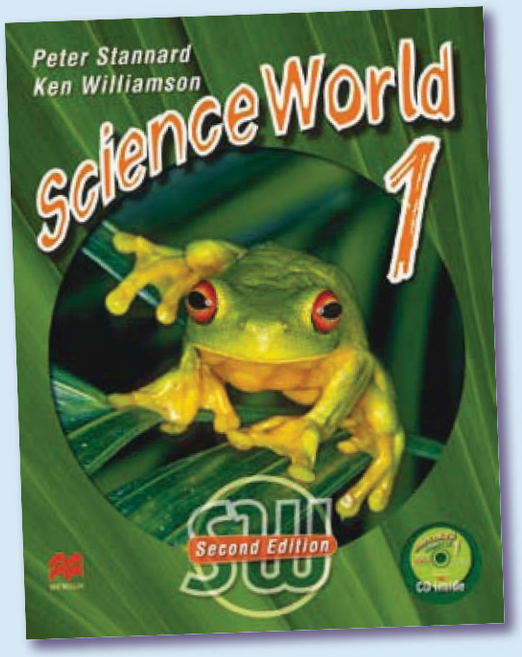
Contents

The ScienceWorld 1 package

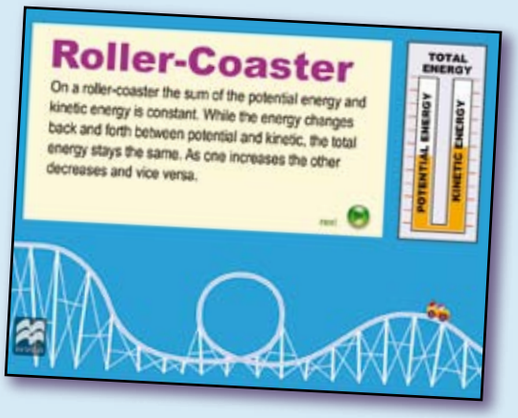


ScienceWorld 1 student book and CD

ScienceWorld 1 is designed to help teachers implement the Essential Learnings developed for the Queensland Curriculum and Reporting Framework (QCAR). *ScienceWorld 1* and *ScienceWorld 2* together provide adequate opportunities to develop all of the Essential Learnings students are required to achieve by the end of Year 9. The Essential Learnings checklist on pages xii–xiii indicates how this is done.

The student CD contains:

- PDFs of each chapter in the textbook
- animations
- Crossword Wizard crosswords (one for each chapter)
- ICT skillsheets.



Animations

- Using a Bunsen burner
- Fire extinguisher
- Motorcycle forces
- Froth flotation
- Particle theory
- Atoms
- Roller-coaster
- How limestone caves are formed
- How sedimentary rocks are formed

