

Wizard Potion Science Kit

Experiment Manual

SAFETY INFORMATION

- The potion-making activities must be performed under the close supervision of an adult.
- Clean and dry the equipment in warm soapy water before use. Do not wash in a dishwasher.
- Always clean and dry the equipment after each use.
- Do not drink any of the potions until they are completely finished.
- We recommend drinking only a few small sips of one potion per sitting.
- Store the prepared potions in the refrigerator and use within three days.

IMPORTANT!

When “spoonfuls” of ingredients are called for in the potion recipes, it **ALWAYS** refers to level spoonfuls of the **spoon-end of the wizard wand!**

YOU WILL ALSO NEED: *Water, scissors, paper towels, refrigerator*





Randolph and Zelinda, two wizards in training,
were stuck inside, bored — outside, 'twas raining.

So snooping they went, 'cause they thought it'd be cool
to find hidden rooms in their sorcery school.

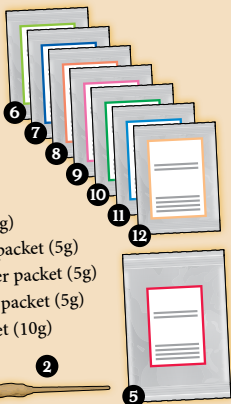
Deep in a closet, where they happened to look,
they laid their keen hands on a dusty old book.

"Check it out, it says 'potions'," shouted Randy with glee,
"There's a cauldron, a wand, and round flasks times three!"

Most curious of all were the foil packets of silver ...
Dear reader, don't these treasures look quite familiar?

Kit Contents

- 1 Plastic cauldron
- 2 Plastic wand with spoon end
- 3 3 Small round flasks with lids
- 4 Measuring beaker (110ml)
- 5 Granulated sugar packet (60g)
- 6 Citric acid packet (5g)
- 7 Sodium bicarbonate packet (5g)
- 8 Calcium lactate powder packet (6g)
- 9 Pink grapefruit flavored powder packet (5g)
- 10 Green strawberry flavored powder packet (5g)
- 11 Flavored color-changing powder packet (5g)
- 12 Flavored chia seed mixture packet (10g)





Zeli flipped through the book, skimming the potions,
“Let’s make them all!” she cried with emotion.

“Here’s one,” Rand observed, “that looks like it’s fizzy.
Maybe when you drink it you hiccup till you’re dizzy?”

They mixed up the brew, heeding the text to a tee.
It was pink, and it frothed, and it tasted grapefruity.

But hiccup they did not, to their dissatisfaction.
What they got instead was a chemical reaction!

It released G-O-2, the book went on noting.
“That must be the gas that is fizzing and floating!”

Fizzing Grapefruit Potion

1. Using the **spoon-end of the wand** to measure, add 5 spoonfuls of **sugar** and 2 spoonfuls of **sodium bicarbonate** to the **cauldron**.
2. Add the whole packet of **pink grapefruit flavored powder** to the cauldron.
3. Using the **measuring beaker**, add 100 ml of **water** to the cauldron and stir well with the **wand**.
4. Carefully pour the mixture into a **round flask**. Before you do the next step, make sure you are working in an area that can get a little messy.
5. Add 2 spoonfuls of **citric acid** to the flask and observe! The potion will fizz and foam up, and likely overflow from the flask. Wait for the foaming to subside before drinking.



See the back cover for scientific explanations.



Potions

The first potion left the kids intrigued and amused.
But as Zelinda turned the page, she looked quite confused.

"I guess now," she said, "we must go to the bog,
as it appears what we'll need are the eggs of a frog!"

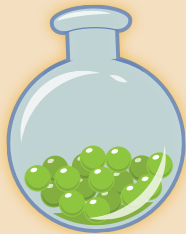
They concocted the drink, but no eggs they did waste
making juicy green blobs with a strawberry taste.

"Sodium alginate plus calcium," the book explained,
"Produces polymers — long, braided, and chained."

It may sound like some magical incantation,
But lo and behold, it's a chemical equation!

Frog's Eggs Potion

1. Measuring with the **beaker**, fill the **cauldron** with 300 ml of room-temperature **water**.
2. Add the whole packet of **calcium lactate powder**, stir well, and wait 15 minutes.
3. Put 30 ml of **warm water** into the beaker. Add 10 spoonfuls of **sugar** and 10 spoonfuls of the **green strawberry flavored powder**. (Important: Save 2 spoonfuls for the last potion!)
4. Using the spoon-end of the **wand**, drop the strawberry mixture into the calcium water to make the "frog's eggs."
5. Scoop the "eggs" out of the cauldron and place them in a **flask**.



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Just then, they heard footsteps outside the door.
“Who’s in here?” called their chem teacher, Ms. Bohr.

The young wizards quickly ducked and started to look for a shape-shifting tonic in the magical book.

Perhaps they could hide the fact they were there by disguising themselves as a desk and a chair.

They spotted a potion that gave some indication that it would result in transmogrification.

Swiftly they stirred it and each took a drink.
The potion changed colors — from bright blue to pink.

But shape transformations did not come to light, and in front of Ms. Bohr, they stood in plain sight.

An indicator, the book said, was at work in this case. It changes color in the presence of an acid or base.

