

GLOWING CHEMISTRY



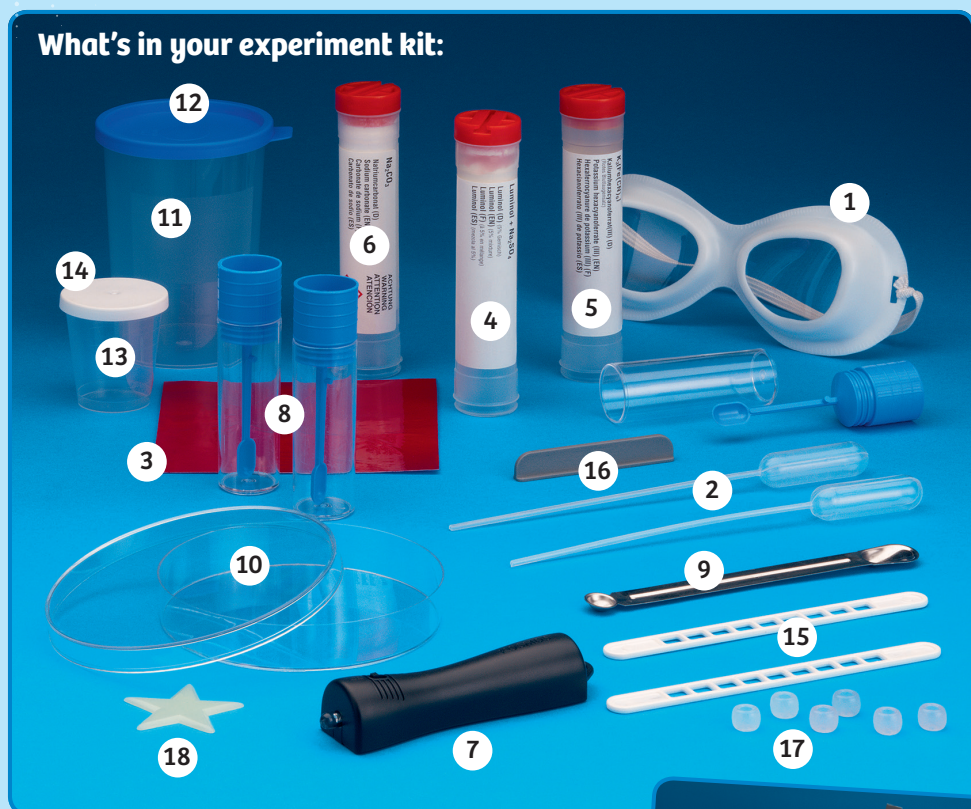
THAMES & KOSMOS



WARNING. Not suitable for children under 10 years. For use under adult supervision. Contains some chemicals which present a hazard to health. Read the instructions before use, follow them and keep them for reference. Do not allow chemicals to come into contact with any part of the body, particularly the mouth and eyes. Keep small children and animals away from experiments. Keep the experimental set out of reach of children under 10 years old. Eye protection for supervising adults is not included.

WARNING
— Chemistry Set. This set contains chemicals and/or parts that may be harmful if misused. Read cautions on individual containers and in manual carefully. Not to be used by children except under adult supervision.

What's in your experiment kit:



Checklist: Find – Inspect – Check off

✓	No.	Description	Quantity	Item No.
<input type="radio"/>	1	Safety goggles	1	052297
<input type="radio"/>	2	Pipette	2	232134
<input type="radio"/>	3	Red film	1	713929
<input type="radio"/>	4	Luminol (5% mixture with sodium sulfate), 3 g	1	033482
<input type="radio"/>	5	Potassium hexacyanoferrate(III), 6 g	1	033492
<input type="radio"/>	6	Sodium carbonate, 12 g	1	033412
<input type="radio"/>	7	UV Lamp	1	713927
<input type="radio"/>	8	Test tubes (with built-in spoon)	3	702781
<input type="radio"/>	9	Double-headed measuring spoon	1	035017
<input type="radio"/>	10	Petri dish	1	702184
<input type="radio"/>	11	Large measuring cup	1	702810



IMPORTANT!

You will find safety information about the chemicals on page 10.

UV detective

Your UV lamp is capable of making all sorts of natural and artificial substances glow. See what you can get your hands on.

YOU WILL NEED

- › UV lamp
- › Various household or office items

HERE'S HOW

1. Walk through the house (in the dark) and try testing everything you can find to see whether it glows under the light of your UV lamp.
2. For example, you might have luck with reflective vests, text highlighters, sticky notes, security strips on paper money, stamps, discarded glow sticks, and of course paper. Test your teeth and clothing too. Sometimes, threads of dust will show up as bright dots on dark clothes.



