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Key	
■ ■ ■	Science inquiry skills
■ ■ ■	Biological sciences
■ ■ ■	Chemical sciences
■ ■ ■	Physical sciences
■ ■ ■	Earth and space sciences

How to use this book • STUDENT BOOK

Pearson Science 2nd edition has been updated to fully address all strands of the new **Australian Curriculum: Science** which has been adopted throughout the nation. Since some states have tailored the Australian Curriculum slightly for their own particular students, the coverage of the new **Victorian Curriculum: Science** is also captured in this new edition. We address inclusion by clearly indicating the additional content which enables flexibility to determine the approach, as well as the added bonus of an option to engage with **extension** and **revision** opportunities.

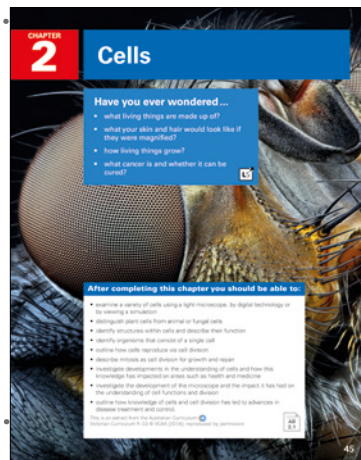
All aspects of the student books have been thoroughly reviewed by our **Literacy Consultant Dr Trish Weekes** and the result is **more accessible** content, **enhanced scaffolding** and **strengthened question and instructions sets**. The design is updated to improve the readability and navigation of the text.

In this edition, we retain a flexible approach to teaching and learning. A careful mix of **inquiry**, **STEM** and a range of **practical investigations**, along with **fully updated** content reflect the dynamic and ever-changing nature of scientific knowledge and developments. Combined with the improved and enhanced sets of questions, this series provides a rich assortment of choice, supporting a **differentiated approach**.

An integrated and research-based approach to science education, which ensures every student has engaging, supportive and challenging opportunities.

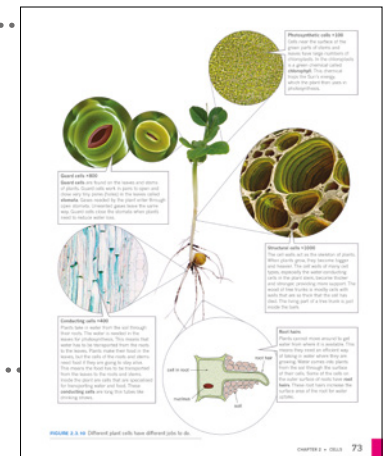
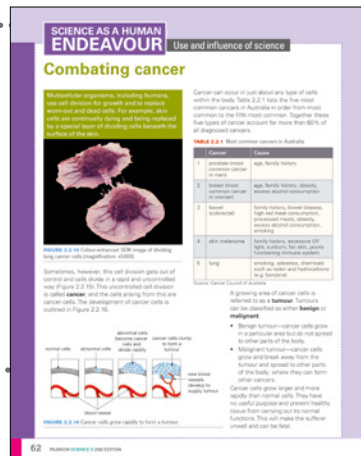
Be set

The **Chapter opening page** sets a context for the chapter, engaging students through questions that get them thinking about the content and concepts to come. The chapter learning outcomes are provided in student friendly language and give transparency and direction for the chapter. Each chapter is divided into self-contained modules. The **module opening page** includes an introduction that places the material to come in a meaningful context.



Be interested

Stunning and relevant **photos and illustrations** are purposefully selected to build understanding of the text. Students know when and how they should engage with artwork as each image is clearly referenced from within the text to develop understanding. Captions for every artwork, along with labels for more difficult images, build further meaning and understanding.



How to use this book *continued*

Be confident

Each module concludes with a comprehensive **module review** set that checks for understanding of key concepts and ideas developed through a carefully prepared range of Blooms categorised questions. Students enjoy the benefit of checkpoint opportunities to engage with module review questions at key points throughout the module.

2.2 Review questions

Remembering

1. Explain the terms:
 - a. cell membrane
 - b. cytoplasm
2. What were the functions of each of the following?
 - a. the cell wall substance within a cell
 - b. the vacuole when empty in animal cells
 - c. the nucleus inside a cell that produces proteins
3. Why do animal cells have two membranes?
 - a. Explain the function of each.
 - b. List the structures in a cell.
 - c. Label the structures in animal cells.
 - d. Label the structures in plant cells.
 - e. What is the function of the nucleus in the word 'nucleus'?
 - f. Name the structures that you would expect to see in a plant cell absent in the animal cell on page 16.

