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	Science Inquiry Skills
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	Physical sciences
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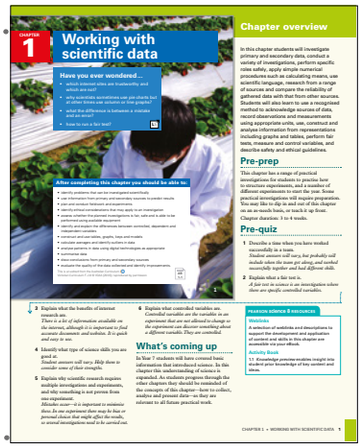
Pearson Science 2nd edition Teacher Companion

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.

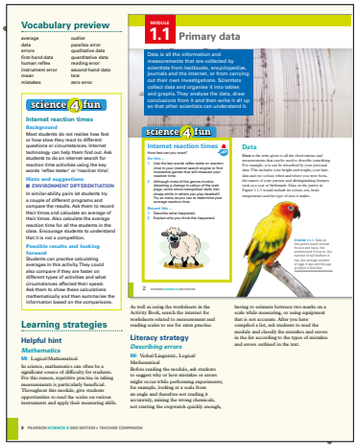
Be prepared



The **Chapter preview** provides an overview for planning purposes, including things to be aware of and organise ahead of commencing.

- The **pre-prep** gives an insight into what is coming up in the chapter and what the teacher should do to prepare. It also has an indicator to guide the time allocation to complete the chapter.
- A **pre-quiz** with answers is a quick warm-up tool that can provide some insight into the general class readiness for the topic, by allowing teachers to test prior knowledge of some key concepts.
- **What's coming up** provides a snapshot of the chapter and looks ahead to the content covered, the emphasis and how the practical activities fit into the module.

Be an expert



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

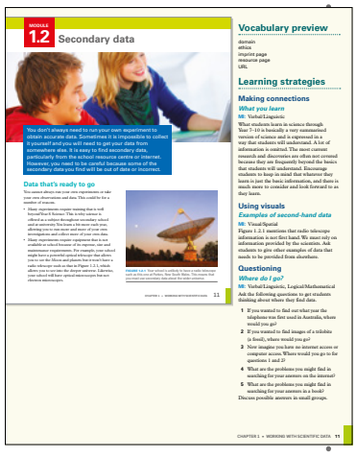
- **Literacy Consultant: Dr Trish Weekes**

Literacy support is integrated throughout each chapter, and there is a careful approach taken to ensure that literacy tasks and activities build language development—at the word, sentence, paragraph and whole text, levels. The Australian Curriculum shows that we need to be explicit about using language in science at these four levels.

Tasks have been carefully developed to address and develop skills in:

- building vocabulary
- writing
- reading
- speaking, listening and viewing
- note-taking.

A detailed spread in the preliminary pages of this book provides more support around the approach integrated in this series to 'The literacies of science'.



- **Differentiation Consultant: Anna Bennett**

Differentiation opportunities are provided at many stages throughout each chapter, and there is a careful approach taken to ensure that the key elements of effective differentiated instruction are present.

The embedded suggestions and notes enable teachers to be guided by general principles of differentiation through content, process, product and environment.

The support enables this to be done through a range of instructional strategies and according to student:

- readiness
- interests
- learning profiles.

A detailed spread in the preliminary pages of this book provides more support around the approach integrated in this series for 'Differentiation in the science classroom'.

- **School laboratory technicians: Penny Lee and Donna Chapman**

Two experienced school laboratory technicians have reviewed all practical activities and activities have been trialled, amended and replaced as necessary. Teachers and students can be confident that practical activities they undertake are tested and will yield effective results.

