Welcome to Science

Mr Blackmore
Curriculum Team Leader for Science

In Year 7

- 6 lessons per fortnight
- Studying a range of different units from the 3 different Sciences starting with
  - Biology - Cells
  - Chemistry - Particle model
  - Physics - Energy
- 1 or 2 teachers - makes no difference to the topics taught but they will be in parallel if a class has 2 teachers

Our KS3 curriculum

- Our curriculum is carefully sequenced, highly coherent curriculum that focuses especially on the KEY things students need to know.
- It delivers knowledge through clear, narrative-driven explanations, and secures it with the use of extensive independent practice and constant checking for understanding
- It pays particular attention to “working scientifically” skills
- It focuses on retrieval practice, and this is stringently organised

2 key foci

Knowledge-rich: the content is taught to be REMEMBERED not just encountered – and therefore gives a strong foundation of information that students will retain into the next phase of their education and beyond. Thought has gone into the SEQUENCE of topics.

Retrieval practice: This can be defined as the act of trying to recall information without having it in front of you. It's a simple strategy that has been shown to improve grades. When students retrieve and bring information to mind, this mental challenge produces durable long-term learning. Easy learning leads to easy forgetting.

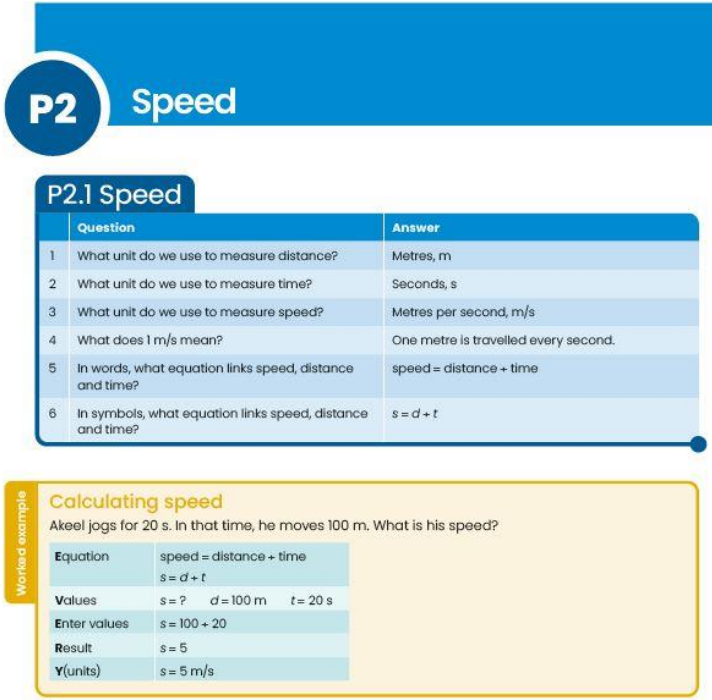
Why?

All of this means that students arrive in KS4 with a solid grounding in the basics of Science - the key stuff that they need to know to progress well in Science at GCSE.

How?

Reduce cognitive load

Every topic is explained through a succinct and focused table of questions and answers, capturing all the essential knowledge pupils need.



P2 Speed

P2.1 Speed

	Question	Answer
1	What unit do we use to measure distance?	Metres, m
2	What unit do we use to measure time?	Seconds, s
3	What unit do we use to measure speed?	Metres per second, m/s
4	What does 1 m/s mean?	One metre is travelled every second.
5	In words, what equation links speed, distance and time?	speed = distance ÷ time
6	In symbols, what equation links speed, distance and time?	$s = d \div t$

Worked example

Calculating speed

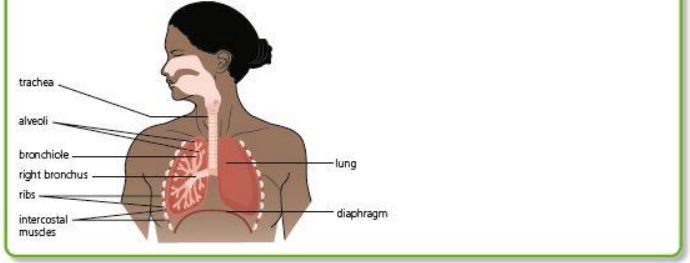
Akeel jogs for 20 s. In that time, he moves 100 m. What is his speed?