Understanding

4. Explain why membranes are needed to make cells.
5. Explain why it is important to control the movement of substances into and out of cells.
6. Name the parts of the animal cell labelled A, B and C in Figure 2.2.1b.
7. Describe the function of each.

Applying

8. Identify which organelles or structures would be present in large numbers in the following cells. Give reasons for your answers.
 - a. cells that require a lot of energy
 - b. cells that manufacture proteins
 - c. cells that store specialised products.

Analysing

9. Identify the type of cell or organelle being described in each of the following statements. It is in a grid and where contained under a very high power on the microscope. The grid contains the following:
 - a. Chloroplast
 - b. Nucleus
 - c. Cell wall
 - d. Vacuole
 - e. Cytoplasm
 - f. Cell membrane
 - g. Mitochondrion
 - h. Golgi apparatus
 - i. Ribosome
 - j. Centriole
 - k. Vacuole
 - l. Nucleus
 - m. Cell wall
 - n. Vacuole
 - o. Cytoplasm
 - p. Cell membrane
 - q. Mitochondrion
 - r. Golgi apparatus
 - s. Ribosome
 - t. Centriole

FIGURE 2.2.1b

2.2 Review questions

14. What are the similarities and differences between the following cells?
 - a. animal cell and plant cell
 - b. plant cell and target cell
15. Name the organelles that you would expect to see in a plant cell absent in the animal cell on page 16. Explain why you should not have seen them in the animal cell.
16. What is the function of the nucleus in the word 'nucleus'?
17. Name the structures that you would expect to see in a plant cell absent in the animal cell on page 16.
18. Explain why you should not have seen them in the animal cell.
19. What is the function of the nucleus in the word 'nucleus'?
20. Explain why it is important to control the movement of substances into and out of cells.
21. Name the parts of the animal cell labelled A, B and C in Figure 2.2.1b.
22. Describe the function of each.

Evaluating

23. What do you think the advantages are of using prepared slides rather than making your own slides?
24. A student was using a microscope to examine a plant cell. Figure 2.2.2 shows what was visible through the microscope. Explain why the student should not be able to see the vacuole in the cell.

Creating

25. Construct a timeline showing the main developments in science knowledge of cells from the time that Robert Brown discovered the nucleus to the time that the cell theory was developed. Use your own words to describe the main developments in science knowledge of cells from the time that Robert Brown discovered the nucleus to the time that the cell theory was developed. Use your own words to describe the main developments in science knowledge of cells from the time that Robert Brown discovered the nucleus to the time that the cell theory was developed.

FIGURE 2.2.2

Be investigative

Practical investigations are placed at the end of each module. New Student Designed Investigations and STEM inquiry tasks provide students with opportunities to plan investigations, design and trial their plans to seek answers and solve problems. A timing suggestion assists with planning, whilst safety boxes highlight significant hazards. Full risk assessments, safety notes and technician's checklist and recipes provided via ProductLink and eBooks. Practical investigation icons appear throughout the modules to indicate suggested times for practical work. An icon will also appear to indicate where a SPARKlab alternative is available.

Prac 1
p. 175

2.2 Practical investigations

3 • Microscopic life in pond water

Purpose
To observe microscopic organisms in pond water.

Timing 45 minutes

Materials
• pond water
• light microscope
• cover slip
• cover glass
• cover slip
• cover slip
• cover slip
• cover slip
• cover slip

Procedure

1. Place a drop of pond water on a slide.
2. Place a thin film of cover glass and other thin film on the slide.
3. Carefully lower the cover glass onto the slide and lift off the cover water.
4. Examine the slide using the low power of the microscope.
5. Now use high power. Remember that you are not observing the live or the specimen but the dead specimen in the microscope.

Results

1. Record the number of different types of organisms.
2. Draw the organisms you see and label any parts you can identify.
3. Use Figure 2.2.3 to classify the organisms you see.

Analysis

1. List the different types of organisms you see.
2. Describe the characteristics of each type of organism.
3. Describe any adaptations you had observing the organisms. How did you overcome these difficulties?
4. Why do you think the cover glass was necessary in the slide? Did it have any other functions?
5. Describe the most interesting organism you observed.

