

Exercise walk-through

Island Biogeography ■ 2.3

eXercise

You must be able to

- explain how **island size** and **distance** affect species number
- apply the theory to habitat fragments
- reason about immigration and extinction

Method — Island biogeography

The number of species on an island balances **immigration** (new species arriving) against **extinction** (species dying out).

Method — Size effect

Larger islands support **more** species — more habitat, larger populations (lower extinction). Small islands hold fewer species.

Method — Distance effect

Islands **closer** to a mainland receive **more** immigrants, so they hold more species; **far** islands receive fewer.

Method — Applying to habitat fragments

Fragments of habitat (from roads, farms) act like islands. **Large, connected** fragments keep more species than **small, isolated** ones — a key idea for reserve design.

Practice 2.1 ■ 1 mark

Do larger islands hold more or fewer species?

Solution 2.1

Method: Size effect

Worked steps

More species **B1**.

Practice 2.2 ■ 1 mark

Do islands closer to the mainland receive more or fewer immigrants?

Solution 2.2

Method: Distance effect

Worked steps

More immigrants **B1**.

Practice 2.3 ■ 1 mark

The number of species balances immigration against what?

Solution 2.3

Method: Island biogeography

Worked steps

Extinction **B1**.

Exam-style 3.1 ■ 1 mark

An island far from the mainland is expected to have

A more species (more immigration)

B fewer species (less immigration)

C no extinction

D unlimited species

Solution 3.1

A more species (more immigration)

B fewer species (less immigration) 

C no extinction

D unlimited species

Worked steps

B — fewer species (less immigration).

Exam-style 3.2 ■ 1 mark

A forest is split into one large fragment and several small ones.

- (a) Which fragment will likely keep more species?
- (b) Explain using island biogeography.

Solution 3.2

Method: Applying to habitat fragments

Worked steps

(a) The large fragment **B1**. (b) A larger area has more habitat and larger populations (lower extinction), so it keeps more species, like a large island **M1 A1**.

Exam-style 3.3 ■ 2 marks

Explain why connecting habitat fragments with wildlife corridors helps preserve species.

Solution 3.3

Method: Applying to habitat fragments

Worked steps

Corridors let species move between fragments, increasing immigration and gene flow and reducing extinction — effectively making the fragments act like one larger habitat **M1** **A1**.