# EXPLORING SCIENCE

## WORKING SCIENTIFICALLY

Course Guide

Engage KS3 students in science and build key skills for GCSE (9–1) success

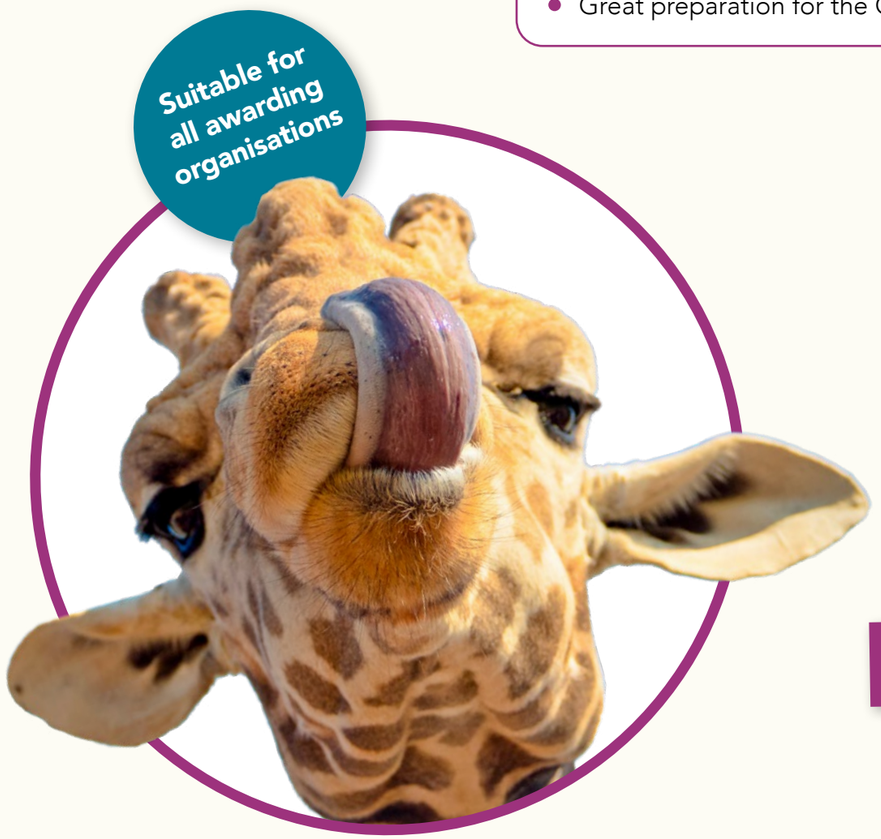
Pearson

# Build key science skills for GCSE (9–1) success

**Now is a great time to take a look at Exploring Science as your KS3 course.** Already popular with hundreds of schools, it provides an engaging and inspiring way to develop students' love of science, while building skills that are critical to GCSE (9–1) success. With your help, it's just got even better!

**Features include:**

- ✓ KS3 Lab Books: develop practical skills for GCSE (9–1) success
- ✓ interactive Scheme of Work: a flexible online 11-16 planning tool
- ✓ Assessment Builder: create customised assessments to fit your teaching
- ✓ curriculum mapping: for Pearson Edexcel and AQA.




## Practical skills

- Over 150 practicals to introduce the full range of skills and techniques.
- KS3 Lab Books: write-in lab books for 12 key practicals.
- Great preparation for the GCSE (9–1) Core/Required Practicals.

*More on page 13.*

## GCSE-style questions

From the start of Year 7, Exploring Science encourages students to:

- apply knowledge to unfamiliar contexts (AO2)
- develop evaluation skills (AO3)
- recognise and respond to GCSE-style command words.

## Personalised progression to GCSE (9–1)

- Deliver the course over 2 or 3 years.
- Suitable for all awarding organisations, with mapping provided for **Pearson Edexcel** and **AQA** KS3/11–16 pathways, Entry Level Certificates and GCSE (9–1).

## Maths skills

- Explanations and worked examples in the Student Books.
- 1000s of activity sheets on ActiveLearn.
- Terminology and approaches consistent with those used in maths teaching.

