

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. AUSTRALIA – JOHNCO PRODUCTION PTY LTD. WEB SITE: WWW.JOHNCOPRODUCTIONS.COM. EMAIL: INFO@JOHNCOPRODUCTIONS.COM. TEL: 61-2-94525819.56-0474. BELGIUM – DAM BVBA. IJZERENWEGLEI 17, B-2640 MORSTEL, BELGIUM. WEBSITE: WWW.DAM.BE. EMAIL: INFO@DAM.BE. TEL: 32-34498811. CANADA – PLAYWELL ENTERPRISES LIMITED. EMAIL: PELCA@ROGERS.COM. TEL: 1-416-439-0044. MALAYSIA - ELITE TOYS (M) SDN BHD. EMAIL: INFO@ELITE-TOYS.COM. TEL: 603-9171 8830. NEW ZEALAND – LEISURE DYNAMICS (NZ) LTD.. EMAIL: LDSALES@HOLDSON.CO.NZ. TEL: 64-9-8287159. SINGAPORE – LANCASHIRE MARKETING PTE LTD. EMAIL: INFO@LANCASHIRE-TOYS.COM.SG. TEL: 65-6743 1184. UNITED KINGDOM - GREAT GIZMOS LIMITED, BARLOW HOUSE, CROMPTON FIELDS, CRAWLEY, RH10 9QB, UK. WEB SITE: WWW.GREATGIZMOS.CO.UK. EMAIL: ENQUIRIES@GREATGIZMOS.CO.UK. TEL: 44-1293-543221. UNITED STATES –TOY INVESTMENTS INC. DBA TOYSMITH. 3101 WEST VALLEY HWY EAST, SUMNER, WA 98390, USA. WEBSITE: WWW.TOYSMITH.COM. EMAIL: INFO@TOYSMITH.COM. TEL: 800-356-0474.

A. SAFETY ADVICE FOR SUPERVISING ADULTS

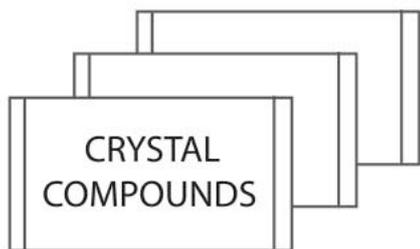
- 1. The supervising adult should be satisfied that this kit is suitable and safe for the child's abilities before proceeding.**
- 2. Because children's abilities vary so much, even within age groups, supervising adults should exercise discretion as to which activities are suitable for which child.**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

B. SAFETY MESSAGES

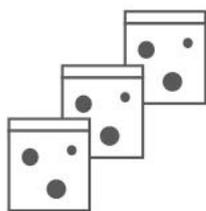
- Read the instructions before use. Follow them, and keep them in a safe place for reference.**
- Adult supervision and assistance are required at all times.**
- The incorrect use of chemicals can cause injury and damage to health. Only carry out the procedure as described.**
- Do not allow chemicals 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.**

C. 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.



3 x large bags containing white crystal compounds



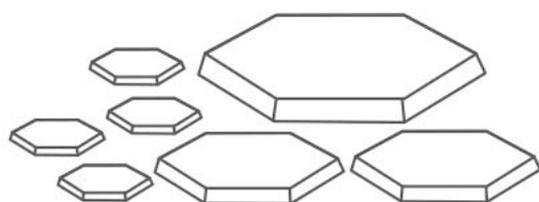
3 x small bags containing seeding mixture



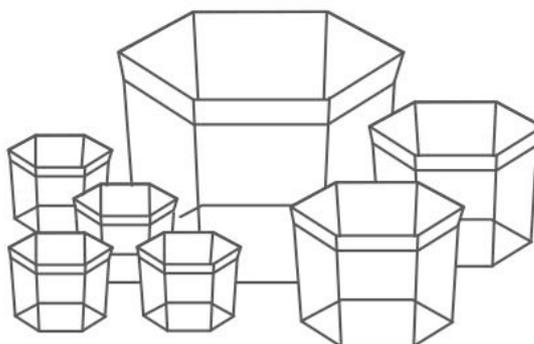
1 x stirring bowl



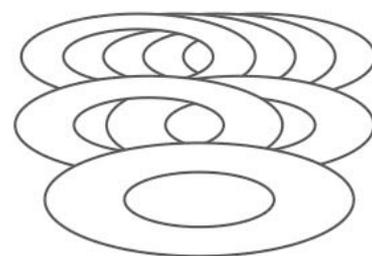
1 x stirring spoon



Display bases (1 large, 2 medium & 4 small)



