

EXPLORING SCIENCE

INTERNATIONAL 11-14

Course Guide



Inspiring 11-14 science which provides the perfect transition into Pearson Edexcel International GCSE (9-1) Sciences

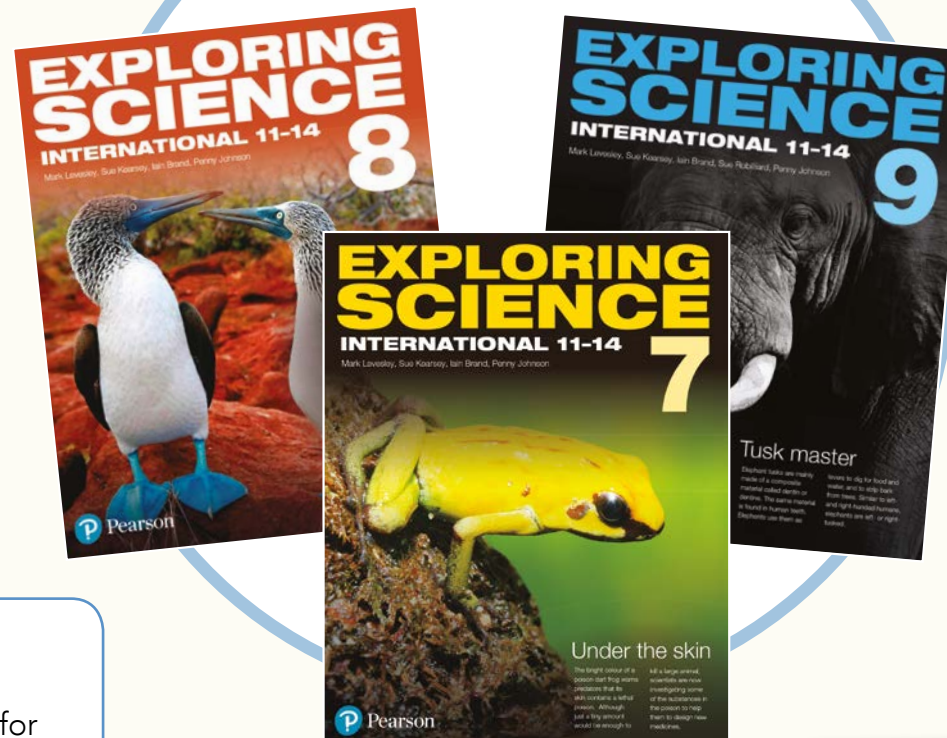
**Full Pearson Edexcel
iLowerSecondary
coverage!**

Build the foundation for International GCSEs

Exploring Science International: Our leading 11–14 course – loved by teachers for its exciting, real-life science – now also offers seamless progression to Pearson Edexcel International GCSE Sciences.

- ✓ Real-world science to spark your students' curiosity and inspire the next generation of scientists.
- ✓ **FREE** interactive Scheme of Work: a flexible online 11–16 planning tool.
- ✓ Science your students can relate to with stunning facts, case studies and photographs.
- ✓ Provides content for a broad and balanced 11–14 international science curriculum.
- ✓ Authored by expert subject team Mark Levesley, Penny Johnson, Sue Kearsey, and Iain Brand.

Real-life
science to
inspire



International focus

- Topics developed with the international learner in mind and appropriate cultural sensitivity.
- The only course to offer full coverage of the Pearson Edexcel International iLowerSecondary Award.
- Content written to B1+ English standard.
- Also offers full coverage of the content from the UK National Curriculum and mapped to Cambridge IGCSE Science.

Transition to International GCSE

Exploring Science International has been developed specifically to build the skills and knowledge needed to progress to International GCSE.

- Content has been written specifically to support progression.
- Students benefit from a consistent and balanced science scheme from 11 through to 16.
- Students will quickly learn to recognise and respond to International GCSE-style command words.

Preparing your students

- **STEM spreads** focus on key skills and potential STEM jobs for the future.
- **Working Scientifically spreads** develop the enquiry, practical and mathematical skills needed for future progression.