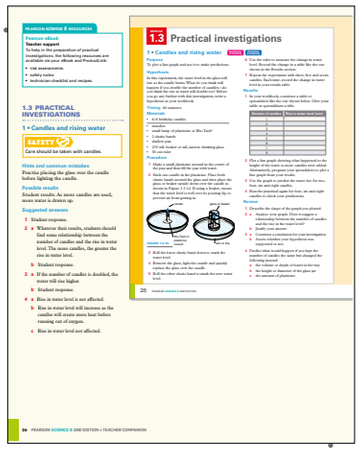
Teachers, laboratory technicians and students are supported and guided with full risk assessments, safety notes and technician's checklist and recipes, all of which have been updated to reflect new regulations around safety and materials in school science classrooms.

The laboratory technicians assure that safety regulations are met and that all the necessary checks and testing of all practical activities have been carried out.

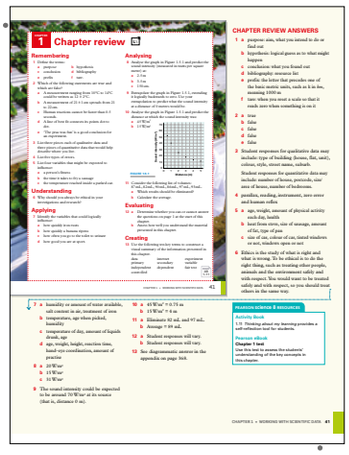
Additional safety boxes are included within practical activities, and specific teacher support within the Teacher Companion, assists further in the implementation and assessment of practical activities including:

- alternative materials and equipment lists
- hints and common mistakes
- possible results
- suggested answers.

It is important that the materials and procedures are followed to ensure that the safety of these activities is not compromised.



Be informed



Student book questions have full answers included for all science4fun, STEM4fun, module reviews, chapter review sets, Try yourself activities, Working with Science features, Science as a Human Endeavour spreads, practical activities, STEM investigations and Thinking Scientifically features, enhancing the students' learning experiences.

For module and chapter reviews, the answers are structured under the relevant Bloom's category (see page xv).

Diagrammatic answers can be found in the appendix at the end of the book.

Be progressed

A wide range of **learning strategies** are provided in each module and these assist teachers to support students in developing their understanding. When questions are given for teachers to ask, suggested answers are provided. Some examples of strategies include:

- inquiry activity: short hands-on activities that stimulate learning; often drawn from the text, photos or activities within the Student Book
- using visuals: ideas for using visual stimuli to promote greater understanding and interest or active engagement in content
- catering for diversity of learners: strategies to help cater for a range of students from different backgrounds with different learning needs and styles
- homework: suggested homework ideas.

Most learning strategies use a multiple intelligences (MI) approach. The multiple intelligences for each activity are listed.

To help students evaluate their preferred ways to learn, the Toolkit in Activity Book 8 contains a learning styles quiz. Use these findings to assist you in selecting or guiding students towards activity options that are most suited to their learning preferences.

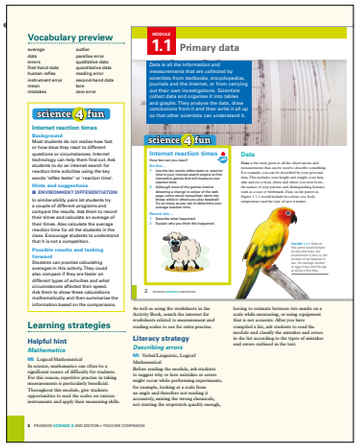
Be inventive

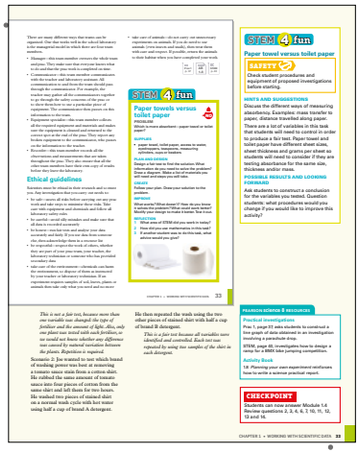
Science4fun

Science4fun inquiries provide background support and, possible outcomes and information for going forward in the module or chapter.

STEM4fun

STEM4fun activities include hints and suggestions as well as possible results and information for going forward in the module or chapter.





Be informed

A variety of **assessment** ideas are provided at the end of each module.

