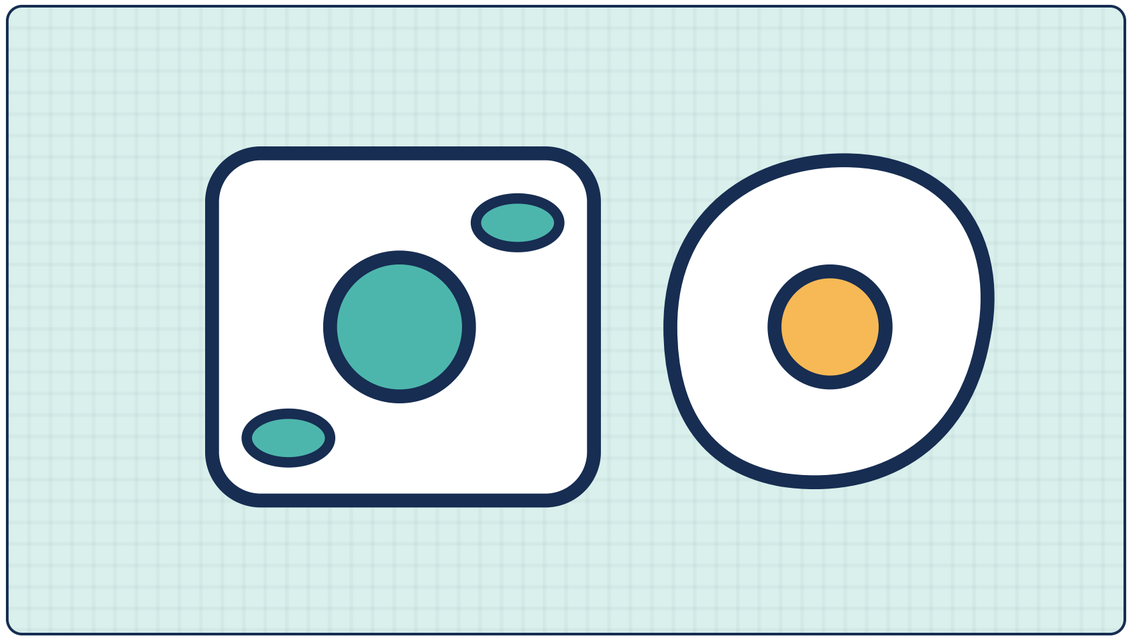
Biology · The building blocks of every living thing

Plant and Animal Cells



Goals

By the end of this lesson you can

- Explain why cells are called the basic unit of life
- Name five parts found in both plant and animal cells
- Name three parts found only in plant cells
- Say what each cell part does
- Describe cells seen through a light microscope

What is a cell?

- Every living thing is made of one or more cells
- A cell is the smallest unit that carries out life processes
- New cells only come from existing cells dividing
- Robert Hooke named cells in 1665 after looking at cork