## Revision

- Summary sheets
- Word sheets
- Quick quizzes

**Learn more and start your free trial ›**

# What's in **Exploring Science?**

## Student Books

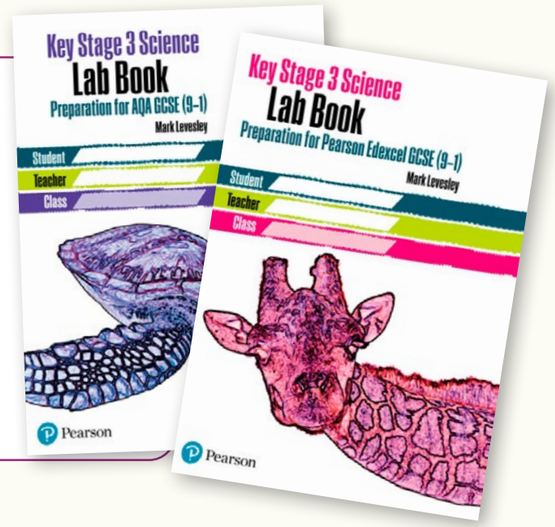
The Student Books present KS3 science in the series' well-loved style, packed with fascinating real-world examples, photos and facts to encourage all students to connect what they're learning to their world. Online versions of the Student Books - ActiveBooks - are also available.

*More on page 6*


## Lab Books

Focused support for 12 KS3 practicals, designed to introduce the full range of skills required for the GCSE (9–1) Core/Required Practicals. This support extends to teachers too – we provide full teacher and technician guidance including a skills mapping grid.

*More on page 13*




**Learn more and start your free trial ›**

## What's in Exploring Science *Active*Learn?

- 1000s of teaching and learning resources
- Access for all teachers and students in your school

### Teaching resources

- 3 front-of-class Student Books
- 200+ world-class videos and animations
- 300+ interactive activities
- 650+ PowerPoint presentations
- 1000+ activity worksheets

*More on page 8*

### Planning

- interactive Scheme of Work
- Differentiated routes
- 150+ lesson plans
- 150+ technician notes

*More on page 12*

*Active*Learn

### Student resources

- 800+ auto-marked homework activities
- Summary Sheets, Word Sheets and Quick Quizzes for every unit

*More on page 10*

### Progress & Assess

- Baseline tests for KS3 and KS4
- End-of-unit and end-of-year tests
- **NEW** Online Markbooks
- **NEW** Assessment Builder

*More on page 11*

# Student Books and ActiveBooks

Inspire budding scientists from the start of Year 7 with Exploring Science Student Books. Take a closer look...

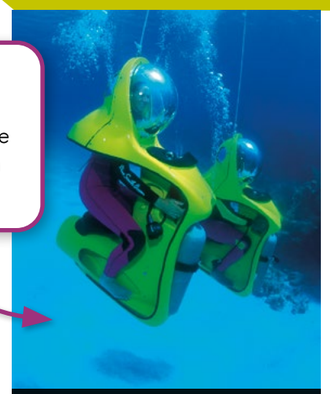
ActiveLearn

Online versions of the Student Books are available as ActiveBooks for students to use at home.

Extraordinary photos encourage students to connect the things they're learning in the classroom to the real world.

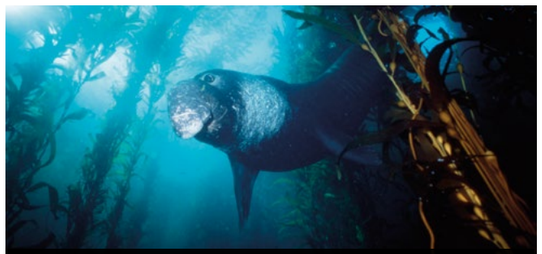
## 8Cd COMPARING GAS EXCHANGE

**HOW DO WE DETECT GAS EXCHANGE IN DIFFERENT ORGANISMS?**



**A |** HydroBOB underwater scooters

To spend long periods underwater, humans take oxygen with them to breathe. Water-living mammals, however, have adaptations so they can go for a long time without breathing. For example, elephant seals have an organ in their bodies that stores blood that is full of oxygen.



**B |** Elephant seals can stay underwater for 2 hours.

Questions familiarise students with GCSE (9–1)-style command words.

**1** a| What adaptation do elephant seals have to help them go for a long time without breathing?
b| Explain how this adaptation works.

**2** Allan is diving and uses a tank of air in 30 minutes. Will the same tank of air last for more or less time if Allan uses a HydroBOB? Explain your reasoning.

