AP ENVIRONMENTAL SCIENCE • EXERCISE SHEET

1.1 Introduction to Ecosystems

Name: _____ Class: _____ Date: _____ **Total: 11 marks**

Objective

Build the skills to answer exam questions on **ecosystems** —living and non-living components and their interactions.

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)

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.

What an ecosystem is

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

Biotic vs abiotic

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

Interactions

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

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**.

2 Practice

Now apply the methods above.

2.1 Define an ecosystem. [1]

2.2 Classify each as biotic or abiotic: (a) sunlight, (b) a frog, (c) soil, (d) bacteria. [2]

2.3 Name one type of interaction between organisms. [1]

3 Exam-style questions

3.1 Which is an abiotic factor? [1]

- **A** a fish
- **B** water temperature
- **C** algae
- **D** a bacterium

3.2 A student studies a grassland ecosystem.

(a) Give two biotic and two abiotic factors. [2]

(b) Describe one interaction between two organisms in it. [2]

3.3 Explain why both biotic and abiotic factors must be considered when studying an ecosystem. [2]

4 Go further

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

- work through the **1.1 Introduction to Ecosystems** lesson on the **Learn** page;

- read the **Introduction to Ecosystems** section of the AP Environmental Science handout on the **Know** page.

Solutions

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

2.2 (a) abiotic; (b) biotic; (c) abiotic; (d) biotic.

2.3 Any one: predation, competition, symbiosis.

3.1 B —water temperature.

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

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