

18.3 Selection

Name: _____ Class: _____ Date: _____

Total: 7 marks

KEY WORDS antibiotic 抗生素 • bacteria 细菌 • selection 选择 • resistant 耐药 • natural selection 自然选择

Objective

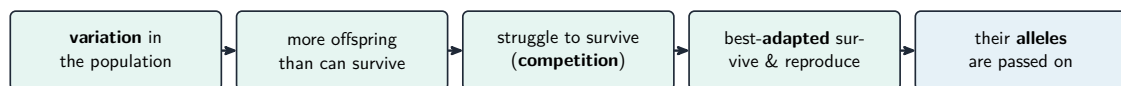
Build the skills to answer exam questions on **selection** 选择 — **natural selection** 自然选择, antibiotic resistance, and **selective breeding** 选择育种.

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

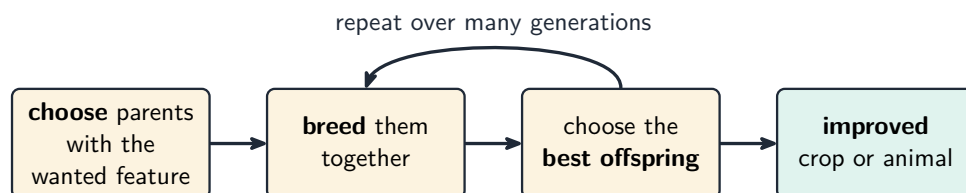
1 Worked examples

■ Natural and artificial selection



over many generations the population becomes better adapted

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
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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

2.1 the process by which the best-adapted organisms survive, reproduce and pass on their alleles.

2.2 humans.

3.1 B. The best-adapted individuals are most likely to survive and reproduce.

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 resistance allele, so the population becomes resistant.

(b) in natural selection the environment selects; in selective breeding humans select.