

### 3. PICTORIAL FEATURE OF PLANT KINGDOM

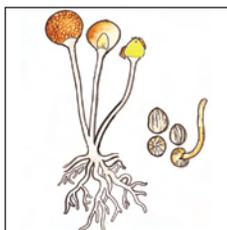


#### 3.1. FUNGI

**Fungi do not have chlorophyll and cannot prepare their own food.**

All of us would have noticed the sudden growth of mushrooms soon after the rain in humus soil. They belong to the kingdom of fungi.

Fungi is a third kingdom of Whittaker which include moulds, mushrooms, toadstools, puff balls and bracket fungi.



Mould



Mushroom



Bracket fungi



Puff balls

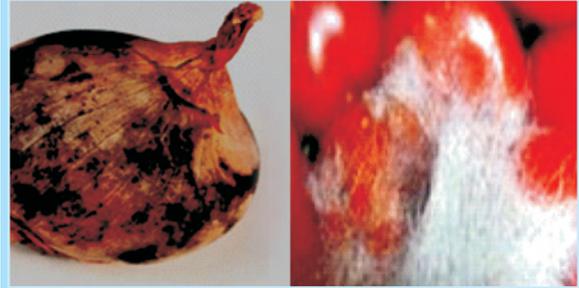
### Features of fungi

1. They may be unicellular (e.g., Yeast) or multicellular (Rhizopus, Agaricus, Aspergillus)
2. They are non green organisms as they lack chlorophyll.
3. Their body is made up of hyphae called mycelium and is covered by cell wall made up of chitin.
4. It reproduces by sexual or asexual reproduction.
5. Based on nutrition, fungi are classified into three types.
  - **Parasites**- Fungi living on other living organisms. e.g., Puccinia.
  - **Saprophytes**- Fungi living on dead and decaying matter. e.g., Agaricus, Rhizopus.
  - **Symbionts**- Fungi (living associated with algae (lichens) or on the roots of higher plants (Mycorrhizae).

### ACTIVITY 3.1

Let us list out few eatables affected by the growth of fungi, which you have observed.

- 1.....2.....  
3.....4.....

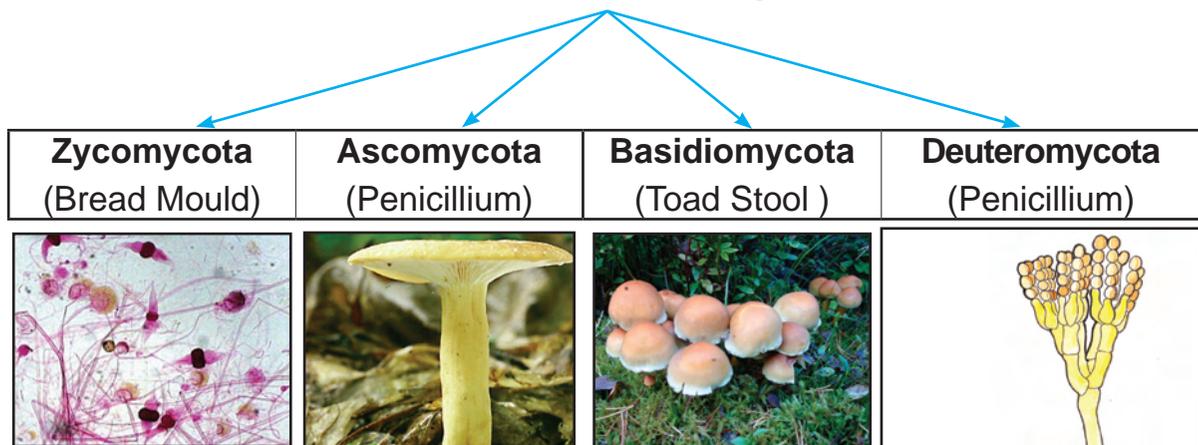


*Fungal affected Onion and tomato*

### MORE TO KNOW

- There are about 1,00,000 different species of fungi that have been named.
- Lichens are bio indicators of environmental contamination.