Knowledge retention

- Summary sheets.
- Word sheets.
- Quick quizzes.

Learn more and start your free trial:
www.pearsonglobalschools.com/exploringscienceinternational

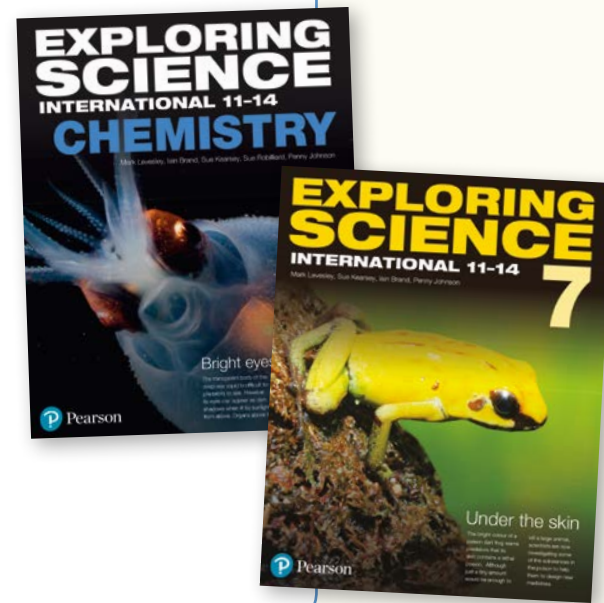
What's in Exploring Science International?

Student Books

Choose from student books arranged by subject (Biology, Chemistry, Physics) or by Year (7, 8, 9) to suit your school!

The Student Books present inspiring 11–14 science that is 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 pages 6–8



Workbooks

Our colourful Workbooks contain space to answer questions from the Student Books along with additional questions to consolidate and deepen learning. They also provide complete coverage of Pearson Edexcel's iLowerSecondary statements.

More on page 9



Learn more and start your free trial:
www.pearsonglobalschools.com/exploringscienceinternational

What's in Exploring Science International *ActiveLearn*?

The digital subscriptions within this programme contain everything teachers and students need to create a personalised learning experience. With 1000s of teaching and learning resources to inspire and inform your students, front-of-class ActiveBook versions of the Student Books, comprehensive planning and assessment tools, you'll be saving valuable time whilst bringing together your planning, teaching and assessment needs across one online service.

Teaching resources

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

More on pages 10–11

Planning

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

More on page 14

ActiveLearn

Student resources

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

More on page 12

Progress & Assess

- End-of-unit tests
- Online Markbooks

More on page 13

Student Books and ActiveBooks

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

ActiveLearn

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

Quick reference helps you know which curriculum your lesson is mapped to.

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

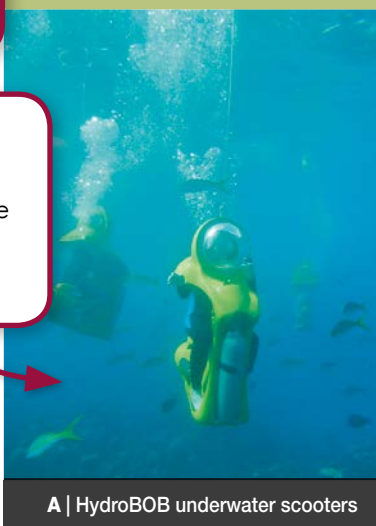
Questions check student understanding of the content and develop skills of application and analysis.

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

UK NC, ILS, CEE

8Cd COMPARING GAS EXCHANGE

HOW DO WE DETECT GAS EXCHANGE IN DIFFERENT ORGANISMS?



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.



- 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.

