

Characteristics & Classification

IGCSE Biology ■ Topic 1

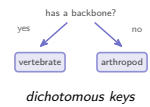
IGCSE Biology



Characteristics & Classification

What we will cover

- 1 The seven characteristics
- 2 Species & naming
- 3 Dichotomous keys
- 4 The five kingdoms
- 5 Vertebrates & arthropods
- 6 Plants & viruses



1

Life and naming

Characteristics & Classification

Life and naming

The seven characteristics

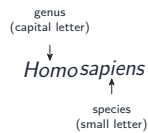
M	Movement
R	Respiration
S	Sensitivity
G	Growth
R	Reproduction
E	Excretion
N	Nutrition

- **Movement** 运动 – an action by an organism, or part of an organism, that changes its position or place.
- **Respiration** 呼吸作用 – the chemical reactions in **cells** 细胞 that break down **nutrient molecules** 营养物质 and release...
- **Sensitivity** 应激性 – the ability to detect and respond to changes in the internal or external **environment** 环境.

Characteristics & Classification

Life and naming

Species and naming

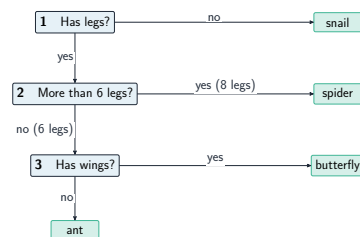


- The **first** part is the **genus** 属 (a larger group that the species belongs to). It starts with a capital letter.
- The **second** part is the species. It starts with a small letter.

Characteristics & Classification

Life and naming

Dichotomous keys

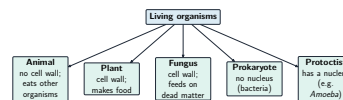


A **dichotomous key** 二歧检索表 identifies an organism by a series of **two-way** choices. Use clear, visible features (wings / no wings), not size.

2 Kingdoms and groups

Characteristics & Classification Kingdoms and groups

The five kingdoms



- **Animal** – many cells, no cell wall, feed
- **Plant** – cell wall, **photosynthesis** 光合作用
- **Fungus** – cell walls, feed on matter
- **Prokaryote** – bacteria, no nucleus 细胞核
- **Protocist** – e.g. *Amoeba*

Characteristics & Classification Kingdoms and groups

Vertebrates

mammals – fur 毛发/hair; feed young on milk

birds – feathers 羽毛 & a beak; hard-shelled eggs

reptiles – dry scales 鳞片; leathery eggs on land

amphibians – moist skin; eggs & young in water

fish – wet scales & fins 鳍; breathe with **gills** 鳃

Vertebrates 脊椎动物 have a **backbone** 脊柱.

Characteristics & Classification Kingdoms and groups

Arthropods

insects – 3 body parts; 3 pairs of legs; **antennae** 触角

arachnids – 2 body parts; 4 pairs of legs; no wings

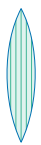
crustaceans – many legs; 2 pairs of antennae; mostly aquatic

myriapods – many **segments** 体节, legs on each

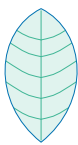
Arthropods 节肢动物 have no backbone but a hard **exoskeleton** 外骨骼.

Characteristics & Classification Kingdoms and groups

Plants and viruses

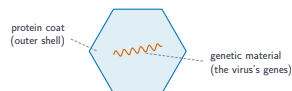


Monocotyledon
parallel veins, 1 cotyledon



Dicotyledon
net (branching) veins, 2 cotyledons

Monocots 单子叶植物: one **cotyledon** 子叶, parallel veins. **Dicots** 双子叶植物: two, net veins.



A **virus** 病毒: a protein coat around genetic material; not a cell, reproduces only in a **host** 宿主.

3 Recap

Worked example – using a key

A student finds a small animal with six legs and two pairs of wings. Which group is it in, and how do you write its name?

- Six legs ⇒ an **insect** (arthropods are grouped by **leg number**).
- Insects: 6 legs, 3 body parts, usually 2 pairs of wings.
- Names use the **binomial system** 双名法: *Genus species*.
- *Apis mellifera* – genus with a capital, species lower case, both in italics.

Arthropods split on **legs**:
insect 6, arachnid 8, crustacean >10, myriapod many. Count legs first, every time.

Topic 1 – key takeaways

1 MRS GREN

the seven characteristics of living things

2 Naming

binomial: capital genus, small species, italics

3 Kingdoms

animal, plant, fungus, prokaryote, protist

4 Groups

vertebrates (backbone), arthropods (exoskeleton)

Check yourself

- 1 What does the R in MRS GREN stand for?
- 2 Which part of a scientific name has a capital letter?
- 3 What feature do all arthropods share?
- 4 Why are viruses not placed in a kingdom?



Answers 1. Respiration 2. the genus (first part) 3. a hard exoskeleton & jointed legs 4. they are not made of cells