



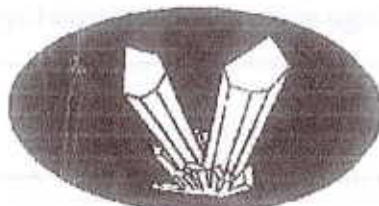
Highly Commended

Crystal Investigation

Year 3-4

Sophie Cerny
Yuiko Fujihara

East Marden Primary School



Crystal Growing Competition
Watch your crystal grow

OLIPHANT SCIENCE AWARDS

CATEGORY: CRYSTAL GROWING

**Supported by the SA Branch of the Royal Australian Chemical Institute
and
The RACI Chemical Education Group (S.A.)**

raci

LOG BOOK

STUDENT NAME(S) Yuiko Fujihara

Sophie Cerny

YEAR LEVEL: 4..... **SCHOOL:** East Marden

Please note: the use of this version of a log book is not mandatory.

There will be no penalty for not using it.

However the student(s) who are preparing a crystal will need to provide evidence of their ongoing efforts by comments related to the criteria suggested in this log book model.

The competition instructions suggest that the crystal growers formulate an hypothesis that they can test while growing the crystal(s)

Examples of questions that could be expressed as a prediction or hypothesis are:

- Can my crystal grow to the required 9 mm in 3 weeks?
- Does leaving my crystal in a dark place help it to grow better?
- Does more or less attention help my crystal to be more clear and well-formed?
- Does an incubator help grow bigger crystals in a given time period?

MY HYPOTHESIS

Does putting the crystal into the fridge make my crystal grow faster or slower?

MY PREDICTION

I think it will be slower because it will freeze in the cold temperature.

The log book in this form is only advisory but students should try to document the following:

- Date and time for each handling of the crystal procedure
- Describe exactly what they did on each occasion (should include measurements of volume and temperature made at any time)
- What has happened to the selected crystal on each viewing (changes)
- Description of the crystal characteristics – clarity, regularity (smooth faces, sharp edges), and size (can be assisted by sketches or digital photos)
- What problems were encountered and how they were solved – may include summaries or discussions with teachers/mentors
- Acknowledgment of manual assistance by others e.g. for competitors from the R-2, 3-5 age groups, what teachers or parents did.
- Acknowledgement of any crystal growing advice from books or websites

Date/Time	Descriptions of what the student(s) did, problems encountered and solved	Crystal characteristics	signed
2/6/2020 Tuesday	Today, I started the crystal. I used water, APS (Aluminium Potassium Sulphate), a jar, spoon. Once I was done putting the water and APS into the jar, I started to mix the things with a spoon. When it had dissolved, I put a paper towel on top to stop the dust from going in. When I finished all those things, I put it in the fridge for the hypothesis.	The APS started to dissolve.	Yuiko
6/6/2020 Saturday 9:10~9:40 AM	Today, I got the crystal out of the fridge and saw that the APS was stuck to the side of the jar. But I could get it off. I put it into the microwave for a while to let it melt so that I can get the crystals. When I got it out of the microwave, the water was 60 degrees. After that, I waited for the crystal to go to 30 degrees. While I was waiting for the water to go to 30 degrees, I picked the biggest crystal piece. Crystal 1 was nice and round and was 4mm long. Crystal 2 had flat sides and was 5mm long. I tied them onto a thin string. I waited overnight to go to 30 degrees.	The crystals were stuck to the side of the jar because it had been put in the fridge. I think it was stuck to the side because the fridge wasn't the temperature of the house.	Yuiko
7/6/2020 Sunday 10:30~10:50 AM	Today, I checked the water temperature and it was around 28 degrees. I put the water into the jar and put the crystals into the jar. I wrapped the top of the jar with a wrap so that the dust won't go into the water.	The crystal water changed from 60 degrees to 28 degrees.	Yuiko
	The crystal was stuck to the string and the crystal was stuck to other crystals so, I	The crystal was growing on the string.	Yuiko

7/6/2020 Sunday 8:55~9:20 PM	separated the crystal apart. Then, I picked the best crystal and tied the good crystal to the string to let it grow into an even better crystal. I melted the other bad crystal bits into the water to use for the good crystal. The water was 60 degrees after I heated it. I waited until the water was 30 degrees.		
8/6/2020 Monday 11:00~11:20	Today morning, I saw that the crystal I started yesterday was growing but on the string. I wasn't like a normal crystal. That means I have to break it up and separate the crystal sticking on the string.		Yuiko

