

TECHFEST

Promoting Science, Technology, Engineering and Mathematics

Scottish Charity No SC010349

TechFest's

SPOOKY SCIENCE

Potions Pocket Guide



Rules for Potion Crafting



Crafting potions is a great way to experiment and learn, but it's only fun when done safely. Make sure to follow these rules when making your own potions!

- 1: Get a responsible adult to help you and always ask permission before you start
- 2: Don't ever eat or drink when you're doing science (potion making!).
- 3: Protect the surfaces you work on: use a drip tray or table cloth and wipe up spills.
- 4: Follow any safety instructions carefully.
- 5: Always wash hands after doing science.



Popping Potion

This potion pops and fizzes!

What you need:

- A goblet (or cup)
- Water ($\frac{1}{2}$ the goblet/cup)
- Popping candy (1 sachet)
- Bicarbonate of soda (1 teaspoon)
- Food colouring (a few drops)
- Lemon juice ($\frac{1}{3}$ of the goblet/cup)



What to do:

- 1: Half fill your goblet with water
- 2: Pour in the popping candy
- 3: Pour in a teaspoon of bicarbonate of soda
- 4: Add a few drops of food colouring
- 5: Put the goblet in a tray and add the lemon juice

The Science:

- When you can hear the popping sounds, this is the sound of carbon dioxide gas being released as the popping candy dissolves in the water.
- When you add bicarbonate of soda, more carbon dioxide is produced as it mixes with the now sugary water.
- Adding a stronger acid speeds up the reaction, resulting in a lot of fizz!

Slime

Make a slime!

What you need:

- 2 cups
- PVA glue (100ml)
- Water (200ml total, 2x 100ml)
- Borax (laundry starch) (1 teaspoon)
- Spoon
- Food colouring
- Mixing bowl



What to do:

- 1: In 1 cup, with about 100ml of water, add 1 teaspoon of laundry starch
- 2: Stir it until it has entirely dissolved
- 3: Add 100ml of water, and 100ml cup of PVA glue to a bowl, and mix them thoroughly (you can use your hands if you clean them!)
- 4: Add some food colouring to the glue mixture and mix until consistent
- 5: Add a little bit of the laundry starch solution at a time and keep mixing until you get the desired consistency for your slime

The Science:

- The PVA glue is made of molecules that are like loads of long strings, that when in a liquid, can slide off each other and move.
- When mixed with the borax solution, these long molecules bind together, and can no longer slide as a liquid, but form a slime.

Oobleck

A slime that changes it's properties!

What you need:

- Cornflour
- Water
- Mixing bowl

What to do:

- 1: In 1 cup, with about 100ml of water, add 1 teaspoon of laundry starch
- 2: Stir it until it has entirely dissolved
- 3: Add 100ml of water, and 100ml cup of PVA glue to a bowl, and mix them thoroughly (you can use your hands if you clean them!)
- 4: Add some food colouring to the glue mixture and mix until consistent
- 5: Add a little bit of the laundry starch solution at a time and keep mixing until you get the desired consistency for your slime



The Science:

Oobleck is a Non-newtonian fluid. The molecules that make it up are able to move around like a liquid under no pressure, but if we squeeze it, or push it around, those molecules get closer, and behave more like a solid.

Lava Lamp



There are dancing bubbles of colour in this potion!

What you need:

- Empty bottle
- Water ($\frac{1}{4}$ of the bottle)
- Cooking oil ($\frac{1}{2}$ of the bottle)
- Funnel
- Food colouring
- Vitamin C tablet

Additional Warnings:

Be extra careful with any tablets!
Do not put the lid on the bottle!

What to do:

- 1: Use the funnel to pour water into the bottle until it is about $\frac{1}{4}$ full
- 2: Add food colouring to the water
- 3: Top up the bottle with the oil, until it is about $\frac{3}{4}$ full.
- 4: Break a soluble vitamin C tablet in half and add one half to the bottle

The Science:

- Water and oil do not mix. This is because water is denser than oil, and therefore sinks to the bottom.
- Food colour does not mix with oil but it does mix with water, which is why the oil stays its normal colour.
- The Vitamin C tablet falls through the oil and into the water.
- The tablet reacts with the water to produce a gas called carbon dioxide.
- The gas rises through the water and the oil, carrying drops of coloured water with it.
- When the bubbles get to the surface they pop, the gas is released and the water droplets sink back down.

Elephants Toothpaste

A potion full of foam and fun!

What you need:

- 500ml plastic bottle
- Yeast (1 teaspoon)
- Warm water (1cm at bottom of bottle)
- Hydrogen Peroxide ($\frac{1}{3}$ of a bottle)
- Food colouring
- Washing up liquid
- Funnel

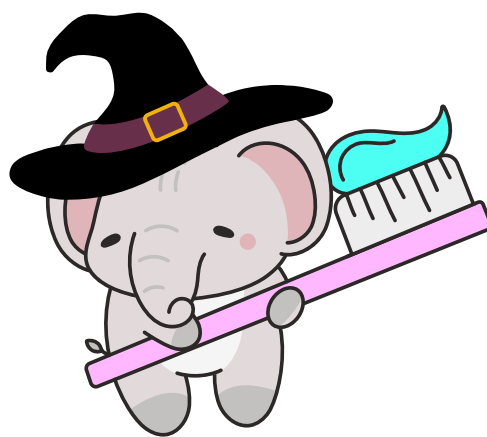
Additional Warnings:

Ask an adult to help you.

Hydrogen Peroxide is corrosive

Wear safety goggles and gloves.

Do not handle foam without gloves if sensitive to washing up liquid.



What to do:

- 1: Add the yeast and warm water to the plastic bottle (this can be done hours in advance).
- 2: Add some food colouring and washing up liquid and swirl together.
- 3: Use the funnel to add the hydrogen peroxide and remove the funnel quickly

The Science:

- Hydrogen peroxide (H_2O_2) naturally breaks down into water and oxygen (it is unstable). It is stored in opaque containers to help slow down this process.
- The reaction is summarized by this formula:
$$2\text{H}_2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + \text{O}_2$$
- Catalase (an enzyme in all living things, including yeast) speeds up the reaction.
- Washing up liquid catches the oxygen and makes bigger bubbles and the food colouring makes it look cool.
- The foam and bottle feel warm because the reaction is exothermic, that means it releases energy as heat.

Growing a hand

Reanimate a buried glove!

What you need:

- A small disposable pot
- Scissors
- A bigger pot
- Sellotape
- Bicarbonate of soda
- Vinegar
- An air-tight, disposable glove
- Compost (optional)



What to do:

- 1: Make holes on the edge, but near the bottom of the small pot, carefully using scissors, or another tool.
- 2: Add in a few tablespoons of Bicarbonate of soda (up to the holes)
- 3: Attach the glove around the top of the small pot, and sellotape it tightly around the wrist
- 4: Place your small pot in the big one, there should be space around it
- 5: Optional: Add some compost to start burying the glove
- 6: Add vinegar (more than you think!) and watch the glove sprout!

The Science:

- The reaction between bicarbonate of soda and vinegar releases carbon dioxide.
- Vinegar can reach the bicarbonate of soda through the holes in the pot, but as the gas is produced, it rises up and starts inflating the glove.



Thanks for coming along to TechFest's Spooky
Science Potion Class.

Have fun making your own potions, and join our mailing
list and follow us on social media to stay informed of
other events we will be running.



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