

Characteristics and classification of living organisms revision notes

All living things share seven characteristics. This topic covers what each characteristic means, and the features of viruses, which are not made of cells.

For Cambridge IGCSE Combined Science 0653. **Supplement** is Extended content, only examined on Papers 2 and 4.

1 Characteristics and classification Spec B1.1

The seven characteristics of living organisms Spec B1.1.1

Every living organism, from a bacterium to a blue whale, shows **seven characteristics**. A non-living thing, such as a car or a flame, may appear to show some of them, but never all seven.

Movement	an action by an organism or part of an organism causing a change of position or place
Respiration	the chemical reactions in cells that break down nutrient molecules and release energy for metabolism
Sensitivity	the ability to detect and respond to changes in the internal or external environment
Growth	a permanent increase in size and dry mass
Reproduction	the processes that make more of the same kind of organism
Excretion	the removal of the waste products of metabolism and substances in excess of requirements
Nutrition	the taking in of materials for energy, growth and development

The first letters spell **MRS GREN**: Movement, Respiration, Sensitivity, Growth, Reproduction, Excretion, Nutrition. Learn each definition word for word, because Cambridge mark schemes follow the syllabus wording.

Points that are often marked

- Plants move too. A plant moves when its leaves or flowers change position, even though the whole plant stays in one place.
- Growth means a permanent increase in size and **dry mass**. A balloon gets bigger when inflated but does not grow.
- Excretion is not the same as egestion. Faeces are undigested food that never entered the body's cells, so they are not metabolic waste.
- Examples of excretion: carbon dioxide from respiration, urea from the breakdown of excess amino acids, and oxygen from photosynthesis in plants.

Common mistake: Respiration is not breathing. Respiration is a set of chemical reactions in cells that release energy. Breathing only moves air in and out of the lungs.

Quick check

1 . What is excretion?

2 Features of organisms

Spec B10.1

Supplement

Viruses Spec B10.1.5

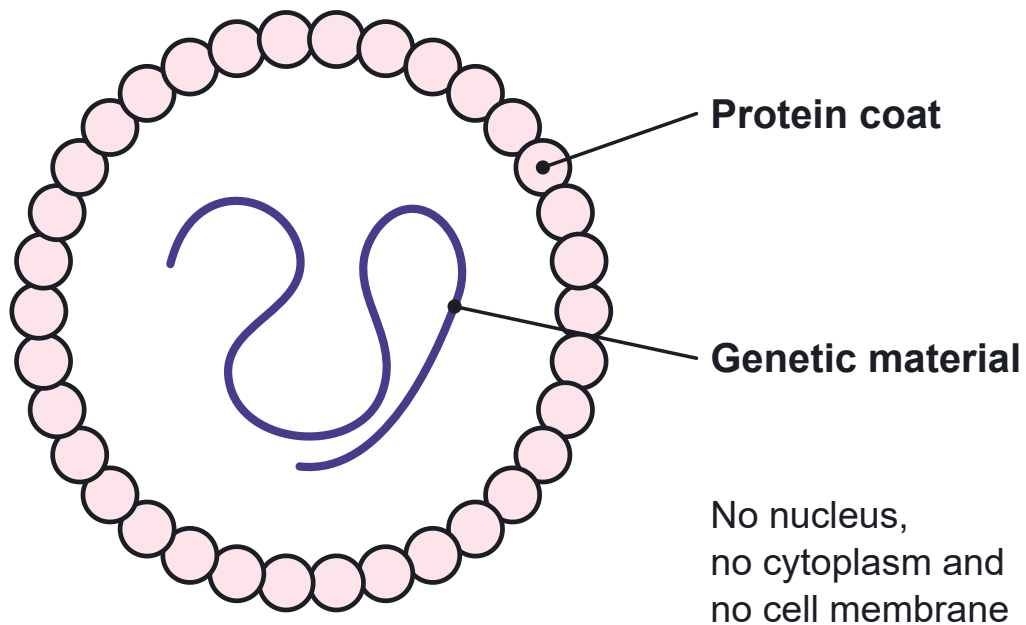
Supplement

A **virus** is much smaller than a bacterium. Viruses are not made of cells, so they do not fit into the five kingdoms. The features of a virus are limited to two: a **protein coat** and **genetic material**.

Supplement

Features of a virus

Part	Description
Protein coat	Surrounds and protects the genetic material
Genetic material	Carries the instructions for making new viruses; inside the protein coat



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A virus has only a **protein coat** and **genetic material**.

Supplement

Exam tip: Do not describe a virus as having a nucleus, cytoplasm or cell membrane. State protein coat and genetic material, and nothing else.

Quick check

1. **Supplement** State the two features of a virus.

Quick check answers

Characteristics and classification

1. The removal of the waste products of metabolism and substances in excess of requirements.

Features of organisms

1. A protein coat and genetic material.