Not all the oxygen in a breath of air goes into the blood, so exhaled air still contains a lot of oxygen (table C). This means that most of the oxygen in a diver's air tank is lost in exhaled bubbles. Some divers, though, use rebreather apparatus. This contains calcium hydroxide, which removes carbon dioxide from their exhaled air and recirculates the remaining air for them to breathe.

A solution of calcium hydroxide is called **limewater**. It is a clear and colourless liquid that turns cloudy as it absorbs carbon dioxide, so is used to test for this gas.

Carbon dioxide dissolves in water to form an acidic solution. This means that respiration can also be detected using an **indicator**. For example, **hydrogen carbonate indicator** is pink in water but turns yellow as carbon dioxide is added and the **pH** drops.

Another way of detecting respiration is to look for a temperature rise, because some of the energy released by respiration warms up a cell's surroundings.

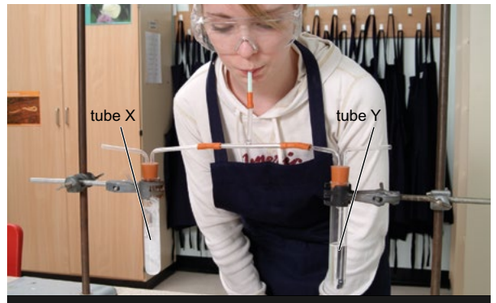
Key words are in bold. A glossary is provided at the end of the book.

**C**

| | Inhaled air (%) | Exhaled air (%) |
|---|---|---|
| nitrogen | 78 | 78 |
| oxygen | 21 | 16 |
| carbon dioxide | 0.04 | 4 |
| water vapour | variable | more |
| temperature | variable | warmer |

**3** Explain why the percentages of each of the five items in table C are or are not different between inhaled and exhaled air.






**D |** Inhaled breath bubbles through limewater in one tube and exhaled breath bubbles through limewater in the other.

**4** Look at photo D.
a| Through which tube is the girl's exhaled breath flowing?
b| How can you tell?
c| If the contents of tubes X and Y are replaced with water containing hydrogen carbonate indicator, explain what will happen as the girl breathes in and out.

Fascinating facts for students to think about.

**FACT**

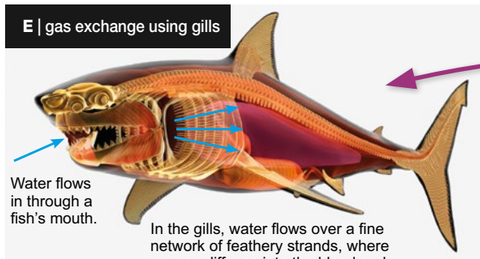
**It has long been a dream to develop an artificial gill for divers to use. This photo shows what one might look like, but it is not a reality … yet.**

**F**

## Gills

Mammals use lungs to get oxygen and so must breathe air. However, some animals never breathe air because they can extract oxygen from water, often using **gills**.

**E |** gas exchange using gills




Clear illustrations to aid understanding.

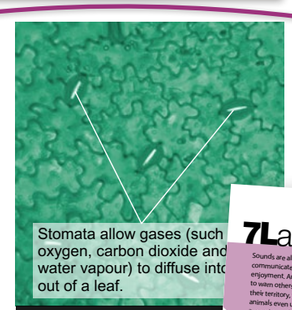
## Plants

Using **photosynthesis**, plants make glucose to store energy. Plant cells release the energy again using aerobic respiration, which happens in all cells, all the time. To allow gases in and out, land plants have tiny holes in their leaves called **stomata**.

**5** a| What substances do plants need for aerobic respiration?
b| How do they get these substances?

**6** Explain why fish tanks often become more acidic with time.

**7** What are the similarities and differences between gas exchange in mammals and fish?



**G |** stomata (the singular is stoma) on a geranium leaf (magnification × 200)

Stomata allow gases (such as oxygen, carbon dioxide and water vapour) to diffuse into and out of a leaf.

**I can …**

- recall how to detect aerobic respiration
- describe how gas exchange occurs in different organisms

Clear learning outcomes ensure students understand their own learning journey.


Each unit starts and ends with a page that asks students to apply what they are learning to real-life situations.