### Classification of Fungi



## We and fungi

### 1. Food

The mushrooms are rich in protein and minerals. The most commonly eaten mushroom is button mushroom i.e., *Agaricus*. All the mushrooms are not edible. There are 2,000 species of edible mushrooms.

**Edible mushroom:** e.g., *Agaricus campestris*, *Agaricus bisporus* etc.

**Poisonous mushrooms (Toadstools)** *Amanita muscaria*, *Amanita phalloides* (death cup) etc.



*Agaricus campestris*



*Amanita Phalloides*



*How can I differentiate the edible mushrooms from the poisonous ones?*

Poisonous mushrooms are usually brightly coloured.

### 2. Antibiotics

It is a chemical substance extracted from one living organism to kill or stop the growth of the other living organism.

Such antibiotic, like Penicillin, is extracted from fungi, *Penicillium* and other common antibiotics are Streptomycin, Neomycin, Kanamycin, Gentamycin and Erythromycin.

### 3. Vitamins

Fungi *Ashbya gossypii* and *Erythrothecium ashbyii* are used in the synthesis of Vitamin B-riboflavin

### Fungal diseases

**Human** - Mycoses (growing on skin, nails, hair, organs), athlete's foot, ringworm.

**Animals** - Ergot, athlete's foot.

**Plants** - Rust, black rot, black spot, canker.

### ACTIVITY 3.2

- Observe the mushrooms that grow after the rain in your area. Note down their colour, shape and various parts.
- Visit a nearby mushroom cultivation centre and learn the process of cultivation.

### MORE TO KNOW

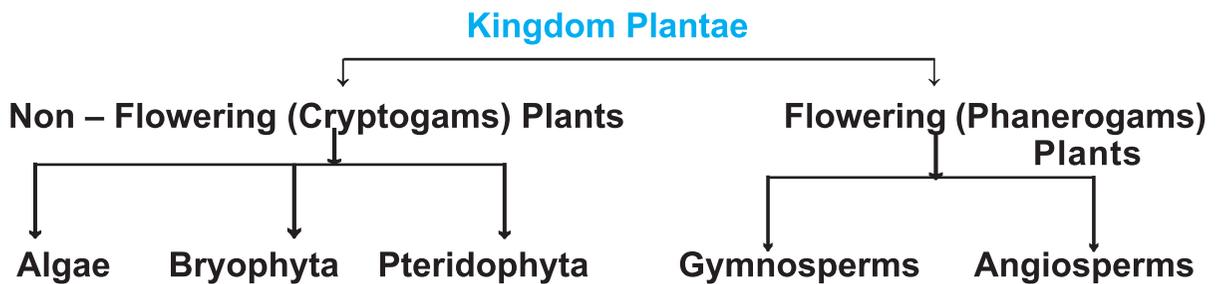
*Claviceps purpurea* – Hallucinogenic fungi cause the greatest damage to the frustrated youth by giving unreal, extraordinary lightness and hovering sensation.

*Aspergillus* cause allergy to children while *Cladosporium* protects against allergy.

## 3.2. FLOWERING AND NON FLOWRING PLANTS



The plants in this world are classified into flowering and non-flowering plants. The classification of kingdom plantae is given below



### Non flowering plants

#### 3.3. ALGAE

1. They are green water plants called algae. They are lowest and simplest primitive plants. Their body is not differentiated into root, stem or leaf.
2. They may be unicellular, multicellular, filamentous or branched and tree like.

3. They possess chlorophyll and can prepare their own food.
4. Their cell wall is made up of cellulose.
5. Algae reproduce by
  - **vegetative reproduction** (fragmentation) e.g. *spirogyra*
  - **Asexual reproduction** (Spores)

- Sexual reproduction
- Scalariform conjugation and Lateral conjugation e.g., *Spirogyra*
- By producing sex organs Antheridia and archegonia e.g., *Chara*.

**ACTIVITY 3.3**  
Collect some pond water along with algae and observe under the microscope.

**MORE TO KNOW**  
The California giant kelp (brown marine algae) is the fastest-growing sea weed (15 cm/day & 160ft/year).

