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Primary Science

Teacher's Resource 1

Jon Board & Alan Cross

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Glossary

You can download the following resources for each unit:

Differentiated worksheets and answers

Language worksheets and answers

Resource sheets

> Acknowledgements

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> Introduction

Welcome to the new edition of our Cambridge Primary Science series.

Since its launch, the series has been used by teachers and learners in over 100 countries for teaching the Cambridge International Primary Science curriculum framework.

This exciting new edition has been designed by talking to Primary Science teachers all over the world. We have worked hard to understand your needs and challenges, and then carefully designed and tested the best ways of meeting them.

As a result of this research, we've made some important changes to the series. This Teacher's Resource has been carefully redesigned to make it easier for you to plan and teach the course.

The series still has extensive digital and online support, including Digital Classroom which lets you share books with your class and play videos and audio. This Teacher's Resource also offers extra teaching guidance and downloadable resources.

The series uses the most successful teaching pedagogies like active learning and metacognition, and this Teacher's Resource gives you full guidance on how to integrate them into your classroom.

Formative assessment opportunities help you to get to know your learners better, with clear learning objectives and success criteria as well as an array of assessment techniques, including advice on self and peer assessment.

Clear, consistent differentiation ensures that all learners are able to progress in the course with tiered activities, differentiated worksheets and advice about supporting learners' different needs.

All our resources are written for teachers and learners who use English as a second or additional language. They help learners build core English skills with vocabulary and grammar support, as well as additional language worksheets.

We hope you enjoy using this course.

Eddie Rippeth

Head of Primary and Lower Secondary Publishing, Cambridge University Press

> About the authors

Jon Board



Jon Board is a lecturer in teacher training at the University of Manchester and also works as a specialist teacher of primary science at Mauldeth Road Primary School, Manchester. He has been teaching for 20 years and working in teacher training for more than 15 years. He also works internationally in teacher training, assessment and curriculum development, and has worked with teachers, education experts and education ministries in many countries including Egypt, Kazakhstan, Mongolia, Saudi Arabia, Macedonia and Indonesia. In addition to Cambridge Primary Science, Jon is the co-author of *Creative Ways to Teach Primary Science*, published by McGraw Hill, and of *Curious Learners in Primary Maths, Science, Computing and Design Technology*, published by Sage.

Jon is passionate about developing learners' curiosity by creating opportunities for them to ask and explore their own questions and about engaging learners in scientific thinking by getting them involved in planning and leading their own practical scientific enquiry. He is particularly interested in using primary science to develop learners' creative and rational problem-solving skills. These transferable, life-long skills will then be used in other subjects and in everyday situations. Cambridge Primary Science is written specifically to support teachers in developing this range of skills in learners as well as teaching the new vocabulary and the underpinning science knowledge required to do well in academic assessments.

Alan Cross

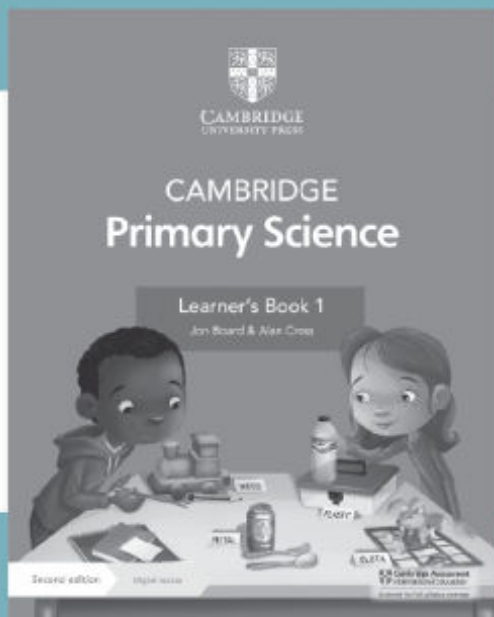


Alan has worked very successfully as a primary teacher, local advisor, trainer, inspector, external examiner, school governor and teacher educator. He has worked in the school and university sector in the UK and on projects and training around the world. Alan has researched primary STEM and has contributed to conferences and published extensively for teachers in primary science and technology including links with mathematics.

