

HEY SMART GIRL

SAMPLE  
CHAPTER

# BOOK OF CHEMISTRY



REAL SCIENCE  
HANDS-ON  
EXPERIMENTS  
CURRICULUM  
ALIGNED



AGES  
8 - 12

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# 1

## Welcome to Chemistry



**Y**ou've probably heard the word *science* loads of times. Maybe someone even used it to explain something weird or wonderful, like, "It's just science!" But what *is* science, really?



## What is science?

Whether this is your first *Hey Smart Girl* book or you've already read about biology or physics, stick around. This chapter has a fresh example of the scientific method and a story about a brilliant woman who changed science forever.

Science is how we explore the world—from the tiniest particles to the biggest galaxies. It helps us understand *why* things happen, *how* they happen, and what we can do with that knowledge. Every invention, every discovery, and every “Aha!” moment starts with someone being curious and asking, “What if ...?”

Think about it—Wi-Fi, vaccines, fizzy drinks, spaceships, and even glittery slime—they all began with someone wondering how the world works and then finding out. That's science in action.

## The different branches of science

Science is a team sport, and each branch has an important role to play. They all bring something unique to the table. Each branch of science helps us understand a different part of the world—but when they work together, they can create real game-changers. Think solving problems, making breakthroughs, and sparking the kind of inventions that change lives!



- **Biology:** The science of life, from tiny bacteria to giant whales.
- **Physics:** The science of motion, forces, energy, and how matter behaves.
- **Chemistry:** The science of what stuff is made of and how it changes.
- **Earth Science:** The science of rocks, oceans, weather, and the planet's systems.

These fields started as separate areas of study, but today, scientists often mix them together to make even bigger discoveries. Think biochemistry (biology + chemistry) or environmental science (biology + chemistry + Earth science). When sciences team up, the possibilities are endless!

This book is all about chemistry—the branch that helps us understand the ingredients of everything, from soap and chocolate to the stars in the sky.

## So, what is chemistry?

Chemistry is the science of matter—what things are made of and how they change.

If it *melts, burns, glows, fizzes, or smells a bit weird*, you can bet chemistry is involved.

Chemistry shows us how atoms come together to make molecules, and how those molecules form everything in our



world, including water, food, plastics, medicines, and even you.

Chemistry links biology and physics. It explains the reactions that happen inside your body (biology) and how particles move and interact (physics). It's the bridge between life and motion, and it's *fascinating*.

In this book, you'll learn how to think like a chemist, use the scientific method to explore your world, and try out some cool experiments of your own.

What can chemistry do?

Did you ever wonder ...

- ... why soap gets rid of dirt?
- ... how glow sticks light up in the dark?
- ... what makes fireworks boom with colour?

Chemistry has the answers. Chemistry doesn't just happen in laboratories; it's in your kitchen, bathroom, garden, and even in your body. And guess what? If you understand chemistry, you can create amazing things, including stronger materials, better medicines, tastier food, and cleaner energy. You could even help solve climate change!

Yes, girl. Chemistry = Superpowers.



**What's a chemist's favourite type of dog?**

**Answer:** A lab-rador!



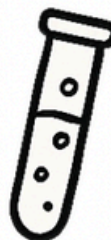
# THE SCIENTIFIC METHOD



1. Ask a question



◦ ◦ 2. Do some research



3. Make a hypothesis

4. Test it out



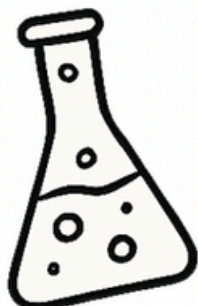
◦ ◦ 5. Observe and record



◦ ◦ 6. Draw conclusions



7. Share it!





## Thinking like a scientist

Let's talk about how real scientists do science. They don't just guess—they test.

That's where the **Scientific Method** comes in. You may remember it from the Hey Smart Girl Physics or Biology books, but here's a fresh chemistry spin:

1. **Ask a question** For example, "Why does bread rise?" or "What happens when I mix baking soda and lemon juice?"
2. **Do some research** What do I already know?
3. **Make a hypothesis** Make a smart guess, for example, "If I mix these, I think it'll bubble."
4. **Test it out** Try it—safely!
5. **Observe and record** Did it bubble? Change colour? Smell funny?
6. **Draw a conclusion** Was I right? What does this tell me?
7. **Share it!** Science is meant to be shared—even if it's just with your pet or a parent!