### Classification of Algae

Algae have photosynthetic pigments which may be green, brown, red or blue green according to the dominant pigment present in them. They are classified on the basis of their colour as given below.

S.No.	1	2	3	4
Colour	Blue-green	Green	Brown	Red
Pigment	Phycocyanin	Chlorophyll	Fucoxanthin	Phycoerythrin
Class	Cyanophyta	Chlorophyta	Phaeophyta	Rhodophyta
Reserve Food	Cyanophycean Starch	Starch	Laminarian	Floridean Starch
Example	Oscillatoria 	Chlamydomonas 	Sargassum 	Polysiphonia 

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### Uses of Algae

#### 1. Food

- The following algae are used as food by human being, domestic animals and fishes. e.g., *Ulva*, *Laminaria*, *Sargassum*, *Chlorella*

#### 2. Agar Agar

- This substance is obtained from the red algae e.g., *Gelidium* and *Gracillaria*.
- It is used to make ice creams.

- It is used as culture medium for growing plants in test tubes. (Tissue culture)

#### 3. Iodine

- It is obtained from *Laminaria* a brown algae.

#### 4. Algae in space travel

- *Chlorella pyrenoidosa* is used in space travel to get rid of CO<sub>2</sub> and other body waste and it also decomposes human urine.

### 3.4. BRYOPHYTES

The trees and rocks of hilly areas are covered by thick green carpet of tiny plants. They are the first plants to come out of water to get adapted to live on the land. But can reproduce only in the presence of water.

- The mosses has root like stem like and leaf like structure.

- They have alternation of generation. (Sporophytic phase alternates with the Gametophytic phase)
- They reproduce sexually by gametes and asexually by spores, gemma and fragmentation.
- They live both on land and water so they are called amphibious cryptogams.

#### Classification of Bryophyta

Classification of Bryophyta		
<p><b>Class – Hepaticae</b></p> <ul style="list-style-type: none"> <li>▪ Undifferentiated thallus</li> <li>▪ Protonemal stage absent e.g., Riccia</li> </ul>	<p><b>Class – Anthocerotae</b></p> <ul style="list-style-type: none"> <li>▪ Sporophyte is differentiated in to seta and capsule</li> <li>▪ Protonemal stage absent e.g. Anthroceros</li> </ul>	<p><b>Class – Musci</b></p> <ul style="list-style-type: none"> <li>▪ Differentiated into root like stem like leaf like organs. e.g. Funaria</li> </ul>
		

#### Uses of Bryophytes

- Peat moss or sphagnum in dried condition is used as fuel.
- Sphagnum is also used as antiseptic and absorbent bandage in the hospitals.
- Sphagnum is also used as seed bed in green houses.
- Bryophytes control soil erosion as they form a carpet over the soil.

#### MORE TO KNOW

Sphagnum moss was once used in disposable diapers because it soaks liquid well.

#### ACTIVITY 3.4

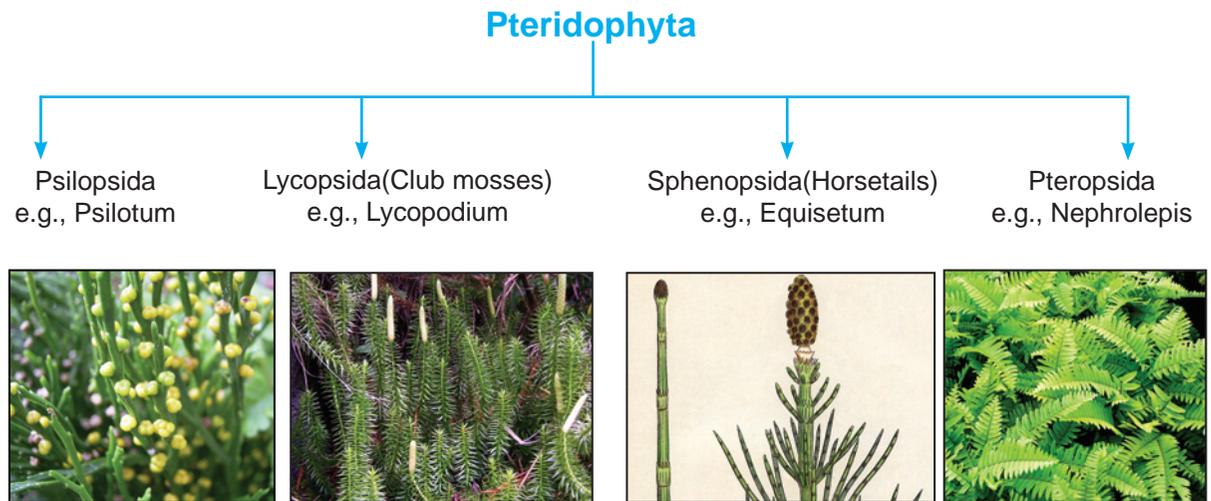
Let us visit a nearby nursery of plants and observe the horticultural methods, where they use Sphagnum.

