Aim

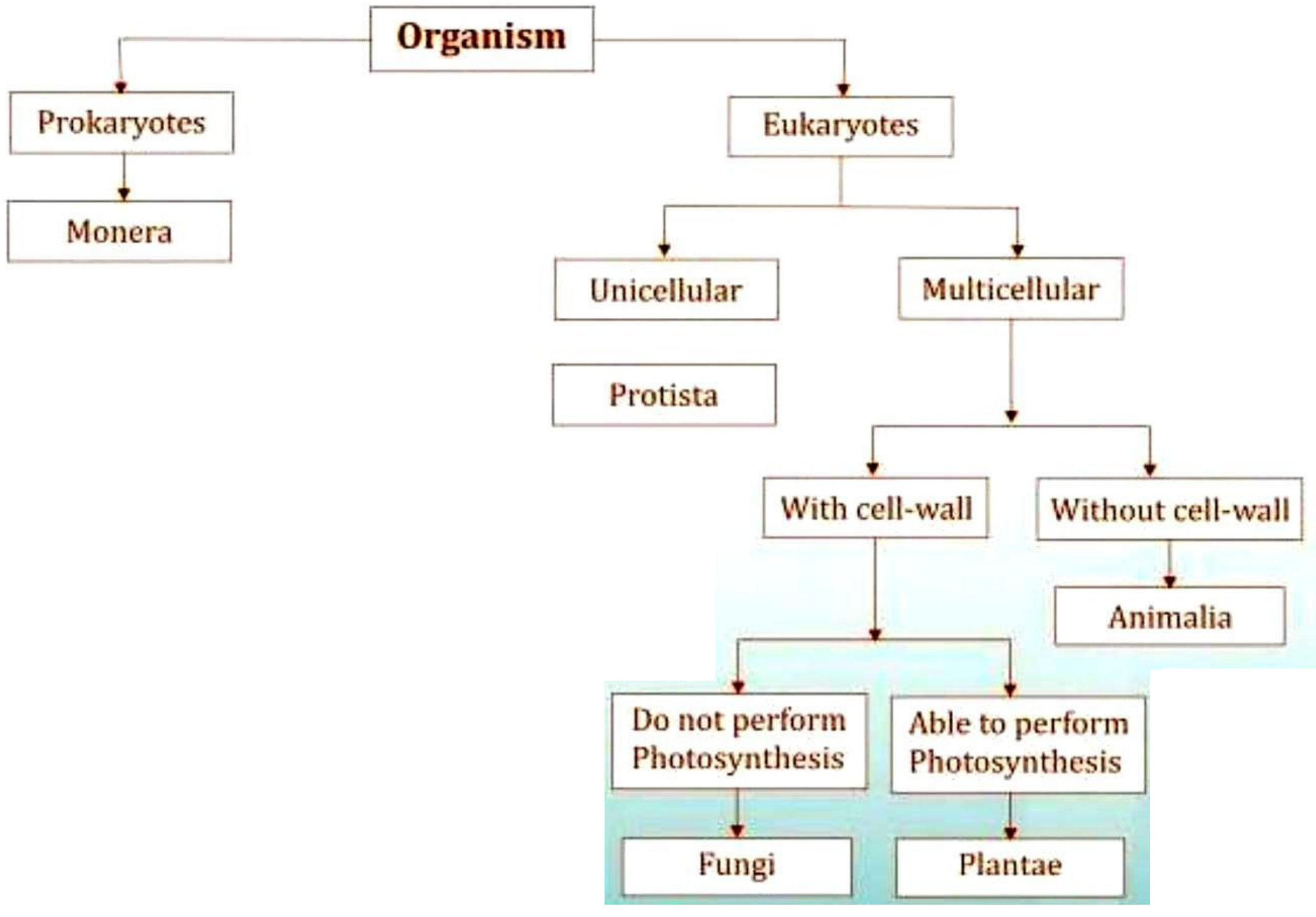
To study the characteristic of Spirogyra/Agaricus, Moss/Fern, Pinus (either male or female cone) and an Angiospermic plant. Draw and give two identifying features of the groups they belong to.