FIGURE 2.2.3

2.4 Practical investigations

1 • Muscles get tired

Purpose
To find out what contributes to muscle fatigue.

Hypothesis
What do you think will cause your muscles to fatigue? Describe what you predict—regarding a ball or rope height or with your arm held above your head. Before you do any further with the investigation, write a hypothesis to test.

Timing 45 minutes

Materials
• ball foam or rubber ball
• stopwatch

Procedure
PART 1: 10 MINUTES

1. In your notebook, construct a table like the one shown in Figure 2.4.1b.
2. Measure the ball or rope height.
3. Record your results in the table.
4. Repeat the experiment three times.
5. Your partner should time you in the experiment.

Results

1. Look at your results for parts 1 and 2. Describe any trends that your muscles were becoming tired.
2. Compare the two graphs. What do you see about the amount of fatigue experienced by the student?
3. What effect might resting your arm have on the blood supply to your arm?
4. What effect could the heat on the muscles have on your arm?
5. Explain why your muscles and blood are important in muscles that are working.

PART 2: 35 MINUTES

1. Repeat steps 1–4 but this time hold your arm above your head as shown in Figure 2.4.1c.
2. Do not lower your arm during the timing test.

FIGURE 2.4.1b

Be extended

Each chapter concludes with an improved and richer assortment of questions organised within the Blooms structure, that bring together the learning of concepts from across a chapter. Apply knowledge and skills to answer questions, engage in fresh new opportunities for **inquiry** and extend into **research** to take your learning to a new level with the enhanced **Chapter review**.

2 Chapter review

Remembering

1. List the parts of the following cells that can be seen under a light microscope:
 - a. animal cell
 - b. plant cell
2. Name the function of the structures that:
 - a. you look through
 - b. is above the specimen
3. Name the process that occurs in chloroplasts.
4. What are the main roles of DNA and RNA?
5. What happens in the field of view when a microorganism is changed from low power to high power?
6. Which of the following statements are true and which are false? Record any false statements to explain them.
 - a. A microscope made up of different types of lenses is called a microscope.
 - b. There are many different regions in a plant cell.
 - c. There are many different regions in an animal cell.
 - d. In a system, many organs work together.

Understanding

7. Explain the function of the following cell parts:
 - a. plant cell wall
 - b. cell membrane
 - c. nucleus
8. Explain the difference between a specimen and an image when using a microscope.
9. What is the field of view in the field of view? What happens to the field of view when a microscope is changed from low power to high power?
10. What happens to a microorganism when you change from low power to high power? Explain why you should not have seen it at low power.
11. What happens to a microorganism when you change from low power to high power? Explain why you should not have seen it at low power.

Applying

12. Draw and label a plant cell, an animal cell and a target cell. Your diagrams should clearly show the differences and similarities for each.
13. Copy and compare the following cells by calculating the missing numbers.

Cell type	Length (µm)	Width (µm)	Area (µm ²)
Plant cell	100	50	5000
Animal cell	50	25	1250
Target cell	200	100	20000
14. The field of view of a microscope you received and used for the first time using a magnification of ×100. Calculate the diameter of the field of view at the following magnifications and using the same microscope.

Magnification	Diameter of field of view (mm)
×100	1.5
×200	0.75
×400	0.375

FIGURE 2.4.1c

Be a thinker

Following the chapter review are **thinking questions** relevant to the chapter. These test students' science and interpretive skills.

2 Inquiry skills

Thinking scientifically

1. Think about the cell shown in Figure 2.2.1b. Use the information on the diagram to decide which one you would like to be a cell from an animal.
 - a. 100 µm
 - b. 1 µm
 - c. 1 cm
 - d. 1 mm
2. The micrograph shows how the animal cell was viewed under a microscope. Use the information on the diagram to decide which one you would like to be a cell from an animal.
 - a. 100 µm
 - b. 1 µm
 - c. 1 cm
 - d. 1 mm
3. Name normal plant cells as shown here.
 - a. Which of the four options below shows what the cells would most likely look like if they were seen from top to bottom for 3 days?
 - A. [Diagram A]
 - B. [Diagram B]
 - C. [Diagram C]
 - D. [Diagram D]

FIGURE 2.4.1d

Pearson Science 2nd edition Teacher Companion

The Teacher Companion makes lesson preparation easy by combining full-colour student book pages with teaching strategies, ideas for class activities and fully worked solutions. All of the Activity Book pages are also included and are complete with model answers.