Transparent covers (1 large, 2 medium & 4 small)



Ring-shaped templates (1 large, 2 medium & 4 small)

D. CONTENTS

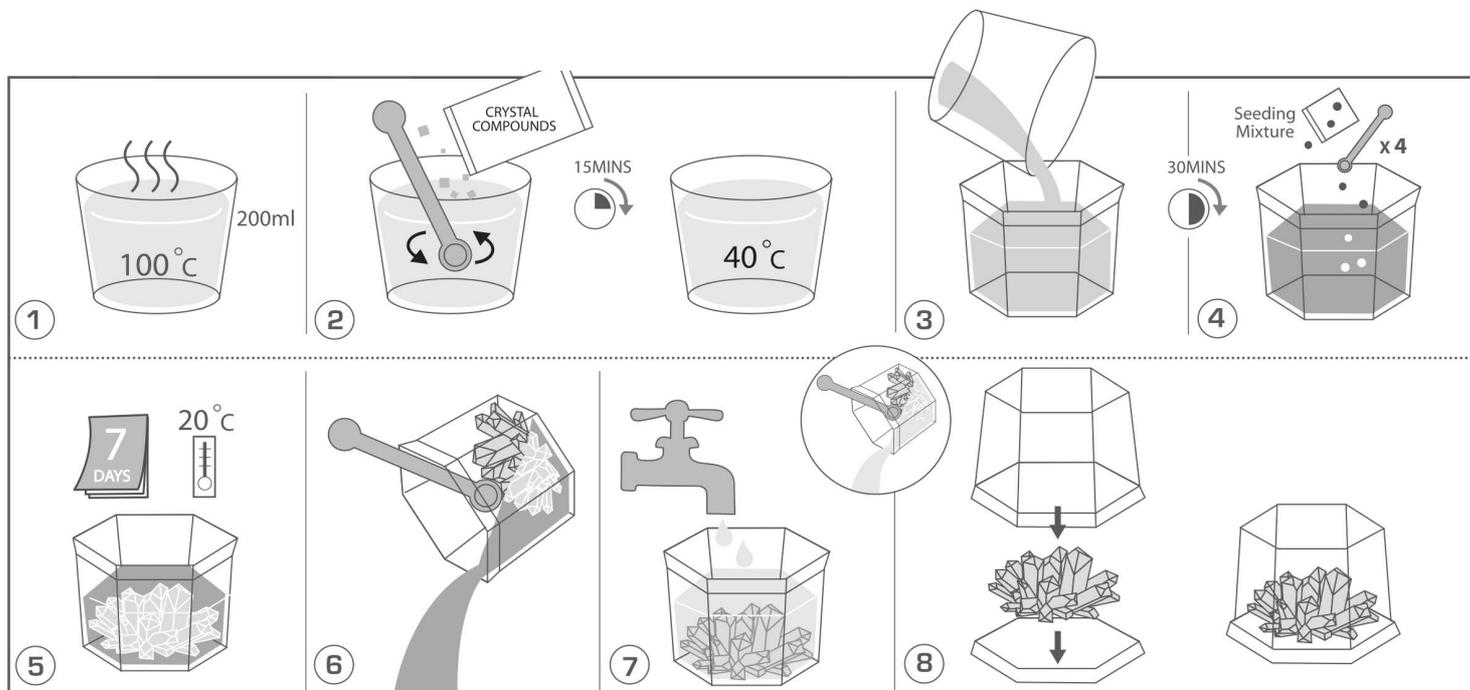
3 x large bags containing white crystal compound* (a base compound called Monoammonium Phosphate), 3 x small bags containing seeding mixture*, 1 x large display base with hexagonal transparent cover, 2 x medium display bases with hexagonal transparent covers, 4 x small display bases with hexagonal transparent covers, 1 x stirring bowl, 1 x stirring spoon, 1 x large ring-shaped template, 2 x medium ring-shaped templates, 4 x small ring-shaped templates and detailed instructions.

