



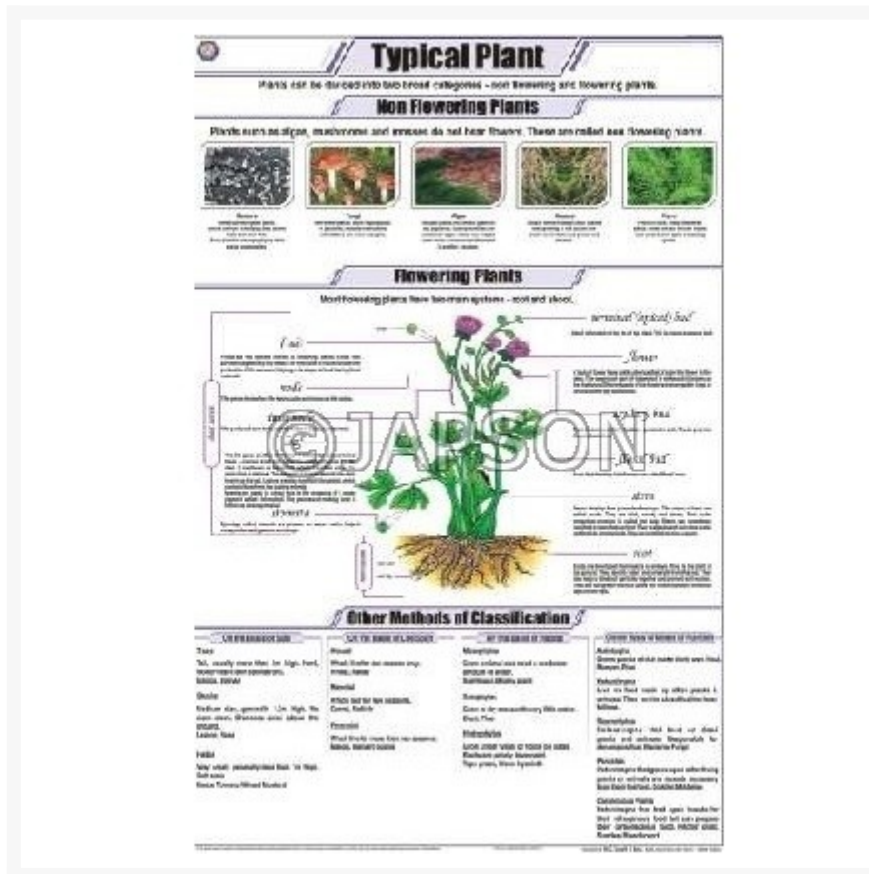
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# Plant Charts, Botany, School Education

## Product Image



## Description

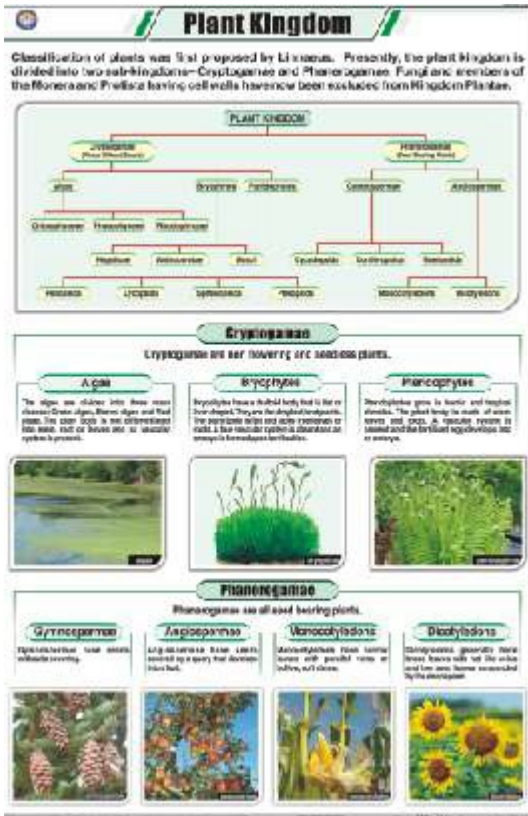
**Standard Size : 58x90cms**

**Language : English**

Laminated Paper Charts with Plastic Rollers. These Charts have technically accurate and detailed description in vivid colours.

