Switched on Kids
Connect-Learn-Share-Celebrate

20 Easy Science Experiments Using Household Items

By Switched on Kids

🧭 How to Use This Guide

- 🟢 **Easy** – Beginner-friendly, minimal setup
- 🟡 **Medium** – Some guidance required
- 🔴 **Advanced** – Adult supervision recommended

STEM Skills Key:

🧪 Chemistry | ⚙️ Engineering | ⚡ Physics | 🌎 Earth Science | 🔬 Scientific Thinking

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📚 Experiment Index

🧪 Chemistry & Reactions

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   Age: 8+ | *Level:* 🟢 Easy | *Skills:* 🧪 🔬
   Acid-base reactions & gas formation
2. 🎨 **Magic Milk Art**
   Age: 8+ | *Level:* 🟢 Easy | *Skills:* 🧪 🔬
   Surface tension & molecular movement
3. 🫙 **Lava Lamp in a Jar**
   Age: 9+ | *Level:* 🟢 Easy | *Skills:* 🧪 ⚡
   Density & gas bubbles
4. 🧬 **DIY Slime**
   Age: 8+ | *Level:* 🟡 Medium | *Skills:* 🧪 ⚙️
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5. 🧼 **Expanding Ivory Soap**
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⚡ Physics & Forces

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   Age: 8+ | *Level:* 🟢 Easy | *Skills:* ⚡ 🔬
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⚙️ Engineering & Innovation

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    Age: 10+ | *Level:* 🟡 Medium | *Skills:* ⚙️ 🌍
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🔍 Scientific Tricks & Discoveries

17. ✉️ **Invisible Ink**
    Age: 8+ | *Level:* 🟡 Medium | *Skills:* 🧪 🔬
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18. 🧪 **Puncture-Proof Bag**
    Age: 9+ | *Level:* 🟡 Medium | *Skills:* 🧪 ⚙️
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20. 🌪️ **Tornado in a Bottle**
    Age: 8+ | *Level:* 🟢 Easy | *Skills:* 🌍 ⚡
    Vortex & fluid motion

📦 Bonus Sections

- ✅ **Safety Guidelines for Kids & Parents**
- 🧰 **Materials Checklist (Quick Prep Guide)**
- AU **About Switched On Kids**

🎯 Why Parents Love This Guide

✓ Screen-free learning
✓ Builds problem-solving skills
✓ Encourages curiosity & creativity
✓ Aligned with STEM education principles

> Welcome to your STEM Journey! These experiments are designed for explorers aged 8-15. Each project uses simple household items to demonstrate massive scientific laws. Remember: **Always ask an adult for help with heat or sharp objects!**

1. The Fizzy Volcano

WHAT YOU NEED

A plastic cup or small bottle, baking soda, vinegar, red food coloring, a tray (to catch the mess).

INSTRUCTIONS

Place the cup on the tray. Fill it halfway with baking soda. Add a few drops of red food coloring. Quickly pour in the vinegar and stand back!

> **The Science Behind It:**
> This is a classic **Acid-Base reaction**. Vinegar is an acid and baking soda is a base. When they mix, they create Carbon Dioxide gas, which creates the bubbles and foam that 'erupt' out of your volcano.

If you'd like to explore further, the *Horrible Science- Violent Volcano* is also available on our website.

2. Magic Milk Art

WHAT YOU NEED

Full-cream milk, dish soap, food coloring (various colors), a shallow plate, a cotton bud.

INSTRUCTIONS

Pour enough milk to cover the plate. Add dots of different food colors. Dip the cotton bud in dish soap, then touch the center of the milk. Don't stir—just watch!

The Science Behind It:
This happens because of **Surface Tension**. Milk is mostly water and fat. Soap molecules love fat and try to chase the fat in the milk. As they move, they push the food coloring around, creating swirling patterns.

3. Walking Water

WHAT YOU NEED

3 or 5 clear glasses, paper towels, water, food coloring.

INSTRUCTIONS

Place glasses in a row. Fill the 1st, 3rd, and 5th with water and different colors. Leave the 2nd and 4th empty. Fold paper towels into strips and place them like bridges between the glasses.

The Science Behind It:
This demonstrates **Capillary Action**. The water 'walks' up the paper towel through tiny gaps between the fibers. It moves from the full glass to the empty one until they are even!

