

BIODIVERSITY IN PLANTS

6 FEBRUARY 2013

Lesson Description

In this lesson, we will:

- Look at the four groupings of plants and their characteristics
 - bryophytes
 - pteridophytes
 - gymnosperms
 - angiosperms

Key Concepts

- Grouping or classification of plants

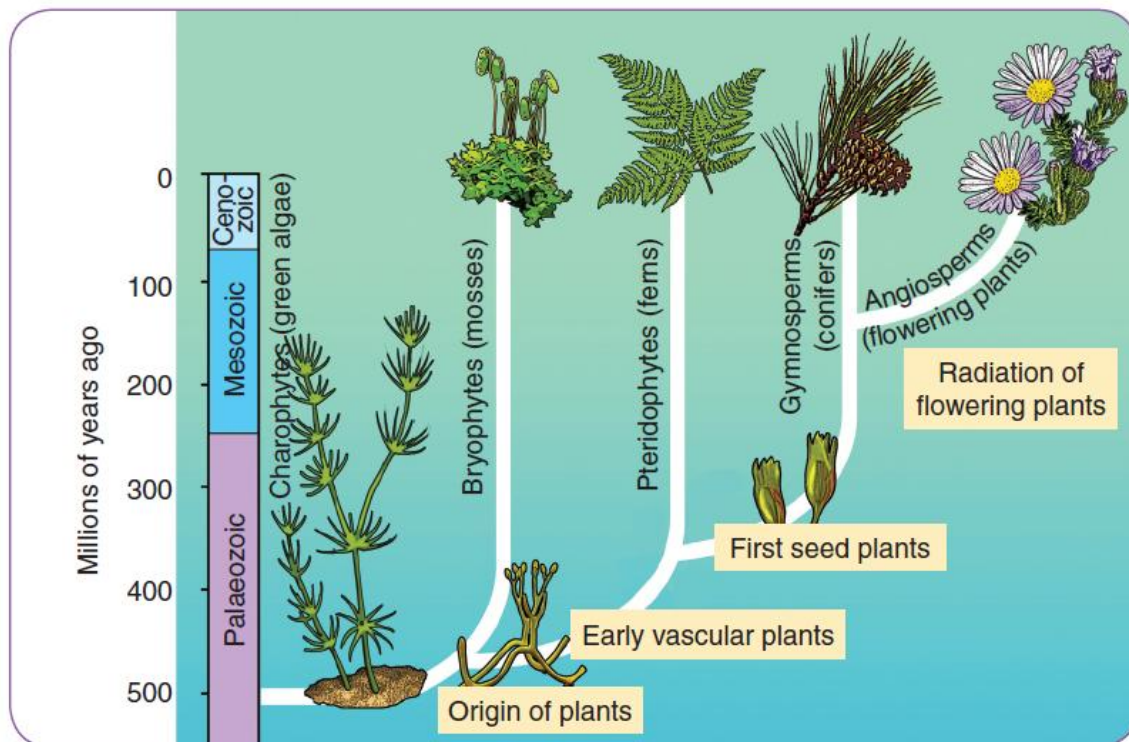


Fig. 2.2 The evolution of plants

(Solutions for all Life Sciences, Macmillan, p56)

- Plants are grouped according to their evolutionary history and the presence or absence of vascular tissue.
- There is one group of plants, the bryophytes that do not have vascular tissue. The tracheophytes which include the pteridophytes, gymnosperms and angiosperms all have vascular tissue in the form of xylem and phloem. (See fig 2.2 Solutions for all, Macmillan, p56)

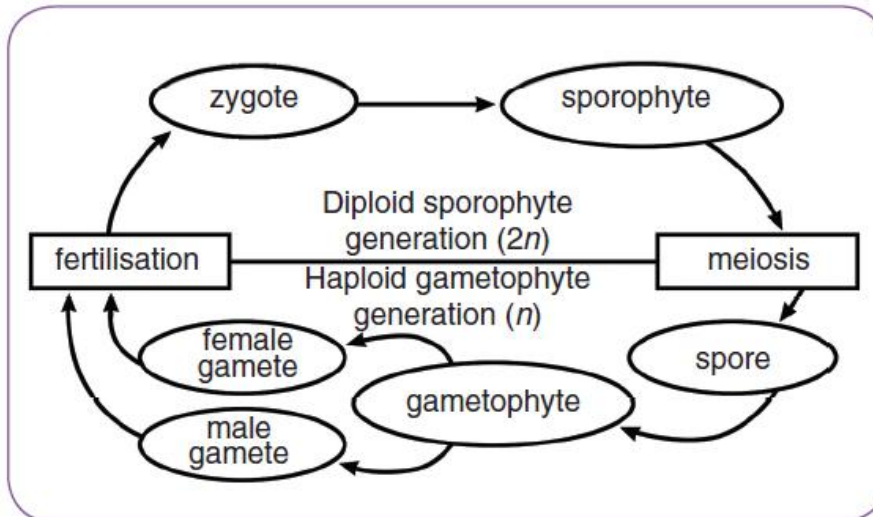


Fig. 2.3 Diagram showing the generalised alternation of generations in plants

(Solutions for all Life Sciences, Macmillan, p57)

- **Plants** alternate sexual and asexual generations.
 - The asexual generation is known as the **sporophyte** and is diploid.
 - The sexual generation is known as the gametophyte which develops from **spores** and they are haploid (through a process of meiosis).