Also needed, but not included in this kit: a jar of steaming hot water, a measuring jug, an apron, protective goggles, and rubber gloves.

*Important Remarks:

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

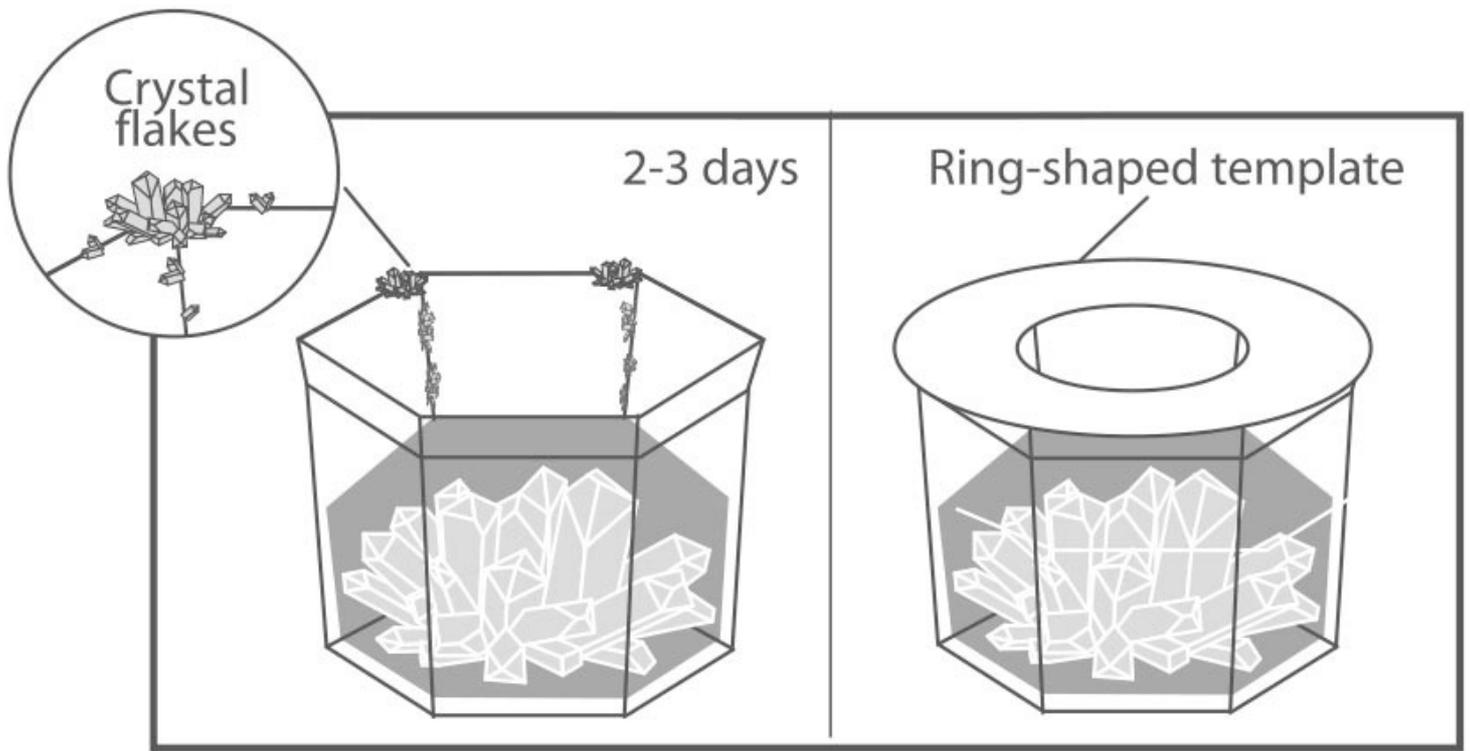
2. The white crystal compound (Monoammonium Phosphate) is hygroscopic: it tends to "capture" humidity contained in the air, and this phenomenon creates links between crystals. The material may become hard (caking), but can very easily be separated afterwards, rather like sugar.