### 3.5. PTERIDOPHYTES

The first successful group of cryptogames to live on the land like vascular system are pteridophytes. They are called vascular cryptogams (xylem and phloem to conduct water and food). These plants are living since the Jurassic period.

- Leaves are called as fronds (sporophylls) They bear sporangia on the ventral [lower] side

- The leaves are dimorphic [two types of leaves] in selaginella
- Stem is a rhizome. They are seedless true land plants
- They reproduce by means of spores
- Spores may be homosporous or heterosporous Sporophyte alternates with the gametophyte.



#### Uses of Pteridophytes

- Grown as ornamental plants for their beautiful fronds.
- Marselia is used as food
- Dryopteris is used as vermifuge.
- Lycopodium powder is used as medicine.

- Leaves vary in nature
- Gymnosperms undergo secondary thickening
- They have two phases in its

### 3.6. GYMNOSPERMS

- Plant body is differentiated into root, stem and leaf.
- Well developed tap root system



Gymnosperms

*Pictorial Feature on Plant Kingdom*

life cycle. Sporophytic and Gametophytic phase

- Most of the Gymnosperms produce male and female cones

**Classification of gymnosperms**

**1. Cycadales:- e.g., cycas**

- Palm like small plants (erect and unbranched)
- Leaves are pinnately compound forming a crown
- Taproot system have coralloid roots



*Cycas tree*



*Ginkgo biloba*

**2. Ginkgoales:- e.g., Ginkgo biloba**

- It is the only living species of the group

- It is a large tree with fan shaped leaves.
- They produce offensive smell.

**3. Coniferales:- e.g., Pinus**

- Evergreen trees with cone like appearance
- Needle like leaves or scale leaves
- Seeds are winged



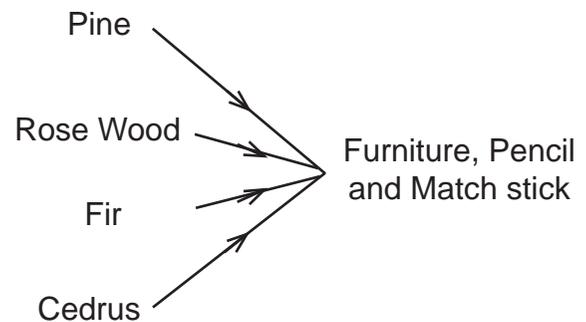
*Pinus tree*

**4. Gnetales:- e.g., Gnetum**

- Small group of plants with advanced characters
- Ovules are naked present on flower like shoot



**Uses of gymnosperms**



1. Timber, oils and resins are produced from *pinus*. Resins are used in the manufacturing of paints, ointments and varnishes.
2. *Ephedra* → Ephedrine (Alkaloid) → cures asthma
3. *Gnetum* → cures rheumatism.  
*Agathis* → paper pulp → paper.
4. Monkey's puzzle (*Araucaria*) → evergreen ornamental plant.

### 3.7. ANGIOSPERMS

1. Angiosperms are flowering plants forms one of the major group of seed plants with atleast 2,60,000 living species.
2. They occupy every habitat on earth except extreme environments. They can be small herbs, shrubs, lianes or giant trees.
3. Conducting tissues (xylem and phloem) are present.
4. secondary growth is observed (formation of bark).



