

Exercise walk-through

Introduction to Ecosystems ■ 1.1

eXercise

You must be able to

- define an **ecosystem** 生态系统 (biotic + abiotic)
- distinguish **biotic** 生物 and **abiotic** 非生物 factors
- describe interactions (predation, competition, symbiosis)

Method — What an ecosystem is

An **ecosystem** is all the **living** (biotic) and **non-living** (abiotic) things in an area, interacting together.

Method — Biotic vs abiotic

- **Biotic** — living or once-living: plants, animals, bacteria.
- **Abiotic** — non-living: sunlight, water, temperature, soil, nutrients.

Method — Interactions

Organisms interact through **predation** (one eats another), **competition** (for shared resources), and **symbiosis** (mutualism, commensalism, parasitism).

Method — A worked classification

In a pond: fish and algae are **biotic**; water temperature and dissolved oxygen are **abiotic**. A heron eating a fish is **predation**.

Practice 2.1 ■ 1 mark

Define an ecosystem.

Solution 2.1

Worked steps

All the living (biotic) and non-living (abiotic) things in an area, interacting **B1**.

Practice 2.2 ■ 2 marks

Classify each as biotic or abiotic: (a) sunlight, (b) a frog, (c) soil, (d) bacteria.

Solution 2.2

Method: Biotic vs abiotic

Worked steps

(a) abiotic; (b) biotic; (c) abiotic; (d) biotic **B1** **B1** *for two, for all four.*

Practice 2.3 ■ 1 mark

Name one type of interaction between organisms.

Solution 2.3

Worked steps

Any one: predation, competition, symbiosis **B1**.

Exam-style 3.1 ■ 1 mark

Which is an abiotic factor?

A a fish

B water temperature

C algae

D a bacterium

Solution 3.1

A a fish

B water temperature



C algae

D a bacterium

Worked steps

B — water temperature.

Exam-style 3.2 ■ 2 marks

A student studies a grassland ecosystem.

- (a) Give two biotic and two abiotic factors.
- (b) Describe one interaction between two organisms in it.

Solution 3.2

Method: What an ecosystem is

Worked steps

(a) Biotic: e.g. grass, grasshopper; abiotic: e.g. sunlight, soil **B1** **B1**. (b) Any valid interaction, e.g. a grasshopper eats grass (predation/herbivory) **M1** **A1**.

Exam-style 3.3 ■ 2 marks

Explain why both biotic and abiotic factors must be considered when studying an ecosystem.

Solution 3.3

Method: What an ecosystem is

Worked steps

Organisms depend on abiotic conditions (light, water, nutrients) and on each other; both together determine what can live and how the ecosystem functions **M1** **A1**.