1

mastery science

MASTERY
PRACTICE BOOK

Learn to apply knowledge and get higher grades.

MASTERY PRACTICE BOOK

Learn to apply knowledge and get higher grades in science.

What will get you really high grades in science exams? Working harder? No, working smarter! 60% of the marks at GCSE aren't for knowing content, they're for 'applying' it. This means you have to figure out questions that are different to any you've seen before. Applying knowledge is one of the most difficult things to do in science, but you can learn how.

The Mastery Practice Book contains the secrets for getting good at applying knowledge. Work through the step-by-step examples, try the 'your turn' questions and then move up to the 'mixed up problems'. Soon you'll be confident with whatever examiners ask.

That's mastery!

- ✔ **Covers all key concepts in Year 7 (age 11-12)**
- ✔ **50+ worked examples**
- ✔ **100's of carefully crafted questions**
- ✔ **Hints and answers**
- ✔ **Ideal for both school and home use**
- ✔ **Based on proven research**

ISBN 9780956681041

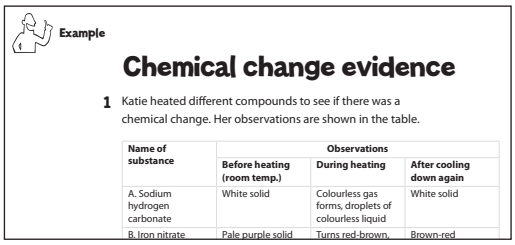
Part of the Mastery Science curriculum

£9.99

www.masteryscience.com

Contents

How to use the book



Example

Chemical change evidence

1 Katie heated different compounds to see if there was a chemical change. Her observations are shown in the table.

Name of substance	Observations		
	Before heating (room temp.)	During heating	After cooling down again
A. Sodium hydrogen carbonate	White solid	Colourless gas forms, droplets of colourless liquid	White solid
B. Iron nitrate	Pale purple solid	Turns red-brown,	Brown-red

Applying what you know is not easy. Keep trying, and learn from your mistakes. With practice you will master the concepts and be confident with whatever examiners ask.

The ***Example*** pages have 3 steps:

Detect — Work out what you need to do to answer the question.

Recall — Bring to mind what you already know about the concept. Showing it visually helps the thinking process.

Solve — Go from what you know to the answer, step-by-step.

Why is this evidence?

Do answer the questions in speech bubbles. This will help you follow the example and remember the main points.

Your turn

The ***Your Turn*** pages have three practice questions. The first is very similar to the example. Look back and copy the steps. The other two questions might look different but they are testing the same thinking process.

1	/3	2	/3	3	/3

Use the scoring box to check how you're doing. Award yourself 3 points if you did Detect, Recall and Solve well. Subtract 1 point for each step you didn't do well. +1 if you answered without a hint.

Hints & Answers

If you're stuck, go to the ***Hints*** pages at the back. The hint is a clue or question to get you moving. Use the ***Answers*** pages to check if you were correct. If you weren't, look back at the example and figure out what you did wrong.

Watch out !

The ***Watch Out*** pages are to help you avoid common mistakes and clear up confusions in your knowledge.

Mixed up problems

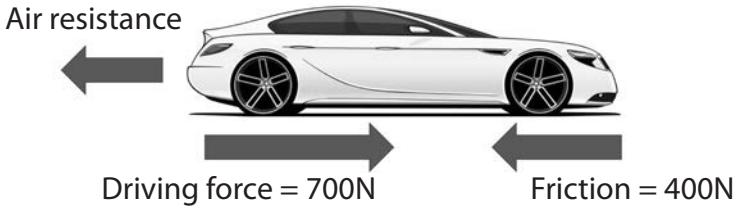
Now you're ready for the challenge at the end of the chapter: ***Mixed up problems.*** This is like an exam where different types of questions are jumbled up. Don't panic, just follow the 3 steps: Detect, Recall and Solve. If you get stuck, look back at the example or try a hint.

Good luck!

Example

1.1 Find missing force

1 A car travels at constant speed. The diagram shows the forces on the car.



Calculate the force of air resistance.

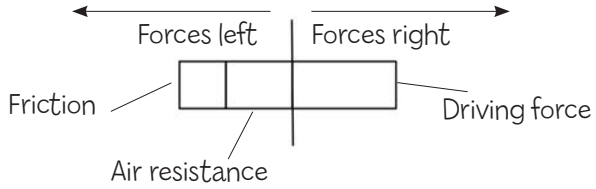
Detect

I know all the forces on the car except one. I have to calculate the missing force.

