18.1 Variation

Name: _____ Class: _____ Date: _____ **Total: 6 marks**

KEY WORDS variation • continuous • mutation • discontinuous • continuous variation

Objective

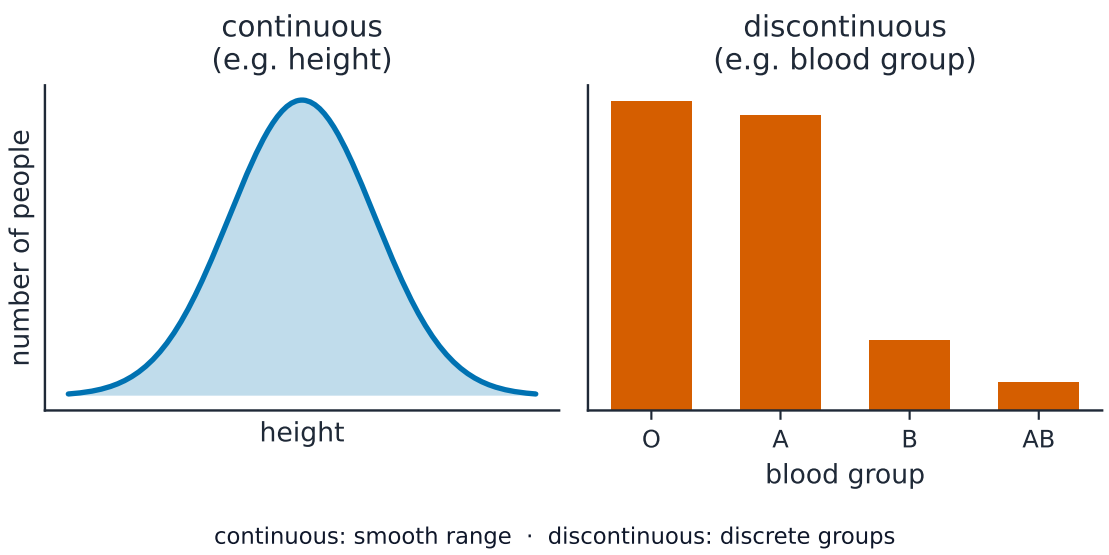
Build the skills to answer exam questions on **variation** – **continuous** and **discontinuous** variation, and **mutation**.

You must be able to:

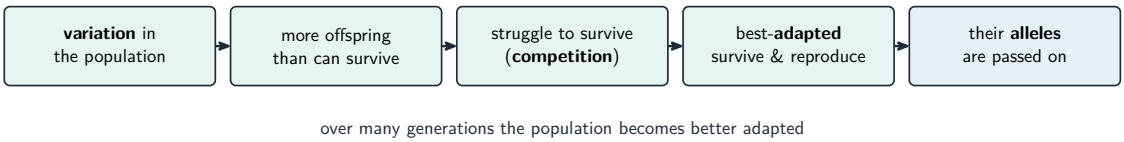
- distinguish continuous and discontinuous variation, with examples
- state the causes of each
- describe mutation as the source of new alleles

1 Key knowledge and worked examples

Two types of variation



Continuous: a smooth range (genes + environment). Discontinuous: separate groups (genes only)



Variation is the raw material of natural selection

- **continuous:** e.g. height, mass. **discontinuous:** e.g. blood group.
- **mutation:** a random change in DNA – makes new alleles (the source of all variation). Radiation/chemicals raise the rate.

2 Practice

2.1 Give one example of discontinuous variation. [1]

2.2 State the source of all new alleles. [1]

3 Exam-style questions

3.1 Human height shows continuous variation because it is affected by: [1]

- ☐ **A** genes only
- **B** the environment only
- **C** both genes and the environment
- **D** neither

3.2 Mutations are genetic changes.

(a) State what a mutation is. [1]

(b) State two things that increase the rate of mutation. [2]

Solutions

Each answer shows the steps, then the **result**.

2.1

- discontinuous variation e.g. **ABO blood groups** (or seed shape)

2.2

- all new alleles come from **mutation**

3.1 C

- human height is affected by **both genes and the environment**
- A and B are only one cause; D is false

3.2

(a)

- a mutation is a **(random) genetic change** in the DNA base sequence

(b)

- **ionising radiation** (e.g. X-rays)
- **certain chemicals**