4. Lava Lamp in a Jar

WHAT YOU NEED

A clear jar, vegetable oil, water, food coloring, an Alka-Seltzer tablet.

INSTRUCTIONS

Fill the jar 3/4 with oil and the rest with water. Add food coloring (it will sink). Drop in a piece of the tablet. Watch the colored blobs rise and fall!

The Science Behind It:
This is all about **Density and Solubility**. Oil is lighter than water, so it stays on top. The tablet creates Carbon dioxide bubbles that attach to the colored water, making it light enough to float up.

If you'd like to explore further, the *Australian Geographic Volcano Lava Lab* is also available on our website.

5. Puncture-Proof Bag

WHAT YOU NEED

A Ziploc bag, sharp pencils, water.

INSTRUCTIONS

Fill the bag with water and seal it tight. Hold the bag up and quickly push a sharp pencil all the way through—from one side to the other. Do it with 5 or 6 pencils!

The Science Behind It:
Plastic bags are made of **Polymers** (long chains of molecules). When you poke the pencil through, the chains move aside and then wrap themselves tightly around the pencil, creating a temporary seal that prevents leaks.

6. Invisible Ink

WHAT YOU NEED

Lemon juice, a small bowl, cotton buds, white paper, a lamp or iron (for adult use).

INSTRUCTIONS

Squeeze lemon juice into the bowl. Write a message on the paper using the cotton bud. Let it dry completely. To read it, heat the paper carefully near a light bulb or with an iron.

The Science Behind It:
Lemon juice contains carbon compounds that are invisible at room temperature. Heat breaks these compounds down, releasing the carbon. When carbon touches oxygen, it turns brown (**Oxidation**), revealing your secret note!

7. Floating Egg

WHAT YOU NEED

Two eggs, two glasses of water, salt.

INSTRUCTIONS

Try to put an egg in plain water (it sinks). In the second glass, stir in about 6 tablespoons of salt. Now put the egg in. It floats!

The Science Behind It:
This experiment teaches **Density**. The egg is denser than fresh water, so it sinks. Adding salt makes the water much denser—eventually becoming denser than the egg itself, which allows the egg to float on top.

8. Rainbow in a Glass

WHAT YOU NEED

Sugar, water, food coloring, a narrow glass, a spoon.

INSTRUCTIONS

Create 4 cups of colored water. In the first, add 1 spoon of sugar; the second 2; the third 3; the fourth 4. Carefully layer them in the narrow glass, starting with the heaviest (most sugar) at the bottom.

The Science Behind It:
By adding different amounts of sugar, you change the **Mass/Density** of each liquid. The bottom layer is the 'heaviest' and can support the weight of the lighter layers above it without mixing.

9. Dancing Raisins

WHAT YOU NEED

A clear glass, clear soda (like Sprite or soda water), a handful of raisins.

INSTRUCTIONS

Fill the glass with soda. Drop in the raisins. They will sink to the bottom, then float up, then sink again as if they are dancing!

The Science Behind It:
The **Buoyancy** changes because the carbondioxide bubbles in the soda stick to the rough surface of the raisins. These bubbles act like tiny life jackets, pulling the raisins up. When the bubbles pop at the surface, the raisins sink.

If you'd like to explore further, the science kits is also available on our website.

10. Paper Clip Float

WHAT YOU NEED

A bowl of water, paper clips, a piece of tissue paper.

INSTRUCTIONS

If you drop a clip, it sinks. Try placing a small square of tissue on the water and gently resting the clip on it. Use a pencil to slowly push the tissue down away from the clip. The clip stays afloat!

The Science Behind It:
This is **Surface Tension** in action. The water molecules at the top are held tightly together like a thin skin. If you are very gentle, the clip isn't heavy enough to break that skin.

11. DIY Slime

WHAT YOU NEED

PVA glue, baking soda, contact lens solution, food coloring.

INSTRUCTIONS

Mix 1/2 cup glue with 1/2 teaspoon baking soda and coloring. Add 1 tablespoon of contact solution. Stir until it pulls away from the bowl, then kneed it with your hands.

The Science Behind It:
This is a **Chemical Cross-linking** reaction. The glue is a polymer. The borate in the contact solution links the polymer chains together, turning a liquid into a stretchy, bouncy solid.

If you'd like to explore further, the *Galt – Slime Lab* is also available on our website.