**Note:** Based on minimum order quantity conditions, Charts can be customized to your requirements in terms of CONTENT, LANGUAGE, SIZE, etc. Please write back to us for discussion.

A. Charts, Plant Kingdom



B. Charts, Typical Plant



C. Charts, Typical Plant Cell

D. Charts, Plant Mitosis

### Typical Plant Cell

**Cell Wall:** It is made up of cellulose. It is a rigid layer that surrounds the cell and provides structural support.

**Plasma Membrane:** It is a selectively permeable membrane that controls the movement of substances in and out of the cell.

**Cytoplasm:** It is a gel-like substance that fills the cell and contains various organelles.

**Nucleus:** It is a large, spherical organelle that contains the cell's genetic material (DNA).

**Chloroplasts:** They are green organelles that perform photosynthesis, converting light energy into chemical energy.

**Mitochondria:** They are bean-shaped organelles that generate energy for the cell through cellular respiration.

**Endoplasmic Reticulum:** It is a network of membranes that is involved in protein synthesis and transport.

**Golgi Apparatus:** It is a series of stacked, flattened sacs that are involved in the transport and processing of proteins.

### Plant Cell Mitosis

Mitosis is a kind of cell division in which the chromosomes are duplicated and distributed equally to the daughter cells. It occurs in somatic cells.

**I. Prophase:** During Prophase, the chromatin fibers condense into visible chromosomes. The nuclear envelope and nucleolus disappear.

**II. Prometaphase:** During Prometaphase, the nuclear envelope breaks down, and spindle fibers attach to the centromeres.

**III. Metaphase:** During Metaphase, the chromosomes align at the equatorial plate (metaphase plate).

**IV. Anaphase:** During Anaphase, the sister chromatids separate and move toward opposite poles of the cell.

**V. Telophase:** During Telophase, a new nuclear envelope is formed around each set of chromosomes, and the nucleolus reappears.

E. Charts, Plant Cell Organelles

F. Charts, Plant Tissues

### Plant Cell Organelles

**Nucleus:** The control center of the cell, containing DNA.

**Cell Wall:** The rigid outer layer that provides structural support.

**Chloroplasts:** Organelles that perform photosynthesis.

**Mitochondria:** Organelles that generate energy for the cell.

**Endoplasmic Reticulum:** A network of membranes for protein synthesis.

**Golgi Apparatus:** A series of stacked sacs for processing and transport of materials.

**Vacuole:** A large, fluid-filled sac that maintains cell turgor.

**Plasma Membrane:** The boundary of the cell that is selectively permeable.

**Cellulose:** The primary component of the cell wall.

**Chlorophyll:** The green pigment in chloroplasts that captures light energy.

### Plant Tissues

Tissues are any kind of cellular fabric that occur in a living being's body. Usually a body has several kinds of tissues which can be distinguished on the basis of their functions. Each tissue contains a particular kind of cell that performs a specific function.

**Meristematic Tissue:** These are the tissues in which the cells are capable of dividing continuously throughout their life. They are present in the growing regions of the plant, such as the shoot apical meristem.

**Permanent Tissue:** These are the tissues that have lost the ability to divide and are specialized for specific functions. They are further divided into Simple Permanent Tissue and Complex Permanent Tissue.

**Simple Permanent Tissue:**

- Parenchyma:** The most common type of simple permanent tissue, consisting of thin-walled cells.
- Collenchyma:** Composed of cells with thickened corners, providing mechanical support.
- Sclerenchyma:** Composed of cells with thickened walls, providing mechanical support.
- Scleroids:** A specialized type of sclerenchyma with thickened walls, providing mechanical support.

