



Charlotte Reade-Brown

Year 1, Walford

Hypothesis: What makes a bigger crystal: hanging or in the bottom of a container?

Log book

Notated by mum, Charlottes writing and drawing attached

Date: Descriptions of what the student did, problems encountered and solved

- 10-May-24 Today I got some ingredients to make crystals. Mummy and I didn't know what do to so we watched YouTube. there was a scientist from America (Buffalo University) who showed how to make crystals. He told us to get:
- Aluminum potaasium sulphate (he called it alum)
 - Distilled water
 - coffee filter papers
 - 3 beakers
 - fishing line
- (we also found at home scales, a spoon and tweezers. I even found a lab coat from an old costume mum which made me a real scientist)
- 12/5/2024 On YouTube, some people were making them in jars other people were tying them on string and hanging them in the water. I wasn't sure which one would make better crystals so Daddy suggested that could be my project question (hypothesis) just like wondering Wednesday at school!"

To make seed crystal:

we need to make mini crystals to start experiments. Mummy found some instructions from RACI (Royal Australian Chemical Institute) that said to use 19g alum and 50ml of water warmed up to 55-60c so we decided to try that.

I measure 19g of alum into a bowl using the scales. I had to put the bowl on the scales then press the button to make it go to zero then spoon the powder into the bowl. Mummy then heated up distilled water on the stove and we used my thermometer to check it was over 55c. Then we measured 50ml using a medicine cup and I stirred stirred stirred. It looked like there was still lots of alum in the water and it wouldn't stir in so we then used the coffee filter to get the water back to clear. The coffee filter fell into the water but we quickly pulled it out. We were worried that compared to the scientist YouTube we had watched that it didn't look like enough, and the filter paper looked like it had heaps of alum in it.

So we made another batch like the scientist in the video we had watched he had used a 800ml beaker and we only had a 600ml one so didn't want to copy his as it cant fit. He used 100g alum and filled to 800ml on the beaker. That looked like way more than what we had just made. He also didn't use filter paper he just poured into the beaker and left behind the crusty bits in the bottom. We decided to cut his recipe to half. So we did what we did before and used the scales to get 50g and then add the water. Mummy measured 400ml of the water but then I got confused and poured it all in so we had a bit more than he did because our beaker looked like 420ml. He then pour it into a big wide container trying to get lots of big crystals, so mummy and I found a cooking dish and poured the liquid into the big cooking dish.

So end of day one we have 50ml of liquid in a beaker and 420ml in a big glass cooking dish.

- 13/5/2024 Got home late from OSHC. Had dinner and then checked crystals. The beaker looked like sparkly glitter, the whole bottom was sparkly. Didn't look like the scientists, so think the filter messed it up. Looked at the oven dish and there were 2 big crystals they are clear in the middle but cloudy on the outside, decided to leave them to see if they get any bigger

Log book

Notated by mum, Charlottes writing and drawing attached

Date: Descriptions of what the student did, problems encountered and solved

14/5/2024 Got home late from OSHC so left them

15/5/2024 Got home earlier and the water was looking really hard and sparkly on top. We were worried that the paper towel we had covered the container in had dipped in the water and making it go funny. Decided to pull them out. When we went to pull the two out we realised there were lots of smaller ones too.

Tried not to touch them so used tweezers, it was really tricky to pick up but lucky they were kind of flat. I pulled it out eventually and held it in the air over a dish whilst mum squirted distilled water on it then put them on paper towel to measure them.

We ended up with 2x 2cm, 3 x 0.5cm, 5 x 0.2cm. The big ones are cloudy the medium and small ones all look like precious gems!!!

We then made up some more liquid to put the crystals into grow more. We made up 3 beakers of 400ml solution the same as we did before. It was too hot so we left it and went to kindy games night for my sister. When we got home it was cold. We poured out some to make each beaker 300ml (x3) and put the rest in 2 Pyrex dishes and we tied the 2 big ones to fishing line with a paddle pop stick and but dad tried to tie one medium to fishing line too, it was soooooo tricky! We then had to wind the fishing line around the paddle pop stick to make sure it was in the middle of the water. We put the other 2 medium in small glass Pyrex bowls and left them with paper towel covers. I took the tiny ones to school to show my class who thought they were precious gems!