Date/Time	Descriptions of what the student(s) did, problems encountered and solved	Crystal characteristics	signed
9/6/2020 Tuesday 8:20~8:30 PM	Today, I measured the crystal to see if the crystal had grown. Crystal 1 had grown from 4mm to 5mm in 3 days. Crystal 2 had grown from 5mm to 6mm. Had means had they have both grown a mm. One of the crystals in the fridge (I put two into the fridge) were combining to other crystals that made it bigger.	The crystals I didn't put in the fridge grew one mm.	Yuiko
17/6/2020 Wednesday 8:50~9:00 PM	Today I checked the crystal. Crystal 1 and 2's crystal had fallen off and melted in the water. I didn't know why. Then I put it into the microwave and when I took it out, it was around 50 degrees. I had to wait for it to get from 50 degrees to 30 degrees. I also checked the other 2 crystals. They had grown! One was 1 cm and the other was also 1 cm. But one of the crystals didn't have flat sides. I tied another small crystal onto the crystal 1 string. The crystal looked beautiful. It had 8 flat sides and sharp points. It was clear but very small. It only was 4mm. After I finished, I waited over night to wait until it was 30 degrees.	Crystal 1 and 2 had fallen off and melted in the water. The other two crystals were 1 cm.	Yuiko
23/6/2020 Monday 8:50~9:30 PM	Today, I checked my crystals again. Crystal 1 had grown a mm (now it is 5mm) Crystal 3 and 4 were very big but the fridge crystals were much bigger and clear. But the crystal was all bumpy and other crystal were stuck together to and that made it bigger. It looked bumpy and it wasn't smooth. But it they were both almost 2 cm I took all the	Crystal 1 grew from 4mm to 5mm. The fridge crystals were around 2 cm.	Yuiko

	<p>crystals out and added around a teaspoon and a half to each crystal water. Then I put it into the microwave to warm it up. I heated the crystal water up until they were close to 50 degrees.</p> <p>I waited for the water to cool up to 30 degrees. When it was around 30 degrees, I put the crystals back and waited for it to grow again.</p>		
<p>29/6/2020 Saturday 8:05~8:35 PM</p>	<p>Today, I took out the crystals to check how much it grew. Crystal 1 had grown from 5mm to 6mm and one of crystal 3 or 4 was 1cm and a half and the other was 1cm. The Fridge crystals was both around 2 cm. Crystal 1 was still 0 grams. Crystal 3 and 4 were both 3 grams. One of the Fridge crystals were 9 grams and the other was 11 grams.</p> <p>I took the crystals out and put the water in the microwave to heat it up to around 50 degrees. After that, I added around a teaspoon of APS and added 25 ml of water to the crystal water. Once I did that with all the crystal waters, I waited until it was around 30 degrees. I put the crystals back in when the water-cooled down and left it to grow again. I had to wait for the water to cool down so that it doesn't melt.</p>	<p>Crystal 1 was 6mm and was 0 grams. One of crystal 3 and 4 were 1 cm and the other was 1 cm. They both weighed 3 grams. One of the Fridge crystals were 2 and the other was 2 and a half. One weighed 9 gams and the other was 11 grams.</p>	<p>Yuiko</p>
<p>7/7/2020 Monday ???????</p>	<p>Today, I checked the crystal to check how much it grew.</p> <p>Crystal 1 was 9 mm and still weighed 0 grams. One of crystal 3 and 4 was 1cm and 6 mm and the other was 1 cm and 9 mm and crystal 3 and 4 both weighed 5 grams. The two fridge crystals were both around 2 cm and a half and were both 13 grams. After I checked how much it grew, I took the crystals out and heated the water up until around 50 degrees. I added 25 ml of water and around a teaspoon of APS in each crystal cup.</p> <p>When I was done, I left the crystals to cool down to 30 degrees.</p>	<p>Crystal 1 grew from 6 mm to 9mm but it was still 0 grams. Crystal 3 and 4 grew from 3 grams to 5 grams. One of crystal 3 and 4 was 1cm and 6 mm and the other was 1 cm and 9 mm. One of the fridge crystals grew from 9 grams to 13 grams and the other fridge crystal grew from 11 grams to 13 grams.</p>	<p>Yuiko</p>
<p>14/7/2020 Monday 7:00~7:30 PM</p>	<p>Today, I took the crystals out to check how much it grew. Crystal 1 was 1 cm and 1 gram. It had grown a mm and a gram. Crystal 3 was 2 cm and 2 mm and was 7 grams. Crystal 4 was 2 cm and 6 grams. One of the fridge crystals was 2 cm and 8 mm and were 12 grams. The other fridge crystal was 3 cm and was 13 grams.</p> <p>After I checked how much it grew, I left the crystals on a paper towel and heated the water in the jar up until the APS I the water dissolved. The water was around 45 to 50 degrees when it dissolved. Then I added 25</p>	<p>Crystal 1 grew from 9 mm to 1 cm and grew from 0 grams to 1 gram. One of crystal 3 and 4 grew from 5 grams to 6 and the other crystal (Crystal 3 or 4) grew from 5 grams to 7 grams. One of crystal 3 and 4 grew from 1cm and 6 mm to 2 cm and 2 mm or 2 cm and 8 mm and the other grew from 1 cm</p>	<p>Yuiko</p>