**Download your free samples ›**

ActiveLearn
Teaching resources

# ActiveLearn teaching resources

## Interactive front-of-class teaching resources that boost engagement and inspire.

Access everything you need for a lesson by clicking the blue hotspots, including videos, interactive activities, and customisable PowerPoint presentations.*

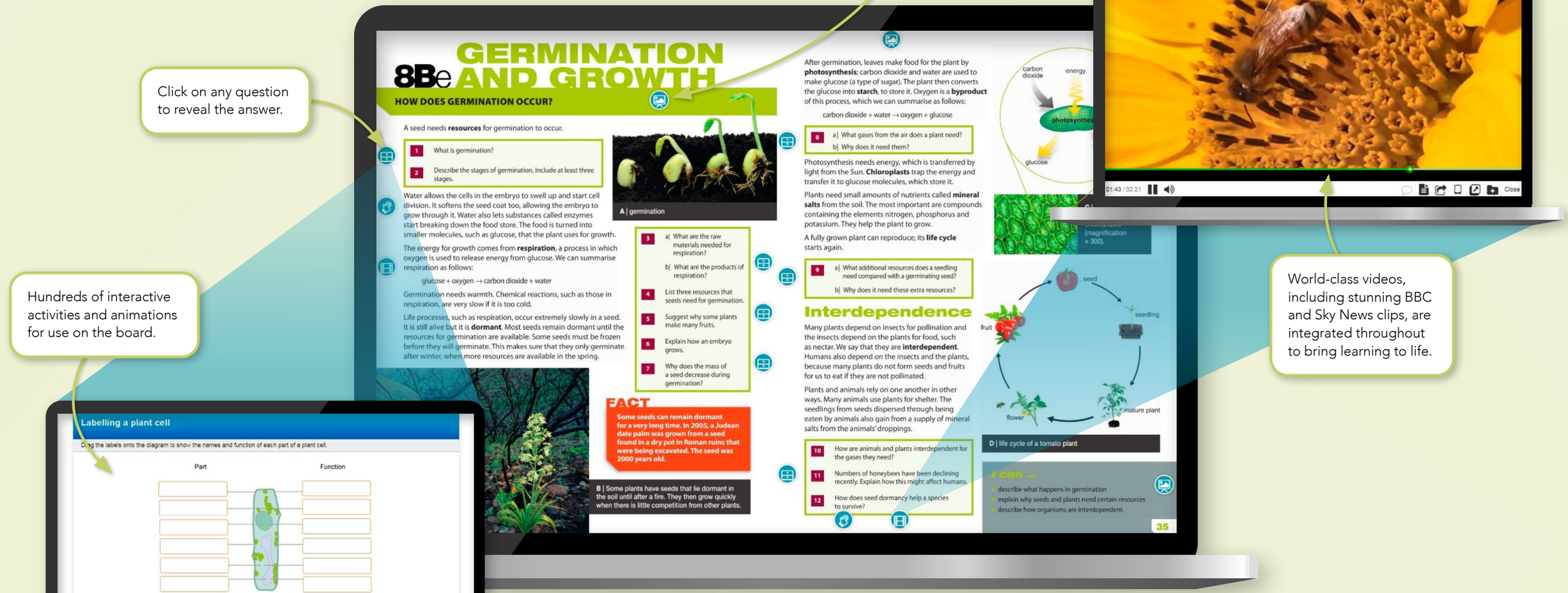
Editable PowerPoint presentations help you explain key concepts in lessons.

Click on any question to reveal the answer.

Hundreds of interactive activities and animations for use on the board.

World-class videos, including stunning BBC and Sky News clips, are integrated throughout to bring learning to life.

A zoom feature helps you focus on individual artworks, photos or any piece of text.




**Learn more and request your free trial ›**

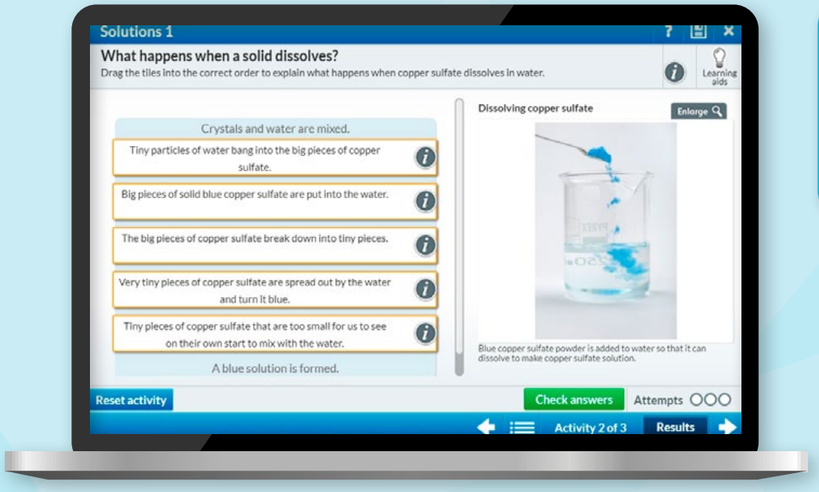
*Also accessible via the ActiveLearn resource library.

