

1.2 Concept and uses of classification systems

Name: _____ Class: _____ Date: _____ **Total: 22 marks**

KEY WORDS species 物种 • binomial system 双名法 • scientific name 学名 • genus 属
• ancestor 祖先

Objective

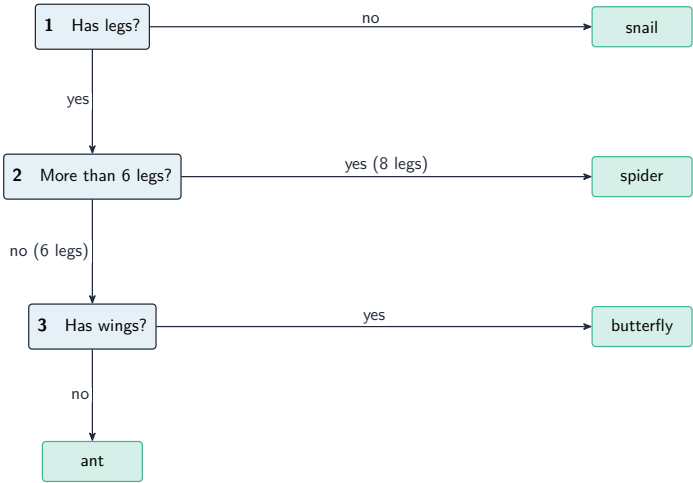
Build the skills to answer exam questions on **classification systems** 分类系统 — **species** 物种, the **binomial system** 双名法, **dichotomous keys** 二歧检索表, and DNA in classification.

You must be able to:

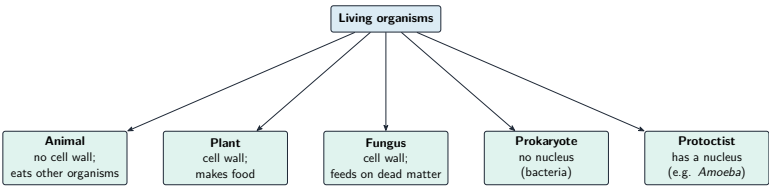
- define a species and use the binomial naming rules
- use and construct a dichotomous key
- explain how DNA base sequences show how closely related organisms are

1 Worked examples

■ Keys and naming



Each step of a key gives two choices until you reach the organism



A key sorts organisms into the five kingdoms

- **species:** a group that can reproduce to make fertile offspring.
- **binomial:** *Genus species* — Genus capital, species lower-case, both italic.
- more similar DNA base sequence → more closely related (more recent ancestor).

2 Practice

2.1 Define a species. [1]

2.2 In the name *Homo sapiens*, state which word is the genus. [1]

3 Exam-style questions

3.1 Two organisms with very similar DNA base sequences are: [1]

- A distantly related
- B closely related
- C the same individual
- D not related

3.2 A student writes a scientific name as “homo Sapiens”.

(a) State the two mistakes in this name. [2]

(b) State one feature you should use when building a dichotomous key, and one you should avoid. [2]

3.3 Explain how DNA base sequences can be used to find out how closely two species are related. [2]

3.4 Five small animals were found in a pond.

Animal	Legs	Wings	Body
P	6	yes	three parts
Q	8	no	two parts
R	0	no	many segments
S	6	no	three parts
T	10	no	two parts

(a) Construct a dichotomous key that separates all five animals. [4]

(b) Animals **P** and **S** belong to the same class. Name that class and give **two** features from the table that place them in it. [3]

(c) One of the animals is called *Daphnia pulex*. State what each part of the name tells you, and give **two** rules for writing a binomial name. [4]

(d) Explain why scientists use scientific names instead of common names. [2]

Solutions

2.1 a group of organisms that can reproduce to make fertile offspring.

2.2 *Homo*.

3.1 B. Similar DNA base sequences mean closely related.

3.2 (a) the genus should have a capital letter (*Homo*); the species should be lower-case (*sapiens*).

(b) use a clear visible feature (e.g. has wings / no wings); avoid a feature that changes, such as size.

3.3 compare the base sequences of the two species; the more similar the sequences, the more closely related they are (they share a more recent ancestor).

3.4 (a) A workable key, each step offering exactly two choices, e.g. 1 has legs → 2; has no legs → **R**. 2 has 6 legs → 3; has more than 6 legs → 4. 3 has wings → **P**; has no wings → **S**. 4 has 8 legs → **Q**; has 10 legs → **T**.

(b) **Insects**; both have six legs and a body in three parts.

(c) *Daphnia* is the **genus**, the group of closely related species it belongs to; *pulex* is the **species**. The genus starts with a capital letter and the species with a small letter; the whole name is written in italics, or underlined by hand.

(d) A common name can mean different animals in different places, and one animal can have many common names; a scientific name is the same all over the world, so scientists always know exactly which organism is meant.