

CRYSTAL GROWING

⚠ WARNING: THIS IS NOT A TOY. THIS IS INTENDED TO BE AN EDUCATIONAL KIT WHICH DEMONSTRATES A SCIENCE PRINCIPLE IN A FUN WAY. ALL ASSEMBLY AND OPERATION OF THE PROJECT SHOULD BE DONE AND SUPERVISED BY AN ADULT OR AGED 14 AND UP. READ ALL INSTRUCTIONS BEFORE YOU START. NOT SUITABLE FOR CHILDREN UNDER 3 YEARS DUE TO SMALL PARTS. CHOKING HAZARD.

⚠ WARNING: THIS SET CONTAINS CHEMICALS THAT MAY BE HARMFUL IF MISUSED. READ CAUTIONS ON INDIVIDUAL CONTAINERS CAREFULLY.

CAUTION! CONTAINS SOME CHEMICALS THAT ARE CLASSIFIED AS SAFETY HAZARDS. 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. STORE THE CHEMICALS OUT OF REACH OF SMALL CHILDREN.

Please read the following instructions, safety messages, and first aid information provided in case of accidents. Keep them for reference.

In case of accidental swallowing of dangerous substances, please call the local poison centre (central office for first aid information), or your local hospital. Please write your local emergency telephone number here for quick reference: _____

Keep this distributor contact information for future reference.

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SAFETY ADVICES FOR SUPERVISING ADULTS

1. The supervising adult should be satisfied that this kit is suitable and safe for the child's abilities before proceeding.
2. Because children's abilities vary so much, even within age groups, supervising adults should exercise discretion as to which activities are suitable for which child.
3. The supervising adult should discuss the warnings and safety information with the child or children before commencing.

SAFETY MESSAGES

- Read the instructions before use. Follow them, and keep them in a safe place for reference.
- Adult supervision and assistance are required at all times.
- The incorrect use of chemicals can cause injury and damage to health. Only carry out the procedure as described.
- Do not allow chemicals to come into contact with eyes, mouth, or any other part of the body. If any splash on the skin, use plenty of fresh water to wash them away (see first aid instructions below).
- Keep boiling water, solutions and crystals out of reach of small children. In case of burns and scalds, cool affected area with plenty of water for 5 minutes. In case of doubt, seek medical advice without delay.
- Keep small children and animals away from experimental area when you are using this kit.
- Do not inhale the coloured seeding dust.
- Do not eat, drink or smoke in the experimental area.
- Do not use equipment that has not been supplied with this kit unless advised.
- Keep surrounding area clear of obstructions, well lit, and ventilated. Work near a sink or other water supply.
- Wear suitable clothing, gloves and eye/face protection when handling the colour seeding, and when removing the crystals from the container.
- Clean all equipment after use.
- Wash hands and surrounding area after experiment and after handling chemicals or crystals.
- Make sure that all containers are fully closed and properly stored after use.
- Do not use any containers that have been used in the experiment for foodstuffs.
- Store this set in a safe place, out of reach of small children, when not in use.
- Place completed crystals on a plate or non-porous material, as the colour in the crystals will remain soluble and may stain surfaces.
- Dispose of materials according to your country's health and safety, and environmental regulations.
- Do always wear eye protection.

FIRST AID

If chemical or solution contacts skin, immediately rinse with soap and water. If chemical or solution contacts eye, immediately rinse with large amount of water for at least 15 minutes. If irritation occurs, seek medical attention. If chemical is inhaled, breathe fresh air. If symptom occurs, seek medical attention. If chemical or crystal, or solution is swallowed, immediately rinse mouth with water, drink large quantity of milk or water, and seek medical attention or call your poison control centre.

CONTENTS

1 x large bag containing white crystals* [a base compound called Monoammonium Phosphate], 3 x small bag containing coloured crystal seeding mixture*, 1 x container, 1 x seeding spoon, detailed instructions. Also needed, but not included in this kit: a jar of steaming hot water, an apron, protective goggles, and rubber gloves.

