm is composed of the phellogen, phellem, and phelloderm.

During secondary growth, the outer epidermal layer and the cortical layer are broken because of the cambium. To replace them, the cells of the cortex

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turn meristematic, giving rise to cork cambium or phellogen. It is composed of thin-walled, narrow and rectangular cells.

Phellogen cuts off cells on its either side. The cells cut off toward the outside give rise to the phellem or cork. The suberin deposits in its cell wall make it impervious to water. The inner cells give rise to the secondary cortex or phelloderm. The secondary cortex is parenchymatous.

12. Describe the internal structure of a dorsiventral leaf with the help of labelled diagrams.

Answer

Dorsiventral leaves are found in dicots. The vertical section of a dorsiventral leaf contains three distinct parts:

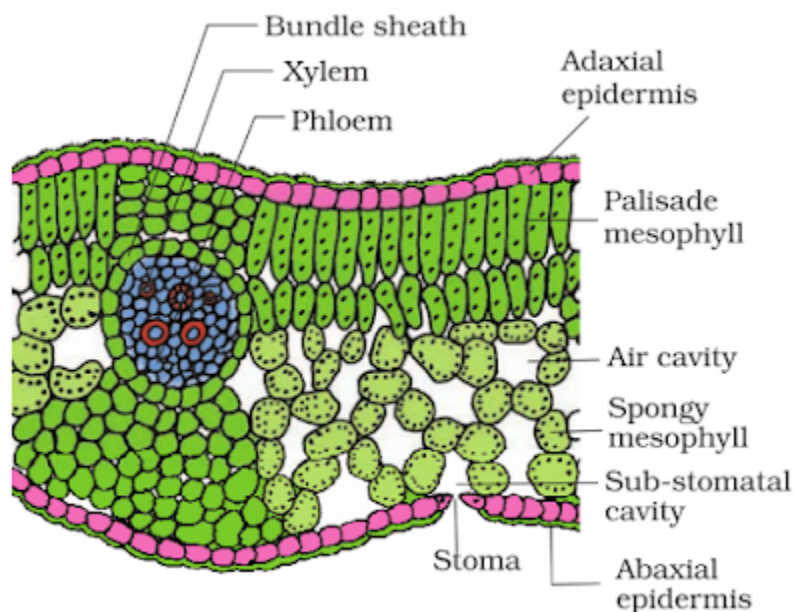
→ Epidermis: The epidermis is present on both upper surface (adaxial epidermis) and lower surface (abaxial epidermis) of the leaf has a conspicuous cuticle.. It is made up of elongated, compactly arranged cells, which form a continuous layer. The epidermis on the outside is covered with a thick cuticle. Abaxial epidermis bears more stomata than the adaxial epidermis.

→ Mesophyll: It is a tissue of the leaf present between the adaxial and abaxial epidermises. It is differentiated into the palisade parenchyma (composed of tall, compactly-placed cells) and the spongy parenchyma (comprising oval or round, loosely-arranged cells with inter cellular spaces). Mesophyll contains the chloroplasts which perform the function of photosynthesis.

→ Vascular system: Vascular system includes vascular bundles, which can be seen in the veins and the midrib. The size of the vascular bundles is dependent on the size of the veins. The veins vary

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in thickness in the reticulate venation of the dicot leaves. The vascular bundles are surrounded by a layer of thick walled bundle sheath cells.



TS of dicot leaf

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Chapterwise NCERT Solutions for Class 11 Biology:

- Chapter 1: The Living World
- Chapter 2: Biological Classification
- Chapter 3: Plant Kingdom
- Chapter 4: Animal Kingdom
- Chapter 5: Morphology of Flowering Plants
- Chapter 6: Anatomy of Flowering Plants
- Chapter 7: Structural Organisation in Animals
- Chapter 8: Cell-The Unit of Life
- Chapter 9: Biomolecules
- Chapter 10: Cell Cycle and Cell Division
- Chapter 11: Transport in Plants
- Chapter 12: Mineral Nutrition
- Chapter 13: Photosynthesis in Higher Plants
- Chapter 14: Respiration in Plants
- Chapter 15: Plant - Growth and Development
- Chapter 16: Digestion and Absorption
- Chapter 17: Breathing and Exchange of Gases
- Chapter 18: Body Fluids and Circulation
- Chapter 19: Excretory Products and Their Elimination
- Chapter 20: Locomotion and Movement
- Chapter 21: Neural Control and Coordination
- Chapter 22: Chemical Coordination and Integration

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Organise pre-service and in-service training of teachers; develop and disseminate innovative educational techniques and practices; collaborate and network with state educational departments, universities, NGOs and other educational institutions; act as a clearing house for ideas and information in matters related to school education; and act as a nodal agency for achieving the goals of Universalisation of Elementary Education.

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