MATERIALS AND APPARATUS REQUIRED

A slide of Spirogyra, the specimen of Agaricus, Fern, Moss, Finns (male and female cone), Pea plant/any flowering plant, compound microscope.

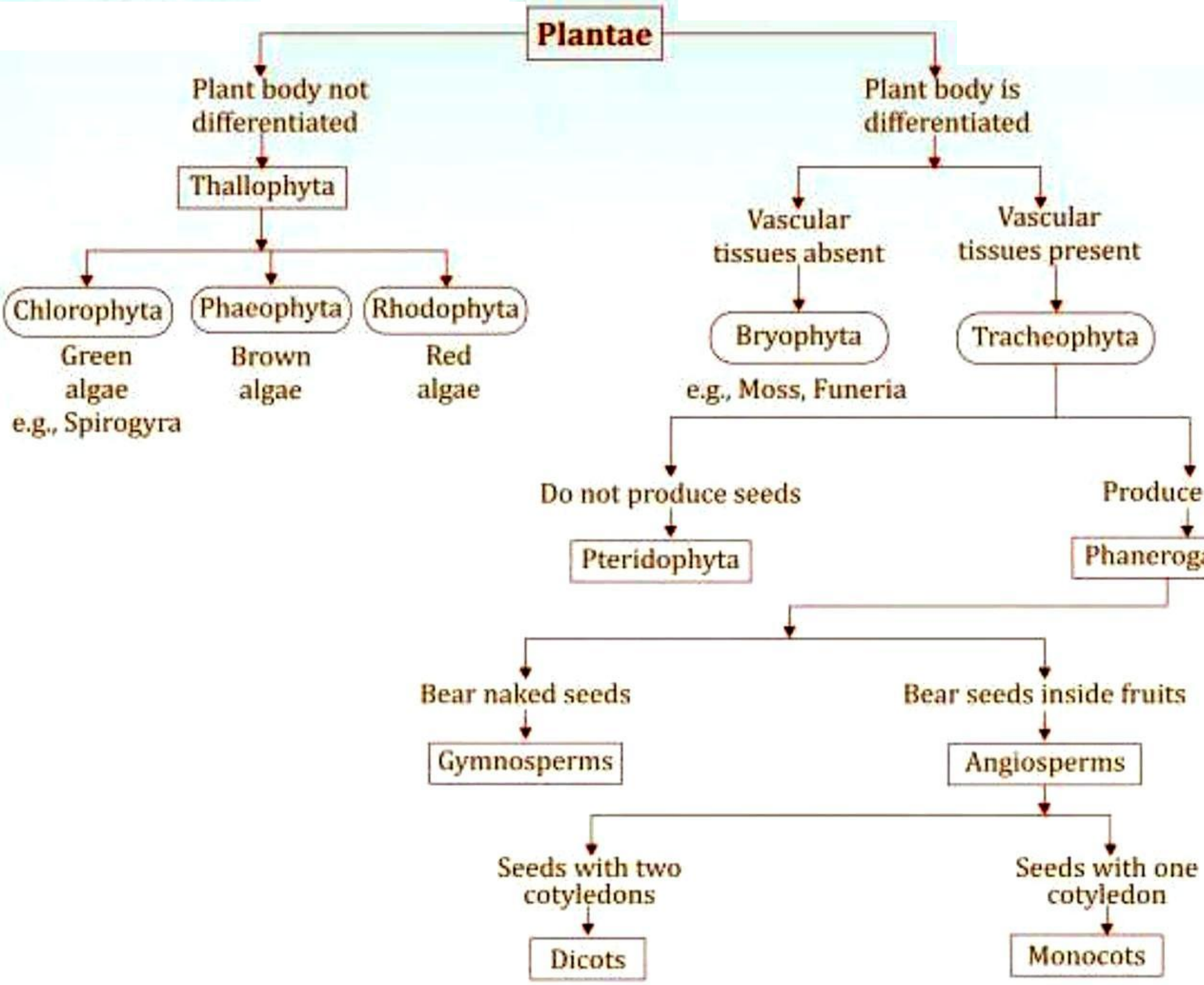
THEORY

1. **Classification:** The organisms are classified/grouped based on the similarities (grouped) and dissimilarities (grouped separately).
2. **Whittaker classification:** It has five kingdoms, and these groups are formed based on their cell structure, mode and source of nutrition and body organisation. The classification is given below.