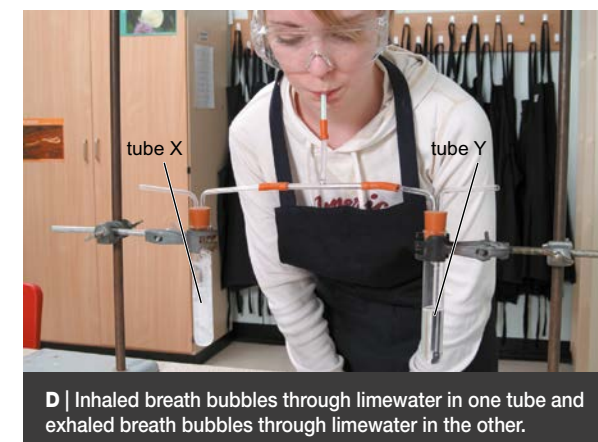
A solution of calcium hydroxide is called **limewater**. It is a clear and colourless liquid that turns cloudy as it absorbs carbon dioxide, so is used to test for this gas.

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.

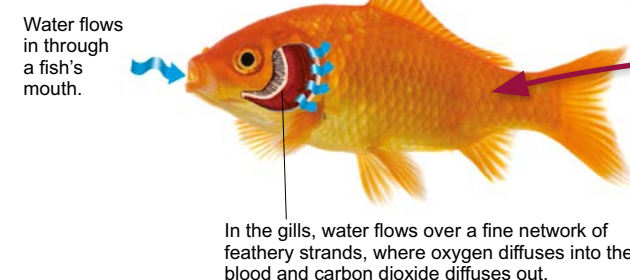
- 3 Explain why the quantities of each of the five items in table C are or are not different between inhaled and exhaled air.

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



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**.



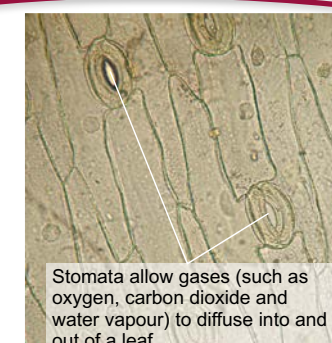
Plants

For **photosynthesis**, plants need carbon dioxide to make glucose. Plant cells then release energy from the glucose 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?

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.



I can ...

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

Fascinating facts for students to think about.

Clear illustrations to aid understanding.

Download your free samples at
www.pearsonglobalschools.com/exploringscienceinternational

Clear learning outcomes ensure students understand their own learning journey.

Student Book STEM spreads

STEM stands for science, technology, engineering, and mathematics. We have included STEM spreads within our Student Books (and ActiveBooks) so your budding scientists can explore STEM-related concepts from the start of their Secondary science journey!

Real life science to inspire your students and put learning into context.

Links made to relevant STEM careers for the future.

BUILDING 7Jd ROBOTS

WHAT DO ROBOT ENGINEERS DO?

A robot is any machine that performs complicated tasks automatically. Robots are controlled by computers. Many factories use robots to assemble cars and other machines. They are also used for jobs that are too difficult or dangerous for humans.



B | This robot is exploring Mars. It is very difficult, dangerous and expensive to send humans to Mars.

A | Robots are used to help sick and elderly people who cannot move around easily.

- Suggest two tasks robots could perform:
a | in your home
b | in your town.
- Suggest two parts of the Earth where robot explorers should be used instead of humans.

Controlling robots

Self-driving cars are robots. They must be designed to drive to the correct place without bumping into anything. Diagram C shows a flowchart model for what a human driver does when seeing an obstacle ahead.

A self-driving car needs sensors to detect what is around the car. It also needs motors to control the steering and speed, and a computer control system to decide what to do.

The sensors and motors are all in circuits that are controlled by switches and variable resistors. The control system receives electrical signals from sensors such as cameras. It then switches on motors or other devices to control the car. The engineers who design the control system have to think of all the possible tasks the car needs to do, and program the computer to make the correct response each time. The same ideas apply to designing any kind of robot.



C | a model for how a human driver controls a car

STEM

3 Look at flow diagram C.
a) Which parts of a human carry out tasks 1, 2 and 3?
b) Suggest what a self-driving car could use to carry out tasks 1 and 2.

Careers in robotics

Robotics engineers need a degree in a subject such as electronics, computer science or mechanical engineering. A robot is designed to do particular tasks, so engineers also need to communicate with the people who will use it, so they understand what those tasks are.

The engineers in photo D need to understand the conditions on Mars so they can make sure the robot will work when it gets there.