Realizing that the kids were actually learning, Ms. Bohr said, “carry on,” her tone quite affirming.

Transmogrification Potion

1. Put 30 ml of **water** into the **beaker**. Add 10 spoonfuls of **sugar** and the whole packet of **flavored color-changing powder**.
2. Pour the mixture into a **flask**.
3. Add 2 spoonfuls of **sodium bicarbonate** and swirl. The mixture turns blue.
4. Add 2 spoonfuls of **citric acid**. The mixture fizzes and turns pink. Wait for the foaming to subside before drinking.



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Though their potions did not produce magic exactly, the things they observed were most satisfactory.

So our heroes tried another potion, which contained seeds. They figured it might sprout and grow lots of weeds.

They stirred and swirled the odd seed-filled mixture, and found it was a pleasant, fruit-flavored elixir.

“Gel-coated chia seeds,” the book did mention, “float in the water to make this suspension.”

Eventually, some of the seeds will settle down, like kids spinning ‘round and ending up on the ground.

Slime Seed Potion

1. Put 70 ml of **water** into the **beaker**. Add 10 spoonfuls of **sugar** and the whole packet of **flavored chia seed mixture**. Stir.
2. Pour the mixture into a **flask**, seal it with the lid, and shake well.
3. Let it sit in the refrigerator for two hours and then observe. You will see that the chia seeds have formed gel-like coatings around them.
4. Swirl the mixture around in the flask and observe how the gel-coated seeds interact with each other and the liquid they are suspended in.



See the back cover for scientific explanations.



The kids — tired from making these potions and all — were too weary to walk to the dining hall.

So they found an anti-gravity potion to enable a ride on thin air to the dinner table.

They blended the tonic — it was quite fun, to see a dark layer rest atop a clear one.

In the book it explained, making good common sense, a dense liquid can hold up one that's less dense.

But this wasn't the levitation drink from their stories — they'd still have to climb the stairs to their dormitories.

Anti-Gravity Potion

1. Fill the beaker up to the 30 ml mark with **sugar**.
2. Add **water** up to the 50 ml mark and stir until the sugar is dissolved.
3. Pour the solution into a **flask**.
4. Put 20 ml of **warm water** into the beaker and add 2 spoonfuls of **green strawberry flavored powder** to it.
5. Carefully pour a small amount of the green solution from the beaker down the inside of the flask onto the clear solution in the flask, disturbing the clear solution as little as possible. Observe immediately: Can you get the green solution to float in a layer on top of the clear solution?



See the back cover for scientific explanations.



It's the end of our story, and we've still seen no magic.
Yet we've learned a lot of science, so it's hardly tragic.

"What'd we do wrong?" asked Zeli, "Let's take a look."
She inspected the cover of their grimy old book.

Wiping dust off the leather, Zeli let out a gasp,
"Now this is something I had yet to grasp!"

Hands outstretched, Rand yelled, "Lemme see!"
and read: "Real-World Potions: Intro to Chemistry!"

"This science stuff is cool," Zeli said, "and it's real —
we can learn by observing what experiments reveal!"

They transferred to STEM school, we must mention here.
One became a chemist, and one an engineer.

The moral of our story, indeed what a triumph:
Magic is swell but real wizards do science!



The End

What's Happening?

Scientific Explanations

Fizzing Grapefruit Potion

The sodium bicarbonate is alkaline (also known as a base) and the citric acid is, of course, acidic. When you mix these two chemicals in a solution of water, a chemical reaction occurs. The bubbles you see when your grapefruit drink fizzes are evidence of this reaction. They are made of carbon dioxide (CO_2), a common molecule consisting of one carbon and two oxygen atoms. Humans and other animals exhale CO_2 with every breath.

Frog's Eggs Potion

When the sodium alginate solution comes into contact with calcium in the calcium solution, the liquid turns into a jelly-like solid ball. In molecular gastronomy, or scientific cooking, this technique is called spherification. The calcium ions insert themselves between the individual alginate strands, forming a massive molecular complex. The bead's shell consists entirely of this compound. You have created a giant molecule!

Transmogrification Potion

The color change occurs because there is a natural chemical indicator in the color-changing powder: purple sweet potato! The indicator changes color in the presence of a base (sodium bicarbonate) and an

acid (citric acid). The color change is an indication of the reaction happening between the sodium bicarbonate and the citric acid. The fizz is another indication that a chemical reaction has occurred. The bubbles are made of carbon dioxide, which is one product of the reaction.

Slime Seed Potion

This potion contains chia seeds, which are the edible seeds of a flowering plant called *Salvia hispanica*. The seeds are hygroscopic, absorbing up to 12 times their weight in water. When wet, they form a mucilaginous coating, resulting in the gel-like texture. A solid suspended in a liquid is a type of mixture called a suspension.

Anti-Gravity Potion

The green liquid floats on top of the clear liquid because the clear liquid has a higher density. Density is the amount of matter, or "material," that is contained within a volume. The cold, clear, sugar-filled water weighs more than an equal volume of the warm, green water. This is because the sugar that is dissolved in the water increases the weight of the solution, and also because the colder materials are, the more tightly packed they become (in most cases) and thus the more dense.