Further classification is done by naming the sub-groups at various levels as shown below:

PLANT KINGDOM



PROCEDURE

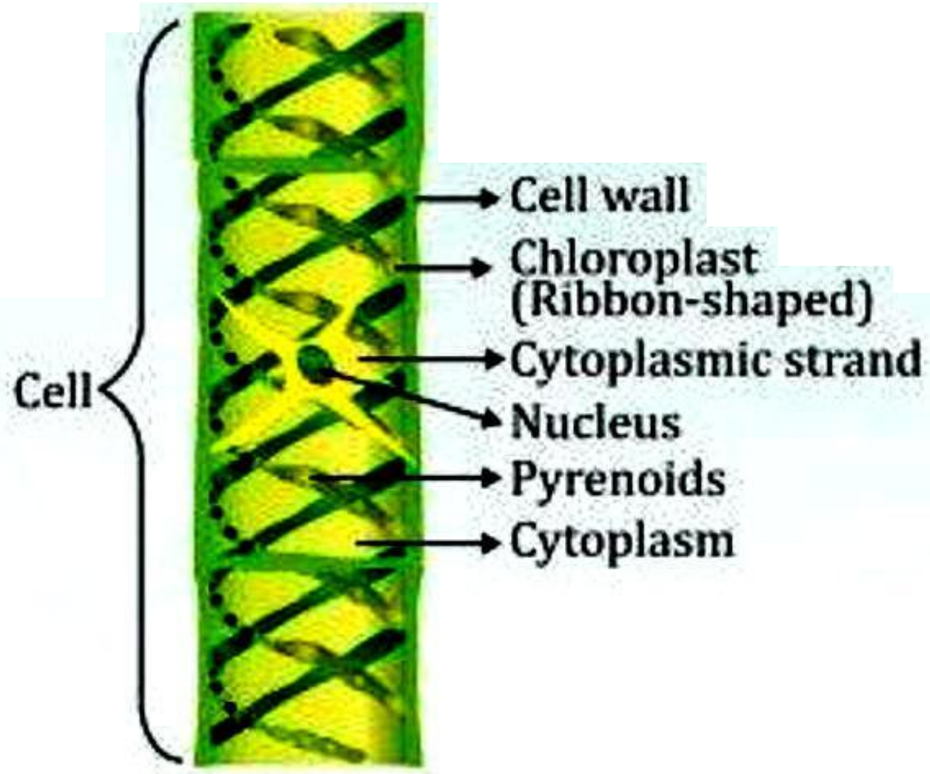
Observe the given specimen. Draw a diagram of each specimen, label it and write 2-4 identifying features of the groups they belong to.

I. Spirogyra

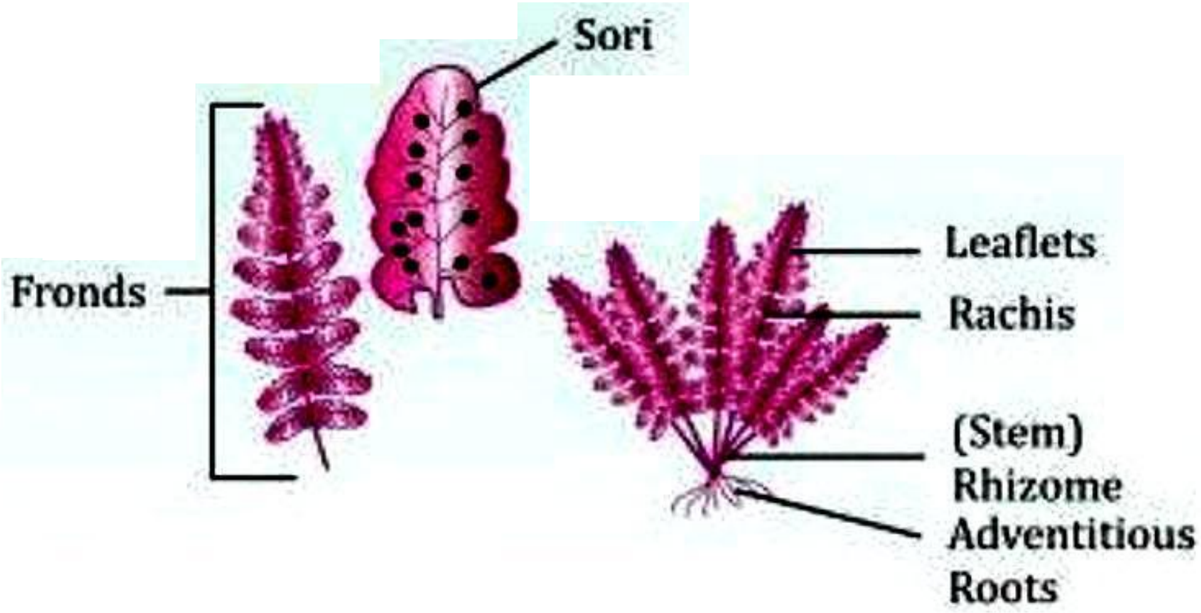
1. Kingdom → Plant
2. Division → Thallophyta
3. Class → Chlorophyta