	<p>ml of water to each cup and around a teaspoon of APS to each cup. I heated up again until it was 60 degrees. Then I left the crystal water to cool down to around 30 degrees and put the crystals back in when it was around 30 degrees. (I always put the fridge crystal into the fridge after)</p>	<p>and 9 to 2 cm or 2 mm or 2. One of the fridge crystals grew from 9 grams to 12 or 13 grams and the other didn't grow by weight. One of the fridge crystals was 3 cm and the other was 2 cm and 8 mm.</p>	
<p>17/7/2020 Thursday 8:30~9:00 PM</p>	<p>Today, I took the crystals out to check how much it grew. Crystal 1 was 1 cm and 4 mm. And it was 3 grams. Crystal 3 was 1 cm and 9 mm. And it was 8 grams. Crystal 4 also grew to 1 cm and 9 mm and was 6 grams. One of the fridge crystals was 3 cm and was 15 grams. The other fridge crystal grew also to 3 cm and was 16 grams.</p> <p>After I measured all the crystals, I took the crystals out of the jar and microwaved the water until the APS in the water dissolved. I added around a teaspoon of APS into each cup and around 10 ml of water to each cup.</p> <p>Then, I left the jar to let it cool down to around 30 degrees. When it was around 30 degrees, I put the crystals back in and the fridge crystal back into the fridge. I put a box over the crystals to make it dark.</p>	<p>Crystal 1 grew from 1 gram to 3 grams and grew from 1 cm to 1 cm and 4 mm. Crystal 3 grew to 1 cm and 9 mm and was 8 grams. Crystal 4 grew to 1 cm and 9mm and was 6 grams.</p>	<p>Yuiko</p>
<p>19/7/2020 Sunday 8:00~8:30 PM</p>	<p>Today I took the crystals out to check how much it grew. Crystal 1 was 1cm and 4 mm and was 3 grams. Crystal 3 was 1 cm and 9mm and was 7 grams. Crystal 4 was 2 cm and was 8 grams. One of the fridge crystals was 2 cm and 4 mm and was 18 grams. The other fridge crystal was 3 cm and 3 mm and was 15 grams.</p> <p>When I finished measuring, I took the crystals out and heated the crystal water up until it dissolved. I added around a teaspoon of APS and around 25 ml of water to each jar. After it was dissolved and hot (Water was around 60 degrees) I left the crystal water to let it cool down as I left the crystals on a paper towel. I waited until it cooled down to around 30 degrees.</p>	<p>Crystal 1 grew from 1 cm and 4 mm to 1cm and 9 mm and the crystal didn't grow by grams. Crystal 3 didn't grow by length but it did by weight. Crystal 3 grew from 6 grams to 7 grams. Crystal 4 grew from 1 cm and 9mm to 2 cm and crystal 4 didn't grow by weight. One of the fridge crystals was 2 cm and 4 mm and was 18 grams. The other fridge crystal was 3 cm and 3 mm and was 15 grams.</p>	<p>Yuiko</p>
<p>23/7/2020 Thursday 7:15~8:00 PM</p>	<p>Today I took the crystals out to check how much it grew. Crystal 1 was 1 cm and 6 mm and was 8 grams. Crystal 3 was 1cm and 9 mm and was 8 grams. Crystal 4 was 2 cm and was 8 grams. One of the fridge crystals were 3 cm and 9 mm and was 21 grams. The other fridge crystals were 3 cm and 4 mm and were 20 grams.</p>	<p>Crystal 1 grew from 1 cm and 4 mm to 1 cm and 6 mm. And crystal 1 grew from 3 grams to 4 grams. Crystal 3 grew from 7 grams to 8 grams. Crystal 4 didn't grow at all. One of the</p>	<p>Yuiko</p>