There are lots of things to think about when designing a robot space explorer, such as how the robot moves, how it examines rocks, and how to keep it powered. Each task can be broken down into smaller problems to be solved. For example, if scientists want to receive photos of rocks with a particular colour:

- Which sensor should the robot use?
- How can it decide if the rock is the right colour?
- How will the pictures be sent back to the scientists on Earth?

D | These engineers are developing a new robot to explore Mars.

4 Look at the list of problems to be solved for a robot Mars explorer. Suggest one solution for each problem.

ACTIVITY

Photo E shows Robear. This robot is designed to lift patients in hospitals or care homes. Engineers have to work out how it can do tasks such as:

- understand what the patient wants
- find the patient
- lift the patient safely
- put the patient down safely in the correct place.

Work in a group and choose one of these tasks to discuss. Break the task down into three or four parts and suggest a solution for each part. Summarise your conclusions in a report or presentation.

E | Robear being tested

Support and ideas for running STEM projects with students.

Workbooks

Capture evidence of your students' progress in one place with our Exploring Science International Workbooks.

These workbooks are designed to be used in class and at home as an accompaniment to the 11-14 Exploring Science International Student Books. They offer plenty of structured space for students to record their answers, plus additional activities to consolidate and stretch learning.

Icon indicates questions repeated from the student book.

Space for students to write in.

8EC WS - FAIR TESTING

SB 1 In the experiment shown in the diagram, two variables are the volume of fuel burnt and the time it takes for all the fuel to burn.

a Which of these is the independent variable and which is the dependent variable? Explain your answer.

i independent variable: _____

ii dependent variable: _____

b One variable that should be controlled is the type of fuel. Explain how using different fuels might affect the dependent variable.

c Describe **one** other variable that should be controlled in this experiment and what effect it might have if it were not controlled properly.

2 Complete this table for each statement.

Statements	is definitely correct	might be correct	might be wrong	is definitely wrong
a The independent variable does not change because of anything the experimenter does.				
b The dependent variable is the variable the experimenter measures.				
c The dependent variable is changed when the independent variable changes.				
d A control variable is fixed so that it can change the dependent variable in the correct way.				

8EC WS - FAIR TESTING

3 Use words from the box to complete the sentences. You can use the words more than once.

control dependent fair independent valid

In an experiment you need to stop the _____ variables changing. This is so that only the _____ variable causes changes in the _____ variable. A test like this is a _____ test and is one that produces the data that it is supposed to. A _____ test produces _____ data.

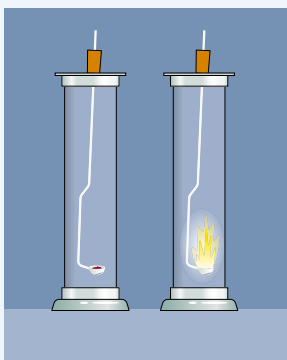
4 Some students recorded the time 10 g of different fuels burned and the highest temperature reached by a beaker of water heated by each fuel. They wrote:

Fuel C burned for six minutes and fuel D burned for half as long, and fuel D only heated the water to 26 °C but fuel C heated it to 71 °C. 10 g of fuel A burned for 7 minutes and the water reached 63 °C. Fuel B heated the water to 55 °C and burned for 4 and half minutes.

Design a table to present these results.

5 Some students wanted to find out if different metals burned for different lengths of time in oxygen. They lowered samples of hot metals into gas jars of oxygen (shown in the diagram). They recorded the length of time that each metal burned. Write down **three** control variables for this investigation, and how to control each.

Control variable	How it is controlled



Our Workbooks enable differentiation for every pupil to offer additional support and challenge where relevant.