5. Ovules are enclosed within the carpels of ovary Which later gets modified into fruit. Ovules become seeds and seeds have cotyledons.

Angiosperms are crucial for human existence. They are the sources for food, clothing fibres, medicine and timber.

### Classification of angiosperms

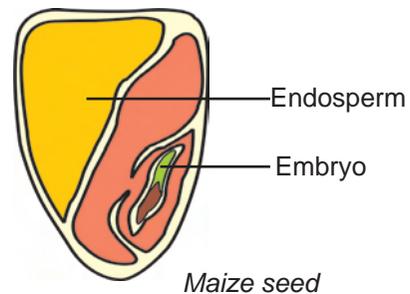


### ACTIVITY 3.5

Take few gram seeds and maize, soak them in water. After sometimes dissect and observe.

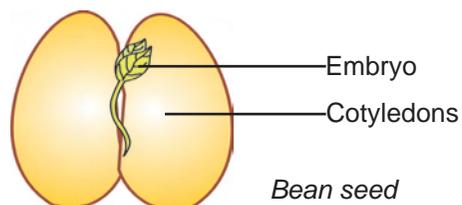
### 3.8. MONOCOTYLEDONS

The plants which have seeds with only one cotyledon are called as monocotyledons. e.g., grass, paddy, maize, wheat



### 3.9. DICOTYLEDONS.

The plants which have the seeds with two cotyledons are called as dicotyledons. e.g., bean, pea, mango.



## Morphology of dicot and monocot plant

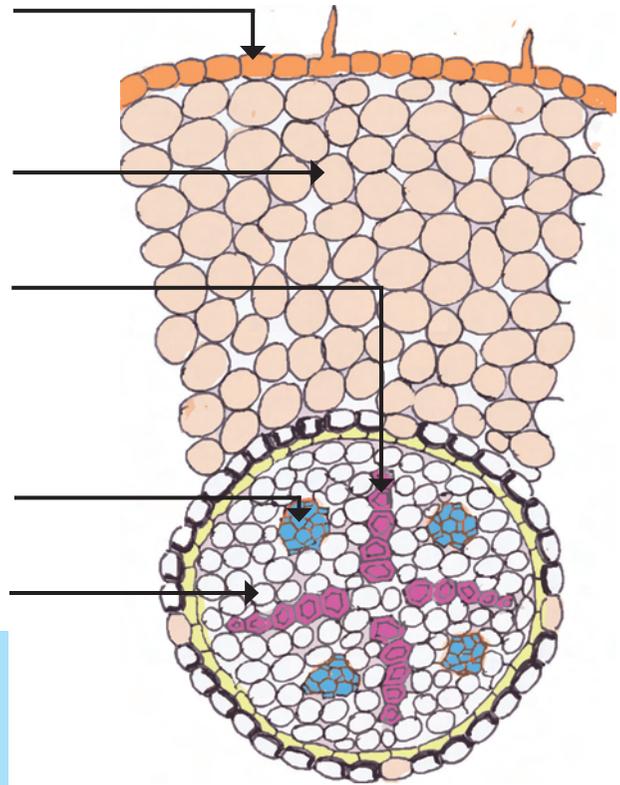
Parts of the plant	Dicot	Monocot
Root	Tap root system	Fibrous root system
Leaf	Reticulate venation	Parallel venation
Flower	Calyx and corolla are differentiated eg. Mango, Neem. Floral parts are in the sets of 4 or 5.	Calyx and corolla not differentiated but fused to form perianth. Floral parts are in the sets of 3.

### ACTIVITY 3.6

Pull out a grass plant and a small Acalypha plant. Observe the morphological difference between dicot and monocot.

### 3.10. STRUCTURE OF ROOT

- The outer most layer of the root is **rhyzodermis**. It gives rise to unicellular root hairs.
- The next layer is **cortex**, helps in conduction and storage.
- The **xylem** vessels transport water from roots to various parts of the plant.
- The **phloem** vessels translocates food from leaves to other parts of the plant.
- There is a **conjunctive tissue** between xylem and phloem.
- Pith is the centre part of the root. It is present in monocot and absent in dicot it helps in storage.