ActiveLearn
Student resources

# ActiveLearn
# Student resources

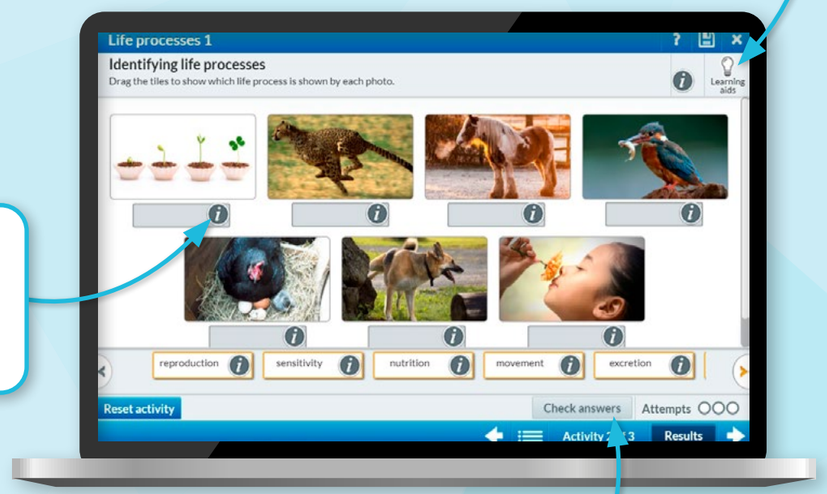
## Homework and Practice exercises

ActiveLearn includes hundreds of auto-marked activities for your students to use in lessons or at home, to cement their knowledge and skills.




Students can work at the best level for them with differentiated activities for each topic.

Stuck or in need of inspiration? Learning aids contain extra information.




On-screen hints and feedback help students work independently.

All activities are self-marked and results are tracked; students get instant feedback and you can see how they are progressing.



ActiveLearn
Progress & Assess

# ActiveLearn
# Progress & Assess

ActiveLearn Progress & Assess* is a reliable, easy-to-use system to track students' progress from KS3 to GCSE. It can work alongside your own system, will give you confidence in your data, helps you plan appropriate interventions, and saves you time.

It includes:

- ✓ 12-Step Progression Scale with mapping to indicative GCSE (9–1) grades
- ✓ Progression Map for KS2 to KS4
- ✓ Baseline, end-of-unit and end-of-year assessments for KS3 and KS4
- ✓ **NEW** Assessment Builder
- ✓ Mark schemes
- ✓ **NEW** Online Markbooks that provide analysis of students' results.

## Online Markbooks

Online Markbooks are aligned with your ActiveLearn assessments. Use these to record your students' results throughout the year, predict future performance, quickly identify problems, and take the most effective actions.

## Assessment Builder

Create assessments to match your teaching, choosing questions that test the skills and topics you have covered. Assessment Builder can be used alongside your personal lesson plans or with our Schemes of Work.

ActiveLearn Progress & Assess is available as an 'add-on' to your Exploring Science ActiveLearn subscription, or can be purchased as a separate subscription for 11-16, KS3 or KS4 science.

**www.pearsonschools.co.uk/ScienceProgressAndAssess**

*Formerly Pearson Progression services.

ActiveLearn
Planning

# ActiveLearn
# Planning and guidance

Complete support for planning and teaching, including:

- ✓ detailed teacher and technician notes
- ✓ lesson ideas to suit a range of teaching and learning styles
- ✓ mapping to Pearson Edexcel and AQA KS3/11-16 pathways, Entry Level Certificates and GCSE (9–1)s
- ✓ answers to questions in the Student Books and Lab Books.