Recall

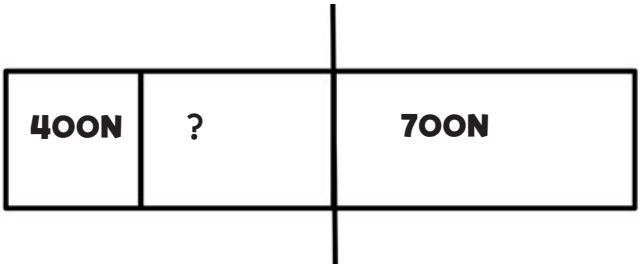
Constant speed (or at rest) means the forces are balanced. So,
Sum of forces in one direction = Sum of force in opposite direction.

Why is this equation true?



Solve

Put the values from the question into the balanced forces diagram:



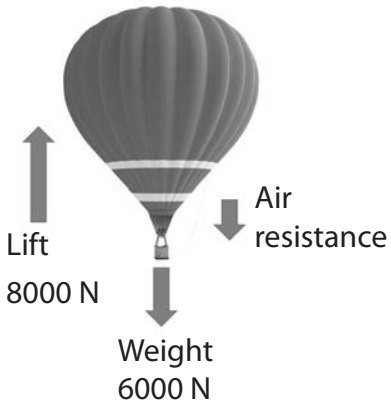
How did I work this out?

We can write this as an equation:

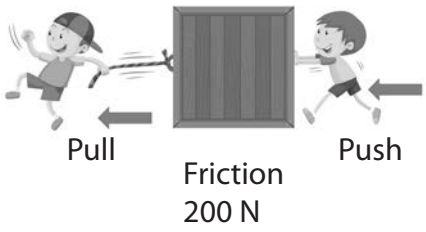
400N + air resistance = 700 N

So, air resistance = 700 - 400

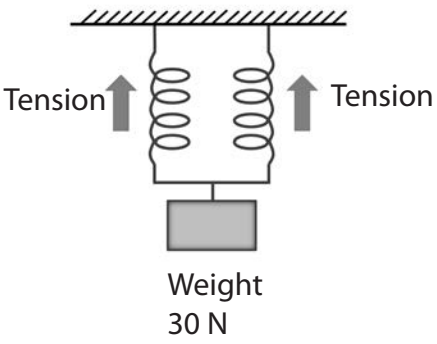
2 The hot air balloon is climbing at a steady speed. Calculate the air resistance.



3 Two boys pull and push a box with the same force. The box moves at a steady speed. Calculate the push and pull force.



4 The weight is supported by the tension in two identical springs. What is the tension in each spring?



1	/3	2	/3	3	/3	no hints: +1 Total	/10

Example

5.1 Chemical change evidence

1 Katie heated different substances to see if there was a chemical change. The table shows her observations.

Name of substance	Observations		
	Before heating (room temperature)	**During heating**	**After cooling**
i) Sodium hydrogen carbonate	White solid	Colourless gas and droplets of colourless liquid form	White solid
ii) Iron nitrate	Pale purple solid	Turns red-brown, brown gas forms	Brown-red solid
iii) Hydrogen peroxide	Colourless liquid	Bubbles form	Colourless liquid

For substances **i)**, **ii)** and **iii)**, explain whether there was a chemical change.

Detect

I need to think what the evidence is for a chemical change.

Why is this evidence?

Recall

In a chemical change, a new substance always forms.

The evidence for a new substance can be:

- ◯ Permanent colour change
- ◯ Fizzing or sign of a new gas
- ◯ Heat or light produced
- ◯ A precipitate (solid) forms if I mix two solutions.

Solve

i) Heating sodium hydrogen carbonate

- ◯ Permanent colour change
- ✓ Fizzing or sign of a new gas
- ◯ Heat or light produced

→ **Chemical change**
The droplets are likely to be water. A colourless gas and water droplets are both evidence for new substances.

ii) Heating iron nitrate

- ✓ Permanent colour change
- ✓ Fizzing or sign of a new gas
- ◯ Heat or light produced

→ **Chemical change**
A permanent colour change and brown gas are both evidence for new substances.

iii) Heating hydrogen peroxide solution

- ◯ Permanent colour change
- ? Fizzing or sign of a new gas
- ◯ Heat or light produced

→ **Not sure**
The bubbles could be a new gas, or due to boiling. There is no other evidence.