T.S. of Dicot root

Many xylem bundles in monocot (Polyarch)  
Four xylem bundles in dicot (Tetrarch)

### 3.11. STRUCTURE OF A STEM

- **Cuticle** - waxy coating
- **Epidermis** - barrel shaped cells, gives protection and produces multi cellular epidermal hairs
- **Cortex**- it is divided into three layers.

**Collenchyma** – thick walled, gives mechanical support.

**Chlorenchyma** - thin walled, filled with chlorophyll and helps in photosynthesis.

**Parenchyma** - thin walled, helps in storage and ventilation.

- **Endodermis** (Starch Sheath) – barrel shaped, helps in protection and conduction.
- **Pericycle** - parenchyma alternates with sclerenchyma
- **Vascular bundle**

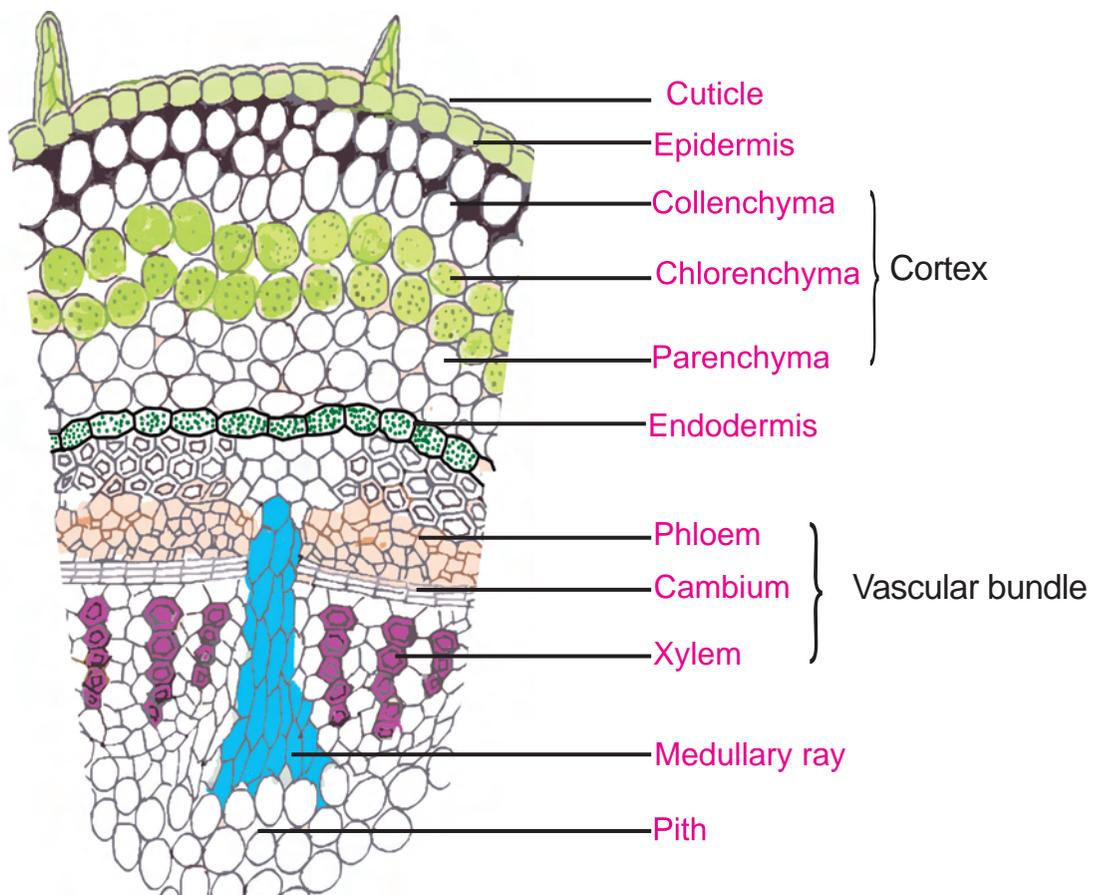
**Phloem** - Translocates food

**Cambium** - secondary growth

**Xylem** - conducts water

**Medullary ray**- extends between vascular bundles

- **Pith**- helps in conduction



T.S of Dicot stem (Sunflower)