Equation	speed = distance ÷ time $s = d \div t$
Values	$s = ?$ $d = 100$ m $t = 20$ s
Enter values	$s = 100 \div 20$
Result	$s = 5$
Y(units)	$s = 5$ m/s

B4.1 Ventilation

	Question	Answer
1	What is the respiratory system?	A system that allows air to pass in and out of the body
2	In the respiratory system, what is ventilation?	The movement of gases into and out of the lungs
3	What happens to the intercostal muscles and rib cage when we breathe in?	Intercostal muscles contract and rib cage expands
4	What happens to the diaphragm when we breathe in?	Diaphragm contracts and flattens
5	What happens to lung pressure when we breathe in?	Lung pressure decreases
6	What happens to the intercostal muscles and rib cage when we breathe out?	Intercostal muscles relax and rib cage drops inwards
7	What happens to the diaphragm when we breathe out?	Diaphragm relaxes and moves up
8	What happens to lung pressure when we breathe out?	Lung pressure increases
9	What is the function of the goblet cells in the trachea?	To release mucus into the trachea
10	What is the function of mucus in the trachea?	To trap dust and bacteria
11	What is the function of the ciliated epithelial cells in the trachea?	To sweep mucus up and out of the trachea

▼ Parts of the human respiratory system

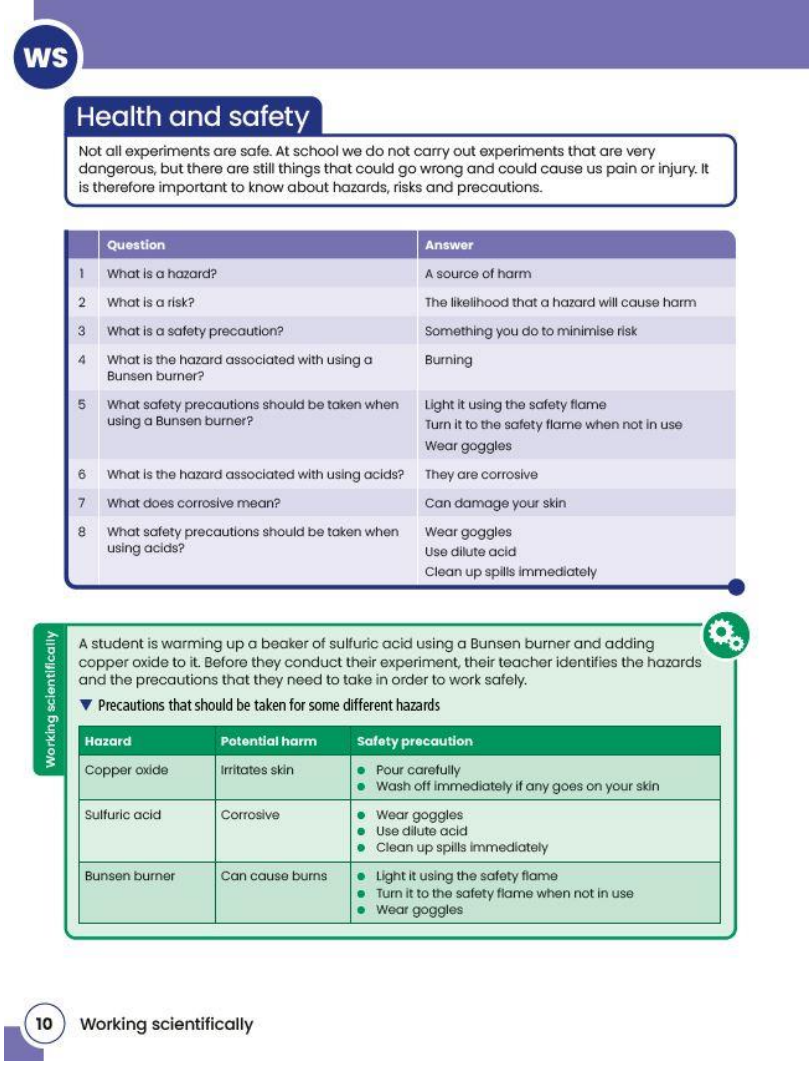


Use visual aids to further understanding

Complex topics are paired with annotated diagrams and other explanations to illustrate key skills and calculations in further detail.

Strengthen scientific skills

'Working Scientifically' pages integrate principles and concepts into students' understanding, using questions and answers,
diagrams, tables, and more.



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Health and safety

Not all experiments are safe. At school we do not carry out experiments that are very dangerous, but there are still things that could go wrong and could cause us pain or injury. It is therefore important to know about hazards, risks and precautions.