E. MAKING THE LARGE-SIZED CRYSTALS

Adult supervision is required at all times. As the solution and the crystal may stain, cover your work area with old newspaper beforehand. Take great care with hot water and solutions. Be careful when handling your crystals, as the spines are very sharp and are easily broken!

1. You need 200 ml (6.7 fl.oz.) of hot water to grow your crystals. Use boiling water (at 100°C (212°F)) if possible, as this makes the crystals grow best. Use a measuring jug to measure the 200 ml (6.7 fl.oz.) of hot or boiling water, and pour this into the stirring bowl. (Do not use the hexagonal transparent cover for this purpose, as the hot water will deform the thin plastic.)
2. Now add the contents of ONE large bag (the white crystal compound) to the water. Stir until all the powder has dissolved to make a solution. Allow 15 minutes for the solution to cool in the stirring bowl until it is warm (not too cool, not too hot, and ideally around 40°C (104°F)).
3. Pour the solution into the large hexagonal transparent cover, which will also be used for growing crystals. Allow another 30 minutes for the solution to stabilize.
4. Now take one small bag containing the seeding mixture. Choose your colour seeding or refer to section H to mix the seeding mixtures for different colours. Using the stirring spoon (make sure it's clean and dry before use), gently sprinkle all the seeding mixture over the surface of the warm solution. The particles should sink and spread evenly over the base of the large transparent cover. **DO NOT STIR THE SOLUTION.** Also try not to disturb any of the base compound that may have fallen to the bottom of the large transparent cover. **Note:** handle the seeding mixture with care, as the pigment may cause stains.
5. The crystals need a temperature above 20°C (68°F) to grow properly. Carefully put the large transparent cover in a warm room, or on top of your refrigerator, where it will be warm. Place a piece of kitchen paper under the transparent cover as a mat. **DO NOT PUT THE BASE ON THE LARGE TRANSPARENT COVER.** Choose a place where the transparent cover will remain undisturbed for at least 15 hours, to allow the crystals to start growing. Observe the crystals every few hours. In normal conditions, your crystals will start to grow in the first day and reach a width of about 50mm (about 2 ins) and a height of about 40mm (about 1.5 ins) 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!

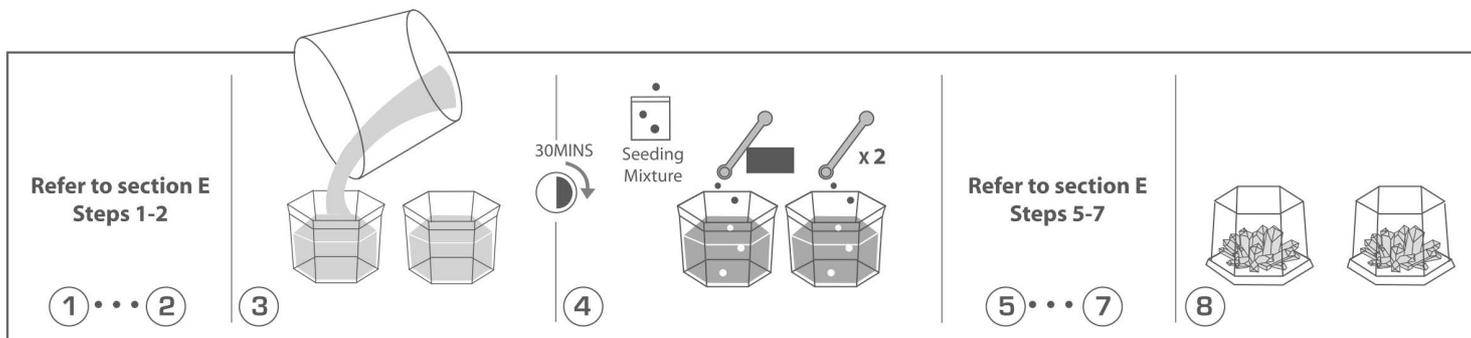


Note: On days 2-3 of the growing process, some small crystal flakes may start to grow around the inner wall of the transparent cover. This effect is called "crystal climbing". To avoid these small crystal flakes eventually growing out of the transparent cover and staining the table top, gently remove the small crystals without disturbing the solution, and place the ring-shaped template provided on top. This will stop the further growth of crystal flakes. Please refer to SECTION J for more details on crystal climbing.