He loves to see curiosity and creativity develop in learners and teachers. Alan sees science as an amazing subject for opening people's eyes to the beauty of the universe including planet Earth. For him, science gives primary teachers the opportunity to introduce young minds to phenomena and explanations so that learners see another way to interact with the world, a way in which they can pose their own questions and begin to solve them.

Cambridge Primary Science provides the support that teachers need in empowering their learners' exploration and investigation of the world. Its stimulating materials and careful guidance give teachers confidence. Science tasks and activities are tried and tested and give a very strong emphasis to learners' thinking and working scientifically and to catering for the spread of achievement encountered in today's primary classrooms.

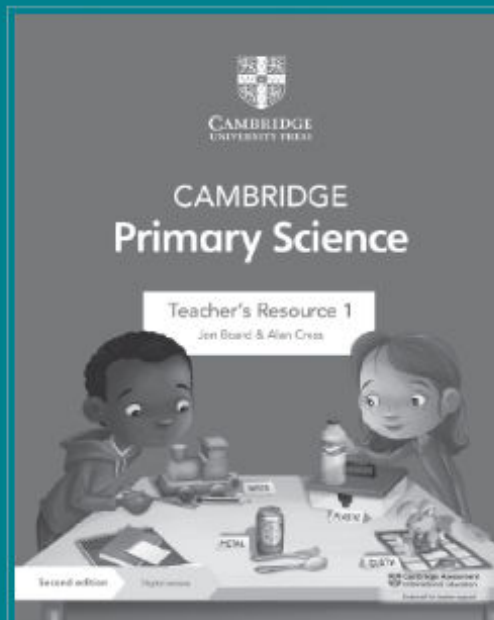
> How to use this series

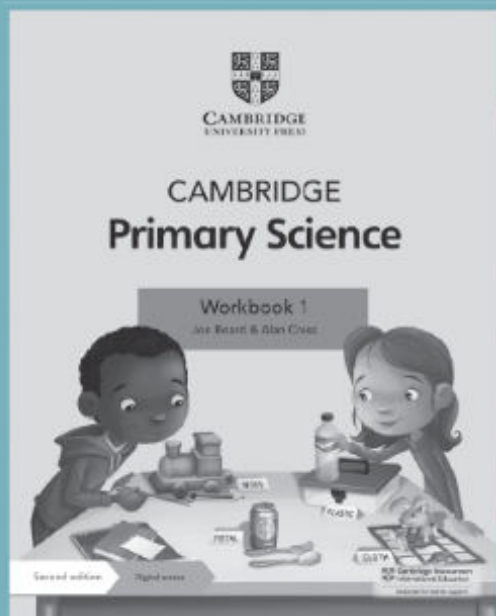


The Learner's Book is designed for students to use in class with guidance from the teacher. It contains six units which offer complete coverage of the curriculum framework. A variety of investigations, activities, questions and images motivate students and help them to develop the necessary scientific skills. Each unit contains opportunities for formative assessment, differentiation and reflection so you can support your learners' needs and help them progress.

The Teacher's Resource is the foundation of this series and you'll find everything you need to deliver the course in here, including suggestions for differentiation, formative assessment and language support, teaching ideas, answers, and extra worksheets. Each Teacher's Resource includes:

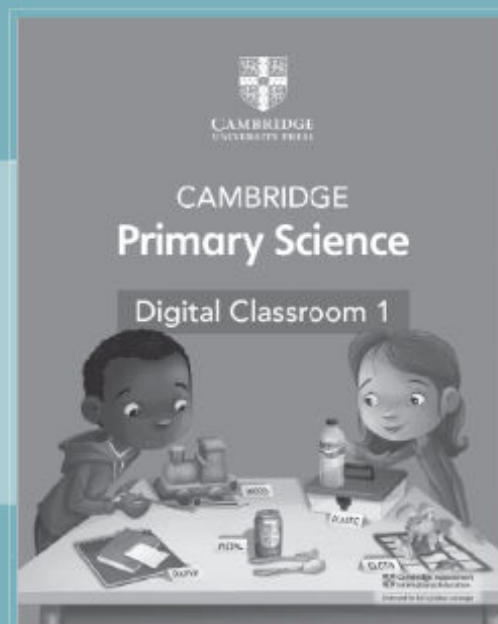
- A print book with detailed teaching notes for each topic
- A Digital edition with all the material from the book in digital form, plus editable planning documents, extra guidance, downloadable worksheets and more.





The skills-focused write-in Workbook provides further practice of all the topics in the Learner's Book and is ideal for use in class or as homework. A three-tier, scaffolded approach to skills development promotes visible progress and enables independent learning, ensuring that every learner is supported.

Digital Classroom includes digital versions of the Learner's Book and Workbook, complete with pop-up answers, and is designed for teachers to use at the front of class. Easily share the books with the whole class on your whiteboard, zoom in, highlight and annotate text, and get your learners talking with videos, images and interactive activities.



↓ A letter to parents, explaining the course, is available to download from Cambridge GO (as part of this Teacher's Resource).

> How to use this Teacher's Resource

This Teacher's Resource contains both general guidance and teaching notes that help you to deliver the content in our Cambridge Primary Science resources. Some of the material is provided as downloadable files, available on **Cambridge GO**. (For more information about how to access and use your digital resource, please see inside front cover.) See the Contents page for details of all the material available to you, both in this book and through Cambridge GO.

Teaching notes

This book provides **teaching notes** for each unit of the Learner's Book and Workbook. Each set of teaching notes contains the following features to help you deliver the unit.

The **Unit plan** summarises the topics covered in the unit, including the number of learning hours recommended for the topic, an outline of the learning content and the Cambridge resources that can be used to deliver the topic.

Topic	Approximate number of learning hours	Outline of learning content	Resources
2.1 Sound sources	2+	Exploring sources of sound, including some that use electricity	Learner's Book Activity: Sound sources in school Think like a scientist: Find that sound! Workbook Topic 2.1 Digital Classroom: Song – What's that sound?

The **Background knowledge** feature explains prior knowledge required to access the unit and gives suggestions for addressing any gaps in your learners' prior knowledge.

BACKGROUND KNOWLEDGE

Sound

A sound is produced when an object moves in a way that causes a vibration in the air around it. You call the object a sound source. Air is a mixture of different gases which are all made up of tiny particles called molecules.

Learners' prior knowledge can be informally assessed through the **Getting started** feature in the Learner's Book.

The **Teaching skills focus** feature covers a teaching skill and suggests how to implement it in the unit.

TEACHING SKILLS FOCUS

Skills for life: critical thinking

Show that science predictions help us to think

One way to encourage critical thinking in young primary learners is to ask them to make predictions regularly about what they think will happen.

Reflecting the Learner's Book, each unit consists of multiple sections. A section covers a learning topic.

At the start of each section, the **Learning plan** table includes the learning objectives, learning intentions and success criteria that are covered in the section.

It can be helpful to share learning intentions and success criteria with your learners at the start of a lesson so that they can begin to take responsibility for their own learning

LEARNING PLAN

Learning objectives	Learning intentions	Success criteria
1Ps.01 Identify different sources of sound.	<ul style="list-style-type: none">To find sources of sound.	<ul style="list-style-type: none">Learners can find sources of sound.

There are often **common misconceptions** associated with particular learning topics. These are listed, along with suggestions for identifying evidence of the misconceptions in your class and suggestions for how to overcome them.

Misconception	How to identify	How to overcome
Sound cannot go around corners.	Observe learners as they listen to and talk about sound sources that are out of sight. Do they suggest a problem hearing such sounds?	Arrange for a sound to be made just out of view, for example, behind furniture or an open door. Can learners hear the sound?