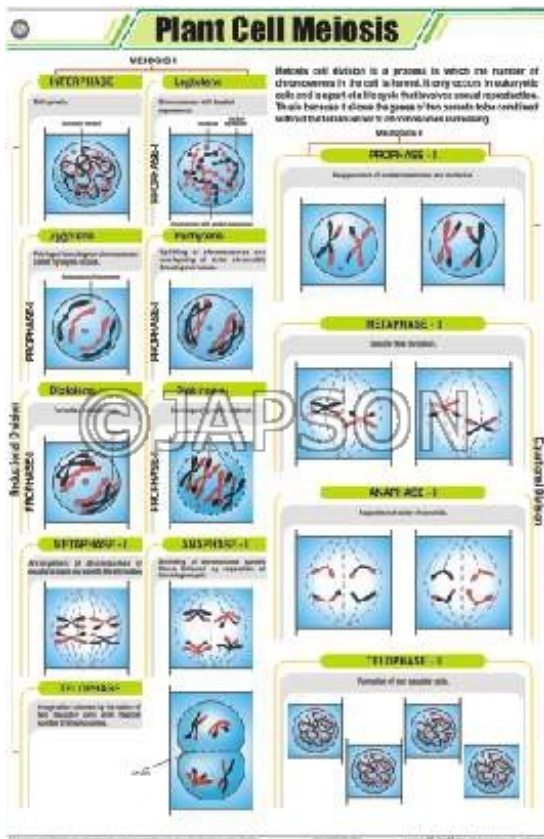
**Complex Permanent Tissue:**

- Xylem:** Responsible for the conduction of water and minerals from the roots to the leaves.
- Phloem:** Responsible for the conduction of organic nutrients from the leaves to other parts of the plant.

**Secretory Tissue:** These are the tissues that secrete substances. They are further divided into Laticiferous Tissue and Glandular Tissue.

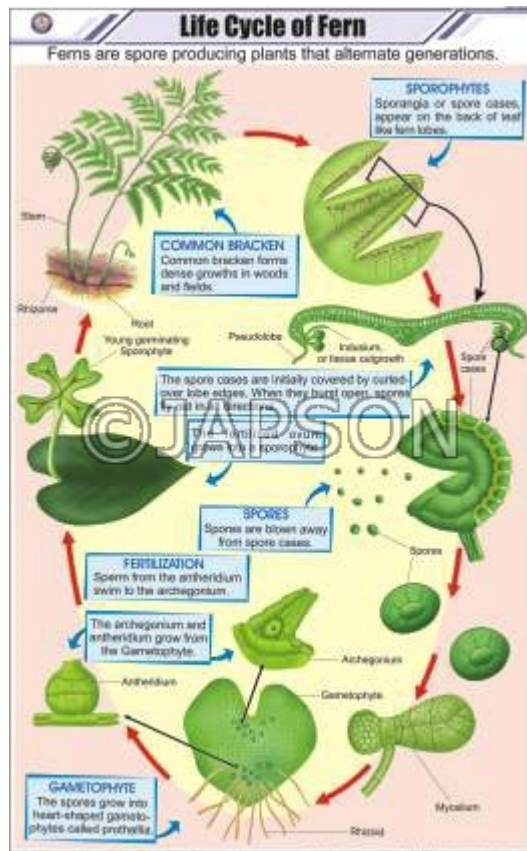
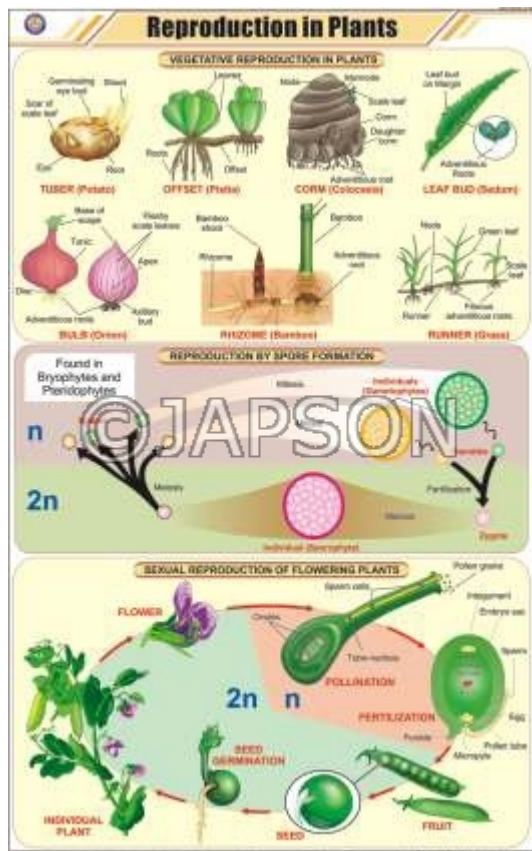
G. Charts, Plant Cell Meiosis