Download your free samples at
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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.*

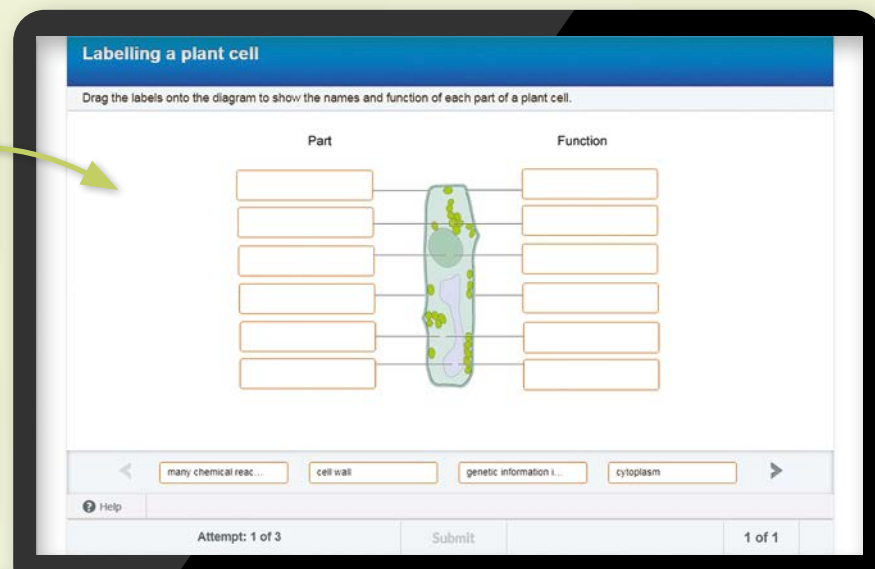


Editable PowerPoint presentations help you explain key concepts in lessons.

Click on any question to reveal the answer.

Hundreds of videos, interactive activities and animations for use on the whiteboard.

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



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*Also accessible via the ActiveLearn resource library.

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 level best 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* is a reliable, easy-to-use system to track students' progress from KS3 to Pearson Edexcel International 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 Pearson Edexcel International GCSE (9–1) grades
- ✓ Progression Map for 11–16
- ✓ Baseline, end-of-unit and end-of-year assessments for KS3 and KS4
- ✓ Mark schemes
- ✓ 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.

ActiveLearn Progress & Assess is included as part of the Exploring Science International ActiveLearn subscription.

*Formerly Pearson Progression services.

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
- ✓ answers to questions in the Student Books.

Interactive Scheme of Work

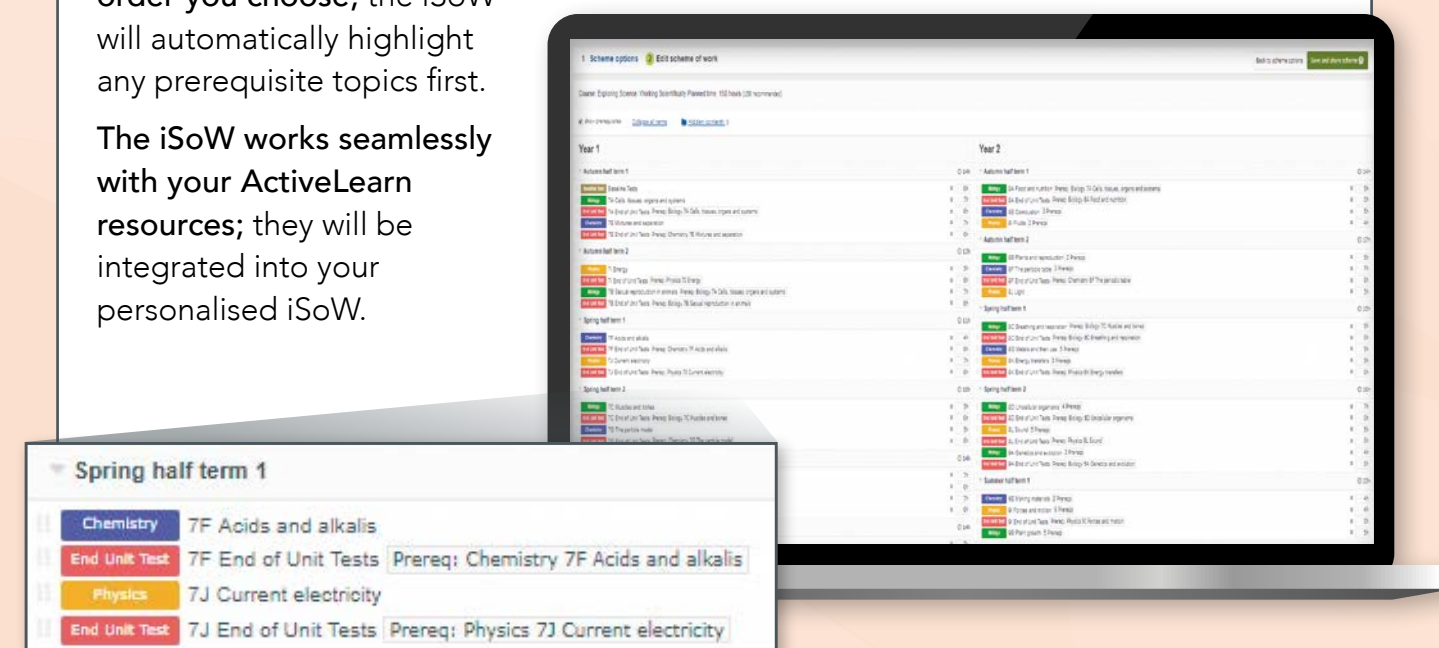
Take a closer look at our unique planning tool.

