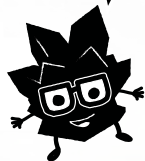


**GEEK
& CO.
SCIENCE!**



PROJECT KIT Ages
8+

CrYsTaL NIGHTLIGHT



Warning.

Not suitable for children under 8 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 8 years old. Eye protection for supervising adults is not included.

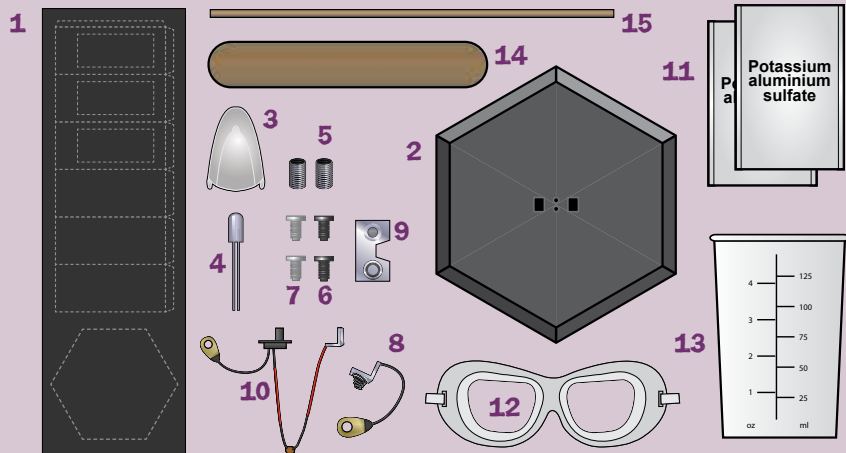
WARNING — This set contains chemicals and/or parts that may be harmful if misused. Read cautions on individual containers and in manual carefully. Not to be used by children except under adult supervision.

Franch-Kosmos Verlags-GmbH & Co. KG, Pfizerstr. 5-7, 70184 Stuttgart, Germany | +49 (0) 711 2191-0 | www.kosmos.de
Thames & Kosmos, 301 Friendship St., Providence, RI, 02903, USA | 1-800-587-2872 | www.thamesandkosmos.com
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KIT CONTENTS



- | | | | |
|---|--|----|---|
| 1 | Die-cut black cardboard | 9 | Double contact latch |
| 2 | Plastic base with lid | 10 | Switch with eyelet and contact latch |
| 3 | Transparent plastic cone | 11 | Potassium aluminium sulfate powder (alum), 50 g (2) |
| 4 | Color-changing LED | 12 | Safety goggles |
| 5 | Contact springs (2) | 13 | Measuring cup, 125 ml |
| 6 | Black screws (2) | 14 | Wooden spatula |
| 7 | Silver screws (2) | 15 | Wooden stick |
| 8 | Black wire with eyelet and contact latch | | |

YOU WILL ALSO NEED: *Two clean empty jelly jars (about 600 ml, one with a lid), paper, pencil, scissors, tape, water, old pot and hot pad, pot holders, paper towels, a piece of cardboard, sturdy string, ruler, all-purpose glue, tweezers, small Phillips-head (“crosshead”) screwdriver, two AAA batteries (1.5-volt, type LR03).*

Hey Crystal Growers!

Ready to grow a beautiful crystal and make it into a cool nightlight that will glow in a spectrum of colors? First you'll grow the crystal from alum powder, then you'll wire up the nightlight circuitry, then you'll put them both together! Let's get started! Rocky the Geeker will be your guide!

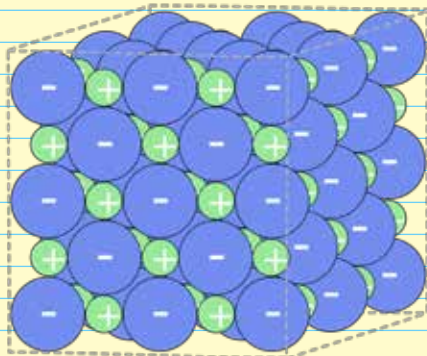
Hi! I'm Rocky!



WHAT IS SALT, REALLY?

A salt consists of several chemical elements. For example, ordinary table salt consists of the elements **sodium** and **chlorine**. That's why chemists call it **sodium chloride**. All salts form crystals.

In a table salt crystal, the small sodium and chloride particles are always arranged in a specific, orderly pattern. One chloride particle (blue spheres) is always surrounded by six sodium particles (green spheres) — left, right, above, below, in front, and behind.



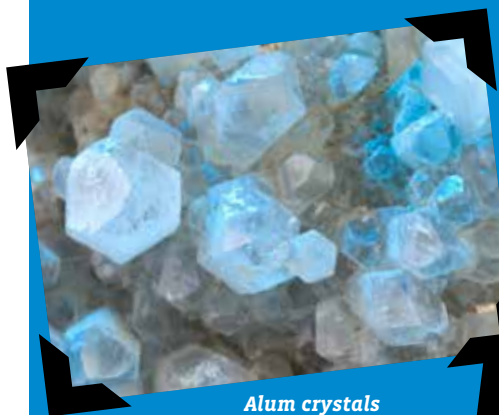
Sodium chloride structure

The pattern formed by the particles is called the **crystal lattice** of each type of salt. A salt that consists of other elements will also form a different pattern. The crystal lattice determines how table salt crystals are formed and what shape they take.

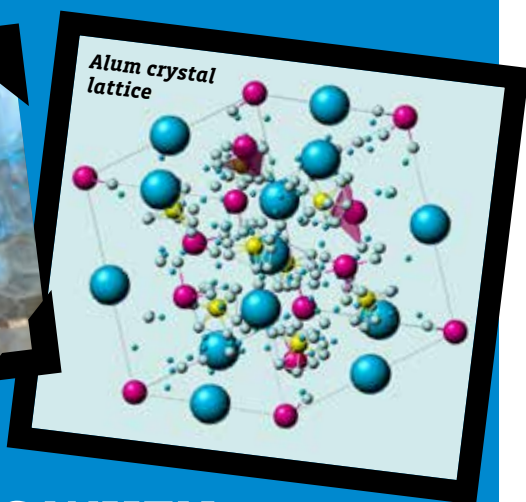


WHAT ELEMENTS DOES ALUM CONSIST OF?

A salt can also consist of more than two elements. Alum consists of potassium, aluminium, and sulfur — hence its chemical name, potassium aluminium sulfate. It also contains oxygen and hydrogen. Compared to table salt, an alum crystal lattice looks pretty complicated, doesn't it?



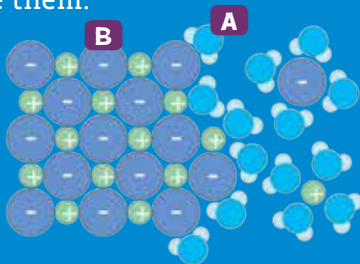
Alum crystals



WHAT HAPPENS WHEN A SALT DISSOLVES?

When a salt dissolves, water molecules **A** push between the salt particles **B** and release them from the crystal lattice. These particles then float around one by one in the water. Since they are so tiny, you cannot see them.

When the water evaporates, the particles recollect and accumulate on one another — in the exact same pattern as before. Once enough particles accumulate, they become visible again — a new crystal has formed!



Salt dissolving