CHARACTERISTICS

1. It is a single-cell thick, cylindrical filament, slimy to touch green-coloured algae.
2. It grows very fast in the water.
3. It has a spiral-shaped ribbon-like chloroplast hence it is named Spirogyra. Each cell is rectangular with the nucleus in the centre.
4. The cell wall is seen.
5. Chlorophyll is present in chloroplast and helps in photosynthesis.



Spirogyra filament



IDENTIFYING FEATURES.

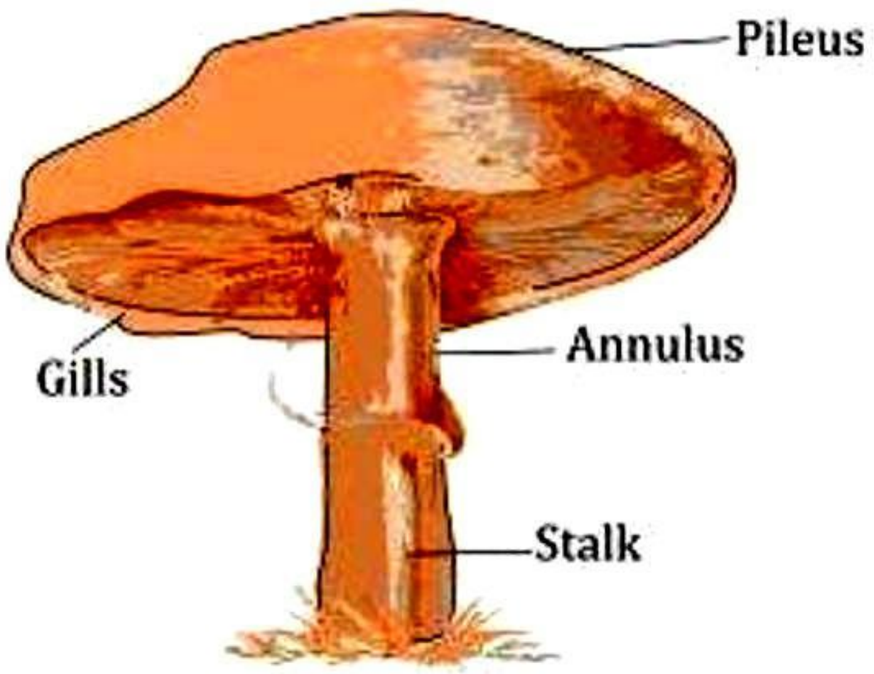
1. The plant body is thallus-like, not differentiated into roots, stems and leaves.
2. It has a green-coloured spiral-shaped, ribbon-like chloroplast.
3. It has a large central vacuole.

II. Agaricus

1. Kingdom→ Plantae
2. Division → Thallophyta
3. Class → Basidiomycetes

CHARACTERISTICS

1. Agaricus is commonly called a mushroom, it is non-green.
2. It has a stalk and cap-like structure with spores in it.
3. The spores germinate to form mycelium.
4. The cap on its lower sides has gills which bear spores.