Cells are tiny

10–100 µm

typical width of a plant or animal cell

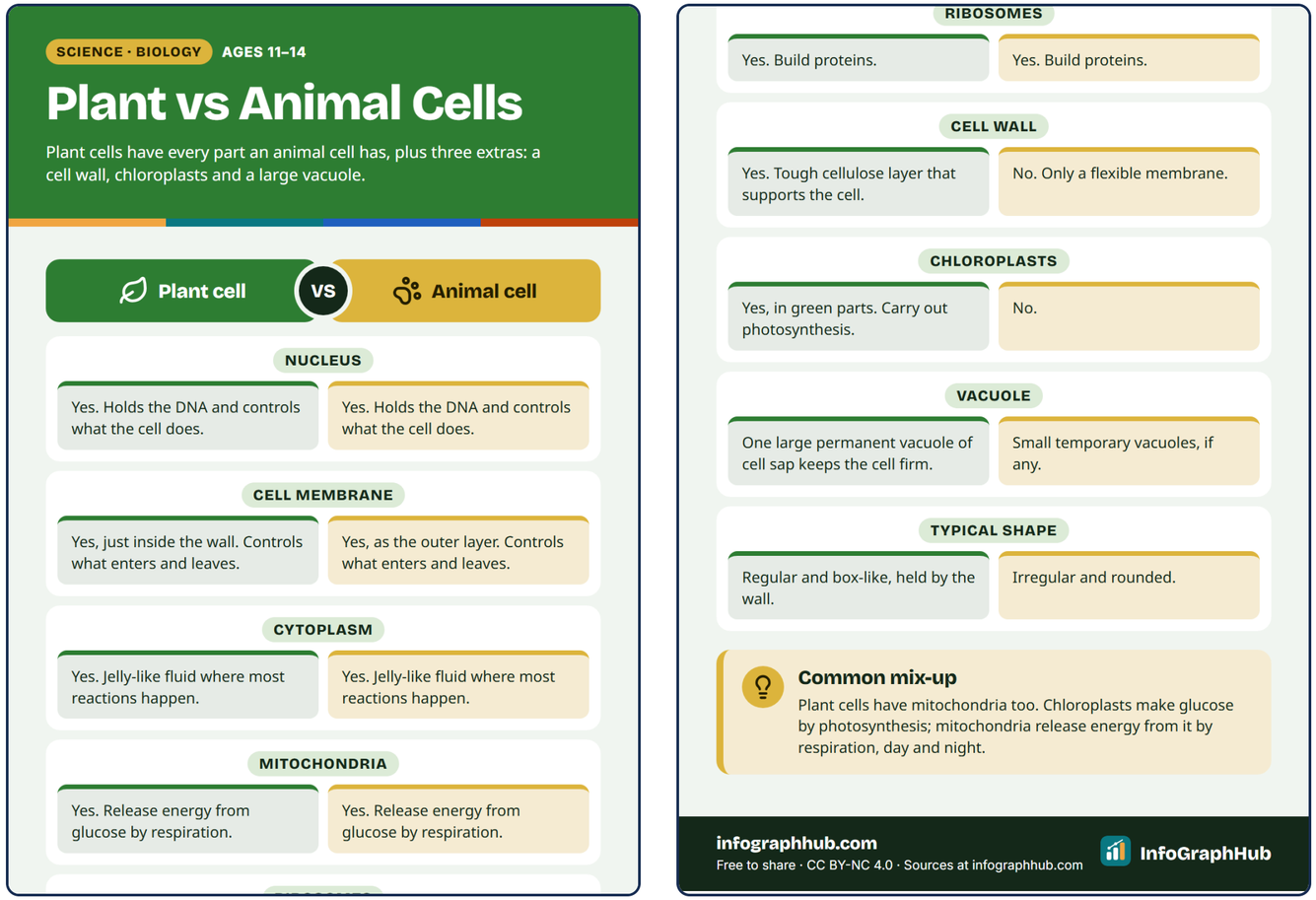
- 1 millimetre = 1,000 micrometres (µm)
- Most cells need a microscope to be seen

Parts found in both plant and animal cells

- Nucleus: holds the DNA and controls the cell
- Cell membrane: controls what enters and leaves
- Cytoplasm: jelly-like fluid where most reactions happen
- Mitochondria: release energy from food by respiration
- Ribosomes: build proteins

Plant and animal cells side by side

- Both have a nucleus, membrane, cytoplasm, mitochondria and ribosomes
- Plant cells add a cell wall, chloroplasts and a large vacuole



Poster: Plant vs Animal Cells: What Each Part Does

Three extra parts in plant cells

- Cell wall: tough layer of cellulose that supports the cell
- Chloroplasts: contain green chlorophyll and carry out photosynthesis
- Large permanent vacuole: stores cell sap and keeps the cell firm

Plant cell vs animal cell

Plant cell

- Cell wall made of cellulose
- Chloroplasts in green parts
- One large permanent vacuole
- Often a regular, box-like shape

Animal cell

- No cell wall, only a membrane
- No chloroplasts
- Small temporary vacuoles, if any
- Often an irregular, rounded shape

Why plants need walls and vacuoles

- Plants have no skeleton to hold them up
- A full vacuole presses the cell against its wall
- Firm cells keep stems and leaves upright
- Short of water, vacuoles shrink and the plant wilts

Worked example

two cells under the microscope

- Onion skin: box-shaped cells in neat rows
- Onion skin: clear cell walls and a stained nucleus
- Cheek cells: rounded, irregular and separate
- Cheek cells: thin membrane, no wall, stained nucleus

Specialised cells: shape fits the job

- Root hair cells grow long thin extensions
- These extensions give a large surface for absorbing water and minerals
- Leaf cells near the upper surface are packed with chloroplasts
- Same basic parts, different shapes for different jobs

From cells to whole organisms

- Cells: the smallest units of life
- Tissues: groups of similar cells doing one job
- Organs: several tissues working together, such as a leaf or the heart
- Organ systems and organisms: organs working as a team

Common mix-ups

- Plant cells have mitochondria too: they respire all the time
- Plant cells have a membrane as well as a wall
- Not every plant cell has chloroplasts
- The nucleus is not the same as the cell

Quick check

Which part is found in plant cells but not in animal cells?

A. Nucleus

B. Cell membrane

C. Chloroplast

D. Mitochondrion

Summary

Key takeaways

1. All living things are made of cells
2. Plant and animal cells share a nucleus, membrane, cytoplasm, mitochondria and ribosomes
3. Plant cells also have a cell wall, chloroplasts and a large vacuole
4. Each part has a job that keeps the cell alive
5. Cell shape often matches the cell's job