The focus is on **formative assessment** and the range of options can be categorised as:

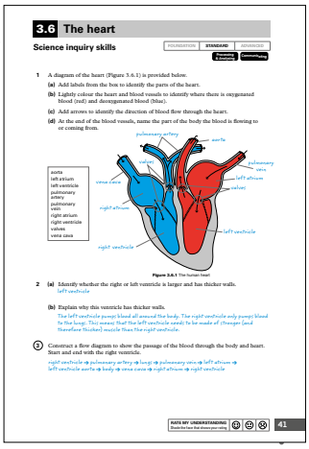
- **alternative assessment** which has a focus on creative and interesting assessment tasks that can be used to assess students' understanding of module content
- **evaluate understanding** which includes strategies for the teacher to evaluate students' understanding through stimulus questions, short revision quiz ideas or other activities
- **reteach relearn** which provides ideas for re-teaching or revising key ideas.

Summative assessment opportunities are provided in the chapter tests accessible via the Teacher ProductLink as well as in the teacher version of the eBook. The chapter review in LightBook Starter provides an additional option for summative assessment.

Be ready

Answers to activity book worksheets

The final section of the *Pearson Science 2nd Edition Teacher Companion* provides answers to all worksheets in the *Pearson Science 2nd Edition Activity Book*. For clarity these are presented in the actual worksheet.



Answers to STEP-UP chapter worksheets are accessible via the Teacher ProductLink as well as in the teacher version of your eBook.

Be supported

Pearson Science resources

Pearson Science resource boxes are a reminder of what resources are available in the Pearson Science package. These include teacher and student support on Pearson eBook, such as:

- interactive activities
- Untamed Science videos
- SPARKlabs
- weblinks to relevant information to support learning and research activities
- risk assessments and much more.

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.

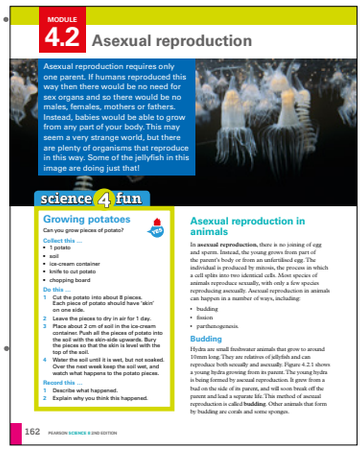
All aspects of the student books have been thoroughly reviewed by our **Literacy Consultant, Dr Trish Weekes**, and the result is **more accessible** content, **enhanced scaffolding** and **strengthened question and instructions sets**. There is also the added bonus of an option to engage with **extension** and **revision** opportunities. 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 curricula. 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.

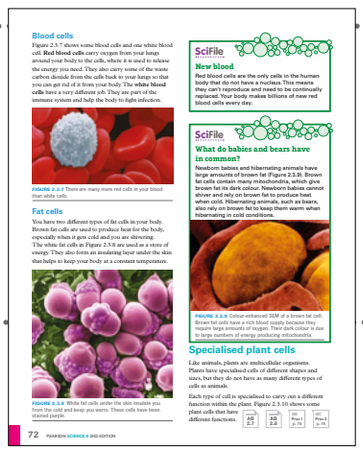
Be set

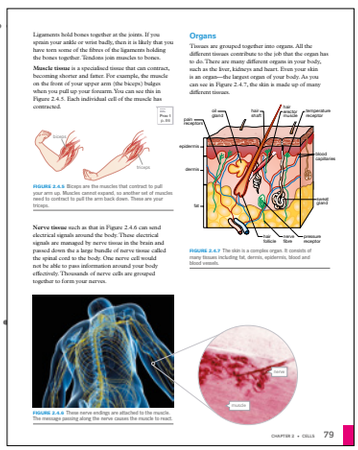
The **chapter opening page** sets a context for the chapter, engaging students through questions that get them thinking about the content and concepts to come. The chapter learning outcomes are provided in student-friendly language and give transparency and direction for the chapter. Each chapter is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