Be prepared

The **Chapter preview** provides an overview for planning purposes, including things to be aware of and organise ahead of commencing. The **pre-prep** also has an indicator of the time allocation to complete the chapter.

Be an expert

A further improved Teacher Companion places the support of **experts** alongside every Pearson Science 2e teachers, featuring wrap-around teaching and learning strategies and support from:

- **Literacy Consultant: Dr Trish Weekes**
- **Differentiation Consultant: Anna Bennett**
- **School laboratory technicians: Penny Lee and Donna Chapman**

Be confident

All practical activities have been trialled, reviewed, amended and replaced as necessary to ensure teachers and students can undertake practical activities that are tested, work and will yield effective results. Suggested replacement materials and equipment provided to make science more accessible.

Full risk assessments, safety notes and technician's checklist and recipes provided. Pracs and risk assessments have been updated to reflect new regulations around safety and materials in school science classrooms.

Be informed

Full **answers** including suggested findings and possible answers to practical activities, fully worked solutions and support for open-ended research, inquiry and STEM activities.

Pearson Science Lightbook Starter

Lightbook Starter offers a **digital formative and summative assessment tool** with **hints, instant feedback** and **auto-correction** of responses. Students and teachers also enjoy the visibility of learning through

a **progress tracker** which shows student achievement against curriculum learning outcomes. Lightbook Starter provides questions with the most sophisticated auto-correction of answers.

Be ready

Commence each chapter with questions to establish a baseline for each student around prior knowledge. The **'before you begin'** section includes useful preparatory material with **interactive** resources to **activate prior knowledge** and **reteach key concepts**.

Be in control

Lightbook starter is written to enable teachers and students to use this digital assessment tool as an **alternative** (or additional practice) **to Student Book questions**. The Lightbook Starter structure mirrors the student book question set, thereby providing a complimentary alternative to the student book questions. This supports a fully integrated approach to digital assessment and feedback.

Be assisted

Module review questions (with **hints** and **solutions**), help students **check for understanding** of learning, revise and provide useful **formative assessment** to help teachers identify areas of weakness, great for lesson planning. These serve as a touchpoint throughout the chapter and students benefit from auto-corrected responses which provide **instant feedback** and support.

Be assessed

The **Chapter review** in the student book has a complimentary **assessment** set in Lightbook Starter. Use this as an alternative to a class test at the end of a topic.

Be reflective

An integrated **reflection** set supports students in considering their progress and future areas for focus.

Be tracked

Enjoy seeing progress through the learning outcomes updated instantly in the **progress tracker**.

Pearson Science eBook

Pearson eBook enables viewing and interaction with the student book online or offline on any device: PC or Mac, Android tablet or iPad and interactive whiteboard. This eBook retains the integrity of the printed page whilst offering easy to access resources, support and linked activities that will engage your students at school and at home.

The eBooks provide a fully integrated, digital learning platform. Enjoy the benefits of having the following digital assets and interactive resources at your fingertips:

- * New interactive activities and lessons
- * New Untamed Science videos
- * Web destinations
- * Student investigation templates and teacher support
- * New STEP UP Student Book and Activity Book chapters with answers at Years 9 & 10
- * Full answers to all Student Book and Activity Book questions
- * SPARKlabs
- * Risk assessments
- * Full teaching programs and curriculum mapping audits
- * Chapter tests with answers



Pearson Science ProductLink

Additional student and teacher resources are available free when you purchase **Pearson Science 2nd Edition**. To access, visit www.pearsonplaces.com.au and log in. Click on 'Toolkit' then select 'ProductLink' and browse your title.

Professional Learning, Training and Development

Did you know that Pearson also offers teachers a diverse range of training and development product-linked learning programs? We are dedicated to supporting your implementation of Pearson Science, but it doesn't stop here.

Our courses align closely with Pearson Science Second Edition and offer an in-depth learning experience, combining both practical and theoretical elements, enabling you to implement the resource effectively in your classroom.

Find out more about our product-linked learning, workshops, courses and conferences at **Pearson Academy** www.pearsonacademy.com.au