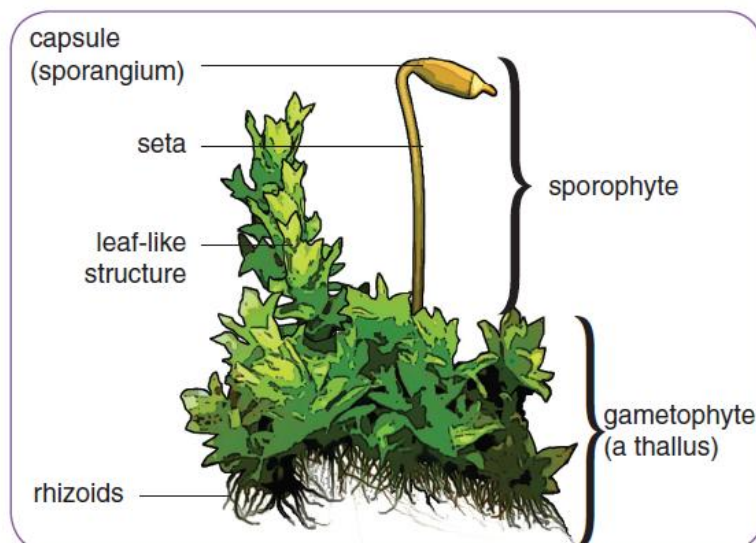


Fig. 2.4 A moss gametophyte generation with sporophyte generation attached

(Solutions for all Life Sciences, Macmillan, p58)

- **Bryophytes** (e.g. moss) are the most primitive terrestrial plants. They are non-vascular and absorb water from the soil and air.
 - They grow in moist conditions
 - Gametophyte generation is dominant
 - The body is a **thallus**

- No true roots and leaves but have **rhizoids** for anchorage
- Spores are asexual and are formed in the **sporangium**

(Solutions for all Life Sciences, Macmillan, p60)

- **Pteridophytes** (e.g. fern) are a grouped between the bryophytes and seed-bearing plants
 - They have vascular tissue, true leaves in the form of fronds
 - **Adventitious roots** grow off an underground stem called a rhizome and absorb water and anchor the plant
 - Under the leaves are **sori** which contain **sporangia**. The fern is **homosporous**)
 - Does not produce fruit or seeds

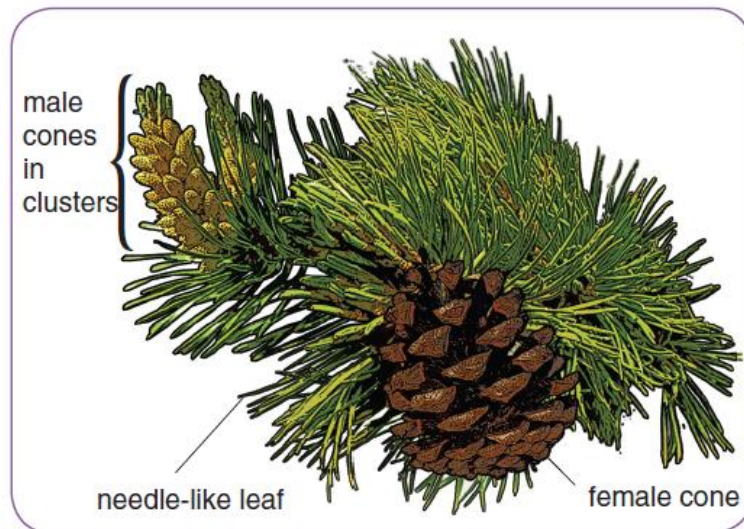


Fig. 2.7 Needles and cones of a pine tree

(Solutions for all Life Sciences, Macmillan, p64)

- **Gymnosperms** have well developed vascular tissue.
- **Leaves** are in the form of needles
- **Roots** anchor plants in soil and absorb water. Wide ranging root system
- **Seeds** are produced in cones. Gymnosperms are **heterosporous**
- **Fruit** is not produced and the seeds are 'naked'.

