

Exercise walk-through

Survivorship Curves ■ 3.3

eXercise

You must be able to

- describe **Type I, II, and III 存活曲线** survivorship curves
- match each to a reproductive strategy
- read a survivorship curve

Method — The three curves

A **survivorship curve** plots the fraction surviving against age:

- **Type I** — high survival when young, most deaths in **old age** (large mammals, humans). K-selected.
- **Type II** — a **constant** death rate at all ages (many birds, rodents) — a straight diagonal line.
- **Type III** — very high death rate when young, few survive to adulthood (fish, insects, plants). r-selected.

Method — Matching to strategy

Type III goes with **r-selected** species (many offspring, little care); **Type I** with **K-selected** species (few offspring, much care).

Method — Reading a curve

A curve that stays high then drops steeply at the end is **Type I**; one that drops steeply at the start is **Type III**; a straight line is **Type II**.

Method — A worked match

A sea turtle laying hundreds of eggs, most eaten young, shows a **Type III** curve.

Practice 2.1 ■ 1 mark

Which survivorship type has most deaths in old age?

Solution 2.1

Method: The three curves

Worked steps

Type I **B1**.

Practice 2.2 ■ 1 mark

Which type has a constant death rate at all ages?

Solution 2.2

Method: The three curves

Worked steps

Type II **B1**.

Practice 2.3 ■ 1 mark

Which type matches r-selected species?

Solution 2.3

Method: Matching to strategy

Worked steps

Type III **B1**.

Exam-style 3.1 ■ 1 mark

A Type III survivorship curve shows

- A** most deaths in old age
- B** a constant death rate
- C** very high death rates when young
- D** no deaths

Solution 3.1

- A** most deaths in old age
- B** a constant death rate
- C** very high death rates when young 
- D** no deaths

Worked steps

C — very high death rates when young.

Exam-style 3.2 ■ 1 mark

A fish species lays thousands of eggs, and very few survive to adulthood.

- (a) State the survivorship curve type.
- (b) Explain how this matches its reproductive strategy.

Solution 3.2

Method: The three curves

Worked steps

(a) Type III **B1**. (b) It is r-selected — producing many offspring with little care, so most die young, giving a steep early drop **M1 A1**.

Exam-style 3.3 ■ 2 marks

Explain why humans show a Type I survivorship curve.

Solution 3.3

Method: The three curves

Worked steps

Humans (K-selected) produce few offspring with much care, so most survive to old age and deaths cluster late in life, giving a Type I curve **M1** **A1**.