16/5/2024 The next day the big two had crystals in the bottom, the one I scratched a bit with tweezers ended up with mini crystals all up the fishing line! The medium one that dad put in the water was heaps bigger and still really clear! The 2 in Pyrex had grown a little too, no other crystals in their water either

18/5/2024 The crystals in the Pyrex have smaller little crystal friends starting to form next to them, I picked them off with tweezers. The big clear crystal on the line also had little friends so I poured the liquid into a different container and picked the little friends out of the bottom. I put all the new little crystals in another small rectangle Pyrex to see if anything would happen with them as didn't want to waste them.

19/05/2024 You can see the containers I interrupted yesterday aren't happy. When I picked out their little friends its now got glitter starting to grow on the bottom of each. I tried to sweep it away from them with tweezers

23/05/2024 No real change

2/06/2024 We've been really busy so kind of left them. And now they have grown heaps! The scratched one now has heaps of other little crystals on the line and on the bottom its almost 3cm, I've tried to chip all the little mini crystals off to see what happens. The one daddy tied is looking much bigger and still really clear! Its about 2cm. Some of the ones growing sitting on the bottom of the containers are growing bigger but look more flat. It looks like the ones in the container by them selves grow faster. The ones on their own are 2cm or bigger where are the ones all in together are only 1 cm. I drain off the crusty crystals and poured the left over water in with the smaller crystals. For the big crystals I made up a new batch of alum water and added them.

4/06/2024 Chunky little crystals have all appeared in with the larger crystals. The scratched crystal is full of tiny little glitter all over the bottom of the jar

8/06/2024 We think the chunky crystals are stopping everything from growing so we drained them off. Leaving the crystals in clear alum water

Log book

Notated by mum, Charlottes writing and drawing attached

Date: Descriptions of what the student did, problems encountered and solved

30/06/2024 We went interstate and then got really sick with Influenza A. Looking at the crystals we don't think they have grown any more but the water has gone down. So we made some more alum water and replaced the water in each of the containers. We had to pick off some dirty water bits of each crystal as we removed them to put in fresh water. One big one is 3.7cm, one is 3.5cm. The clearest one was hard to measure as we didn't want to drop it on the paper towel as we were worried it would make it cloud so we think it was about 3.5cm. Of the ones growing in a pot together the smallest ones were now around 0.5cm, older pot ones were now medium sized were much clearer but only roughly 2cm. The 2 that were left to grow on the bottom of a container by themselves 2.5-3cms and clear as we haven't been touching them as much but the shape very flat, one of them has a crystal that tried to join to the side of it and we tried to chip it off. We chose our favourites and put them back in the new batch of cooled alum water. We kept 2 large hanging crystals, the 2 medium crystals lying by themselves in containers. Then the batch of small & medium crystals in together in the bottom of 2 containers.

21/07/2024 We went away again in the school holidays and left them sitting on the bench whilst we were away. We got home and they have grown again, we now have a lot of crystals!!! Today is the day we decided to finish the experiment so that we can give them to the teacher to enter the competition. We pulled them out of the alum water and squirted with more water and measured them all. The measurements for the end of the experiment are:

Hanging in the Alum water:

1. 4.5 cm long, 3.3 cm wide, 2.8cm tall. Cloudy diamond shape with rough edges
2. 4.7cm long, 4 cm wide, 2.5cm tall. smooth bits but mostly bumpy, sharp edges

Sitting in alum water alone:

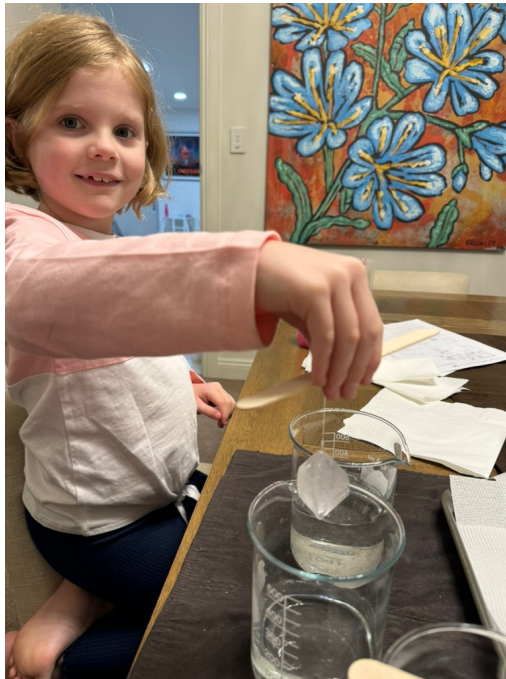
3. 2.3cm long, 2.7cm wide, 1cm tall, sharp edges, smooth sides barely cloudy
4. 3.8cm wide, 3.5cm long, 1.3cm tall, a lot of crystals inside of it bumpy and sharp edges

