

7.2 Natural Selection

Name: _____ Class: _____ Date: _____

Total: 9 marks

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
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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]

4 Go further

You are now ready for the real exam questions on this subtopic:

- work through the **7.2 Natural Selection** lesson on the **Learn** page;
- read the **Natural Selection** section of the AP Biology handout on the **Know** page.

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.