

# 8.3 Population Ecology

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_ **Total: 9 marks**

**KEY WORDS** population 种群 • logistic 逻辑斯蒂 • logistic growth 逻辑斯蒂增长  
• carrying capacity 环境容纳量 • exponential 指数

## Objective

Build the skills to answer exam questions on **population ecology** — growth models.

You must be able to:

- distinguish **exponential** 指数 from **logistic** 逻辑斯蒂 growth
- explain **carrying capacity** 环境容纳量  $K$
- read a growth curve

## 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.

### ■ Exponential growth

With unlimited resources, a population grows **exponentially** — a **J-shaped** curve that keeps steepening. Rare in nature except briefly (e.g. new habitat).

### ■ Logistic growth

With limited resources, growth **slows** as the population rises, leveling off at the **carrying capacity**  $K$  — an **S-shaped** curve.

### ■ Carrying capacity

$K$  is the **maximum** population the environment can support long-term. Near  $K$ , births  $\approx$  deaths and growth stops.

### ■ A worked reading

An S-curve that flattens at 500 individuals has a carrying capacity of 500. Growth is fastest in the middle of the curve, not at the top.

## 2 Practice

Now apply the methods above.

**2.1** What shape is an exponential growth curve? [1]

**2.2** What does carrying capacity mean? [1]

**2.3** What shape is a logistic growth curve? [1]

## 3 Exam-style questions

**3.1** Logistic growth levels off at the [1]

- |   |   |
|---|---|
| A | B |
| C | D |
- A origin  
B carrying capacity  
C exponential phase  
D zero point

**3.2** A population grows and then levels off at 1200 individuals.

(a) State the carrying capacity. [1]

(b) Explain why growth slows as the population approaches this value. [2]

**3.3** Explain the difference between exponential and logistic growth in terms of resources.[2]