

18.1 Classification

Name: _____ Class: _____ Date: _____ **Total: 24 marks**

KEY WORDS class 纲 • species 物种 • kingdom 界 • taxonomic hierarchy 分类层级 • domain 域

Objective

Build the skills to answer exam questions on **classification** — the meaning of **species** 物种, the three **domains** 域, the **taxonomic hierarchy** 分类层级, the four **kingdoms** 界, and how viruses are classified.

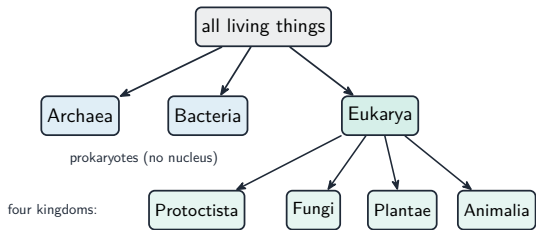
You must be able to:

- 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 Worked examples

Species and domains

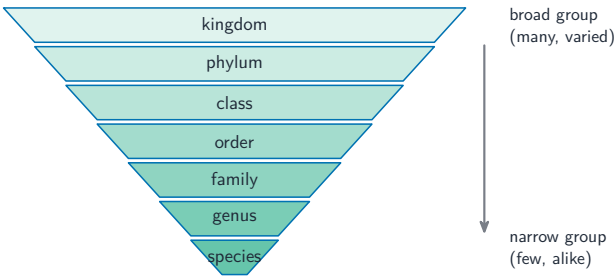
A **species** can be defined by the **biological** (can interbreed to give fertile offspring), **morphological** (look alike), or **ecological** (same niche) concept.



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

Archaea 古菌 and **Bacteria** 细菌 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 | B |
| C | D |
- A Archaea
B Bacteria
C Eukarya
D Protocista

3.2 Viruses are classified according to: [1]

- | | |
|---|---|
| A | B |
| C | D |
- 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]