### 3.12. STRUCTURE OF LEAF

- **Cuticle** – Outermost layer.
- **Upper epidermis** – Barrel shaped cells. Helps in protection.
- **Mesophyll tissue**

**Palisade parenchyma** – cylindrical cells have chlorophyll and helps in photosynthesis.

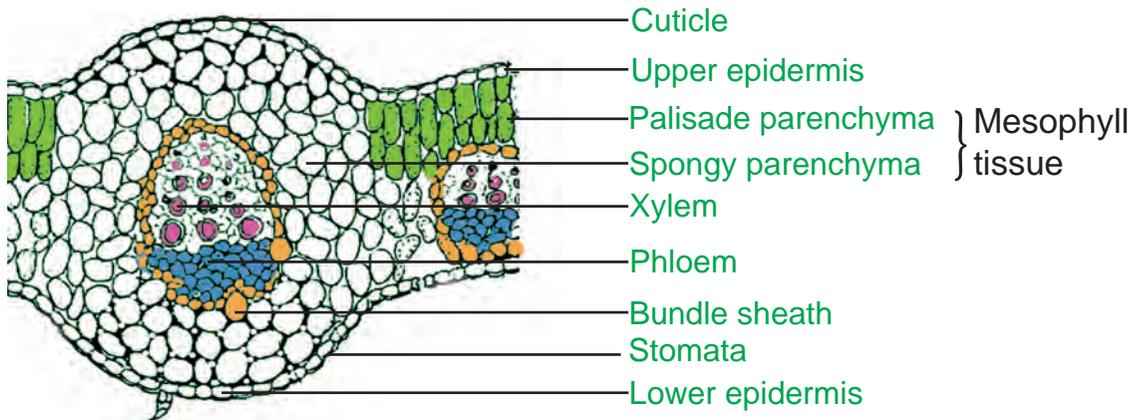
**Spongy parenchyma** – oval or round shaped without chlorophyll helps in storage and conduction.

● **Vascular bundle - xylem** conducts water, **phloem** translocates food.

● **Lower epidermis** – barrel shape, have stomata, helps in exchange of gases and transpiration.

**Isobilateral** – (either spongy or palisade parenchyma are present) in monocot.

**Dorsiventral** – (both palisade and spongy parenchyma are present) in dicot.



T.S of Dicot leaf (Sunflower)

## EVALUATION

### 1. Choose the correct answer

- An example of saprophyte. (Puccinia / Agaricus) \_\_\_\_\_
- Agar-agar is obtained from (Gelidium / Chlorella) \_\_\_\_\_
- \_\_\_\_\_ is a palm like Gymnosperm. (Cyca / Pinus)
- \_\_\_\_\_ are called as amphibious cryptogams (Bryophytes/Pteridophytes)
- The algae which decomposes human urine is \_\_\_\_\_  
 \_\_\_\_\_ [spirullina/chlorella]

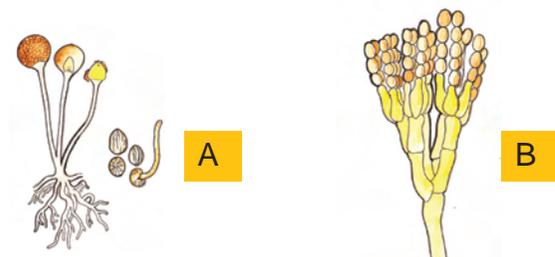
## 2. Reason Out In Short

- a) Pteridophytes are vascular cryptogames.
- b) Antibiotics are extracted from bacteria and fungi. They stop the growth of micro organisms and cure diseases. Give any two antibiotics obtained from fungi.

