

Exercise walk-through

Natural Selection ■ 7.2

eXercise

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

Method — 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.

Method — Reading a distribution graph

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

Method — A worked identification

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

Method — Why it matters

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

Practice 2.1 ■ 1 mark

Which type of selection favors the average trait?

Solution 2.1

Method: Three patterns of selection

Worked steps

Stabilizing selection **B1**.

Practice 2.2 ■ 1 mark

Which type shifts the average toward one extreme?

Solution 2.2

Method: Three patterns of selection

Worked steps

Directional selection **B1**.

Practice 2.3 ■ 1 mark

What happens to a distribution under disruptive selection?

Solution 2.3

Worked steps

It splits toward both extremes (two peaks) **B1**.

Exam-style 3.1 ■ 1 mark

Selection that favors both extremes over the middle is

A directional

B stabilizing

C disruptive

D artificial

Solution 3.1

Method: Three patterns of selection

A directional

B stabilizing

C disruptive



D artificial

Worked steps

C — disruptive.

Exam-style 3.2 ■ 1 mark

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

- (a) Name the type of selection.
- (b) Describe how the beak-size distribution changes over generations.

Solution 3.2

Method: Three patterns of selection

Worked steps

(a) Directional **B1**. (b) Large-beaked birds survive and reproduce more, so average beak size increases over generations (the distribution shifts toward large) **M1** **A1**.

Exam-style 3.3 ■ 2 marks

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.

Solution 3.3

Method: Three patterns of selection

Worked steps

Stabilizing selection — the average birth weight is favored while both extremes are selected against, narrowing the distribution around the mean **M1** **A1**.