*IMPORTANT REMARKS:

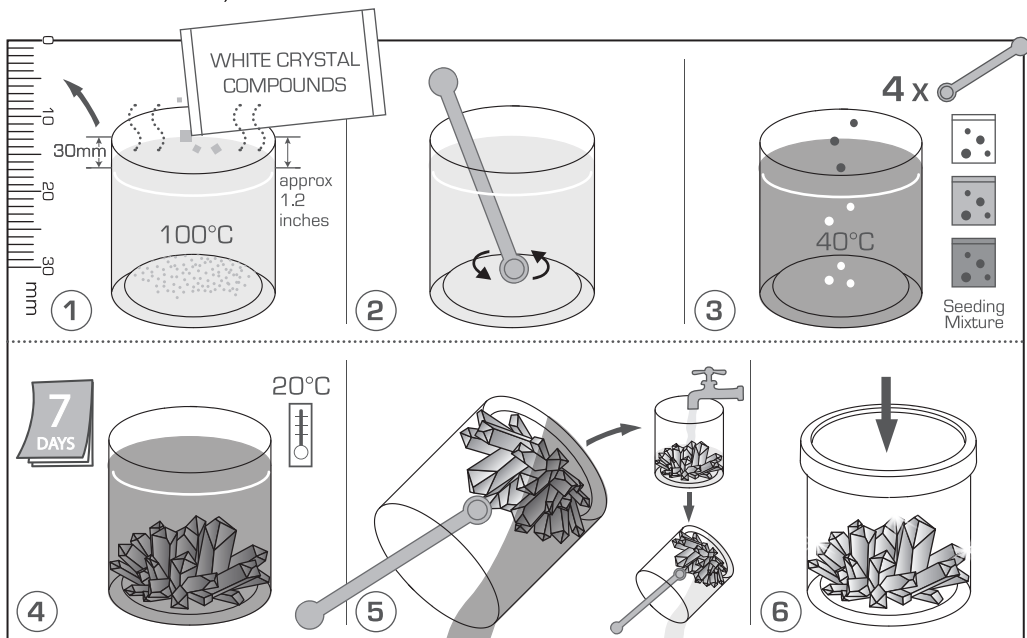
1. The different coloured seeding mixtures contain the following chemicals: White seeding: Aluminium Potassium Sulphate. Blue seeding: Aluminium Potassium Sulphate, Sodium Chloride & Brilliant Blue FCF. Red seeding: Aluminium Potassium Sulphate & Amaranth. Please be aware that the red and blue seeding mixtures are intense colours. While they help produce beautiful crystals, take care not to spill any coloured solution or seeding mixture! While any stains on your skin would be temporary, they may leave permanent stains on some clothing or surfaces. Therefore, please wear an apron and washing up gloves when handling coloured seeding mixtures. Cover the work surface with old newspaper, and clean it after the experiment. Dispose of the coloured solution and unused seeding mixtures properly, to avoid staining the washing sink/drain.

2. The white crystal compound (Monoammonium Phosphate) is hygroscopic: it tends to "capture" humidity contained in the air, and this phenomenon creates links between crystals. The material may become hard (due to caking), but can very easily be separated afterwards, rather like sugar.

We value you as a customer and your satisfaction with this product is important to us. If you have comments or questions, or you find any part of this kit missing or defective, please do not hesitate to contact our distributor in your country. You will find the address printed on the package. You are also welcome to contact our Marketing Support Team: Email: infodesk@4m-ind.com, Fax (852) 25911566, Tel: (852) 28936241, Web site: WWW.4M-IND.COM

CRYSTAL GROWING

A. INSTRUCTIONS: ADULT SUPERVISION IS REQUIRED AT ALL TIMES. TAKE GREAT CARE WITH HOT WATER AND SOLUTIONS. BE CAREFUL WHEN HANDLING YOUR CRYSTALS, AS THE SPINES ARE VERY SHARP AND EASILY BROKEN!



① You will need 200 ml [6.7 fl. oz.] of hot water to grow your crystal. Use boiling water [water at 100°C [212°F]] if possible, as this makes the crystals grow best. To measure out exactly 200 ml, pour the hot or boiling water into the container until it reaches 30 mm [about 1.2 inches] below the rim of the container. You may use the printed scale next to the diagram or a ruler to measure the distance of 30 mm [about 1.2 inches]. You may now add the contents of the large bag [the white base compound] to the water.

Note: alternatively, you could use a measuring cup to measure the 200 ml [6.7 fl. oz.] volume of hot or boiling water, and pour this into the container.

② Stir until all the powder has dissolved to form a solution. Allow the solution to cool in the container until it is warm [not too cool, not too hot, and ideally around 40°C [104°F]].

