

## Crystal Growing

<b>LEVEL:</b>	Grades 6-8
<b>TYPE OF CONTEST:</b>	Individual/Team
<b>COMPOSITION OF TEAMS:</b>	1 - 2 students per team
<b>NUMBER OF TEAMS:</b>	3 teams per Center
<b>SPONSOR:</b>	David Braunstein, CSU Long Beach MSP Center
<b>OVERVIEW:</b>	Students will grow the clearest, largest, most beautiful, best formed crystal and demonstrate its development with a log book and display.
<b>MATERIALS:</b>	Water; potassium alum; beaker or glass jar; thread or string; craftstick or pencil.
	<b>SAFETY NOTE:</b> This competition uses some hazardous materials. Please exercise caution and, when necessary, use safety goggles and gloves. Take all other precautions as required (e.g. MSDS).

### **RULES:**

1. All components of the project must be labeled with the contestant's name, school and MESA center **or a 10% deduction will be assessed on the total score.**
2. A Certificate of Eligibility is required, verifying that the crystal was started on or after the contest start date of **September 1, 2008**, (date may be modified for Centers whose preliminaries are held prior to February).
3. All information must be displayed on a standard, freestanding, tri-fold science fair display board.
4. A logbook or journal containing objectives, materials, procedures and observations and measurements during the crystal's growth must be on the display table.
5. The crystal will be independently displayed.
6. No kits are allowed.

### **Recommendations and Guidelines: (Points will be awarded for the following)**

1. Display board should have diagrams or photographs of the crystal in various stages of growth. Diagrams or photos must be labeled with date and number of days into the growing process.  
Example: November 15, 2008, Day 1; November 24, 2008, Day 9; etc.
2. Display board should have a graphic representation of the growth of the crystal with one axis representing the volume of the growing crystal measured in  $\text{cm}^3$  and one axis representing the days of growth.
3. The logbook should contain a brief written statement of the objective, materials, and the procedure used to grow the crystal and include the growth data and observations. See attachment for the logbook format.
4. Entries must be single and separate crystals. **Masses or clumps of crystals will be disqualified.**
5. An identification and illustration of lattice type should be included on the display board.

### **JUDGING:**

1. A crystal will be judged by size, regularity of shape, clarity, and beauty using a scale of 1-5 for each (5 being outstanding and 1 being minimal) for a total of 20 points possible.
2. Display boards will be awarded 1-6 points, depending on completeness. The display board should contain graphs and photos or drawings showing the crystal growth and a crystal lattice. The maximum number of points for the display board is 6 points.
3. Logbook – The log will be in the format described in the appendix. This book is the primary method of recording the crystal growing project and the source of all other reports on the subject. The data must be entered in the log as it occurs, not later. The maximum number of points for the logbook is 10 points.
4. Points awarded for crystal judging, display board and logbook judging will be combined to determine a **total score**. Highest total score will determine the winner.
5. In the event of a tie, duplicate awards will be given.

**AWARDS:** Awards will be given for 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> place.

**ATTACHMENTS:** Official Entry Form/Certificate of Eligibility, Logbook format, Pictures typical alum crystals.

# OFFICIAL SCORING SHEET FOR CRYSTAL GROWING CONTEST

Junior High School

Student(s) \_\_\_\_\_

School \_\_\_\_\_

MESA Center \_\_\_\_\_

## CERTIFICATE OF ELIGIBILITY

With our signatures below, we certify that this crystal growing entry was started on or after the contest start date of July 1, 2008.

Student Signature(s): \_\_\_\_\_

Advisor's Signature: \_\_\_\_\_

Actual Start Date: \_\_\_\_\_

Actual Ending Date: \_\_\_\_\_

### For Judges' Use Only

**Crystal:** (Total of 20 points possible)

Characteristic	Points Awarded
Size (1-5 Points)	
Regularity of Shape (1-5 Points)	
Clarity (1-5 Points)	
Beauty (1-5 Points)	
<b>TOTAL POINTS</b>	

Display Board Elements (0-2 pts for each item)	Points Awarded
Display board has graph representing growth as outlined in Rule #2.	
Display board has photos or drawings.	
Identification and illustration of lattice.	
Logbook Elements (0-2 pts for each item)	
Format followed	
Entries are made in 'real time' and dated.	
Objectives are clearly defined.	
The work is easy to follow and contains illustration or photos and comments.	
The data is analyzed in the logbook.	

**SUBTOTAL** \_\_\_\_\_

**Less 10 % Labeling Deduction (if applicable)** \_\_\_\_\_

**TOTAL** \_\_\_\_\_

Comments or Reasons for Disqualification: \_\_\_\_\_

**Signatures of Judges:** \_\_\_\_\_

# LABORATORY LOG BOOK

**A COMPLETE RECORD OF THE CRYSTAL GROWING PROCESS IS REQUIRED. THE FOLLOWING IS THE STANDARD LOG BOOK FORMAT. ENTER THE INFORMATION IN THE LOG WHEN YOU DO IT. DO NOT PUT IT ON A SCRAP OF PAPER FIRST.**

**INTRODUCTION** – Background about crystals, what is known about the procedures, and what are the general objectives of the experiments.

**SPECIFIC OBJECTIVE/HYPOTHESIS** – Exactly what are you going to produce? What are the characteristics of your crystal going to be?

**MATERIALS and EQUIPMENT** – What materials did you use in the project? List them.

**PROCEDURE** – Exactly what procedure did you use? Include weights, volumes, materials, etc. Write the procedure steps in the exact sequence you performed them. At any time you do something you must make note of it in the log book *AT THE TIME YOU DO IT* and date it.

**RESULTS** – The best way to keep track of your results is to make a table so that all the important data is in one place. All the columns must be identified first. For the crystal you might want to record date, elapsed time, weight, volume, and observations. Describe how you obtain the data. For example, volume is determined by dividing the weight by the density. Include diagrams, photos, and/or drawings to show changes.

After you finish collecting the data, you will analyze it by drawing graphs or charts.

**CONCLUSION** – Did you meet your specific objectives? Show evidence from your experiment. If not, what do you think went wrong and how would you correct it in the future?

## TYPICAL ALUM CRYSTALS



## A TYPICAL ALUM CRYSTAL

