

## 'Spellbinding Science and The Magic of Hogwarts'



**G.A.T.E.WAYS** is an independent organisation offering challenging and enriching activities and experiences to develop and extend highly able children. This *JOURNEY* for both girls and boys will run over four sessions.

The acclaimed Harry Potter series has captured the imaginations of millions of readers worldwide, but behind the story are pages brimming with serious chemistry that bubbles, pops and sparkles. Join us on this journey as we look behind the flash and bang of the magic at Hogwarts, taking what is essentially fantasy and connecting it to real life. As Muggle chemists, we will explore this magical realm, unravel the science behind some of the most intriguing wizardly effects and ultimately reproduce some Hogwarts magic of our own – no wands or incantations required!

### **SESSION ONE: Welcome to Muggle Magic School**

*"Ron, you're making it snow," said Hermione patiently, grabbing his wrist and redirecting his wand away from the ceiling from which, sure enough, large white flakes had started to fall. (Harry Potter and the Half-Blood Prince Ch. 24)*

*They had Potions that afternoon, which was an unqualified disaster. Try as Harry might, he couldn't get his Confusing Concoction to thicken... (Harry Potter and the Prisoner of Azkaban Ch.16)*

The magic performed by Harry, Hermione and Ron will lead us to an investigation of polymers this session. Polymers are fascinating because their properties can make them bouncy, stretchy, sticky, breakable, mouldable, hard or soft, and just plain fun! We will begin by taking a close look at the basic building blocks of all matter and then discover the amazing things that can happen when atoms arrange themselves in long chains of repeating blocks. Will our understanding of polymers allow us to help Harry to thicken his disastrous Confusion Concoction and could it even help us to produce snow just as Ron did with the flick of his wand?

### **SESSION TWO: Incredible 'Inks'**

*They stopped to buy parchment and quills. Harry cheered up a bit when he found a bottle of ink that changed colour as you wrote. (Harry Potter and the Philosopher's Stone Ch.5)*

*'That's a brilliant theory Hermione,' said Ron, "with just one tiny little flaw. There's nothing written in his diary." But Hermione was pulling her wand out of her bag. "It might be invisible ink" she whispered. She tapped the diary three times and said "Aparecium!" (Harry Potter and the Chamber of Secrets Ch.13)*

The Harry Potter books contain many references to curious inks with a range of magical properties – from the moving ink dots on the Marauder's Map to colour-changing or invisible inks. In this session, we will explore various compounds that can appear to have similar magical properties. We will discover how these compounds can be ideal 'inks' and 'developers' due to their vivid colour changes. We will explore the effects of various development methods and reaction types on different 'inks' to discover which methods can be as effective as the Aparecium spell or a Revealer that you might purchase on your next trip to Diagon Alley!

### **SESSION THREE: How Magical!**

*"I've got an idea, Harry! Give me your glasses, quick!" He handed them to her, and as the team watched in amazement, Hermione tapped them with her wand and said, Impervius!" "There!" she said, handing them back to Harry. "They'll repel water!" (Harry Potter and the Prisoner of Azkaban Ch. 9)*

*Together they climbed the ladder into the dim, stifling tower room. Glowing on every little table was a crystal ball full of pearly white mist. (Harry Potter and the Prisoner of Azkaban Ch. 15)*

Examples of transformations and mystical objects are abundant at Hogwarts. This session we will examine substances with water-repelling properties which can be used to render different surfaces hydrophobic, just like the charm Hermione uses on Harry's glasses during a wild match of Quidditch played in the pouring rain. Then we will explore sublimation and touch on some fascinating bubble chemistry as we make our very own mesmerising crystal ball.

### **SESSION FOUR: Fabulous Flames**

*They stepped over the threshold and immediately a fire sprang up behind them in the doorway. It wasn't ordinary fire either; it was purple. (Harry Potter and the Philosopher's Stone Ch. 16)*

*Reaching Snape, she crouched down, pulled out her wand and whispered a few, well-chosen words. Bright blue flames shot from her wand on to the hem of Snape's robes. (Harry Potter and the Philosopher's Stone Ch. 11)*

References to marvellous coloured flames and fires can be found throughout the pages of the Harry Potter series. This session we will explore flame tests which rely on the vibrant colours that are produced when various metal chlorides are heated to incandescence. We will attempt to use our chemistry know-how to set fire to paper while preventing it from burning, create 'potions' that will repeatedly extinguish and re-light a splint, and we'll even create a hideous burning basilisk!

**REQUIREMENTS:** Please bring a notebook (A5 or larger) and a well-stocked pencil case each week. Please also bring a stamped, self-addressed DL envelope for your report and a small, labelled photograph of yourself to Session 1. A snack will also be needed each week (no nut products please).

**HOMEWORK:** *Goyle's potion exploded, showering the whole class... Malfoy got a face full and his nose began to swell like a balloon... "Silence! SILENCE!" Snape roared. "Anyone who has been splashed, come here for a Deflating Draft" (Harry Potter and the Chamber of Secrets Ch.11)*

The major homework task will require our Muggle chemists to explore osmosis as they produce a swelling and deflating potion using chemistry rather than magic! To complete the homework task students will require two glass jars, 2 eggs, approximately 1 cup of distilled water and approximately 1 cup of corn syrup.

### **About the presenter:**

Stephanie Axon has been a science teacher for many years. Her dynamic workshops provide many opportunities to encourage and foster the enquiring minds of children and she relishes any opportunity to share her enthusiasm and love of learning. Steph was thrilled to be able to combine her passion for science with her love of the Harry Potter series!