AP BIOLOGY • EXERCISE SHEET

8.4 Effect of Density on Populations

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS density-dependent 密度制约 • density-independent 非密度制约 • competition 竞争 • predation 捕食 • population 种群

Objective

Build the skills to answer exam questions on **density-dependent and density-independent factors**.

You must be able to:

- distinguish **density-dependent** 密度制约 from **density-independent** 非密度制约 factors
- give examples of each
- predict which limits a population

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.

Density-dependent factors

These have a **stronger effect** as the population gets **denser**: competition for food, disease spread, predation, and waste build-up. They help regulate the population toward carrying capacity.

Density-independent factors

These affect the population **regardless** of its size: weather, natural disasters (fire, flood), and temperature. A storm kills the same fraction whether the population is large or small.

A worked identification

Disease spreading faster in a crowded population = **density-dependent**. A drought killing many plants regardless of number = **density-independent**.

Why the distinction matters

Density-dependent factors **regulate** populations around K; density-independent factors can cause sudden crashes unrelated to density.

2 Practice

Now apply the methods above.

2.1 Give one density-dependent factor. [1]

2.2 Give one density-independent factor. [1]

2.3 Which type of factor helps regulate a population near carrying capacity? [1]

3 Exam-style questions

3.1 A disease that spreads faster in a crowded population is a [1]

A	B
C	D

A density-independent factor
B density-dependent factor
C carrying capacity
D producer

3.2 A sudden flood kills many organisms in a population.

(a) Classify this factor. [1]

(b) Explain why its effect does not depend on population density. [2]

3.3 Explain how density-dependent factors help keep a population near its carrying capacity. [2]