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 ActiveLearn resources; they will be integrated into your personalised iSoW.



Learn more at
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Ordering information

Use the order form below to select the resources you would like to order*. See back page for ordering options.

A note about subscriptions sizes for ActiveBook and ActiveLearn subscriptions: Small school is fewer than 100 pupils; Medium school is 101–300 pupils; Large school is 301–500 pupils; Extra Large school is 501–999 pupils; Super school is 1000+ pupils.

To learn more, including how to place an order for our digital services, go to www.pearsonglobalschools.com/orderform

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Year 7 Workbook	978 1 292294 10 0	
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Foundations for success

Exploring Science International will offer a seamless transition for progression into Pearson Edexcel International GCSE and beyond. We have a range of resources available to help you prepare your students for success in Pearson Edexcel’s world class qualifications*.

14–16 Pearson Edexcel resources for International GCSE (9–1)



For more information about resources from Pearson visit pearsonglobalschools.com

Exploring Science International is also part of the 11–14 suite of resources from the Pearson Edexcel iProgress family. From Primary through to Secondary, iProgress delivers a consistent and high-quality educational experience for students aged 5 to 19, by providing globally recognised qualifications and curriculum-matched resources at each school stage.

Based on the UK curriculum but designed with a global outlook, iProgress is a learning journey for your students from Pearson Edexcel, and includes iPrimary, iLowerSecondary, International GCSE (IG) and International A Level (IAL).



For more information about iProgress with Pearson Edexcel visit qualifications.pearson.com/iprogress

14 *Prices can be found online, but may vary across regions, therefore please contact your local Pearson consultant for local and up-to-date pricing.

* Paid for published resources. You do not need to purchase Pearson resources to deliver our qualifications. 15

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INTERNATIONAL 11-14

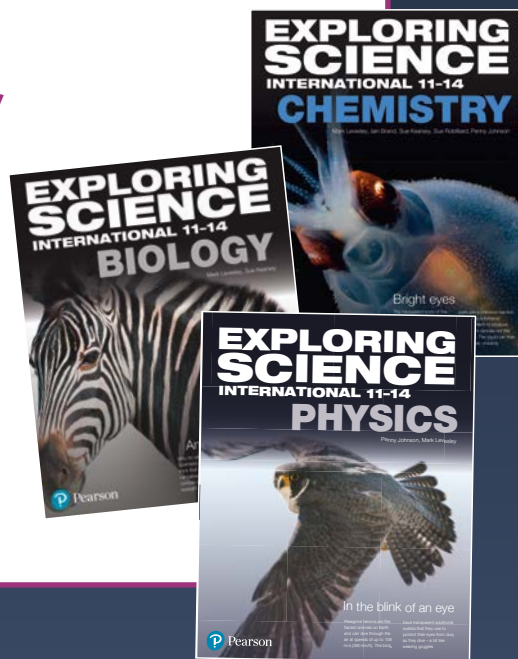
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