

Name: _____ Date: _____ Block: _____

Group Members: _____

Assigned compound: _____

Crystal-Growing Inquiry Project: Science 9

Pure ionic compounds and covalent compounds can form crystals when in their solid state. Compounds have different properties; therefore, their crystals will have different properties such as colour, shape, etc.

In this inquiry investigation, you will research and try to grow crystals of a compound that will be assigned to your group. Then, you will use the scientific method to improve your crystallization technique. Your goal as a group is to develop a technique to grow the largest, most beautiful crystals of your compound, using a limited amount (**15 grams**). Finally, you will complete a lab report and a presentation detailing your methodology and findings from your experiments.

STAGE 1: RESEARCH

Research the compound you have been given. What are some properties of this chemical? What are safety precautions you will have to take when handling this chemical? What do the crystals of this compound look like (shape, colour)?

Research the process of crystallization. How does it work? What materials will you need? What lab equipment works best? What are some common causes of crystals failing to form? How do you grow large and beautiful crystals?

Submit:

- A summary of your research (1.5-2 pages typed, can include pictures)
- List of credible information sources used (minimum 3 sources) (links are fine; MLA not required)

STAGE 2: PRACTISE TRIAL

Create a list of materials you will need for your practise trial. Create a step-by-step procedure that can be used to reproduce your experiment. Run your experiment and record observations.

Submit 1 copy as a group:

- Materials
- Procedure
- Labelled Diagram of Experimental Set-up
- Observations
 - o Photos
 - o Qualitative Observations
 - o Quantitative Observations (if applicable) (e.g. mass of crystals, dimensions of largest crystal, number of crystals)

STAGE 3: REFLECTION, REVISION, FIRST TRIAL

Reflect upon what went well in your practice trial, and what did not. Make changes to your materials/procedure. Complete additional research if necessary. Revise your methodology and write a step-by-step procedure.

If your Practise Attempt did not result in any crystals, you should do more research and possibly manipulate multiple variables. Have your teacher check your procedure prior to running your experiment.

Run your experiment and record observations.

Submit 1 copy as a group:

- Reflection and proposed revision(s)
- (Optional: extra research and links to information sources)
- Materials (updated)
- Procedure (updated)
- Labelled Diagram of Experimental Set-up
- Observations
 - o Photos
 - o Qualitative Observations
 - o Quantitative Observations (if applicable) (e.g. mass of crystals, dimensions of largest crystal, number of crystals)

STAGE 4: REFLECTION, REVISION, SECOND TRIAL

Select one variable from your “First Trial” procedure to manipulate. Remember the goal of the project is to grow the largest and most beautiful crystal.

Submit 1 copy as a group:

- Reflection and proposed revision(s)
- (Optional: extra research and links to information sources)
- Materials (updated)
- Procedure (updated)
- Labelled Diagram of Experimental Set-up
- Observations
 - o Photos
 - o Qualitative Observations
 - o Quantitative Observations (if applicable) (e.g. mass of crystals, dimensions of largest crystal, number of crystals)

STAGE 5A: REPORT

Your report will include all the research and submissions created throughout the planning process. Your report should be typed and organized according to the headings outlined above (Stage 1, then Stage 2, etc.)

Report Evaluation:

Ext	Proficient	Dev	Emg
	<ul style="list-style-type: none">- Report is typed and has been organized and formatted correctly- Report includes all required sections and required information.- Report is clear and easy to understand; procedures have sufficient detail that they could be replicated- Report is thoughtful and reflective and demonstrates a good understanding of the scientific method- Experiments have been carefully planned, and all relevant control variables have been accounted for- All links to external information sources have been included		

STAGE 5B: PRESENTATION

Your presentation will be approximately 5 minutes long (maximum 10) and must involve all members of the group in a meaningful way. The presentation must include visual aids.

In your presentation, you will:

- Give background information about your compound (~1 min)
- Give background information about crystallization (~1 min)
- Walk the class through your process, experiments, and findings (~2-3 min)
- Conclusions: What did your best crystals look like? What experimental techniques worked the best? (~1-2 min)

Presentation Evaluation:

	Ext	Proficient	Dev	Emg
Individual		<ul style="list-style-type: none">- Good presentation skills (voice loud and clear, minimal fidgeting, section has been rehearsed, information is clearly presented)- Visual aids are used effectively- Individual has completed a fair share of the work for this group project, according to group members' evaluations		
Group		<ul style="list-style-type: none">- Presentation flows well and is cohesive; transitions have been rehearsed- Presentation is complete and covers all required topics- Visual aids are organized, visually appealing, and a good mixture of images and text. Text is easy to read and free of mistakes.- Group uses in-class time effectively to work on the project		