For each topic, there is a selection of **starter ideas**, **main teaching ideas** and **plenary ideas**. You can pick out individual ideas and mix and match them depending on the needs of your class. The activities include suggestions for how they can be differentiated or used for assessment. **Homework ideas** are also provided.

Starter idea

All kinds of sounds (10 –12 minutes)

Resources: A range of musical instruments, Workbook 2.1 Focus section.

Description: Allow as many learners as possible to make sounds with the instruments. Ask them and the others to listen carefully. Ask one or two learners to demonstrate the sounds and ask others to imitate the sound with their voices.

Main teaching ideas

1 Sounds all around us (10 –15 minutes)

Learning intentions: To find sources of sound.

Resources: Learner's Book, three or four sound sources, for example, a bunch of keys, a bell, a stapler, a whistle, Workbook 2.1 Practice and Challenge sections.

Description: Begin by looking at the Learner's Book and helping learners to understand what we mean by a sound source. Initially ask the learners if they can see some sound sources. Ask these questions. 'What is a sound source?' 'Do we have some around us now?'

The **Language support** feature contains suggestions for how to support learners with English as an additional language. The vocabulary terms and definitions from the Learner's Book are also collected here.

LANGUAGE SUPPORT

This topic uses comparative vocabulary such as small and smaller. Ask learners to listen to comparative words as you say them and then ask learners to repeat the words.


The **Cross-curricular links** feature provides suggestions for linking to other subject areas.

CROSS-CURRICULAR LINKS

This topic could also link to Geography if the learners use local areas to find materials, like in Main teaching idea 4. Learners could carry simple maps of the school or area visited. Show learners where they are on the map at different places in the walk.

› **Digital Classroom:** If you have access to Digital Classroom, these links will suggest when to use the various multimedia enhancements and interactive activities.

Digital resources to download

This Teacher's Resource includes a range of digital materials that you can download from Cambridge GO. (For more information about how to access and use your digital resource, please see inside front cover.) This icon  indicates material that is available from Cambridge GO.

Helpful documents for planning include:

- **Letter for parents – Introducing the Cambridge Primary resources:** a template letter for parents, introducing the Cambridge Primary Science resources.
- **Lesson plan template:** a Word document that you can use for planning your lessons. Examples of completed lesson plans are also provided.

- **Curriculum framework correlation:** a table showing how the Cambridge Primary Science resources map to the Cambridge Primary Science curriculum framework.
- **Scheme of work:** a suggested scheme of work that you can use to plan teaching throughout the year.


Each unit includes:

- **Differentiated worksheets:** these worksheets are provided in variations that cater for different abilities. Worksheets labelled 'A' are intended to support less confident learners, worksheets labelled 'B' should cater for the majority of learners, while worksheets labelled 'C' are designed to challenge more confident learners. For some worksheets, 'Help' and 'Stretch' sheets are provided in addition to the worksheet activity, which can be given to less confident or more confident learners as appropriate. Answer sheets are provided.
- **Language worksheets:** these worksheets provide language support and can be particularly helpful for learners with English as an additional language.
- **Resource sheets:** these include templates and any other materials that support activities described in the teaching notes.

Additionally, the Teacher's Resource includes:

- **Diagnostic check and answers:** a test to use at the beginning of the year to discover the level that learners are working at. The results of this check can inform your planning.
- **Answers to Learner's Book questions**
- **Answers to Workbook questions**
- **Glossary**

In addition, you can find more detailed information about teaching approaches.

 **Video** is available through the Digital Classroom.



> About the curriculum framework

The information in this section is based on the Cambridge Primary Science curriculum framework (0097) from 2020. You should always refer to the appropriate curriculum framework document for the year of your learners' assessment to confirm the details and for more information. Visit www.cambridgeinternational.org/primary to find out more.

The Cambridge Primary Science curriculum framework has been updated for teaching from September 2021. The Primary Science curriculum framework has been developed to support learners in building their understanding about the natural world, particularly how to explain and investigate phenomena.