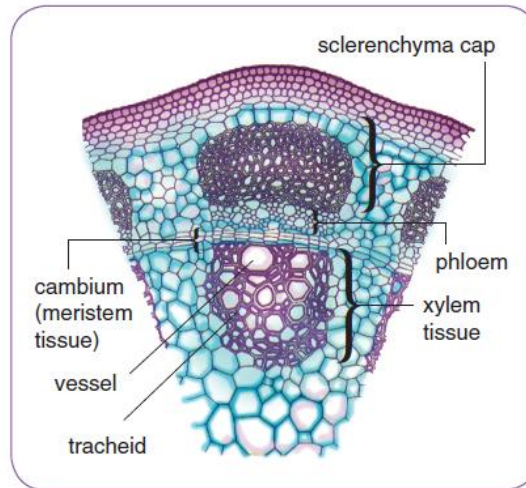


Fig. 2.9 A vascular bundle from the stem of a dicotyledon

(Solutions for all Life Sciences, Macmillan, p64)

- **Angiosperms** are flowering plants that have a dominant diploid sporophyte generation.
- They are divided into **monocotyledons** and **dicotyledons**.
 - Angiosperms contain vascular tissue, roots, stems and leaves.
 - **Monocotyledons** have under-developed vascular tissue and become herbaceous plants. They have adventitious roots and narrow strap-like sessile leaves
 - Dicotyledons have very well developed vascular tissue and can grow into trees.
 - **Angiosperms** are **heterosporous**. **Fruit** is produced and contains the seeds.

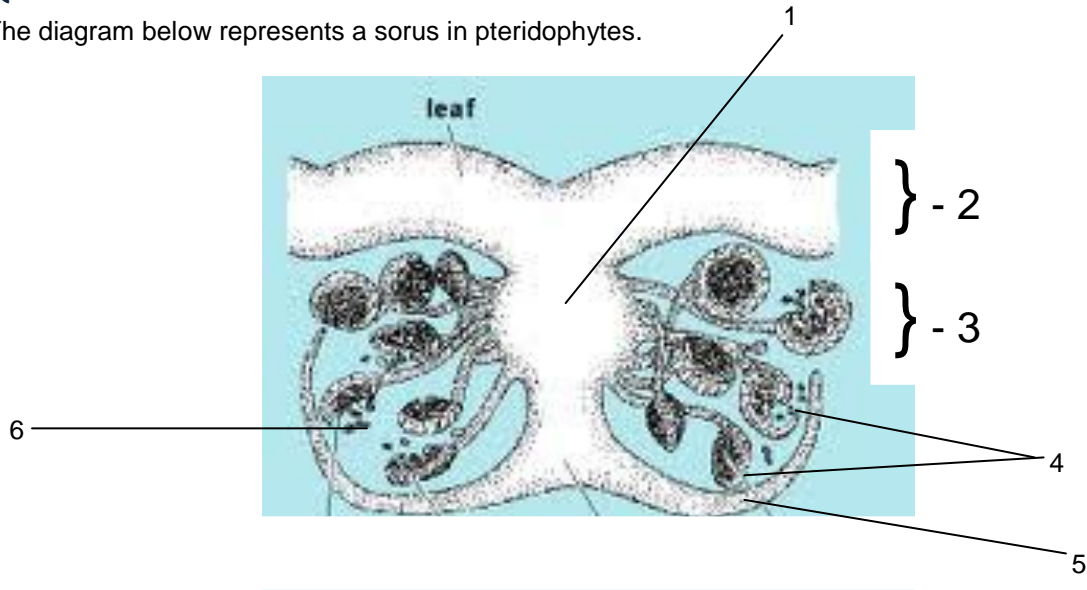
Demonstration

- Fern leaf
- Moss

Questions

Question 1

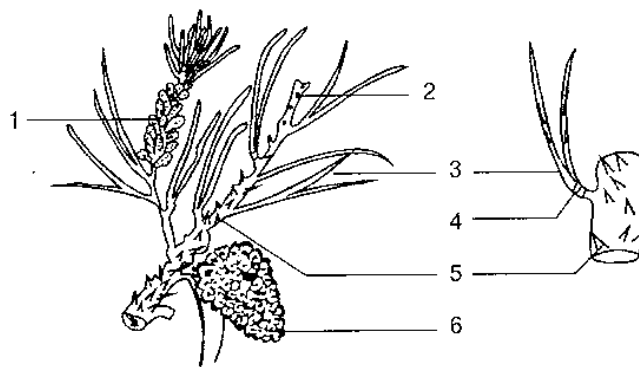
The diagram below represents a sorus in pteridophytes.



- a) Name the plant on which a sorus is found. (1)
- b) Identify parts numbered 1 to 6. (6)
- c) What is the function of part numbered
 - (i) 3 and (ii) 6? (4)
- d) Is this the sporophyte or gametophyte generation? Provide reasons for your answer. (4)
- e) What does the term 'haploid' mean? (1)
- f) Write down the number of a haploid structure. (1)

Question 2

The diagram shows part of a branch of *Pinus* sp.



- a) Identify the parts numbered 4 and 5. (2)
- b) Write down the number of the part in which:
 - i. Microspores are produced; (1)
 - ii. Seed is produced; (1)
 - iii. Photosynthesis takes place; and (1)
 - iv. Unlimited growth can take place. (1)
- c) What is the average life-span of the part numbered 4? (1)

Question 3

Copy and complete the following table to compare the different groups of plants you have studied.

Plant group	Type of vascular tissue	Type of roots, stems and leaves
Bryophytes		
Pteridophytes		
Gymnosperms		
Angiosperms		