6. When the crystals have reached the size described above, drain away the remaining solution. Use the stirring spoon to hold the crystals in the large transparent cover as you tip it up. Once the solution is poured away, you cannot use it again, so DO MAKE SURE THAT YOUR CRYSTALS HAVE GROWN BEFORE YOU POUR AWAY THE SOLUTION. For coloured solutions, you could shine a torch into the solution to see if crystals have grown.

7. Gently rinse the crystals with 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 carefully take the crystals out and place them on kitchen paper for drying. Rinse the large transparent cover with fresh water as well.

8. When the crystals and the transparent cover are completely dry, put the crystals on the large display base and cover them with the transparent cover to protect them from moist air. Congratulations! Your crystals are complete. Display them as part of your crystal collection.



F. MAKING THE MEDIUM-SIZED CRYSTALS

1-2. Refer to steps 1-2 in SECTION E.

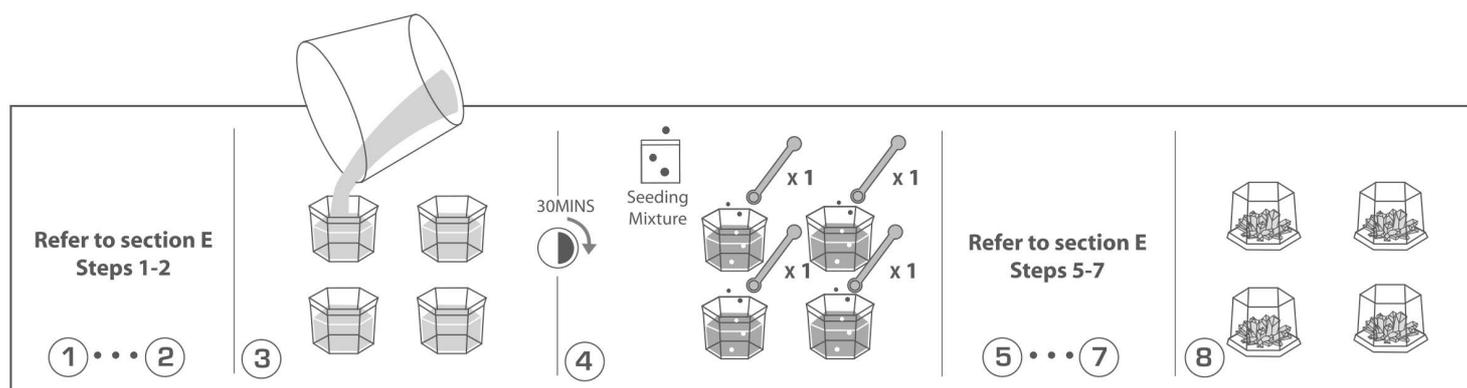
3. Pour the solution evenly into 2 medium hexagonal transparent covers. Allow another 30 minutes for the solution to stabilize.

4. Now take one small bag (containing the seeding mixture). For each warm solution, using the stirring spoon (make sure it's clean and dry before use), gently sprinkle 2 spoons of the seeding mixture (about half of all the seeding mixtures) over the surface. The particles should sink and spread evenly over the bases of the transparent cover. DO NOT STIR THE SOLUTION. Also try not to disturb any of the base compound that may have fallen to the bottom of the transparent covers. Note: handle the seeding mixture with care, as the pigment may cause stains.

5-7. Refer to the steps 5-7 in SECTION E.

Note: In normal conditions, your medium-sized crystals will reach a width of about 30mm (about 1.2ins) and a height of about 25mm (about 1in) in 4 to 7 days. The size will vary depending on the environment in which the crystals are growing.

