

18.1 Classification

Name: _____ Class: _____ Date: _____

Total: 24 marks

KEY WORDS class • species • kingdom • taxonomic hierarchy • domain

Objective

Build the skills to answer exam questions on **classification** – the meaning of **species**, the three **domains**, the **taxonomic hierarchy**, the four **kingdoms**, and how viruses are classified.

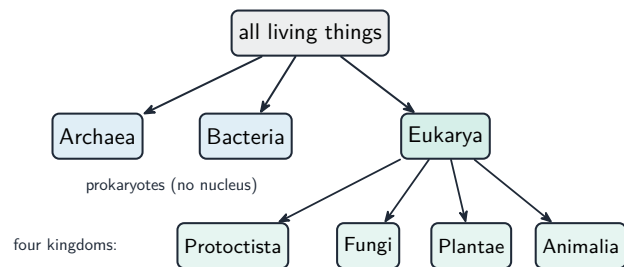
You must be able to:

- discuss the biological, morphological and ecological species concepts
- describe the three domains and the taxonomic hierarchy
- outline the four eukaryotic kingdoms and how viruses are classified

1 Key knowledge and worked examples

■ Species and domains

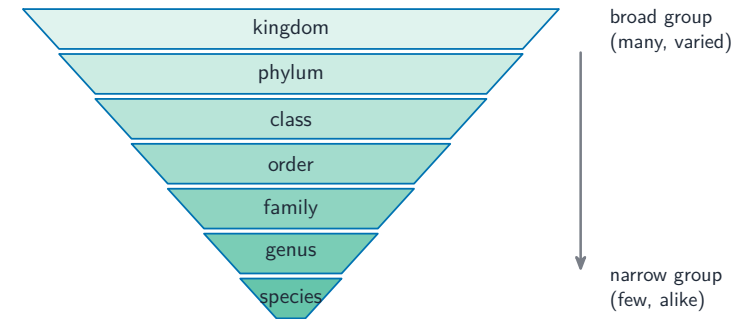
A **species** can be defined by the **biological** (can interbreed to give fertile offspring), **morphological** (look alike), or **ecological** (same niche) concept.



Three domains: *Archaea* and *Bacteria* are prokaryotes; the *Eukarya* split into four kingdoms

Archaea and **Bacteria** are prokaryotes but differ in membrane lipids, ribosomal RNA and cell-wall make-up. **Eukarya** have a nucleus.

■ The taxonomic hierarchy



Kingdom → phylum → class → order → family → genus → species

The four eukaryotic kingdoms: **Protocista** (mostly single-celled), **Fungi** (absorb food, chitin walls), **Plantae** (photosynthesise), **Animalia** (feed on others). **Viruses** are classified by their **nucleic acid** (DNA or RNA) and whether it is single- or double-stranded.

2 Practice

2.1 State the biological species concept. [1]

2.2 Put these in order from largest to smallest group: family, kingdom, genus, order. [2]

3 Exam-style questions

3.1 To which domain do organisms with a nucleus belong? [1]

☐

- A Archaea
B Bacteria
C Eukarya
D Protocista

3.2 Viruses are classified according to: [1]

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A the kingdom they belong to

B the type of nucleic acid and whether it is single- or double-stranded

C their cell wall composition

D the number of chromosomes

3.3 (a) State **two** features that distinguish the kingdom Fungi from the kingdom Plantae. [2]

(b) Explain why Archaea and Bacteria are placed in separate domains even though both are prokaryotes. [2]

3.4 Explain a limitation of the biological species concept. [2]

3.5 The scientific name of the domestic dog is *Canis lupus familiaris*.

(a) Name the taxonomic levels of the hierarchy from domain down to species, in order. [3]

(b) State the rules of the binomial system, using *Canis lupus* as your example. [3]

(c) Name the three domains, and give **one** feature that distinguishes each from the other two. [4]

(d) Explain why classification based on molecular evidence has changed the way organisms are grouped. [3]