The curriculum framework incorporates three components:

- four content strands (Biology, Chemistry, Physics, and Earth and Space)
- a skills strand called Thinking and Working Scientifically
- a context strand called Science in Context.

Biology, Chemistry, Physics and Earth and Space provide the scientific knowledge content, which gradually develops from stage 1 to stage 6 and provides a smooth progression towards Cambridge Lower Secondary study.

The Thinking and Working Scientifically learning objectives focus on the key scientific skills that are developed throughout the course. This strand is split into five types of scientific enquiry:

- observing over time
- identifying and classifying
- pattern seeking
- fair testing
- research.

Science in Context allows for personal, local and global contexts to be incorporated into scientific study, making science relevant to the contexts that learners are familiar with. This element of the curriculum offers great flexibility to teachers and learners around the world.

The Cambridge Primary Science curriculum framework promotes a learner-led, enquiry-based approach. Practical work is a valuable part of science learning and develops learners' investigation skills such as observation, measurement and equipment handling.

> About the assessment

Information about the assessment of the Cambridge International Primary Science curriculum framework is available on the Cambridge Assessment International Education website: <https://www.cambridgeinternational.org/primary>

> Approaches to learning and teaching

The following are the teaching approaches underpinning our course content and how we understand and define them.

Active learning

Active learning is a pedagogical practice that places student learning at its centre. It focuses on how students learn, not just on what they learn. We, as teachers, need to encourage learners to 'think hard', rather than passively receive information. Active learning encourages learners to take responsibility for their learning and supports them in becoming independent and confident learners in school and beyond.

Assessment for Learning

Assessment for Learning (AfL) is a teaching approach that generates feedback which can be used to improve learners' performance. Learners become more involved in the learning process and, from this, gain confidence in what they are expected to learn and to what standard. We, as teachers, gain insights into a learner's level of understanding of a particular concept or topic, which helps to inform how we support their progression.

Differentiation

Differentiation is usually presented as a teaching practice where teachers think of learners as individuals and learning as a personalised process. Whilst precise definitions can vary, typically the core aim of differentiation is viewed as ensuring that all learners, no matter their ability, interest or context, make progress towards their learning outcomes.

It is about using different approaches and appreciating the differences in learners to help them make progress. Teachers therefore need to be responsive, and willing and able to adapt their teaching to meet the needs of their learners.

Language awareness

For many learners, English is an additional language. It might be their second or perhaps their third language. Depending on the school context, students might be learning all or just some of their subjects through English.

For all learners, regardless of whether they are learning through their first language or an additional language, language is a vehicle for learning. It is through language that students access the learning intentions of the lesson and communicate their ideas. It is our responsibility, as teachers, to ensure that language doesn't present a barrier to learning.

Metacognition

Metacognition describes the processes involved when learners plan, monitor, evaluate and make changes to their own learning behaviours. These processes help learners to think about their own learning more explicitly and ensure that they are able to meet a learning goal that they have identified themselves or that we, as teachers, have set.

Skills for life

How do we prepare learners to succeed in a fast-changing world? To collaborate with people from around the globe? To create innovation as technology increasingly takes over routine work? To use advanced thinking skills in the face of more complex challenges? To show resilience in the face of constant change? At Cambridge, we are responding to educators who have asked for a way to understand how all these different approaches to life skills and competencies relate to their teaching. We have grouped these skills into six main Areas of Competency that can be incorporated into teaching, and have examined the different stages of the learning journey and how these competencies vary across each stage.

These six key areas are:

- Creativity – finding new ways of doing things, and solutions to problems
- Collaboration – the ability to work well with others
- Communication – speaking and presenting confidently and participating effectively in meetings
- Critical thinking – evaluating what is heard or read, and linking ideas constructively
- Learning to learn – developing the skills to learn more effectively
- Social responsibilities – contributing to social groups, and being able to talk to and work with people from other cultures.

Cambridge learner and teacher attributes

This course helps develop the following Cambridge learner and teacher attributes.