8. When the crystals and the transparent covers are completely dry, put the crystals on the display bases and cover them with the transparent covers to protect them from moist air. Congratulations! You have made medium-sized crystals!



G. MAKING THE SMALL-SIZED CRYSTALS

1-2. Refer to steps 1-2 in SECTION E.

3. Pour the solution evenly into 4 small hexagonal transparent covers. Allow another 30 minutes for the solution to stabilize.

4. Now take one small bag (containing the seeding mixture). For each warm solution, using the stirring spoon (make sure it's clean and dry before use), gently sprinkle 1 spoon of the seeding mixture (about 1/4 of all the seeding mixtures) over the surface. The particles should sink and spread evenly over the bases of the transparent cover. DO NOT STIR THE SOLUTION. Also try not to disturb any of the base compound that may have fallen to the bottom of the transparent covers. Note: handle the seeding mixture with care, as the pigment may cause stains.

5-7. Refer to steps 5-7 in SECTION E.

Note: In normal conditions, your small crystals will reach a width of about 25mm (about 1in) and a height of about 20mm (about 0.8ins) in 4 to 7 days. The size will vary depending on the environment in which the crystals are growing.

8. When the crystals and the transparent covers are completely dry, put the crystals on the display bases and cover them with the transparent covers to protect them from moist air. Congratulations! The small-sized crystals are complete!

For large-sized crystals:	Purple	Pink	Light blue
Red Seeding	2 spoons	2 spoons	-
Blue Seeding	2 spoons	-	2 spoons
White Seeding	-	2 spoons	2 spoons

For medium-sized crystals:	Purple	Pink	Light blue
Red Seeding	1 spoon	1 spoon	-
Blue Seeding	1 spoon	-	1 spoon
White Seeding	-	1 spoon	1 spoon

For small-sized crystals:	Purple	Pink	Light blue
Red Seeding	0.5 spoon	0.5 spoon	-
Blue Seeding	0.5 spoon	-	0.5 spoon
White Seeding	-	0.5 spoon	0.5 spoon

H. HOW TO MIX COLOURS

With the three colour seeding mixtures provided, you can mix them up to make crystals of different colours. The following tables list the numbers of spoon(s) of different seeding mixtures needed for each result.

For large-sized crystals:

Purple = 2 spoons of red seeding + 2 spoons of blue seeding

Pink = 2 spoons of red seeding + 2 spoons of white seeding

Light Blue = 2 spoons of blue seeding + 2 spoons of white seeding

For medium-sized crystals:

Purple = 1 spoon of red seeding + 1 spoon of blue seeding

Pink = 1 spoon of red seeding + 1 spoon of white seeding

Light Blue = 1 spoon of blue seeding + 1 spoon of white seeding

For small-sized crystals:

Purple = 0.5 spoon of red seeding + 0.5 spoon of blue seeding

Pink = 0.5 spoon of red seeding + 0.5 spoon of white seeding

Light Blue = 0.5 spoon of blue seeding + 0.5 spoon of white seeding

I. HOW DOES IT WORK?

When you add the crystal compound 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.

J. WHAT IS CRYSTAL CLIMBING?

Crystal climbing refers to the phenomenon of small crystal flakes growing around the inner wall of the transparent cover during the crystal growing process. The crystal flakes are formed because liquid moves up through the tiny gaps between the crystals themselves and between the crystals and the transparent cover (this movement is called capillary action), and then as the water evaporates, it allows crystal flakes to grow. If this happens, refer to the resolving instructions in SECTION E – Step 5.

K. 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 621g.**
- **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.**

QUESTIONS & COMMENTS

We treasure you as a customer and your satisfaction with this product is important to us. In case you have any comments or questions, or you find any parts of this kit missing or defective, please do not hesitate to contact our distributor in your country, whose address is printed on the package. You are also welcome to contact our marketing support team at ☐☐☐☐: infodesk@4M-IND.com, Fax (852) 25911566, tel (852) 28936241, ☐☐☐☐☐☐: WWW.4M-IND.COM