12. Static Electricity Balloon

WHAT YOU NEED

A balloon, your hair (or a woolly jumper), small pieces of paper.

INSTRUCTIONS

Blow up the balloon and rub it against your hair for 30 seconds. Hold the balloon near the small bits of paper and watch them jump up to stick to it!

The Science Behind It:
Rubbing the balloon moves **Electrons** from your hair to the balloon, giving it a negative charge. The paper pieces have a positive charge. Since opposites attract, the paper sticks to the balloon.

13. Shadow Sundial

WHAT YOU NEED

A paper plate, a pencil or stick, a sunny day.

INSTRUCTIONS

Poke the stick through the center of the plate and place it in a sunny spot. Every hour, draw a line where the shadow falls and write the time. Check it the next day!

The Science Behind It:
A sundial uses the **Earth's Rotation**. As the Earth spins, the sun appears to move across the sky, which changes the angle and position of the shadow on your plate.

If you'd like to explore further, the *6 In 1 Educational Solar Toy / Robot Kit* is also available on our website.

14. Bending Light (Refraction)

WHAT YOU NEED

A clear glass of water, a pencil.

INSTRUCTIONS

Fill the glass halfway. Put the pencil in and lean it against the side. Look at the pencil from the side of the glass. It looks like it is broken or bent!

The Science Behind It:
This is called **Refraction**. Light travels slower through water than it does through air. This change in speed causes the light to bend, which tricks our eyes into seeing the pencil in a different spot.

15. Homemade Compass

WHAT YOU NEED

A sewing needle, a magnet, a small piece of cork, a bowl of water.

INSTRUCTIONS

Rub the magnet along the needle in one direction 30 times. Stick the needle through the cork and float it in the water. It will slowly turn to point North!

The Science Behind It:
By rubbing the needle, you have **Magnetized** it. The Earth has its own magnetic field, and your tiny needle aligns itself with the Earth's North and South poles.

16. Sound String Phone

WHAT YOU NEED

Two paper cups, a long piece of string, a toothpick.

INSTRUCTIONS

Poke a hole in the bottom of each cup. Thread the string through and tie it to a toothpick so it doesn't pull out. Have a friend take one cup while you take the other. Pull the string tight and whisper!

The Science Behind It:
Sound is a **Vibration**. When you talk into the cup, your voice vibrates the bottom, which travels down the tight string as a wave. The second cup vibrates back into your friend's ear.

17. Expanding Ivory Soap

WHAT YOU NEED

A bar of Ivory soap (it must be this brand!), a plate, a microwave.

INSTRUCTIONS

Place the soap on a plate and microwave it for 1 to 2 minutes. Watch it grow into a massive, fluffy cloud! Let it cool before touching.

The Science Behind It:
Ivory soap has lots of tiny air bubbles inside. According to **Charles's Law**, when you heat gas, it expands. The air inside the soap grows so fast that it stretches the soap into a foam.

18. Potato Battery

WHAT YOU NEED

A large potato, a galvanized nail (zinc), a copper coin, wires, a small LED bulb.

INSTRUCTIONS

Push the nail and the coin into the potato (don't let them touch). Attach wires to each. Connect the other ends to the LED. The light will glow!

The Science Behind It:
The potato acts as an **Electrolyte**. A chemical reaction between the zinc and copper allows electrons to flow through the potato, creating enough electricity to power the bulb.

19. Egg in a Bottle

WHAT YOU NEED

A glass bottle with an opening slightly smaller than an egg, a hard-boiled egg (peeled), a strip of paper, matches.

INSTRUCTIONS

Light the paper strip and drop it in the bottle. Quickly place the egg on the top of the bottle. Within seconds, the egg will be 'sucked' inside!

The Science Behind It:
This is **Air Pressure**. The fire heats the air, pushing some out. When the fire goes out, the air cools and the pressure drops. The high pressure outside the bottle pushes the egg in to fill the space.

20. Tornado in a Bottle

WHAT YOU NEED

Two clear plastic bottles, water, duct tape.

INSTRUCTIONS

Fill one bottle 3/4 with water. Tape the two bottles together at the necks. Flip them so the water is on top and give it a quick circular swirl. A mini-tornado will form!

The Science Behind It:
Swirling the water creates a **Vortex**. The centripetal force moves the water toward the outside, creating a hole in the middle for air to travel up, allowing the water to drain faster.