Sitting in a group in alum water:

5. The first group I counted was too little for the judges, but there was 9 of them (less than 0.9cm)
6. The 2nd group that I counted was chipped edges and cloudy or crystals growing on the sides. There was 18 of them (greater than 0.9cm)

Summary of findings

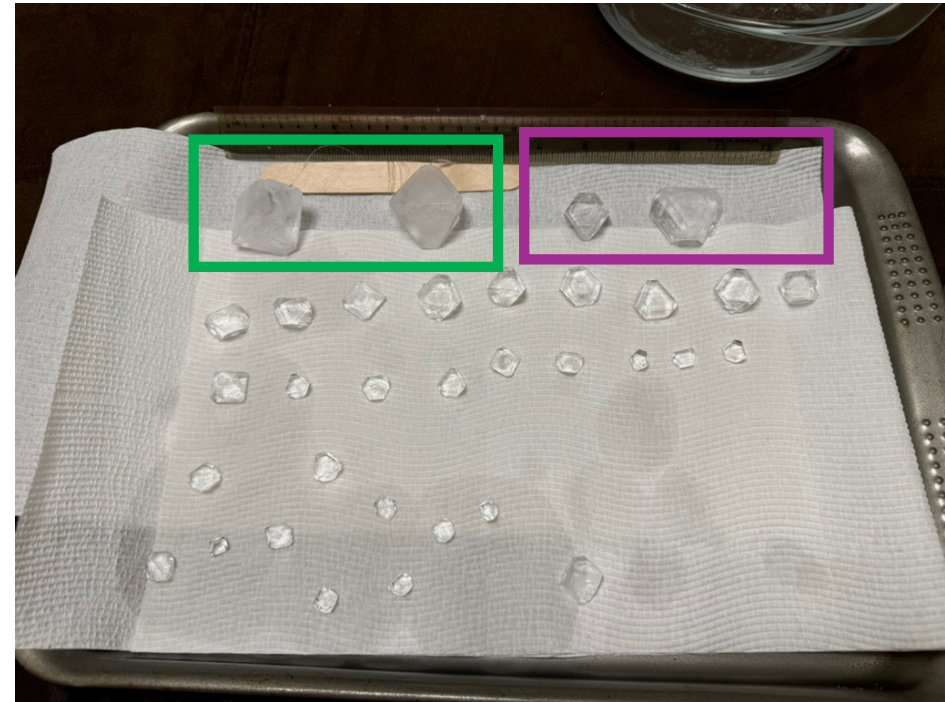
The hanging crystals definitely got bigger and more even shape but it was harder to stop them going cloudy. Growing alone in a container also makes them grow larger. When they are left alone they are clear and don't get scratched with the tweezers but then the shape is flat if not hanging. Amazing how when all in together than they come out all different shapes but are definitely smaller. Therefore, hanging makes bigger but not always better as its tricky to keep them clear the bigger they grow.