Mushroom (Agaricus)

IDENTIFYING FEATURES

1. The body is thallus-like, not divided into roots, stems and leaves.
2. No chlorophyll present, nutrition is saprophytic.

III. Fern (Dryopteris)

1. Kingdom → Plantae
2. Sub-kingdom → Cryptogamae
3. Division → Pteridophyta

CHARACTERISTICS

1. These are commonly called wooden ferns and have 250 species of Dryopteris and around 12,000 species of ferns.
2. It is found in water as well as on land.
3. Some species are found in humid places and few in. dry places.
4. It consists of a horizontal root growing in soil called a rhizome and leaves are called fronds projecting upwards. The leaves are compound.
5. On the underside of leaves (frond) are tiny, dark spots called sori that contain spores.
6. The spores fertilize to give a sporophyte.

7. The leaves are coiled when young and uncoil when they grow.

IDENTIFYING FEATURES

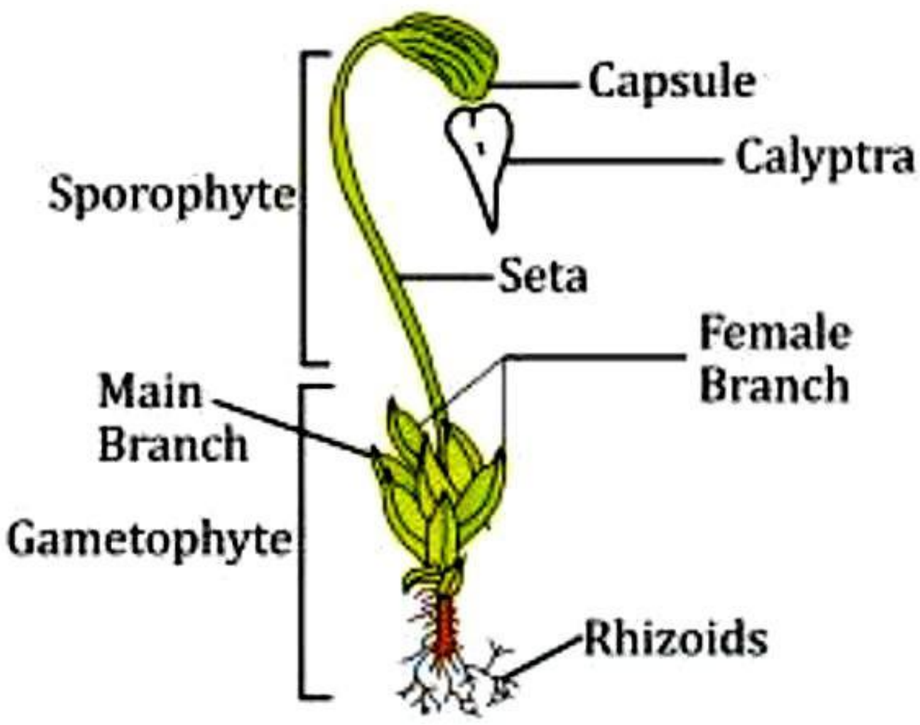
1. It has a vascular tissue i.e., xylem and phloem for the conduction of water and materials.
2. The sporophyte has a well-differentiated body with roots, stems and leaves. The leaves contain sori.
3. The roots are adventitious.

IV. Moss (Funaria)

1. Kingdom → Plantae
2. Division → Bryophyta
3. Class → Bryopsida

CHARACTERISTICS

1. Moss plant grows in dense patches in moist shady and cool places during the rainy season. It has a height of 3-5 cm and shows radial symmetry.
2. The plant body is differentiated into leafy shoots and rhizoids.
3. These are multicellular, amphibious plants. Reproduce by spore formation.
4. They do not have a vascular system.



Funaria

5. They show an alternation of generation i.e., the gametophytic stage alternates with the sporophytic stage.

IDENTIFYING FEATURES

1. The plant body has radial symmetry and rhizoids (root-like structures).
2. No vascular tissues are present.
3. They need water for fertilization.