## Interactive Scheme of Work

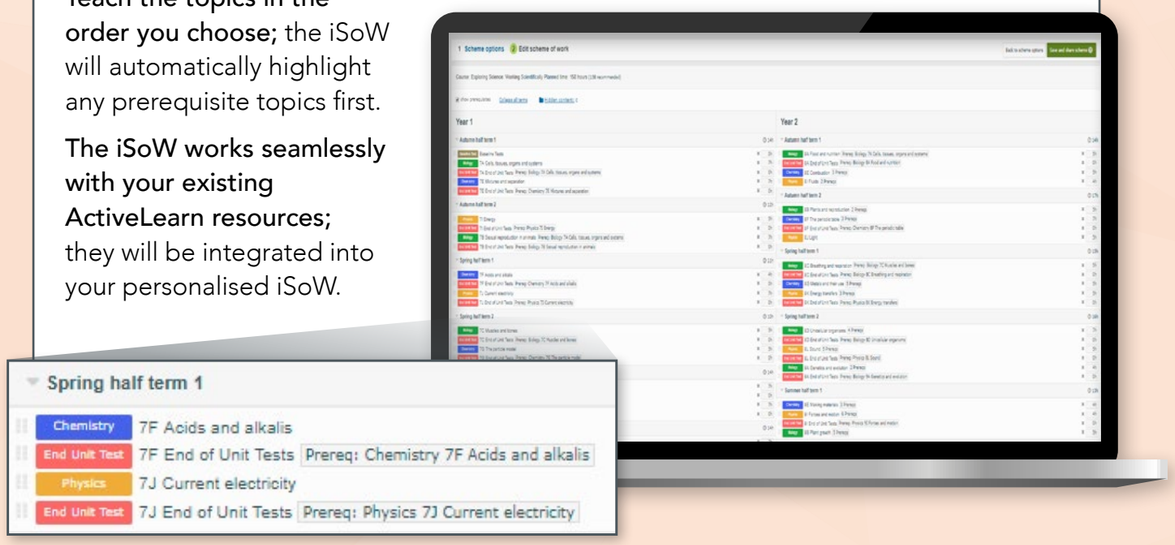
A fantastic new online planning tool for a seamless 11-16 science learning pathway (KS3 and GCSE 9–1), and you can start using the iSoW straight away for free!

### What is it?

Like a traditional scheme of work, our digital iSoW helps you cover the full curriculum and qualification requirements over 5 years. You can choose a 2 or 3-year Key Stage 3.

**Teach the topics in the order you choose;** the iSoW will automatically highlight any prerequisite topics first.

**The iSoW works seamlessly with your existing ActiveLearn resources;** they will be integrated into your personalised iSoW.