21 July

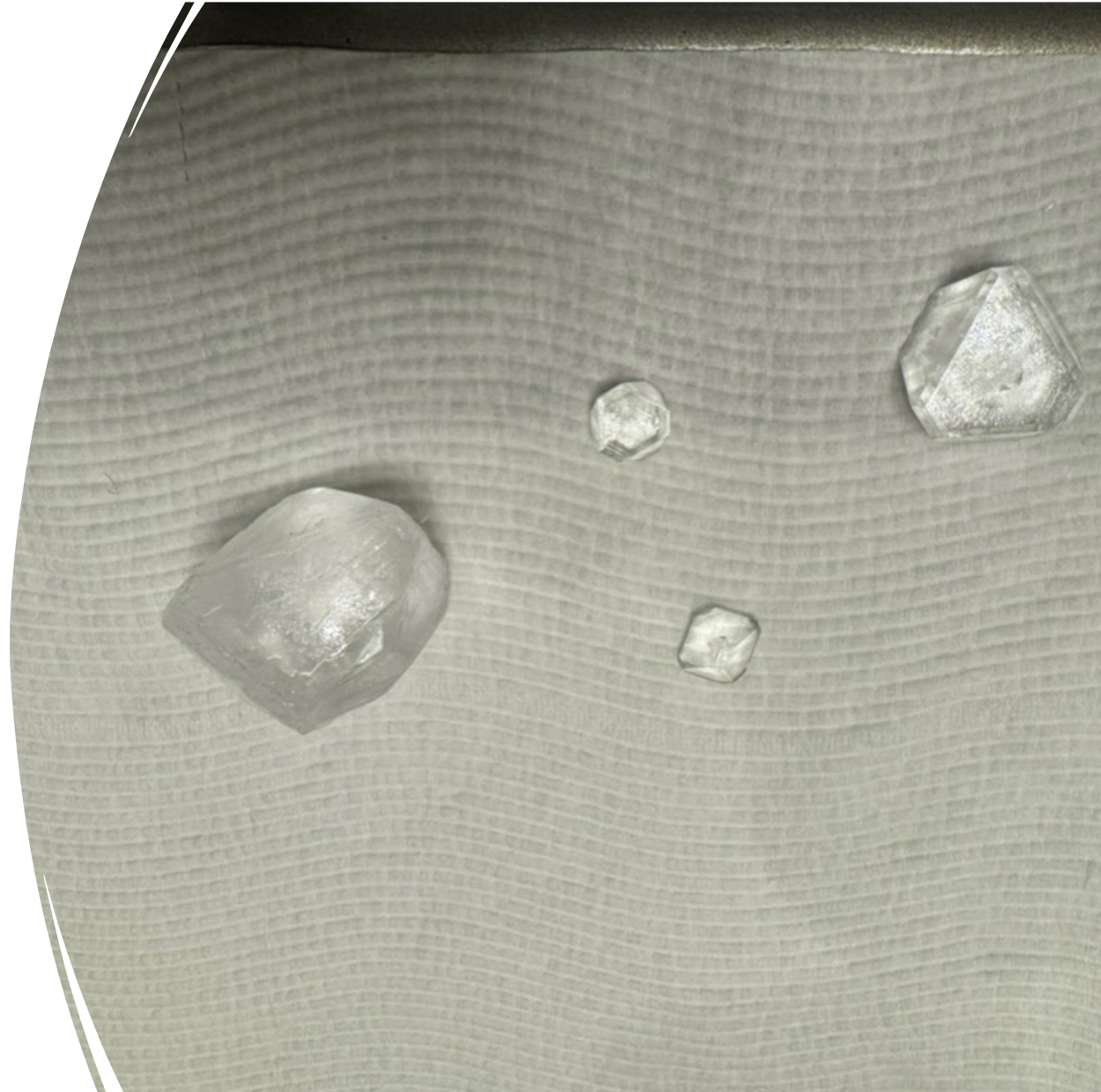
Final Crystals

Green = hanging,
purple – alone in
Pyrex, remaining
grouped together



Final Crystals chosen for entry

I've entered my favourite ones from each type. 1 hanging, 1 sitting in the bottom alone and 2 from the groups in alum. You can see that the hanging got big but cloudy, the alone one is really even but flat and the group ones that were left alone are really clear and sharp, but didn't grow as big.

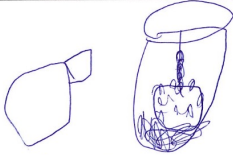
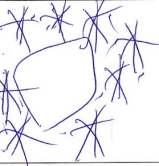
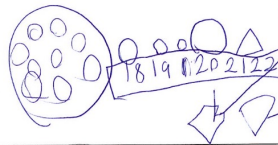

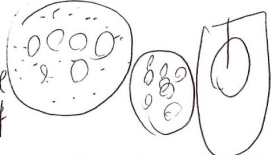


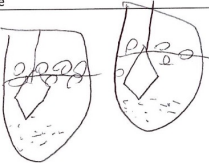
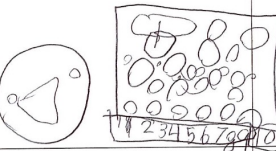


Charlotte Reade-brown

| Date | Picture | Size/Clarity |
|-------------------|---------|--|
| 10 May 2024 | | |
| 12 May 2024 | | 50 420 |
| 13 May 2024 | | 1 cloudy glittery |
| 15 May 2024 | | 2x big cloudy 3x medium clear like glass 5x small clear |
| 16 May 2024 | | 2x big cloudy 1x big clear 2x medium clear |