Be interested

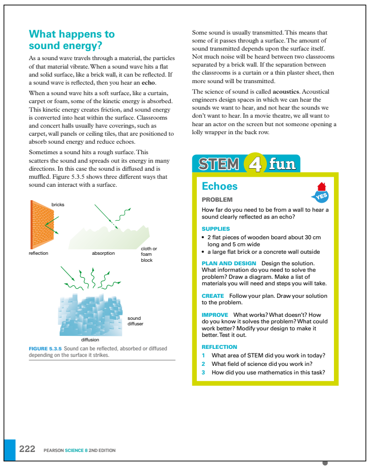
Stunning and relevant **photos and illustrations** are purposefully selected to build understanding of the text. Students know when and how they should engage with artwork as each image is clearly referenced from within the text, to develop understanding. Captions for every artwork, along with labels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





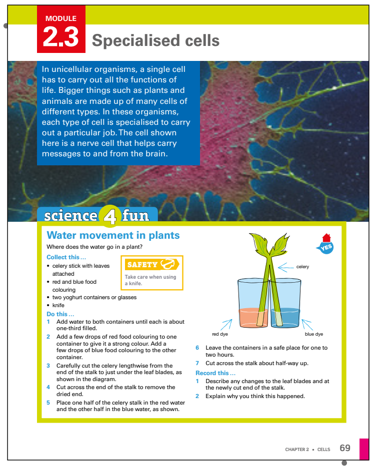
Be inventive

The **STEM4fun** activities are simple STEM-based applications are provided in each chapter. Students are given an open-ended problem and asked to create, design or improve something. These problems require students to draw on their acquired knowledge and skills, but focus on the process more than the actual solution.



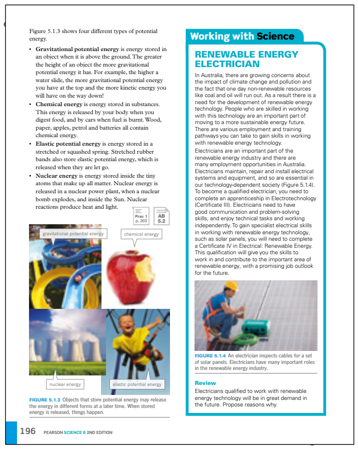
Be inquiring

Science4Fun are inquiry-based activities. They pre-empt the theory and get students to engage with the concepts through a simple activity that sets students up to 'discover' the science before they learn about it. Broadly speaking, they encourage students to think about what happens in the world and how science explains this.



Be inspired

Working with Science career profiles cast a spotlight on the diversity of career opportunities available through science with a focus on future science directions, STEM and women in science. Career profiles include questions that relate to the topic.

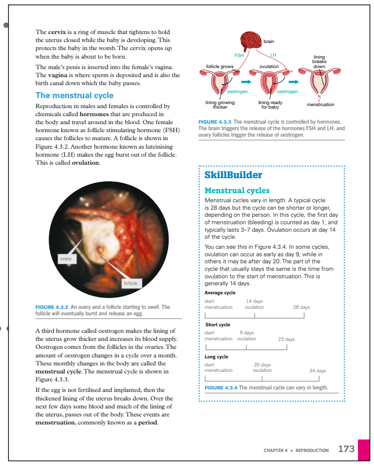


Be amazed

The **Science as a Human Endeavour** strand is addressed throughout the modules as well as in spreads. Many of the spreads have a special focus on Australian Scientists and highlight exciting developments, innovations and discoveries across all science fields. This feature also includes questions to help students build connections with the content they are learning and the relevance of these contributions.

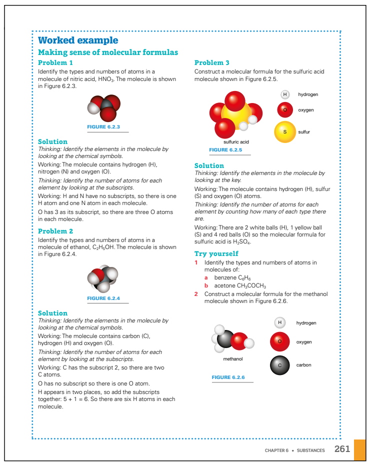
Be skilled

Skill Builders outline a method or technique and are instructive and self-contained. They step students through the skill to support science application.



