

# 8 Energy flow and populations – Part 1

Name: \_\_\_\_\_ Class: \_\_\_\_\_ Date: \_\_\_\_\_

## Vocabulary 词汇

Write each word three times. 把每个单词抄写三遍。

| English           | 中文    | Write it 3 times (English) |
|-------------------|-------|----------------------------|
| ecosystem         | 生态系统  | _____                      |
| producers         | 生产者   | _____                      |
| consumers         | 消费者   | _____                      |
| food chain        | 食物链   | _____                      |
| trophic level     | 营养级   | _____                      |
| population        | 种群    | _____                      |
| carrying capacity | 环境容纳量 | _____                      |

## Recall

You already know how living things depend on one another:

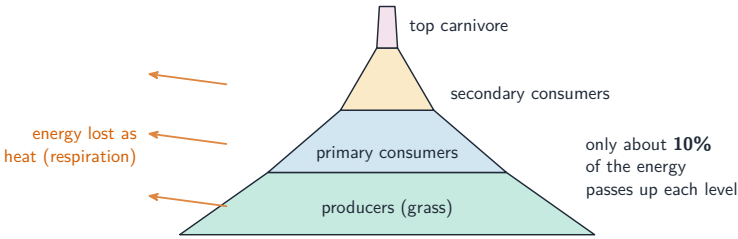
- Food chains show who eats whom, starting with plants.
- Energy from the Sun flows through an ecosystem.
- A population can grow, then level off when resources run low.

This sheet lines up energy flow and population growth. Each idea has a short worked example.

## New ideas

### ■ 1 Energy flow

Energy enters an **ecosystem** 生态系统 as sunlight, captured by **producers** 生产者 (plants), then passes to **consumers** 消费者 along a **food chain** 食物链. Each step is a **trophic level** 营养级.



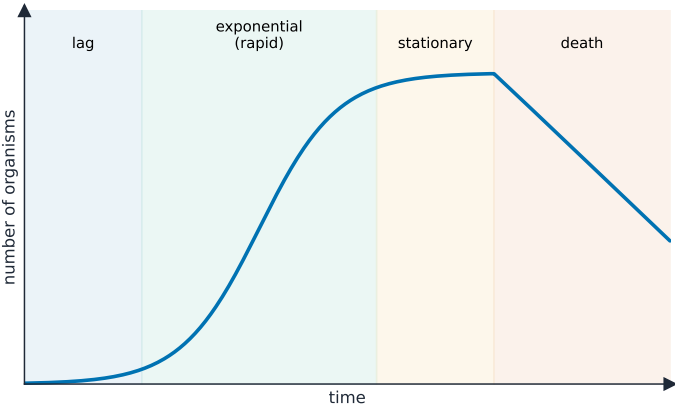
### ■ 2 The 10% rule

Only about **10%** of the energy passes from one trophic level to the next – the rest is lost as heat. This is why food chains are short and top predators are few.

*Worked example.* If plants capture 10,000 units of energy, the next level gets about 1,000, then 100, then just 10 – losing 90% at each step.

### ■ 3 Population growth

A **population** 种群 grows quickly when resources are plenty, then slows and levels off at the **carrying capacity** 环境容纳量 – the most the environment can support.



#### ■ 4 What limits a population

Food, water, space, disease, and predators are **limiting factors** that stop a population growing without end.

**Watch out:** so much energy is lost between levels (about 90% each step) that a food chain rarely has more than four or five links – there is simply not enough energy left to support another predator.

### Practice

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Try these in order. The methods are all above.

**2.1** State where the energy in an ecosystem originally comes from, and which organisms capture it. [2]

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**2.2** About what percentage of energy passes to the next trophic level? [1]

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**2.3** A plant level holds 8,000 units of energy. Estimate the energy at the next two levels.[2]

**2.4** State what “carrying capacity” means. [2]

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**2.5** Give two factors that can limit the growth of a population. [2]

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