- My written logbook and drawings

| Date | Picture | Size/Clarity |
|-------------|---|---|
| 18 May 2024 |  | |
| 19 May 2024 |  | |
| 2 June 2024 |  | 1x big cler 2.8 cm 1x big bit cloudy and flat 1.5 cm |
| 4 June 2024 |  | |
| 8 June 2024 |  | |

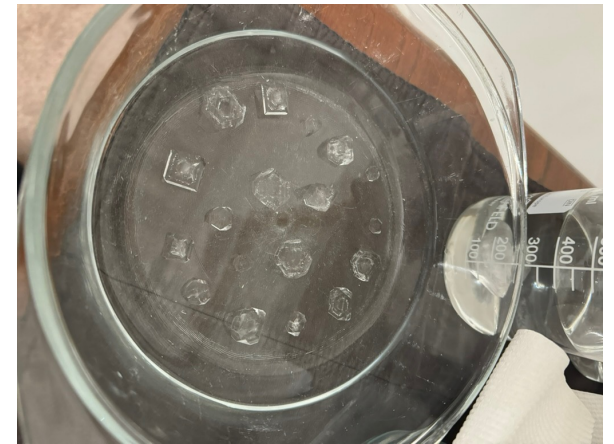
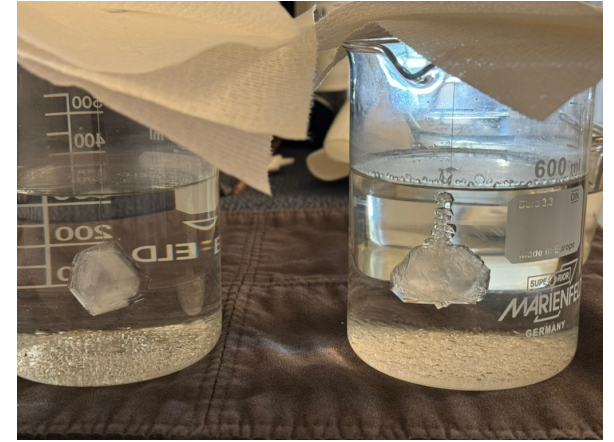
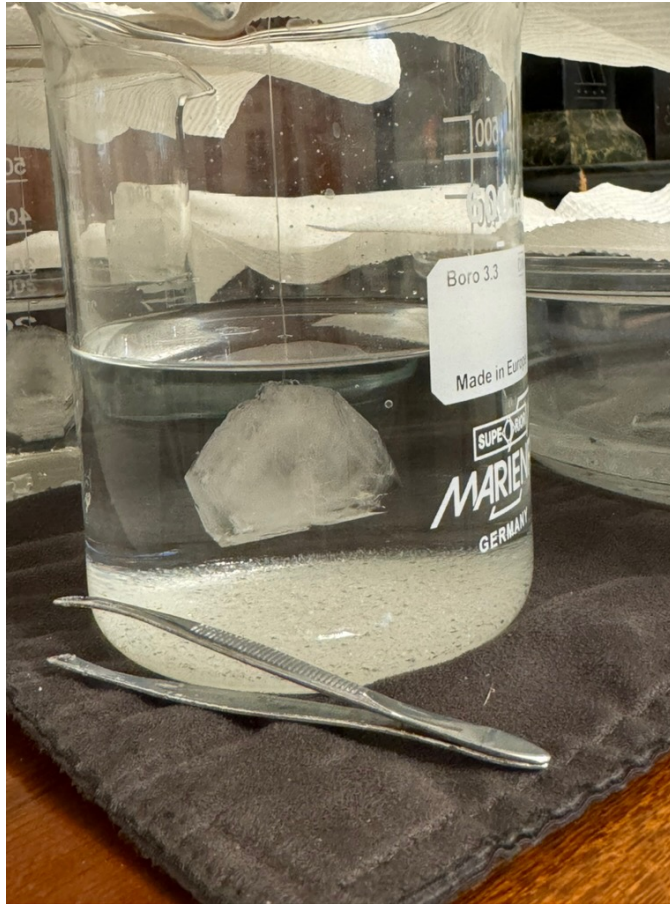
| Date | Picture | Size/Clarity |
|--------------|--|--|
| 30 June 2024 |  | 2 big cloudy 1 big rufes |
| 30 June 2024 |  | 2 mid cloudy cler Smol and meden |
| 2 July |  | 1.4.5 cm long 3.3 cm wide 2 points dimend rufes |
| |  | 2.4.7 cm long 4 cm wide to points Smooth bot most like bun |
| | | 3.2.3 sket in meters 2 point 7 meters long 1 senter mete ripeches bele clude Smooth sides |

