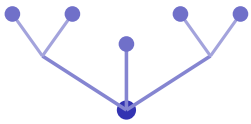
Characteristics & Classification

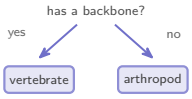
IGCSE Biology ▪ Topic 1

IGCSE Biology



What we will cover

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



dichotomous keys

1 Life and naming

The seven characteristics

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

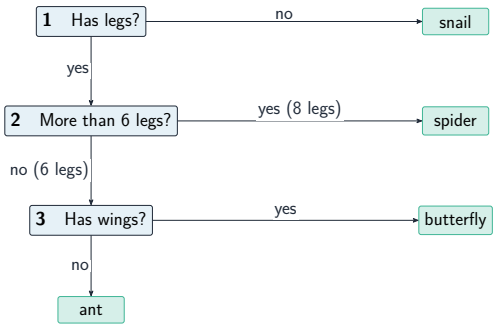
- **Movement** 运动 – an action by an organism, or part of an organism, that changes its position or place.
- **Respiration** 呼吸作用 – the chemical reactions in **cells** 细胞 that break down **nutrient molecules** 营养物质 and release...
- **Sensitivity** 应激性 – the ability to detect and respond to changes in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

Species and naming

genus
(capital letter)
↓
Homo sapiens
↑
species
(small letter)

- 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.

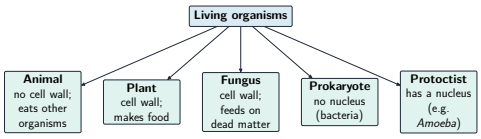
Dichotomous keys



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

The five kingdoms



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

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

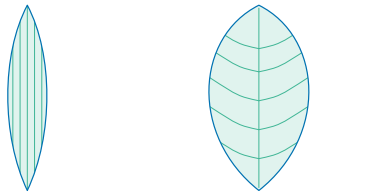
Vertebrates 脊椎动物 have a **backbone** 脊柱.

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.

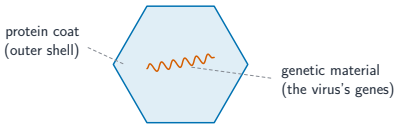
Plants and viruses



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

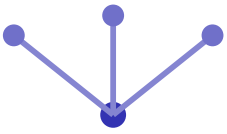
2 Naming
binomial: capital genus, small species, italics

3 Kingdoms
animal, plant, fungus, prokaryote, protoctist

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