And remember, if something doesn't go as planned, that's not a failure—it's science working its magic.



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## Science Hero: Marie Curie – Cracked the mystery of the glow

Let me tell you about a woman who absolutely rocked the science world—**Marie Curie**.

Back in the 1890s, Marie noticed something odd. Certain rocks gave off a strange glow, even in the dark. Most people ignored it, but Marie got curious (Smart Girl move!).



She used the Scientific Method as follows:

- **Question:** “What’s making these rocks glow?”
- **Hypothesis:** They contain something unknown.
- **Experiment:** Curie crushed and tested TONS of rock.
- **Result:** She discovered not one, but two brand-new elements: polonium and radium.

Her work led to life-saving X-rays and cancer treatments. Oh, and she won TWO Nobel Prizes (no big deal). And she did it all at a time when people thought women shouldn’t even be scientists. Ha. Watch her glow, literally and figuratively.



**Smart Girl Trivia:** Marie Curie was the first woman to win a Nobel Prize and the only person ever to win in two different sciences, chemistry and physics!





## Test it like a scientist: Watch rust form

### What you need:

- A clean iron nail or paperclip
- A clear glass or jar
- Tap water
- A second dry nail for comparison
- Optional: a pinch of salt



### Steps:

1. Fill the glass halfway with water and place one nail or paperclip in it. If possible, leave the top part sticking out of the water.
2. Place the second nail somewhere dry.
3. Leave both nails for a few days, then compare them.

### What's happening?

When a nail or paperclip is in water, it reacts with **oxygen from the air dissolved in the water**. This causes a chemical reaction called **oxidation**, which creates a new substance: **rust**. The dry nail won't rust because it isn't in water.

This is chemistry that you can see in action!





**Wait, what's an element?** An element is a pure substance made of just one kind of atom. Don't worry—you'll learn all about them in this book!

## What you'll learn in this book

Get ready to explore the fascinating, fizzy, fiery world of chemistry—from atoms and molecules to reactions, acids and bases, and the magic of matter changing form. You'll discover how the stuff around you is made, why it changes, and what it means for your everyday life—from baking cupcakes to launching rockets.

Best of all, it's written to be clear, fun, and packed with hands-on science moments that will make you say, "Whoa, that's so cool!" because it is.

### First up: What's the matter with matter?

Ever wonder what *everything* is made of? Or how invisible air can fill a balloon? Or why a desk that looks still is actually buzzing with movement?

In this chapter, you'll dive into the world of matter—from invisible gases to electrifying plasma. You'll discover what atoms are, how they move, and how they shape the world around you.



Get ready to zoom in, level up, and unlock the universe's tiny building blocks. Let's find out what makes matter ... really matter.

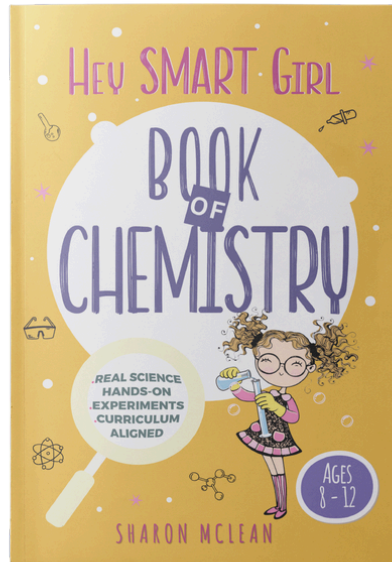
## Smart Girl Status: Levelled up

Here's what you learnt in this chapter:

- Chemistry is the science of what things are made of and how they change.
- The scientific method helps you think and experiment like a real chemist.
- Marie Curie used chemistry to discover new glowing elements and changed science forever.
- Every experiment, even the messy ones, is a chance to learn something new.

**Ready to prove your science smarts? Head to the quiz and show off what you've learned!**





## Ready for More Adventures in Chemistry?

Good news — there's a LOT more to learn and discover. Hey Smart Girl: Book of Chemistry is packed with 30+ hands-on experiments, mind-blowing facts, inspiring scientist stories, and everything you need to understand the atoms and chemical reactions that create our world. Perfect for girls ages 8-12.



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