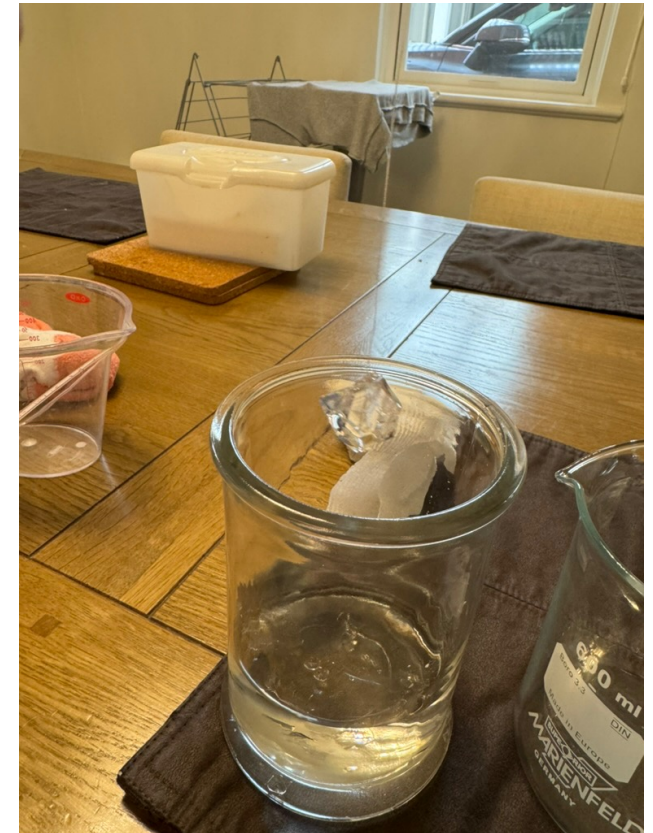
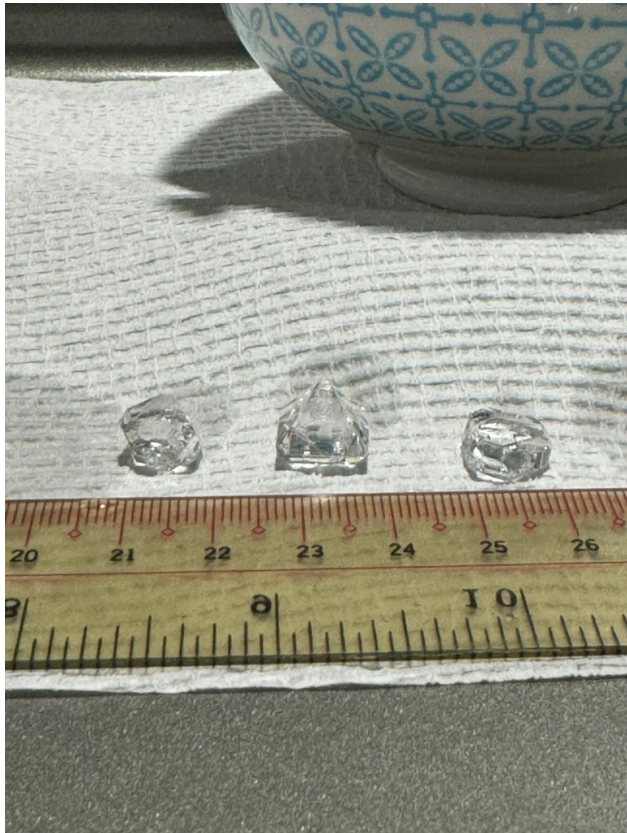
| Date | Picture | Size/Clarity |
|------|---------|--|
| | | 4.0 3.8 sent meters wid 3.5 sent meter wid 1.3 total Long vid |
| | | alot of crystals inside of it bupe shup echis |
| | | 5. the fest grop i captured was |
| | | the total itow works for the gugis. but he |
| | | er was 9 pto 6. the 2 group that i captured was not egis not in the island and |

| Date | Picture | Size/Clarity |
|------|---------|---|
| | | Yes crystals grow in on the sides. There was 8 of them |
| | | |
| | | |
| | | |
| | | |
| | | |

Starting out







Measuring is fun! I love the pyramid one, but it kept growing and lost its sharp edges when it stuck out of the water

Still growing!



The final big two from hanging



Too small or scratched/cloudy