WHAT'S HAPPENING?

A lot of objects contain colors or dyes that are fluorescent or particularly bright in the daylight. They will also glow under a UV lamp. In reflective vests, these fluorescent materials help to make them extremely eye-catching. Some bank notes contain a UV-fluorescent security strips that make them easy to recognize as authentic, and that therefore also make them hard to counterfeit.



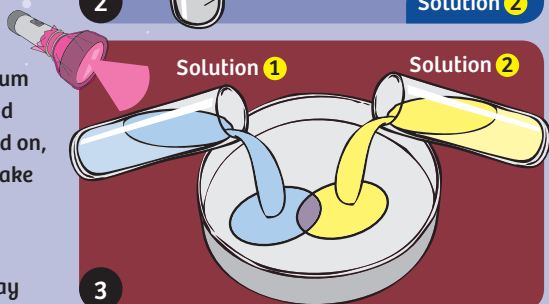
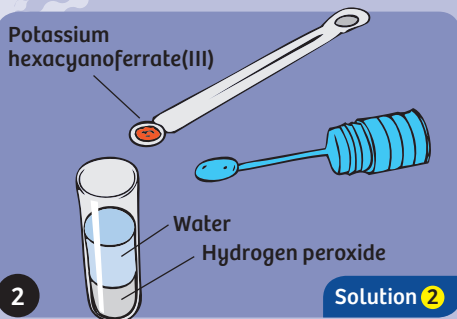
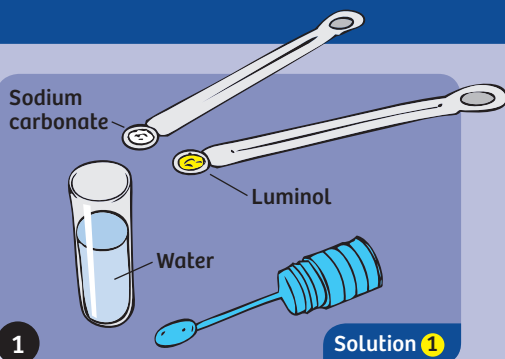
Magical light

YOU WILL NEED

- › Safety goggles
- › Luminol
- › Sodium carbonate
- › Potassium hexacyanoferrate(III)
- › 2 Test tube
- › Double-headed measuring spoon
- › Pipette
- › Petri dish
- › Hydrogen peroxide

HERE'S HOW

1. Fill a test tube three-quarters of the way with water and add a small spoon of sodium carbonate. Clean the measuring spoon and add a small spoon of luminol. Place the lid on, set your thumb firmly over the lid, and shake thoroughly until everything is as well dissolved as possible (Solution 1).
2. Fill the second test tube just about halfway with water, and add hydrogen peroxide with the pipette to bring the level to about three-quarters full. Then sprinkle a small spoon of potassium hexacyanoferrate(III) into it, put on the lid, and shake until everything is dissolved (Solution 2).
3. Darken the room, switch on the red light, and wait a few minutes for your eyes to adjust to the darkness. Then pour both solutions one after the other into the Petri dish and switch off the red light.



WHAT'S HAPPENING ?

The liquid will glow for a few seconds with a mysterious blue light, but then the glow will quickly fade. The cause of the glow is a chemical interaction of the luminol with the hydrogen peroxide, with light emitted in the process. The name for this phenomenon is **chemiluminescence**. As with many chemical reactions, it releases energy. But unlike the combustion of wood, for example, in this case the energy is released as light rather than heat.

What is “bioluminescence”?

In nature, there are many living things that use cold light of the sort that you produced with luminol. You probably know about **fireflies** — little beetles that use their green light to find a mate. The marine phosphorescence that delights sailors in tropical waters comes from microscopically tiny living creatures in the water.

Cold light is especially handy for animals that live in the eternal darkness of the ocean depths. A lot of them, though, don't actually produce the light themselves. Instead, they store luminescent bacteria in parts of their bodies. **Deep-sea anglerfish**, for example, have developed a luminescent organ resembling a fishing rod, which they use to lure their prey into their mouths.

Certain deep-sea squid also hunt with the help of flashes of light. Vampire squid use the light for defense: They confuse their pursuers with a luminescent cloud of ink and use it to make their getaway.

GLOW STICKS

You may know them from parties, but they are also used as emergency lights in rescue operations. They also contain chemicals that mix together when you bend the stick, which breaks a glass tube inside it. Depending on the specific chemicals used, they glow red, blue, green, pink, or yellow.