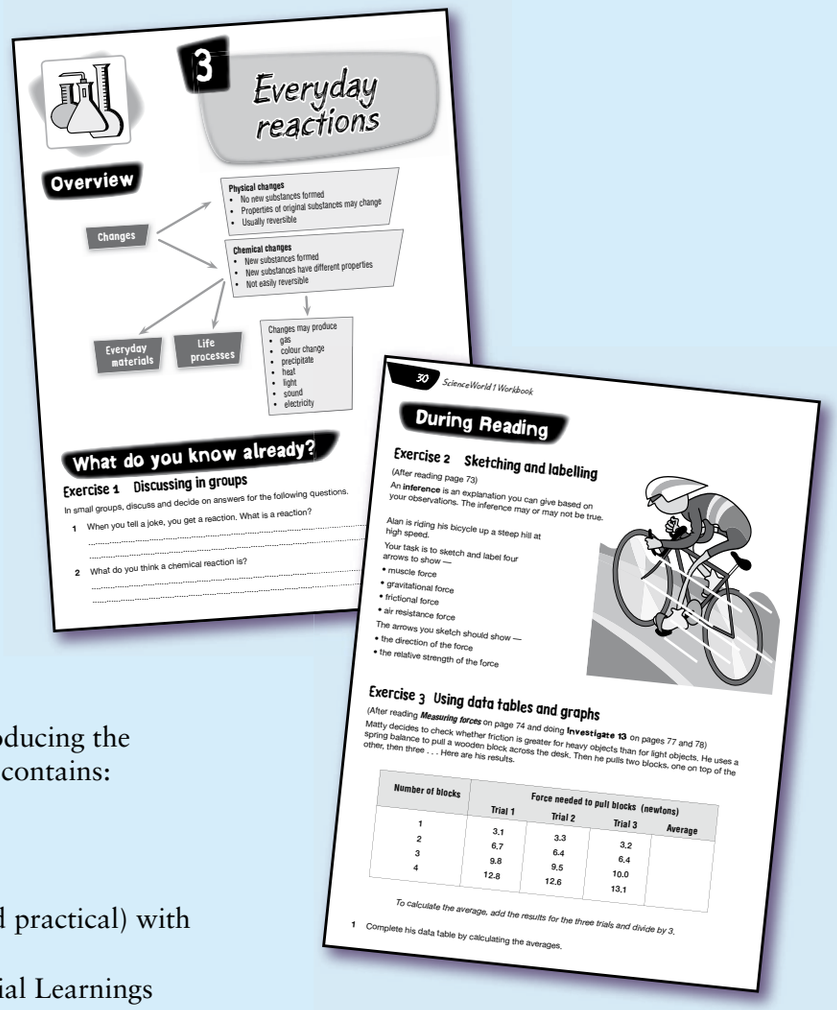
ICT skillsheets

- Getting started with Microsoft Word
- Getting started with Microsoft Word—drawings and pictures
- Getting started with Microsoft Word—tables and charts
- Getting started with Microsoft Excel
- Getting started with Microsoft PowerPoint
- Getting started with Google
- Getting started with dataloggers

ScienceWorld 1 Workbook

The workbook is designed to complement the text by developing students' literacy and *Ways of working* (Working scientifically) skills. It is designed to develop students' language and thinking skills so that they can:

- interact more effctively with the text
- speak and write in the various types of texts required in science
- apply higher-order thinking skills
- complement learning in other subject areas.



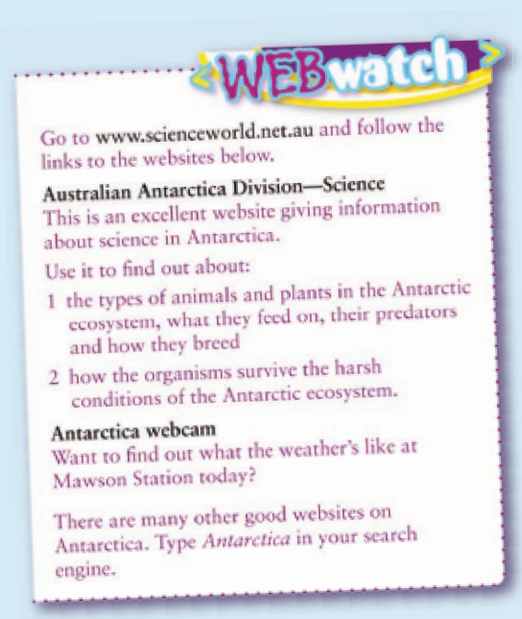
ScienceWorld 1 Teacher Edition and CD

The Teacher Edition of the textbook is in a larger format, reproducing the textbook pages with supporting teacher notes. The teacher CD contains:

- an Essential Learnings checklist
- animations
- crosswords
- chapter tests (multiple choice, short answer, long answer and practical) with answers
- assessment tasks and marking rubrics matched to the Essential Learnings assessable elements and descriptors.

ScienceWorld website

The website (**www.scienceworld.net.au**) contains links for the WebWatches in the text, and a course construction guide prepared as a template from which schools can develop their own work programs using the *ScienceWorld* series.



The '**How to use this book**' explains the structure and key features of the textbook. Students should use it as a tutorial at the beginning of the year so that they become familiar with the various features.

