18.3 Selection

Name: _____ Class: _____ Date: _____ **Total: 7 marks**

KEY WORDS antibiotic • bacteria • resistant • selection • natural selection

Objective

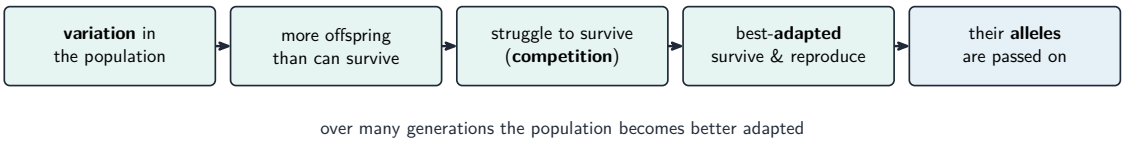
Build the skills to answer exam questions on **selection** – **natural selection**, antibiotic resistance, and **selective breeding**.

You must be able to:

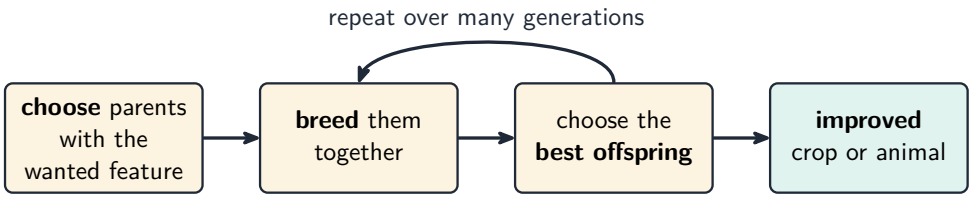
- describe the steps of natural selection
- explain antibiotic resistance as natural selection
- describe selective breeding and contrast it with natural selection

1 Key knowledge and worked examples

Natural and artificial selection



Variation → too many offspring → struggle/competition → best-adapted survive and reproduce → pass on alleles



humans choose which breed (not the environment)

Selective breeding: humans choose which organisms breed, over many generations

- key difference: the **environment** selects (natural) vs **humans** select (artificial).

2 Practice

2.1 State what is meant by natural selection. [1]

2.2 State who or what "selects" in selective breeding. [1]

3 Exam-style questions

3.1 In natural selection, the individuals most likely to survive and reproduce are those that are: [1]

☐ **A** the largest
B best adapted to the environment
C chosen by humans
D identical to each other

3.2 Some bacteria become resistant to an antibiotic.

(a) Explain how antibiotic resistance spreads, using natural selection. [3]

(b) State the main difference between natural selection and selective breeding. [1]

Solutions

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

2.1

- natural selection: the **best-adapted** organisms survive, reproduce and **pass on their alleles**

2.2

- in selective breeding, **humans** select

3.1 B

- those **best adapted to the environment** are most likely to survive and reproduce
- A is not always true; C is selective breeding; D is asexual

3.2

(a)

- a few bacteria carry a **resistant allele** (by mutation)
- the antibiotic kills the non-resistant ones, so the resistant **survive**
- they reproduce and pass on the allele, so the **population becomes resistant**

(b)

- natural selection: the **environment** selects; selective breeding: **humans** select