V. Pinus

1. Kingdom → Plantae
2. Division → Pteripsida
3. Class → Gymnosperma

CHARACTERISTICS

1. Pine trees are common in the Himalayas, they are tall, conical, and evergreen.

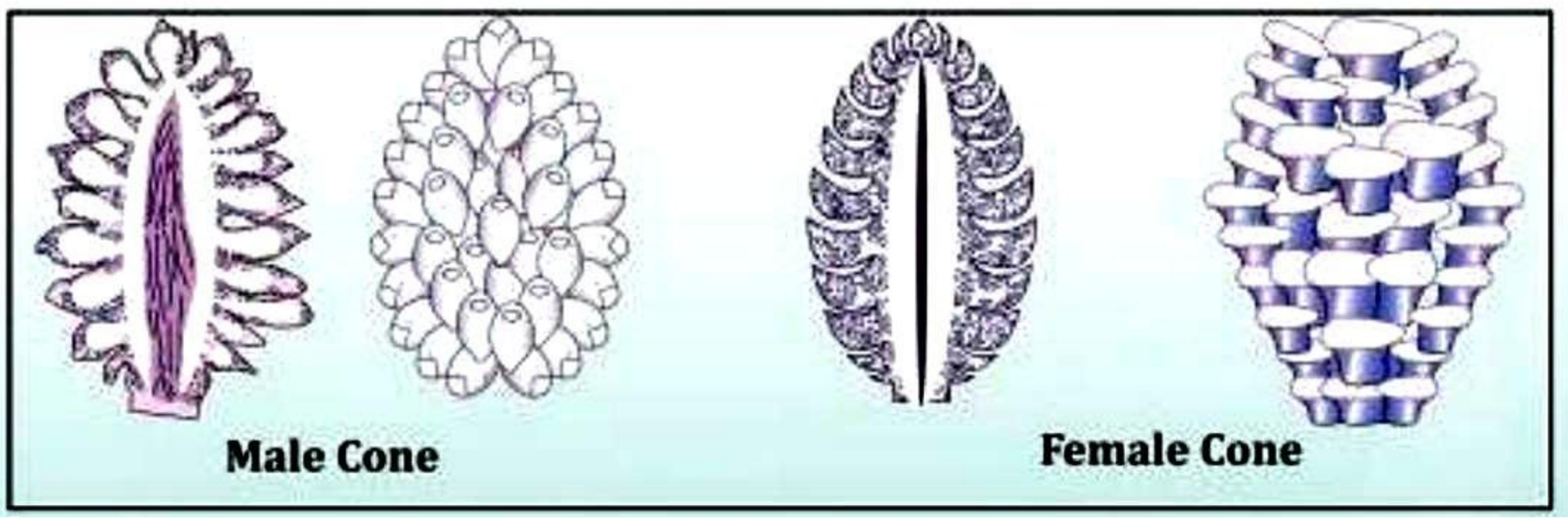
2. The vascular system is well developed.
3. Trees are large 30-50 m, with a trunk diameter of up to 2 m. The leaves are needle-like.
4. Cones are green when young and become brown when 24 months old. Cones open on heat and release seeds.
5. It is used for timber and resin.

Pinus

IDENTIFYING FEATURES

1. Vascular system present.
2. Seeds are naked.

Male Cone	Female Cone
1. It is small in size	1. It is bigger
2. Microsporophylls present	2. Microsporophylls present
3. Microsporophylls produce microsporangia that produces spores	3. Microsporophylls produce ovules which contain eggs
4. Short-lived cones	4. Long-lived cones

