Topic 1: The nature and variety of living organisms

Edexcel International GCSE Biology 4BI1 · Section 1 · statements 1.1–1.4 · sheets 1.1–1.2

A housefly and a maize plant

Your turn

A housefly, a maize plant and an influenza virus.

A. Name three things the housefly and the maize plant both do.

B. Which of the three is not alive, and why?

C. What kind of unit are the fly and the plant both built from?

Eight characteristics of living organisms

Characteristic	Meaning
nutrition	takes in material for energy or growth
respiration	releases energy from food inside cells
excretion	removes waste made by the body
response and **movement**	reacts to surroundings; moves
control of internal conditions	keeps conditions inside steady
reproduction, growth and development	makes offspring; increases in size and changes

Plants and animals

Plants

Multicellular; chloroplasts, **photosynthesis**; cellulose cell walls; store **starch** or sucrose.

Examples: maize (a cereal), peas or beans (a legume).

Animals

Multicellular; no chloroplasts, no cell walls; nervous coordination; move about; store **glycogen**.

Examples: humans (mammal), housefly and mosquito (insects).

Fungi feed outside their bodies

Hyphae grow over dead food material.

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They secrete digestive enzymes onto the food.

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Large insoluble molecules become small soluble ones.

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The hyphae absorb the soluble products.

Chitin walls, many nuclei, store glycogen. Examples: Mucor; yeast (single-celled).

Protoctists and bacteria

Protoctists

Microscopic, single-celled. Amoeba is like an animal cell; Chlorella has chloroplasts.

Pathogen: Plasmodium causes **malaria**.

Bacteria

Cell wall, membrane, cytoplasm, **plasmids**; no nucleus: a circular chromosome of DNA.

Lactobacillus bulgaricus (rods, yoghurt); Pneumococcus (spheres, pneumonia).

The four-way comparison examiners like

Feature	Plants	Animals	Fungi
cell wall	cellulose	none	**chitin**
nucleus	yes	yes	yes
chloroplasts	yes	no	no
carbohydrate store	**starch**	**glycogen**	glycogen

Use the evidence

Bacteria: their own kind of cell wall, no nucleus, some photosynthesise. Chloroplasts: plants and some protoctists only.

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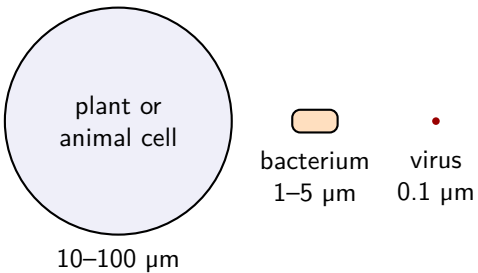
Viruses are not living organisms



A virus is far smaller than a bacterium, which is far smaller than a plant or animal cell.

- A **protein coat** around DNA or RNA, never both.
- **Reproduce** only inside living cells.

Three named viruses

Virus	Host	Disease or effect
tobacco mosaic virus	tobacco **plants**	discoloured, mosaic-patterned leaves; chloroplasts do not form
influenza virus	humans	flu
HIV	humans	AIDS

Five mistakes that cost marks

Mistake	Correct idea
A virus is a cell	**Protein coat** around DNA or RNA; no cell
Fungi photosynthesise; cellulose walls	**Chitin** walls; saprotrophic nutrition
Bacteria have a nucleus	Circular chromosome plus plasmids
Respiration means breathing	Release of energy from food in cells
One example given for two	Learn the named examples

Check yourself

Your turn

Answer without notes, then check.

A. Give two features of a plant cell that an animal cell lacks.

B. Describe saprotrophic nutrition using hyphae, enzymes and absorb.

C. How does a bacterium's genetic material differ from a plant cell's?

D. Name the pathogenic protoctist and its disease.

E. State three reasons viruses are not classified as living.