Learn more about iSoW ›



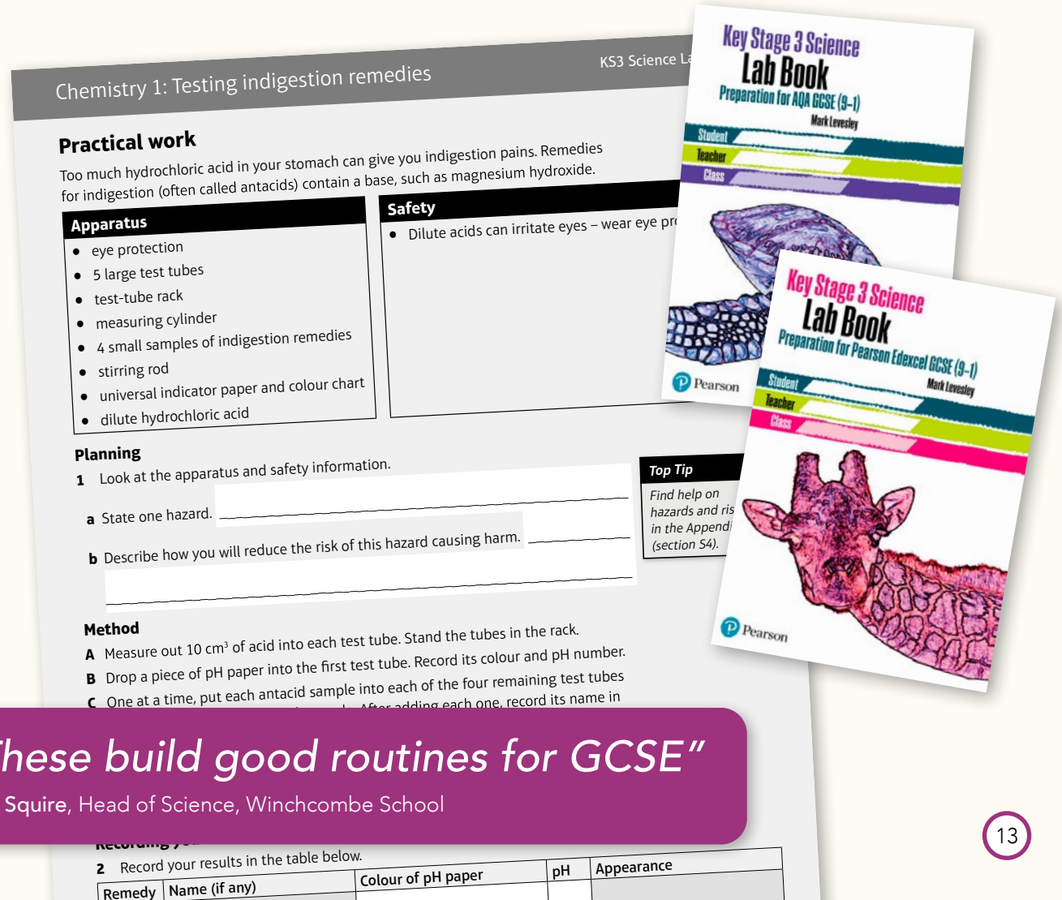
Lab Books

# Lab Books

## Developing practical skills at KS3 in preparation for GCSE (9–1)

The framework students need to perform practicals with confidence, with versions available to prepare students for Pearson Edexcel or AQA GCSE (9–1) specifications.

- ✓ 12 engaging, enjoyable KS3 practicals designed to introduce the full range of skills required for the GCSE (9–1) Core/Required practicals.
- ✓ Writing frames and questions to develop students' scientific skills and prepare them for GCSE-style assessment.
- ✓ A skills grid and skills appendix, which students can refer to as needed.
- ✓ Affordable support that's cheaper than photocopying (RRP only £2.00).
- ✓ A free online Teacher and Technician Guide to help with the delivery of each practical, including a full set of answers and links to Exploring Science Working Scientifically.
- ✓ A skills mapping grid so you can see how the 12 practicals link to the KS3 Curriculum, Exploring Science, Pearson Edexcel's 11-16 Science Learning Pathway, AQA's KS3 Syllabus and the GCSE (9–1) Core/Required Practicals.




*"These build good routines for GCSE"*
**Matt Squire**, Head of Science, Winchcombe School

# Seamless support from KS3 to GCSE (9–1)

Exploring Science Working Scientifically provides a seamless progression to Pearson Edexcel and AQA GCSE (9–1) Science qualifications. Topics are mapped to Pearson Edexcel's 11–16 Science Learning Pathway, Entry Level Certificates and GCSE (9–1) specifications, and AQA's KS3 Syllabus, Entry Level Certificates and GCSE (9–1) specifications.

## 11–14


Student Books


Lab Books

## 11–16

**Teaching resources**

**Planning materials**

*Active*Learn

**Student resources**

**Progress & Assess**

## 14–16 Pearson Edexcel


Student Books, including Support Edition

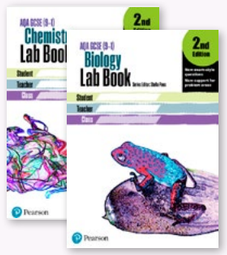

Lab Books


Homework Books


Target Intervention

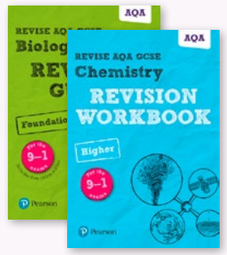

REVISE

## 14–16 AQA




Lab Books


Target Intervention




REVISE

# EXPLORING SCIENCE
## WORKING SCIENTIFICALLY


## Next steps:

### Request a free trial or buy online

It's easy to download samples, request a free trial, and personalise your order. You can also speak to a consultant online with our Live Chat service.

Visit: **www.pearsonschools.co.uk/KS3exploringscience**

If you would prefer to place your order over the phone, call **0161 855 7561**.
We're open Monday to Friday 8.00am - 5.00pm.

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