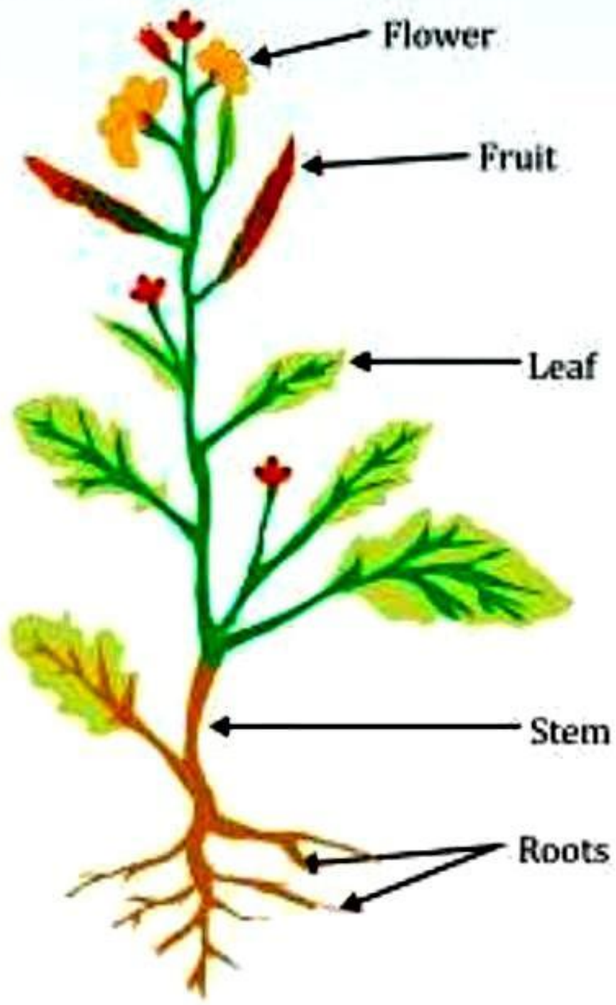


VI. Angiosperm

1. Division→ Tracheophyta
2. Class→ Angiospermae

CHARACTERISTICS

1. The flowering plants are called angiosperms. The flower is the reproductive organ.
2. The plant body is well differentiated into roots, shoots, leaves, flowers and fruits.
3. The seeds are enclosed in fruits.
4. The root system may be tap root or adventitious.
5. Reproduction takes place in the flower.



Flowering Plant

IDENTIFYING FEATURE

1. These are vascular plants.
2. Stems bear distinct nodes and internodes.

VIVA VOCE

Q1. Define taxonomy.

Ans. The branch of science deals with the identification, classification, and nomenclature of different organisms.

Q2. What are thallophytes? Give examples.

Ans. The plants in which the plant body is thallus-like, i.e., not differentiated into stem, root and leaves are called thallophytes. e.g., Ulothrix.

Q3. What is the study of algae called?

Ans. Phycology.

Q4. Give any two important characteristics of algae.

Ans. Algae are autotrophic and contain chlorophyll. The plant body is thalloid and cells have a cell wall made up of cellulose.

Q5. What is the peculiar characteristic of chloroplast in Spirogyra?

Ans. Chloroplast in Spirogyra are ribbon-shaped with pyrenoid bodies present at equidistant.

Q6. Why is Spirogyra slimy to the touch?

Ans. In Spirogyra, the outer cell wall is made up of pectin which absorbs water and gives a slimy appearance.

Q7. What are fungi?

Ans. Fungi are non-green heterotrophic organisms with the thalloid body.

Q8. Give an example of unicellular fungi.

Ans. Yeast.

Q9. What is the cell wall of yeast made up of?

Ans. Chitin.

Q10. Mention various ways of reproduction in fungi.

Ans. Budding, sporulation, conjugation, etc.

Q11. What is an alternation of generations?

Ans. The life cycle of plants has two phases – the gametophytic phase and the sporophytic phase. These two phases alternate in the life cycle. This is called the alternation of generations.

Q12. Why are bryophytes called amphibians of the plant kingdom?

Ans. Bryophytes require water for the fertilization of male and female gametes.

Q13. How do the leaves of mosses differ from those of angiosperms?

Ans. Leaves in mosses are small, sessile and spirally arranged around the axis. Leaves of angiosperms may have stalks, are broad and possess several veins.

Q14. What is the dominant phase in mosses?

Ans. Gametophytic phase.

Q15. Why is a Spirogyra plant green in colour?

Ans. The green colour of Spirogyra is due to the presence of a green colour pigment called chlorophyll in it.

Q16. The correct identification of a given specimen is.

Ans. It is a female cone because it is bigger in size.

Q17. Observe the given diagram and identify it.

Ans. Fungus is saprophytic in nature and cannot prepare its own food.