How to use this book

To help you get to know this textbook and the CD that comes with it, read through the numbered blue boxes one at a time and work through the questions in the green boxes. If you work in a small group you can discuss your answers with other students.

1 Flick through the book. Notice that the name and number of the chapter is at the top of each right-hand page.

Which chapter looks most interesting? Why?

2 Turn to the contents page at the front of the book.

How many sections are there in most chapters?
Which chapters are about living things?
In which chapters would you find information on:
a chemical reactions
b galaxies
c volcanoes
d plant cells

3 The index on pages 312–314 is also very useful for finding things in the text.

On which page would you expect to find information on:
a Pluto
b Sir Isaac Newton
c properties of oxygen ?

4 At the beginning of each chapter there is a section called **Getting Started**. Have a look at a few of these.

What do you think is the purpose of **Getting Started**?

5 Find the heading ***2.1 Inferring and predicting*** on page 24. This is the first section in Chapter 2, and continues until page 28. Note that there are bits of text to read and illustrations to study.

Important new words are in bold type. If you want to find out what a word means you can look it up in the glossary at the back of the book.

Find the words in bold type on pages 24 and 25. Look one of them up in the Glossary.

6 Note the **Investigate** on page 26 on a specially designed page. You should always read an investigation before you do it. To help you make the most of the investigations and to check safety issues there is a **Planning and Safety Check** at the beginning of most investigations. Make sure you do the **Discussion**, to check that you understand what you did in the investigation. In some investigations you have to design your own **Experiment**, for example on page 40.

Most investigations have four headings. What are they?

7 Throughout the book there are **Activities** on a blue background. See page 258, for example. These don't need much time or equipment, and some of them you could probably do at home.

Suppose you wanted to do the activity on page 258. Make a list of the things you would need.

8 The book has a special feature called *Skillbuilder*.

Have a look at the Skillbuilder on page 13. What skill is it teaching you? Can you find another Skillbuilder?

9 When you reach the end of a section you do some or all of the **Check !** questions to check that you understand what you have read and done in class. Look at the questions on page 27.

Which of the five questions do you think is the easiest? Which is the hardest?

The ***challenge*** questions on page 28 are more difficult than the **Check !** and you have to think more for yourself. You need to do well on the **Check !** before going on to these.

10 In some sections there are also **Try this** activities you might like to do if you are interested and have the time. See page 47, for example. There are also **WEB watch** sections throughout the book to help you in your research. See for example the **WEB watch** on page 67. Go to www.scienceworld.net.au to find the links to help you do a science project.

11 Each chapter has several **Working with technology** sections which include animations and crossword puzzles that you can do on the CD.

On the CD, open the animation for Chapter 1 to see how to light a Bunsen burner. Can you find the crossword puzzle for Chapter 1?

12 At the end of each chapter there is a summary called MAIN IDEAS for you to copy and complete. See page 21. You can check your knowledge and understanding of the ideas in the chapter by doing the **REVIEW** on pages 21–22. In this chapter there is also a **LAB REVIEW**.

Which of the test items on pages 21–22 do you think is the easiest? Which is the hardest?
Try Question 1 of the Review on page 21, then check your answer on page 298 at the back of the book.

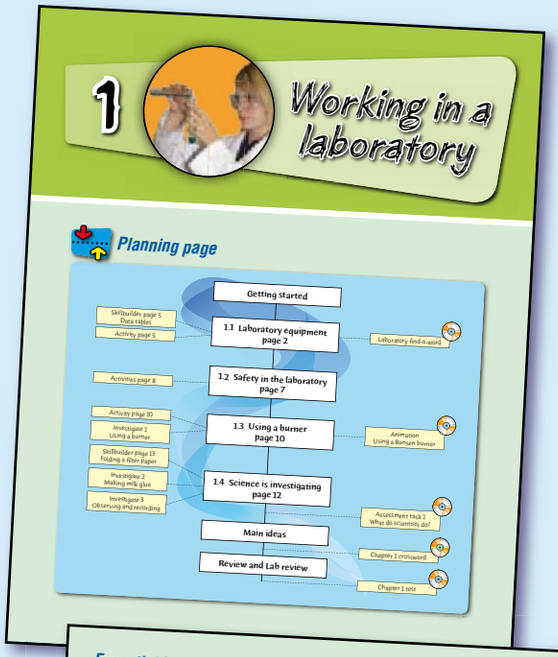
Notice that if you get the wrong answer, you can go back and check the text on page 7.