H. Charts, Plant Diseases



I. Charts, Reproduction in Plants

J. Charts, Life Cycle of Fern



K. Charts, Parasitic Plants

L. Charts, Life Cycle of Moss

### Parasitic Plants

Parasitic plants are vascular plants with specialised organs (Haustorium) that penetrate the tissues of other vascular plants (Hosts) and absorb water, minerals and sometimes products of photosynthesis.

**HOLOPARASITES**

These are also known as "obligate parasites" because of their obligation to find a host in order to survive. They parasitise a host both physically and biologically.

<p><b>RAFFLESIA</b></p> <p>It has a large, fleshy, red flower that lacks leaves and stems. It is a holoparasite that derives its nutrients from the host plant's vascular system.</p>	<p><b>IVY BROODMOP</b></p> <p>It is a holoparasite that lacks chlorophyll and is entirely dependent on its host for food and water. It is a stem parasite.</p>	<p><b>CUSCUTA</b></p> <p>It is a holoparasite that lacks chlorophyll and is entirely dependent on its host for food and water. It is a stem parasite.</p>
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**HEMIPARASITES**

These are also known as "facultative parasites" because they are not completely parasitic. They are capable of both photosynthesis and parasitism. Hemiparasites attach to the host to supplement their own photosynthesis.

<p><b>INDIAN PAINTBRUSH</b></p> <p>It is a hemiparasite that has chlorophyll and can photosynthesize, but it also has a haustorium to absorb water and minerals from its host.</p>	<p><b>MISTLETOE</b></p> <p>It is a hemiparasite that has chlorophyll and can photosynthesize, but it also has a haustorium to absorb water and minerals from its host.</p>	<p><b>OWL'S CLOVER</b></p> <p>It is a hemiparasite that has chlorophyll and can photosynthesize, but it also has a haustorium to absorb water and minerals from its host.</p>
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### Life Cycle of Moss

The life cycle of a moss is dominated by the green, leafy gametophyte (haplophase). The sporophyte (diplophase) consists only of the ascending stalk and capsule.

M. Charts, Hydrophytes

N. Charts, Insectivorous Plants

### Hydrophytes

**External Features**

1. Roots are extremely short and poorly developed.
2. Stem is long, slender, springy and flexible.
3. In monocotyledonous plants, the leaves are thin, long and ribbon-shaped or linearly attached.
4. Floating leaves are large, wide, flat and are attached with long or curved petioles.
5. The leaves of emergent and amphibious hydrophytes are broad and flat.

**Anatomical Characters**

1. All hydrophytes show presence of large air chambers. The tissues that form air chambers are called aerenchyma.
2. Hydrophytes, especially those (dicotyledons) in which primary development is absent.
3. Xylem tissue is small in amount.
4. Ducts are absent.
5. Stomata are absent in submersed hydrophytes.