Why is the answer 'not sure'?

2 Alys mixed different solutions together. The table shows her observations.

	Solution 1	Solution 2	After mixing
i)	Silver nitrate (colourless)	Sodium chloride (colourless)	White precipitate forms
ii)	Copper sulfate (blue)	Dilute sulfuric acid (colourless)	The solution stays blue
iii)	Sodium hydrogen carbonate (colourless)	Hydrochloric acid (colourless)	Fizzing, leaving a colourless solution

For each experiment **i)**, **ii)** and **iii)**, explain whether there was a chemical change.

3 Jason added different substances to water. The table shows his observations.

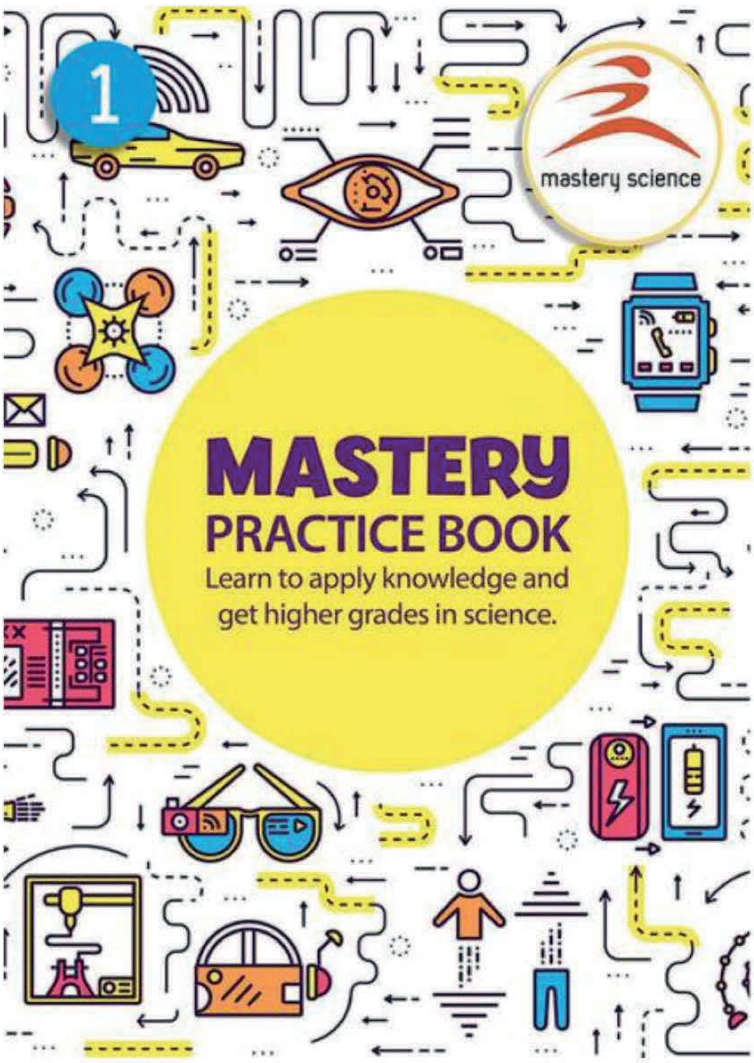
Experiment	Substance	Before adding water	After adding to water
i)	Sodium metal	Silvery-grey metal	Fizzes, catches fire, solid disappears leaving a colourless solution
ii)	Sodium iodide	White solid	Solid disappears leaving a colourless solution
iii)	Iodine	Silvery-grey solid	A pale orange solution forms. Some solid remains

For each experiment **i)**, **ii)** and **iii)**, explain whether there was a chemical change.

4 Tomas mixed red and blue food colour in a glass of water. The water went purple.
Tomas concluded there was a chemical change because it went a different colour.
Do you think he was correct? Explain your answer.

1 /3 2 /3 3 /3 no hints: +1 Total /10

CLICK TO ORDER THE BOOK



Practice Book 1

£8.99 ~~£9.99~~

Add to basket

Offer ends: 24th November

Publishing date: 27th November