KECUDO

PREMIUM
VI
EDITION

HIGH SCHOOL BIOLOGY

Class 6

Plant Biology

Roots, leaves, transport, flowers and seeds — how plants grow, reproduce and feed the world, with a 25-question self-assessment

2026 EDITION · SCIENCE SERIES

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FOUNDATION

Chapter 1 · The green kingdom

What Makes a Plant?

Plants make the oxygen we breathe, the food we eat (directly or through animals), and much of our medicine, building materials and clothing. Almost every food chain on land starts with them.

Feature	What it means
Multicellular eukaryotes	Many cells, each with a nucleus
Autotrophs	Make their own food by photosynthesis in chloroplasts
Cellulose cell walls	Rigid walls give support (Class 1)
Alternation of generations	Life cycle switches between diploid and haploid forms (Chapter 10)
Mostly stationary	Respond by growing toward or away from things (Chapter 9)

Plants evolved from green algae and moved onto land about 470 million years ago. Life on land brought new problems — drying out, support against gravity, and moving water up from the soil — and plant structures are solutions to them.

Real data: how many plants are there?

The World Checklist of Vascular Plants, completed by Kew after more than 35 years of work, lists 350,386 known species of vascular plants. Scientists estimate that as many as 100,000 more have not yet been named.

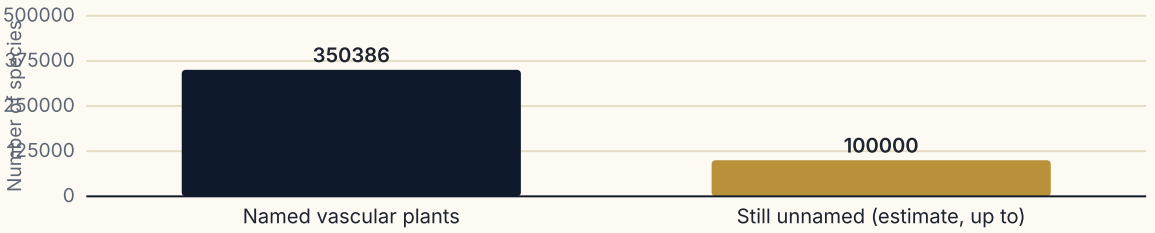


FIG 1.1 Hundreds of thousands of plant species — and many still undiscovered

Source: Royal Botanic Gardens, Kew, State of the World's Plants and Fungi (2023). The same report warns that 45% of known flowering plant species could be threatened with extinction.

Share still unknown. If 100,000 species remain to be named, then of about 450,000 in total, 100,000 ÷ 450,386 ≈ **22%** are still unknown to science.

Not plants: mushrooms (fungi — no chlorophyll, chitin walls) and most seaweeds (algae — no roots, stems or leaves). Classification by DNA confirms that fungi are closer to animals than to plants (Class 3).

FOUNDATION

Chapter 2 · Four big groups

Plant Diversity

Plants are divided into four main groups by three key inventions: **vascular tissue** (pipes for water), **seeds**, and **flowers**.

Group	Vascular?	Seeds?	Flowers?	Examples
Bryophytes	No	No (spores)	No	Mosses, liverworts
Ferns	Yes	No (spores)	No	Ferns, horsetails
Gymnosperms	Yes	Yes, “naked” in cones	No	Pines, spruces, ginkgo
Angiosperms	Yes	Yes, inside fruit	Yes	Grasses, oaks, roses

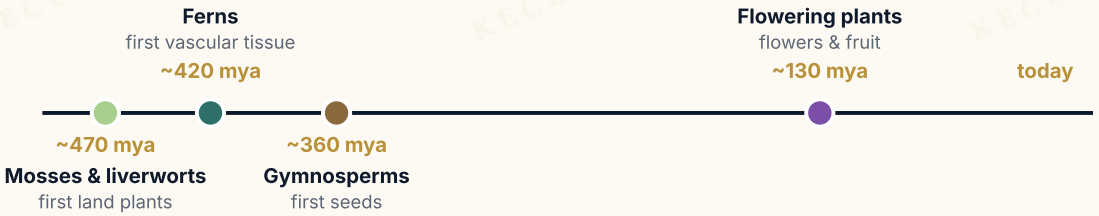


FIG 2.1 Key steps as plants moved onto land (approximate dates)

Without vascular tissue, mosses can’t move water far, so they stay short and live in damp places. Their sperm must swim through water to reach eggs. Seeds and pollen freed later plants from needing water to reproduce.

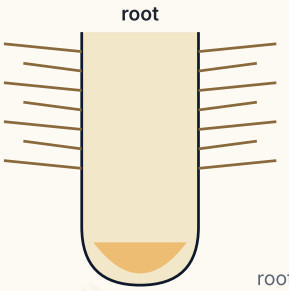
FOUNDATION

Chapter 3 · Three organs

Roots, Stems & Leaves

A plant body has three main organs. Each is made of three tissue systems: **dermal** (protective skin), **vascular** (xylem and phloem) and **ground** (storage and photosynthesis).

Organ	Main jobs	Special forms
Roots	Anchor; absorb water and minerals; store food	Carrots (storage), mangrove stilt roots
Stems	Support leaves toward light; transport	Potato tubers, cactus stems, strawberry runners
Leaves	Photosynthesis; gas exchange	Cactus spines, pea tendrils, Venus flytrap



root hairs: tiny extensions of single cells
→ huge surface area for absorbing water (osmosis) and minerals (active transport)

root cap protects the growing tip

FIG 3.1 A root tip and its root hairs

Water enters root hair cells by **osmosis**, because the soil water is more dilute than the cell sap. Minerals like nitrates are usually more concentrated inside, so they are pumped in by **active transport** using ATP (Class 1).

Self-Assessment

PART A · BASICS

Choose one answer per question. Answers lock once chosen. Your running score is shown at the top of the screen.

1. Which plant group has seeds but no flowers?

- A Mosses
- B Gymnosperms
- C Ferns
- D Angiosperms

2. Water and minerals travel up the plant in the...

- A xylem
- B phloem
- C stomata
- D cuticle

3. The pores on a leaf are called...

- A guard cells
- B anthers
- C cotyledons
- D stomata

4. The female part of a flower that catches pollen is the...

- A anther
- B filament
- C stigma
- D sepal

5. Which hormone causes fruit ripening?

- A Ethylene
- B Auxin
- C Insulin
- D Abscisic acid



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Thank you for learning with Kecudo.

SERIES COMPLETE

You have finished all six classes

Cells · Genetics · Evolution · Human Body · Ecology · Plants.
Thank you for learning with Maya and Kecudo Valley High.