



The Living World



what counts as alive, and how it gets a name



The defining properties of life

- **growth**: an increase in mass and in cell number. It is NOT defining on its own, because a sand dune and a crystal also grow, and they grow from OUTSIDE while living things grow from within
- **reproduction**: also not defining, since a mule, a worker bee and a sterile human are all unambiguously alive and do not reproduce
- **metabolism**: the sum of all chemical reactions in the body. This IS a defining feature, since no non living thing shows it
- **cellular organisation**: every living thing is made of one or more cells, which is the structural half of the definition
- **consciousness**, the ability to sense the surroundings and respond, is the property the syllabus names as THE defining one, and it is the one property no machine truly shows

Why the obvious answers fail *

- in unicellular organisms growth and reproduction are the SAME event, since dividing produces both more mass and more individuals
- an isolated metabolic reaction in a test tube is not living, so metabolism must be happening inside a cell to count
- living things are **self replicating**, **self regulating** and **self organising**, and interact with their surroundings
- so the honest summary is that no single property is enough: what marks life is the whole set operating together

Diversity, and the need to classify *

- over 1.7 to 1.8 million species have been described, and many more are undescribed, which is why an ordered system is not optional
- **classification** is the process of grouping by shared characteristics; **taxonomy** is classification with characterisation, identification and nomenclature added
- **systematics** is wider still: it studies the diversity of organisms and the evolutionary relationships between them
- the word systematics comes from the Latin systema, meaning an ordered arrangement, and Linnaeus's own book was titled Systema Naturae

Binomial nomenclature, and its rules

- given by **Carolus Linnaeus**, and governed today by the codes of botanical and of zoological nomenclature
- each name has two words: the **genus** first, with a capital letter, then the **species**, in lower case
- both words are in Latin and printed in italics; when handwritten they are underlined separately, which is what a written answer must show
- the **author's name** is written after the species in an abbreviated form and is NOT italicised, as in *Mangifera indica* Linn.
- the name is unique worldwide, which is the whole point: a common name like the mango differs by language and region while *Mangifera indica* does not