	<p>I recorded it all down and moved on.</p> <p>When I finished measuring, I took the crystals out and heated the crystal water up until it dissolved. I added around a teaspoon of APS and around 25 ml of water to each jar but I put around a teaspoon and a half to crystal 1 because the APs dissolved too much so there wasn't any left and added a bit less amount of water because there was a lot of water already in the jar. After it was dissolved and hot (Water was around 60 degrees) I left the crystal water to let it cool down as I left the crystals on a paper towel. I waited until it cool down to around 30 degrees.</p>	<p>fridge crystals were 3 cm and 9 mm and were 21 grams. The other fridge crystals were 3 cm and 4 mm and was 20 grams.</p>	
<p>29/7/2020 Wednesday 9:10~9:40 PM</p>	<p>Today I took the crystals out to check how much it grew and heat and add APS to the water. First, I measure the crystals. Crystal 1 was 1cm 8mm and was 5 grams. Crystal 3 was 2cm and 4mm and was 8 grams. Crystal 4 was 2cm and was 9 grams. One of the fridge crystals was 3cm and 2mm and was 22grams. The other fridge crystal was 3cm and 6mm and were 23 grams.</p> <p>When I finished measuring, I took the crystals out and placed it onto a paper towel and heated the crystal water until it dissolved. I added a teaspoon of APS to each cup but not crystal 1 because crystal 1 already had enough. I didn't add any water. When I finished I left the crystals out and let the crystal water cool down to around 30 degrees.</p>	<p>Crystal 1 grew from 1 cm and 6mm to 1cm and 8mm and didn't grow by weight. Crystal 3 grew from 1 cm and 9mm to 2 cm and 4mm and didn't grow by weight. Crystal 4 grew from 8 grams to 9 grams and didn't grow by measurement. One of the fridge crystals was 3cm and 2mm and was 22 grams. The other fridge crystal was 3cm and 6mm and were 23 grams.</p>	<p>Yuiko</p>
<p>1/8/2020 Saturday 8:00~8:40 PM</p>	<p>Today I took out the crystals to check how much it grew. Crystal 1 was 2 cm and was 7 grams. Crystal 3 was 2 cm and 4mm and was 8 grams. Crystal 4 was 2cm and 1mm and was 10 grams. One of the fridge crystals were 3 cm and 5mm and was 22 grams. The other fridge crystal was 3cm and 9mm and was 22 grams.</p> <p>After I finished measuring, I took the crystals out and left it on a paper towel. Then, I heated the crystal water up to around 60~70 degrees. I added around half a teaspoon. When I did it I left the crystal water out overnight until it cooled down to around 30 degrees.</p>	<p>Crystal 1 grew from 1 cm and 8mm to 2cm and grew from 5 grams to 7 grams. Crystal 3 didn't grow at all. Crystal 4 grew from 2cm to 2 cm and 1 mm. One of the fridge crystals was 3cm and 5 mm. The other fridge crystal was 3cm and 9mm and was 22 grams.</p>	<p>Yuiko</p>
<p>4/8/2020 Tuesday</p>	<p>Today I took the crystals out to check how much it grew. Crystal 1 was 2cm and 1 mm and was 7 grams. Crystal 3 was 2cm and 6mm and was 9 grams. Crystal 4 was 2 cm</p>	<p>Crystal 1 grew from 2cm to 2 cm and 1 mm. Crystal 3 grew from 2 cm and 4mm to 2 cm</p>	<p>Yuiko</p>

<p>7:00~7:30 PM</p>	<p>and 3 mm and was 10 grams. One of the fridge crystals was 4cm and was 23 grams. The other fridge crystal was 3 cm and 5mm and was 22 grams.</p> <p>After I finished measuring, I took the crystals out and left it on a paper towel. Then, I heated the crystal water up to around 60~70 degrees. I added around half a teaspoon. When I did it I left the crystal water out overnight until it cooled down to around 30 degrees.</p>	<p>and 6mm and grew from 8 grams to 9 grams. Crystal 4 grew from 2cm and 1 mm to 2 cm and 3mm. One of the fridge crystals was 4cm and 23 grams and the other fridge crystal was 3cm and 5mm and were 22 grams.</p>	

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