We hope that this book and CD make science interesting for you.

Peter Stannard and
Ken Williamson

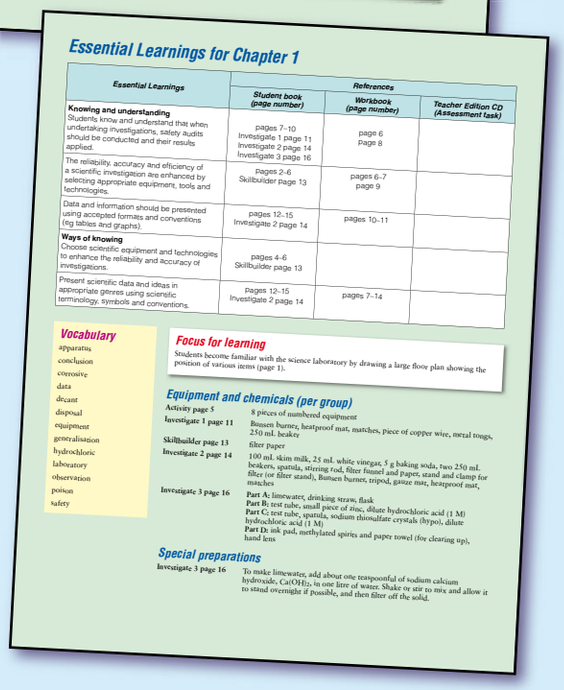
Using the Teacher Edition

The Teacher Edition contains the student text as well as comprehensive and practical support for teachers in their day-to-day teaching. The following is a guide to the features of the Teacher Edition.



Planning page

At the beginning of each chapter is a flow chart to help plan the unit of work based on the chapter. It gives an overview of the chapter and shows where the Activities, Investigates, Experiments and Skillbuilders fit. It also indicates where the animations, crosswords, assessment tasks and chapter tests can be used.



Essential Learnings

The grid on the second page of each chapter links the Essential Learnings to pages in the textbook, the workbook, and also to the assessment tasks on the CD. It lists the *Knowledge and understanding* to be developed in the chapter and the key *Ways of working* used by students to develop and demonstrate this knowledge and understanding.

Vocabulary

The vocabulary list highlights key words that are used in the chapter, especially the words that students may have trouble spelling.

Focus for learning

The Getting Started at the beginning of each chapter provides a real-world learning focus designed to motivate students to engage with the topic. It also provides an opportunity for teachers to use a constructivist approach where you find out what students already know and then allow them to construct new understandings or consolidate their current understandings. The focus for learning statement on this page is summarises the chapter's Getting Started.

Equipment and chemicals

This section is designed to help the laboratory technician prepare the equipment and chemicals needed (per group) for the whole chapter. Each Investigate and Experiment in the text has a materials list, but the teacher edition has a complete list for the whole chapter, including the Activities. Special preparations (eg limewater) are given where needed.

Starting point

1 Ask students to develop concept maps around key words such as *science, safety, experiments* and *equipment*.

Note: if students are not familiar with concept maps (mind maps), refer to page 35 of *ScienceWorld 1 Workbook*.

2 Ask students to describe what they think *working scientifically* means. They could draw a Y-graph using headings such as *describe, feel* and *sounds like*. To construct a Y-graph, draw a large Y in the centre of a page with a heading in each of the three sections. Students place a series of descriptor words or sentences in each section. For example, in the *describe* section students might write *experiments, lab coats, tests, test tubes, chemicals*.

3 Start the lesson with an exciting demonstration full of colour or noise to create an engaging environment. For example, you could demonstrate burning magnesium (with safety precautions), adding acid to magnesium or using universal solution in acids and bases.

