

7.2 Natural Selection

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS disruptive 分裂 • directional 定向 • stabilizing 稳定 • natural selection 自然选择
• variation 变异

Objective

Build the skills to answer exam questions on **types of natural selection**.

You must be able to:

- distinguish **directional** 定向, **stabilizing** 稳定, and **disruptive** 分裂 selection
- match each to its effect on a trait distribution
- give an example of each

1 Worked examples

Study these first. Each one shows the method for a question type used later — follow the steps and you can do the Practice and Exam-style questions yourself.

■ Three patterns of selection

- **Directional** — favors one **extreme**; the average shifts that way (e.g. larger beak size in a drought).
- **Stabilizing** — favors the **middle**; extremes are selected against (e.g. average human birth weight).
- **Disruptive** — favors **both extremes** over the middle; can split a population.

■ Reading a distribution graph

- Directional: the peak **moves** left or right.
- Stabilizing: the peak gets **taller and narrower** (less variation).
- Disruptive: **two peaks** appear.

■ A worked identification

If small and large individuals both survive better than medium ones, that is **disruptive** selection (two favored extremes).

■ Why it matters

Each pattern changes the population's trait distribution differently, shaping how a species adapts over time.

2 Practice

Now apply the methods above.

2.1 Which type of selection favors the average trait? [1]

2.2 Which type shifts the average toward one extreme? [1]

2.3 What happens to a distribution under disruptive selection? [1]

3 Exam-style questions

3.1 Selection that favors both extremes over the middle is [1]

- **A** directional
- **B** stabilizing
- **C** disruptive
- **D** artificial

3.2 In a drought, only birds with large beaks can crack the remaining hard seeds.

(a) Name the type of selection. [1]

(b) Describe how the beak-size distribution changes over generations. [2]

3.3 Human birth weight clusters near an average, with very small and very large babies less likely to survive. Name and explain the type of selection. [2]

Solutions

2.1 Stabilizing selection.

2.2 Directional selection.

2.3 It splits toward both extremes (two peaks).

3.1 C — disruptive.

3.2 (a) Directional. (b) Large-beaked birds survive and reproduce more, so average beak size increases over generations (the distribution shifts toward large).

3.3 Stabilizing selection — the average birth weight is favored while both extremes are selected against, narrowing the distribution around the mean.