### Insectivorous Plants

The autotrophic plants growing in nitrogen deficient conditions and fulfilling their nitrogen requirement by digesting insects. They are divided into four groups on the basis of insect trapping mechanism.

<p><b>Plants with sensitive glandular hairs on the surface of leaves secreting sweet sticky liquid.</b></p> <p>Body fluids on the insects get stuck to the liquid.</p>	<p><b>Plants having sensitive trigger hairs on the leaf surface.</b></p> <p>If fly touches a sensitive hair, trigger hairs are pulled and the leaf closes. The leaf closes tightly and digestive juices attack the fly.</p>
<p><b>Plants with leaves modified into pitchers.</b></p> <p>Leaf blade, stem, and leaf base are modified into pitcher-like structure. A pool of liquid is formed in the pitcher. Insects are attracted to the liquid and get stuck to it.</p>	<p><b>Plants having segmented leaves with some of the segments modified into bladder.</b></p> <p>Bladder-like structure is formed. The bladder is filled with mucus. The bladder is pulled up and sticks to the insect. The bladder is then pulled down and the insect is trapped.</p>

O. Charts, Xerophytes

P. Charts, Mesophytes

### Xerophytes

Xerophytes occur in regions where the amount of water in the soil is very less.

**External Features of Xerophytes**

- The root system is well developed, probably branched and extremely deep.
- The root reaches to a great depth.
- The leaf is generally hard and fleshy.
- In a woody stem, the lenticels are absent.
- Stems may also be fleshy and greatly succulent.
- Some plants have modified stems, for example in Opuntia stem forms a ball like structure called phylloclad. In Asparagus and Phorbia the leaf like structures formed by the leaf called cladodes.
- Leaves are often hard in Sarcocolla.
- Leaves are covered with hairs in Trichophyllum.
- Leaves are smaller in size and reduced in Mesophyllum.
- Leaves are reduced to spines in Mesquiquito.



*Argemone munitida*      *Crotalaria retusa*

(Xerophyte)      (Mesophyte)      (Xerophyte)

**Examples:** Argemone munitida, Crotalaria retusa, Sarcocolla, etc.

**External Features:**

- Succulent stem:** One is habituated with low or no water in the environment where it exists. *Examples:* Euphorbia, Opuntia, etc.
- Succulent stem:** One is habituated with low or no water in the environment where it exists. *Examples:* Euphorbia, Opuntia, etc.

**Anatomical Characters of Xerophytes**

- Reduction in the rate of transpiration.
- Presence of leaves which can retain more water.
- Presence of thick cuticle on leaf and stem epidermis.
- Reduced stomatal frequency.
- Stomata closed during day.
- A thick envelope of hairs on epidermis and around vascular bundle.
- Intercellular spaces are only a few and also very small.
- Reduced loss of the xylem tubes and xylem vessels are well developed.
- Vascular tissues are present in large amount.



*Portulaca oleraceus*      *Crotalaria retusa*

**Examples:** Portulaca oleraceus, Crotalaria retusa, Cereus, Yucca, etc.

### Mesophytes



**Banyan**      **Chrysanthemum**

**GENERAL DESCRIPTION**

- Mesophytes are the plants that grow under moderate conditions of light and moisture.
- The soil water is neither too much nor too little.
- The temperature of the air is neither too high nor too low.
- Mesophytes are, therefore, intermediate between hydrophytes and xerophytes.

**EXTERNAL FEATURES**

- The root system is well developed.
- Leaves are not too small and not too large.
- The stem is soft, erect and normally branched.
- There are stem and lateral roots.

**ANATOMICAL CHARACTERS**

- Herbaceous and succulent stems from moderate water.
- Leaves are not too small and not too large.
- The stem is soft, erect and normally branched.
- In some leaves, a tissue of mesophyll cells, spongy mesophyll and guard cells are present.



**Pea**      **Mango**

## Disclaimer

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