③ Using the seeding spoon [ensure that it is clean and dry prior to use], gently sprinkle the desired seeding mixtures over the surface of the warm solution. You will only need to sprinkle **4 spoonfuls of coloured crystal seeding mixture**. Do not put the entire contents of the 3 bags of coloured crystal seeding mixture into the solution. Refer to the table below for the number of spoonful(s) of different seeding mixture required for growing different coloured crystals. The particles should sink and spread evenly over the base of the container. **DO NOT STIR THE SOLUTION**. Also, try not to disturb any of the base compound that may have fallen to the bottom of the container. Note: handle the coloured crystal seeding mixture with care, as the pigment may cause stains. Properly dispose of the unused seeding.

COLOUR MIXING TABLE	Blue Seeding	Red Seeding	White Seeding
Aqua Blue Crystals	4 spoons	-	-
Light Blue Crystals	1 spoon	-	3 spoons
Dark Purple Crystals	2 spoons	2 spoons	-
Deep Red Crystals	-	4 spoons	-
Light Pink Crystals	-	1 spoon	3 spoons
Crystal Clear Crystals	-	-	4 spoons

④ The crystals require a temperature above 20°C [68°F] to grow properly. Carefully put the container in a warm room, or on top of your refrigerator, where it will be warm. **DO NOT PUT THE LID ON THE CONTAINER**. Choose a place where the container will remain undisturbed for at least 15 hours, to allow the crystals to start growing. Observe the crystals every few hours. Under normal conditions, your crystals will start to grow on the first day and reach a width of about 50 mm [about 2 inches] and a height of about 40 mm [about 1.5 inches] in 4 to 7 days. The size will vary depending on the environment in which the crystals are growing. If the environment is cold or humid, it will take longer for them to grow. In some cases it could take weeks. **SO, PLEASE BE PATIENT**. It will be worth the wait! Note: During the crystal growing process, small crystals may grow around the inner wall of the container. This effect is called "crystal climbing". The crystals are formed because liquid moves up through the tiny gaps between the crystals themselves and between the crystals and the container [this movement is called capillary action], and then, water evaporation allows the crystals to grow. These small crystals may eventually grow out of the container and stain the table top. You are advised to remove the small crystals gently, without disturbing the solution, when you see them beginning to grow up the inside of the container.

⑤ When the crystals have reached the size described above, drain away the remaining solution. Use the seeding spoon to hold the crystals in the container as you tip the container. Once the solution is poured away, you cannot use it again, so **DO MAKE SURE THAT YOUR CRYSTALS HAVE GROWN TO THE PROPER SIZE BEFORE YOU POUR AWAY THE SOLUTION**. For a coloured solution, you may use a torch to shine into the solution to observe whether any crystals have grown. Gently rinse the crystals using fresh water for a few seconds, and pour away the water. Do not wash the crystals for too long, or they will be dissolved by the water. Now, leave the crystals to dry.

⑥ Once the crystals and the container are completely dry, put the lid on the container to protect your crystals from moist air.

Congratulations! Your crystals are complete. Display them as part of your crystal collection. Try growing differently coloured crystals to expand your collection. With each kit, you will grow crystals of different shapes and sizes.

B. HOW DOES IT WORK

When you add the powder to hot water, it breaks up into tiny particles in the water. These particles are far too small to see. The liquid is then called a solution of the powder. In fact, it's called a saturated solution, because if you stir in more powder, no more will dissolve.

Slowly, the water cools, and some water evaporates. Now, the water can't keep all the particles dissolved, and some begin joining together again. More particles join them, and over time, groups of particles come together. The particles join up in an organised way, making the crystals that you see, with straight edges and flat faces.

C. FUN FACTS

- A crystal is a solid object made up of particles [sometimes atoms, sometimes ions, and sometimes groups of atoms called molecules] that are arranged in a neat pattern. This pattern of particles is repeated again and again throughout the crystal.

- Crystals grow in seven basic shapes, called crystal systems. Each system has a different pattern of particles. The crystal systems are called cubic, tetragonal, hexagonal, monoclinic, triclinic, orthorhombic and rhombohedral.

- Many rocks are made up of crystals of different minerals. Common minerals include quartz, feldspar, hornblende and mica.

- The precious stones that sparkle in rings and necklaces, such as diamonds, emeralds and rubies, are crystals.

- The largest diamond ever found was the Cullinan Diamond, which was dug up in South Africa in 1905. It weighed 621 grams.

- Amazing and beautiful giant crystals grow in spaces inside rocks. Sometimes, they are discovered by people exploring caves.

- Monoammonium Phosphate [the powder used in this kit] is an ingredient in some fertilisers used on farms. It's also used in some fire extinguishers.

- The salt that you put on your food is made up of tiny crystals of a mineral called Sodium Chloride.