

2 Specialised cells and size – Part 2

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)
specialised cell	特化细胞	_____
red blood cell	红细胞	_____
oxygen	氧气	_____
root hair cell	根毛细胞	_____
nerve cell	神经元	_____
impulses	脉冲	_____
tissue	组织	_____
muscle	肌肉	_____
organ	器官	_____
organ system	器官系统	_____
digestive system	消化系统	_____
microscope	显微镜	_____
magnification	放大倍数	_____

Recall

Cells are the building blocks of life. Most cells are **specialised** —their shape suits one job —and they build up into larger structures.

New ideas

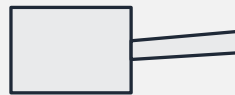
Read these first, then do the Practice.

■ 1 Specialised cells

A **specialised cell** 特化细胞 has a shape that suits its job:



red blood cell
(carries oxygen)



root hair cell
(absorbs water)

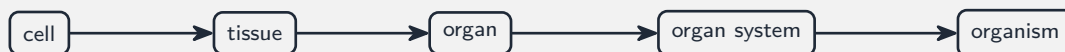


nerve cell
(carries impulses)

Cell	Job	How its shape helps
red blood cell 红细胞	carry oxygen 氧气	no nucleus, dish shape → holds more oxygen
root hair cell 根毛细胞	absorb water	long "hair" → large surface
nerve cell 神经元	carry impulses 脉冲	very long → reaches far

■ 2 Levels of organisation

Cells are organised into bigger and bigger structures:

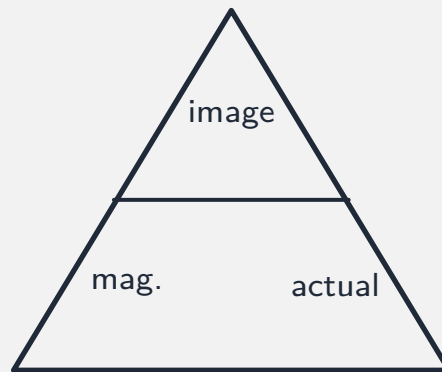


- a **tissue** 组织 is a group of similar cells (e.g. **muscle** 肌肉);
- an **organ** 器官 is several tissues working together (e.g. the heart);
- an **organ system** 器官系统 is several organs together (e.g. the **digestive system** 消化系统).

■ 3 Magnification

Cells are tiny, so we look at them with a **microscope** 显微镜. How much bigger the image is, is the **magnification** 放大倍数:

$$\text{magnification} = \frac{\text{image size}}{\text{actual size}}$$



Cover the quantity you want to find. Always use the **same unit** for both sizes (1 mm = 1000 μm).

Watch out: the levels of organisation go **cell** $\rightarrow$ **tissue** $\rightarrow$ **organ** $\rightarrow$ **organ system** $\rightarrow$ **organism**, in that order. For magnification use the *same unit* for both sizes, and magnification = image $\div$ actual.

Practice

Try these in order.

2.6 Why does a red blood cell have no nucleus? [1]

2.7 Put these in order from smallest to largest: organ, cell, organism, tissue, organ system. [2]

2.8 What is a *tissue*? [1]

2.9 A cell's image is 8 mm across at a magnification of $\times 400$. Work out its actual size in mm. [2]

2.10 How many micrometres (μm) are there in 1 mm? [1]

2.11 Challenge. A cell is actually 0.05 mm wide. Under a microscope its image is 20 mm wide. Calculate the magnification. [2]