4 Set up the laboratory with biological specimens and posters to assist visual learning.

Starting point

These teacher notes, placed next to Getting Started, provide further help with planning the chapter and introducing the topic to students. They suggest ways of finding out what students know already, for example by using concept maps. They also include teacher demonstrations, brainstorming and discussion ideas, and suggestions for the use of multimedia.

Hints and tips

Throughout this Teacher Edition there are numerous hints and tips to make teaching more effective. Some of the suggestions can be applied generally; for example, the think/pair/share and inquire/respond/reflect strategies, and quick questions for revision.

Hints and tips

The following analogy is a useful way of explaining melting to students. Take a large lump of frozen peas out of the freezer and place it into a beaker with a small amount of water in it. While heating the beaker, ask students to explain what the peas breaking away is analogous to. The more heat is added, the more peas break away from the lump until they are all free.

Learning experiences

Learning experience: liquids

To illustrate a liquid changing shape but not volume, place a drop of food dye in the bottom of a beaker then fill it with water so the class can see the water changing shape. Measure the volume. Now pour the beaker of coloured water into another larger beaker and again measure the volume.

There are many suggestions on ways of extending the material in the text, as well as many extra activities. For example there are:

- teacher demonstrations
- teaching techniques such as Y-graphs, word walls and celebrity head activities
- ideas to encourage higher-order thinking
- ideas for making the classroom more visually stimulating
- quizzes and games
- creative writing ideas
- excursions and suggestions for visiting speakers.

Activity notes and lab notes

These are detailed notes on the Activities, Investigates and Experiments. The notes are written by experienced teachers and laboratory technicians, and focus on issues of safety and classroom management. There are also suggestions to help get the most out of each activity or practical.

Lab notes

Read through the instructions with the class and point out anything of importance.

Remind students about the safety issues and techniques for mixing chemicals. For example:

- use very small amounts of solutions (fingernail high)
- follow all instructions
- observe reactions carefully and record observations.

Make sure students prepare data tables to record their observations.

Allow for clean-up time. Cleaning up is just as important as preparing and doing practical work. Leave approximately 10 minutes for clean-up and putting equipment away. Students need to be aware of the correct ways to dispose of chemicals and to clean equipment.

Homework

Ask students to brainstorm some simple separation investigations that can be done at home. Students should be encouraged to describe what is being separated and the piece of equipment that is used to perform this process, eg kitchen sieve to separate large flour particles from small particles. You could also ask students to draw simple diagrams of their techniques.

Homework

These contain suggestions on what material in the text could be used for homework, as well as extra activities.

Animation and assessment task reminders

Where appropriate, there are reminders about using the animations on the student and teacher CDs, as well as suggestions on when the assessment tasks for each chapter could be given to students.

Issues

Organise students into groups of 4 or 5. Each group is to tackle the problem of atmospheric carbon dioxide and global warming from a particular point of view.

These perspectives could include those of:

- an environmentalist
- a power station owner
- an average person
- a meteorologist
- a politician.

Students should showcase their findings and present an argument to support their case.

Hold a whole-class discussion on ways to reduce greenhouse gas emissions.

Issues

In many chapters there are suggested issues for investigation, discussion, debate or action. These issues are an excellent opportunity for students to demonstrate knowledge and achievement of *Science as a human endeavour*: Responsible and informed decisions about real-world issues are influenced by the application of scientific knowledge.

Research

Students might like to find out what a stomach ulcer is, how it affects a person and how it can be cured.

Research

These contain suggestions for research questions and how students could report their findings, eg posters, newspaper articles

Solutions

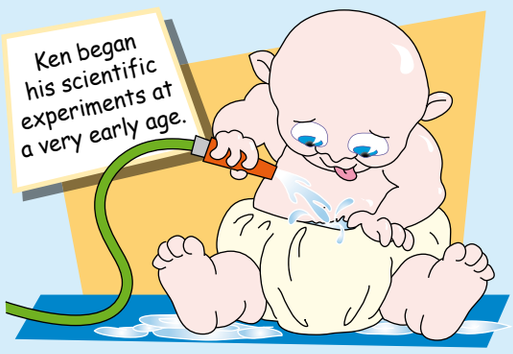
Answers are provided for Check!, Challenge, Main ideas and Review, and these are placed as near as possible to each question.