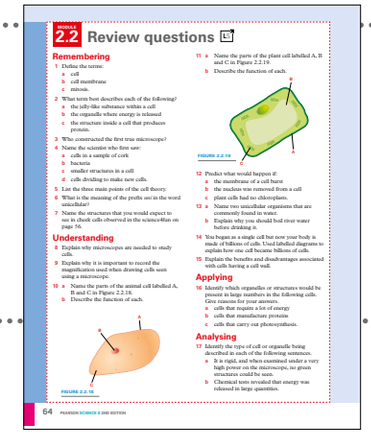
Be guided

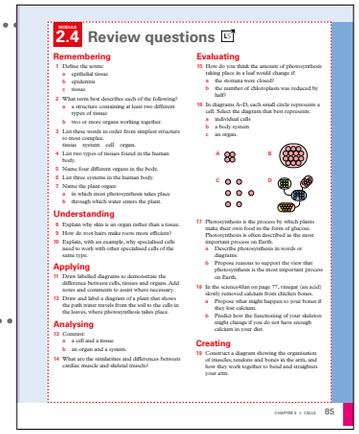
Worked examples scaffold problems and techniques with a new thinking and working approach to guide students through solving problems and applying techniques to master and practise key skills.



Be confident

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



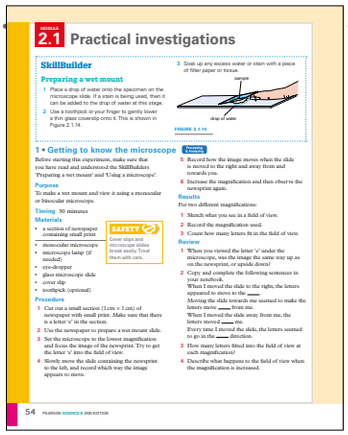


Be investigative

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, while safety boxes highlight significant hazards. Full risk assessments, safety notes and technician's checklist and recipes provided via ProductLink and eBooks support investigations.

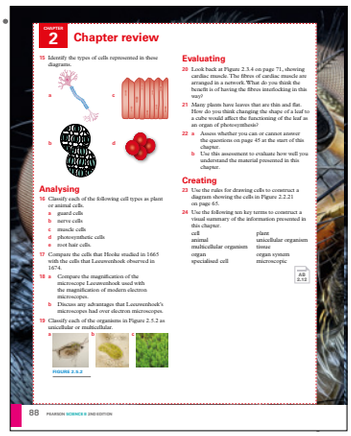
Practical investigation icons appear throughout the modules. An icon will also appear to indicate where a SPARKlab alternative is available.

Prac 1
p. 175



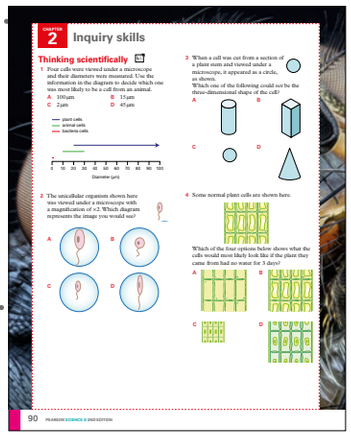
Be extended

Each chapter concludes with an improved and richer assortment of questions organised within the Bloom's structure, that bring together the learning of concepts from across a chapter. Students must apply knowledge and skills to answer questions, and engage in fresh new opportunities for **inquiry** and **research** to take their learning to a new level with the enhanced **chapter review**.



Be a thinker

In addition to the chapter review, there is a set of **thinking questions** relevant to the chapter. These test students' science and interpretive skills.



Be supported

Every chapter concludes with an illustrated **glossary** that is an easy reference for additional support in comprehension of key terms. All key terms are bolded throughout the chapter.