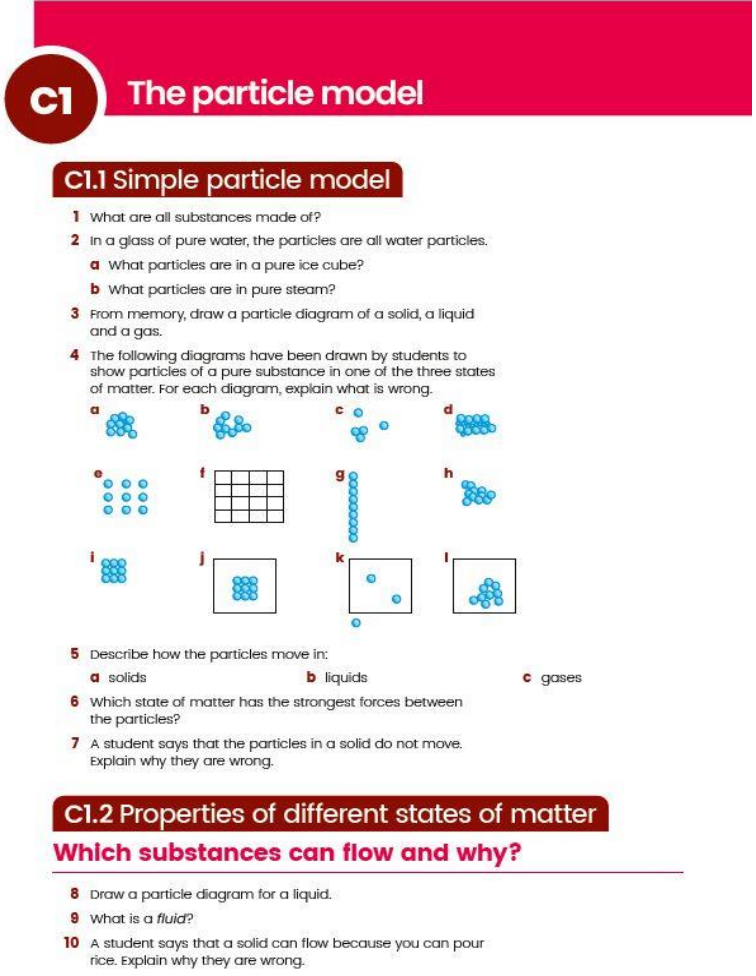
	Question	Answer
1	What is a hazard?	A source of harm
2	What is a risk?	The likelihood that a hazard will cause harm
3	What is a safety precaution?	Something you do to minimise risk
4	What is the hazard associated with using a Bunsen burner?	Burning
5	What safety precautions should be taken when using a Bunsen burner?	Light it using the safety flame Turn it to the safety flame when not in use Wear goggles
6	What is the hazard associated with using acids?	They are corrosive
7	What does corrosive mean?	Can damage your skin
8	What safety precautions should be taken when using acids?	Wear goggles Use dilute acid Clean up spills immediately

Working scientifically

A student is warming up a beaker of sulfuric acid using a Bunsen burner and adding copper oxide to it. Before they conduct their experiment, their teacher identifies the hazards and the precautions that they need to take in order to work safely.

▼ Precautions that should be taken for some different hazards

Hazard	Potential harm	Safety precaution
Copper oxide	Irritates skin	• Pour carefully • Wash off immediately if any goes on your skin
Sulfuric acid	Corrosive	• Wear goggles • Use dilute acid • Clean up spills immediately
Bunsen burner	Can cause burns	• Light it using the safety flame • Turn it to the safety flame when not in use • Wear goggles



C1 The particle model

C1.1 Simple particle model

1 What are all substances made of?
2 In a glass of pure water, the particles are all water particles.
a What particles are in a pure ice cube?
b What particles are in pure steam?
3 From memory, draw a particle diagram of a solid, a liquid and a gas.
4 The following diagrams have been drawn by students to show particles of a pure substance in one of the three states of matter. For each diagram, explain what is wrong.

a b c d
e f g h
i j k l

5 Describe how the particles move in:
a solids b liquids c gases
6 Which state of matter has the strongest forces between the particles?
7 A student says that the particles in a solid do not move. Explain why they are wrong.

C1.2 Properties of different states of matter

Which substances can flow and why?

8 Draw a particle diagram for a liquid.
9 What is a *fluid*?
10 A student says that a solid can flow because you can pour rice. Explain why they are wrong.

40

Practice, practice, practice

Question books provide questions for students to consolidate, apply and extend their knowledge.

- Over 1000 questions per year
- Improve students' long-term retention.
- Build confidence in the key skills.
- Support every student.

Assessment and homework

- Homework quizzes using the same questions encountered in the book to build coherence and ensure relevance with work completed in lessons. It will be set using a platform called Carousel
- Assessments also link in with these questions
  - Pupils provided the questions and the answers to the questions in the test
  - Encourages effective revision technique and provides a level of predictability that strengthens the link between hard work and success on Science
  - Ensures a solid knowledge base for the application of complex scientific principles and concepts later on