## 3. How are the following organisms called?

- a) Algae prepare their own food.
- b) Fungi either depend on living organisms or non living things for their food.
- c) An organisms having both algal and fungal characters

## 4. Name the fungai



## 5. a) Match the following

- |                   |   |               |
|-------------------|---|---------------|
| i) Algae          | — | Nephrolepis   |
| ii) Bryophyta     | — | Chlamydomonas |
| iii) Pteridophyta | — | Riccia        |

- b) I am a true terrestrial plant. I have root, stem, leaf. I reproduce through spores but I don't have flowers. Who am I? Explain :-

## FURTHER REFERENCE

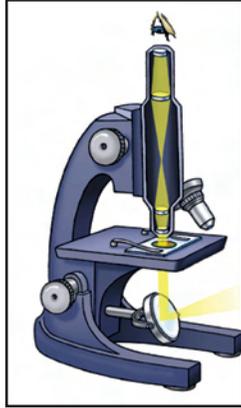
**Books** Outline of Botany- R.V. Narayanasamy, K.N.Rao. and Dr. A. Raman - S.Viswanathan Printers and Publishers

### Websites

[www.fivekingdomclassification.com](http://www.fivekingdomclassification.com)  
[www.wikipedia.org/wiki/plants](http://www.wikipedia.org/wiki/plants)

## 4. MICRO ORGANISMS

Vijay brings his microscope in to the class room. He shows an empty glass slide and another micro slide specimen and he permits his friends to observe.



Compound Microscope

**Vijay:-** Do you see any thing in the micro-slide?

**Sheelan:-** Yes, it is an amoeba on the slide.

**Vijay:-** Today we shall learn more things about micro-organisms through the internet.

As both of them started browsing the internet about micro-organisms,

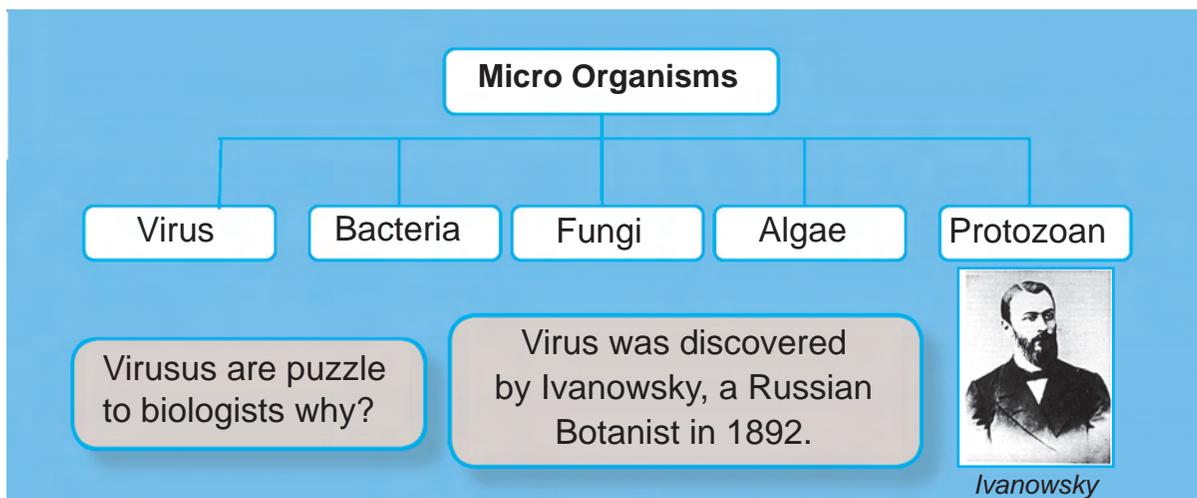
they started getting information about micro-organisms.

Living organisms show a great degree of diversity in their size. A considerable number of species are not visible to the naked eye. They can be seen only with the help of a microscope. Such organisms which can be seen through a microscope are called micro organisms.

They are measured in microns and millimicrons. Example: Virus, bacteria, algae, fungi and protozoan like ***Amoeba, Plasmodium***.

### 4.1. VIRUS

**Virus** is a Latin word which means **poison**. Viruses are the smallest and simplest of all living organisms. The study of viruses is called **Virology**. Viruses show both living and non-living characteristics. They are considered



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