CHAPTER 2 Glossary

mitosis: cell division that produces two identical cells
monocular microscope: a light microscope that has only one ocular lens
multicellular organisms: living things made of many cells
muscle tissue: specialised tissue that can contract
nerve cells: cells that carry information in the body
nerve tissue: many nerve cells grouped together
nucleus: the control centre of a cell
objective lens: the lens of the microscope closest to the stage
ocular lens: the lens of the microscope closest to your eye, also known as the eyepiece
organ: a structure that contains at least two different types of tissues that work together to complete a task
organ system: two or more different organs that work together
organelles: the smaller parts of a cell. Found in the cytoplasm and have a variety of important functions
phloem: cells in a plant that carry glucose from the leaves to all other parts of the plant
photosynthesis: the process used by plants to make food from water and carbon dioxide using energy from the Sun
protists: a group of unicellular organisms often found in ponds and soil
radiotherapy: the use of radiation such as X-rays and gamma rays to destroy cancer cells
red blood cells: cells that carry oxygen from the lungs around the body
ribosomes: structures that produce proteins
root hairs: extensions on the outer surface of some root cells
specialised cells: cells that have a special job to do in the body and have a structure that makes them better able to do their job
specimen: the object being looked at through a microscope
stem cells: cells that can become different types of cells under specific conditions
stereo microscope: a binocular microscope that creates a three-dimensional image
stomata: very tiny pores in leaves
tissue: groups of similar cells that all perform the same function in the body
tissue engineering: the growing of tissues or organs outside a living thing
tumour: a group of cancer cells; can be benign or malignant
unicellular organisms: living things made up of only one cell
vacuole: a small structure in animal cells that may contain toxins or chemicals, or a large sap-filled structure in plant cells that stores water, wastes and nutrients
vascular tissue: made up of cells that create hollow tubes for the transport of nutrients and other substances in fluid
white blood cells: part of the immune system; help the body to fight infection
xylem: cells in a plant that carry water from the roots to the rest of the plant

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Be reinforced

The **Activity Book** provides a set of worksheets for every student book chapter, giving lots of opportunities for practise, application and extension. **Activity Book icons** in the Student Book indicate the best time to engage with a particular worksheet.

AB 4.2

Be progressed

Lightbook Starter contains **complementary sets of questions** for the module and chapter review questions from the **Student Book**. This serves as an alternate or additional assessment opportunity for students who enjoy the benefit of **instant feedback**, **hints** and **auto-correction** when engaging with this cutting-edge digital **formative** and **summative assessment** platform. Questions are all **tracked** against curriculum learning outcomes, making **progress** monitoring simple. Icons in the Student Book indicate the best time to engage with Lightbook Starter.

Be prepared

Focussed on supporting the greater **diversity of learners and pathways**, a 'step-up' program has been developed to launch students into senior sciences, in addition to the 'core' science program. A series of **step-up chapters**, written by experienced senior science teachers, have been developed with the view to providing all students with the best chance of success in senior sciences.

The **Year 9 Student Book** features a step-up chapter on **Psychology**. The **Year 10 Student Book** includes step-up chapters for **Biology**, **Chemistry** and **Physics**. These chapters are referenced from the print text and are provided in full via the **eBook**. The eBook also contains **worksheets** specific to supporting the application and development of skills and knowledge for the step-up chapters.

All Year 10 Student book chapters include a new series of **exam-style questions** to provide students with practise and exposure in preparation for examinations.

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 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, and are 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 reflective

An integrated **reflection** set of questions 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**.

Be in control

Lightbook Starter is written to enable teachers and students to use this digital assessment tool as an **alternative** (or additional practise) **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 assessed

The **chapter review** in the Student Book has a complimentary **assessment** set of questions in Lightbook Starter. Use this as an alternative to a class test at the end of a topic.

LightbookStarter LS

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 while offering easy to access resources, support and linked activities that will engage 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 and 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 for the 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 the Australian Curriculum: Science and the Victorian Curriculum: Science but it doesn't stop here.

These curricula align closely with Pearson Science Second Edition which offers 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**