Essential Learnings checklist (by the end of Year 9)

Ways of working Students are able to:	***ScienceWorld 1 chapters***	***ScienceWorld 2 chapters***
Identify problems and issues, formulate scientific questions and design investigations	2, 3, 8, 11	1, 3
Plan investigations guided by scientific concepts and design and carry out fair tests	4, 8	1, 2, 9
Research and analyse data, information and evidence	7	6, 7, 9, 12
Evaluate data, information and evidence to identify connections, construct arguments and link results to theory	4, 6, 10, 12, 13	2, 3, 4, 5, 7, 8, 11, 12
Select and use scientific equipment and technologies to enhance the reliability and accuracy of data collected in investigations	1, 2, 4, 8, 9	3, 6
Conduct and apply safety audits and identify and manage risks	1, 3, 8, 11, 12	4, 8, 10
Draw conclusions that summarise and explain patterns, and that are consistent with the data and respond to the question	3, 4, 5, 6, 8, 10	1, 2, 5, 8, 9, 10
Communicate scientific ideas, explanations, conclusions, decisions and data, using scientific argument and terminology, in appropriate formats	1, 5, 7, 9, 10, 11, 13	1, 4, 5, 7, 8, 11, 12
Reflect on different perspectives and evaluate the influence of people's values and culture on the applications of science	6	13
Reflect on learning, apply new understandings and justify future applications		6, 11, 13
Knowledge and understanding ***Science as a human endeavour*** **Responsible and informed decisions about real-world issues are influenced by the application of scientific knowledge.**		
Immediate and long-term consequences of human activity can be predicted by considering past and present events	2, 12	10, 11
Responsible, ethical and informed decisions about social priorities often require the application of scientific understanding		9, 13
People from different cultures contribute to and shape the development of science	1, 4, 5, 6, 11, 13	1, 4, 9
Earth and beyond **Events on earth and in space are explained using scientific theories and ideas, including the geological and environmental history of the earth and the universe.**		
Scientific ideas and theories offer explanations about the earth that extend to the origins of the universe	6	12
Global patterns of change on earth and in its atmosphere can be predicted and modelled	3	13
Geological evidence can be interpreted to provide information about past and present events	13	7

Knowledge and understanding ***Energy and change*** **Forces and energy are identified and analysed to help understand and develop technologies, and to make predictions about events in the world.**	***ScienceWorld 1 chapters***	***ScienceWorld 2 chapters***
An unbalanced force acting on a body results in a change in motion	4	7
Objects remain stationary or in constant motion under the influence of balanced forces	4	
Energy can be transferred from one medium to another	12	3
Transfer of energy can vary according to the medium in which it travels	11	3, 8
Energy is conserved when it is transferred or transformed	11, 12	8
Life and living **Organisms interact with their environment in order to survive and reproduce.**		
The diversity of plants and animals can be explained using the theory of evolution through natural selection		11
In ecosystems, organisms interact with each other and their surroundings	7	11, 13
Complex organisms depend on interacting body systems to meet their needs internally and with respect to their environment	9	5, 6
All the information required for life is a result of genetic information being passed from parent to offspring		6
Changes in ecosystems have causes and consequences that may be predicted	7	13
Natural and processed materials **The properties of materials are determined by their structure and their interaction with other materials.**		
Changes in physical properties of substances can be explained using the particle model	10	2
Matter can be classified according to its structure	8	4, 9, 10
Chemical reactions can be described using word and balanced equations	3	2, 4, 10
Reaction rate is affected by various factors, including temperature, concentration and surface area	3	2

Source: QSA *Science Essential Learnings by the end of Year 9*



There are many opportunities throughout *ScienceWorld* to develop Essential Learnings such as planning investigations guided by scientific concepts or designing and carrying out fair tests.