# Learning Portfolio #2 {Hattie Huang}

Current Submission Date:

Use this to reflect on areas of strength and how to improve as a learner for learning portfolio submissions and/or after test assessments.

| Doing well | Skills & habits for learning & assessment success | To improve |
|---|---|---|
| | Attend class & keep up on any missed classes | |
| | ● Engage fully during class time on all activities (no phone and brain on, active learning).<br>● Includes fully completing all work. | |
| | Collaboration with group; be a full participant, sharing your ideas and not relying on others to answer questions & complete work | |
| | Communication;<br>● communicate your understanding to peers and teacher as this solidifies learning and allows errors in understanding to be corrected.<br>● Ask questions of peers & teacher as needed.<br>● Test writing skills: Understanding question & thoroughly answering while matching quantity to marks. | |
| | Critical thinking; be sure to engage in analyzing content, what it is important for, how it related to other topics taught. Analyze your own understanding | |
| | Learning to learn;<br>● Identify learning gaps<br>● Take appropriate actions to correct & improve learning (includes practice outside of class, studying sufficiently and in advance of test)<br>● Seek help as needed<br>● Fully utilize quiz opportunities to improve understanding. | |
| | Other | |

Include the learning artifacts by copying your slides (eg 3-2-1), or for quia quizzes recording your score and noting questions you had incorrect using screenshots, inserting photos or any other means. Just ensure your methods are fairly easy for you and I will be able to determine your understanding. This portfolio is NOT intended to be time-consuming  beyond regular learning expectations, but should greatly enhance your learning and retention if instructions are followed :)

FOLLOW LIST provided on the submission tables in Learning Portfolio Description document

# Submission 2 Artifacts

# START ADDING ITEMS AFTER THIS SLIDE

IMPORTANT ORGANIZATION REQUIREMENTS:

- Keep MY ORDER: Orange background divider, THEN rubric, THEN checklist slide THEN your artifacts
- Put all extra artifacts AFTER the required ones.
- All images as LARGE AS POSSIBLE And UPRIGHT
- All Text **at least** size **14 point** (bigger is easier to read on my devices)
- DO NOT USE SPEAKER NOTES, just add more slides as needed you can use multiple slides for one artifact. Reflections can be on a new slide from the item.
- Put a LARGE title on each item that is easily readable in the “thumbnails” of slides to the left :)
- All this helps me and you to easily locate items and is part of meeting the organization grade.

# Stoichiometry and Solubility Table of Contect

| Topic | Materials I use |
| --- | --- |
| Household Products Activity | Google doc and Physics notes |
| Limiting Lab Questions | Physics notes |
| Double Displacement & Solubility Table Quia | Quia quiz |
| Solubility Curves Lab | Physics notes |
| Anki Deck for Stoichiometry & Solubility | Physics notes |

# Artifact: Household Products Activity

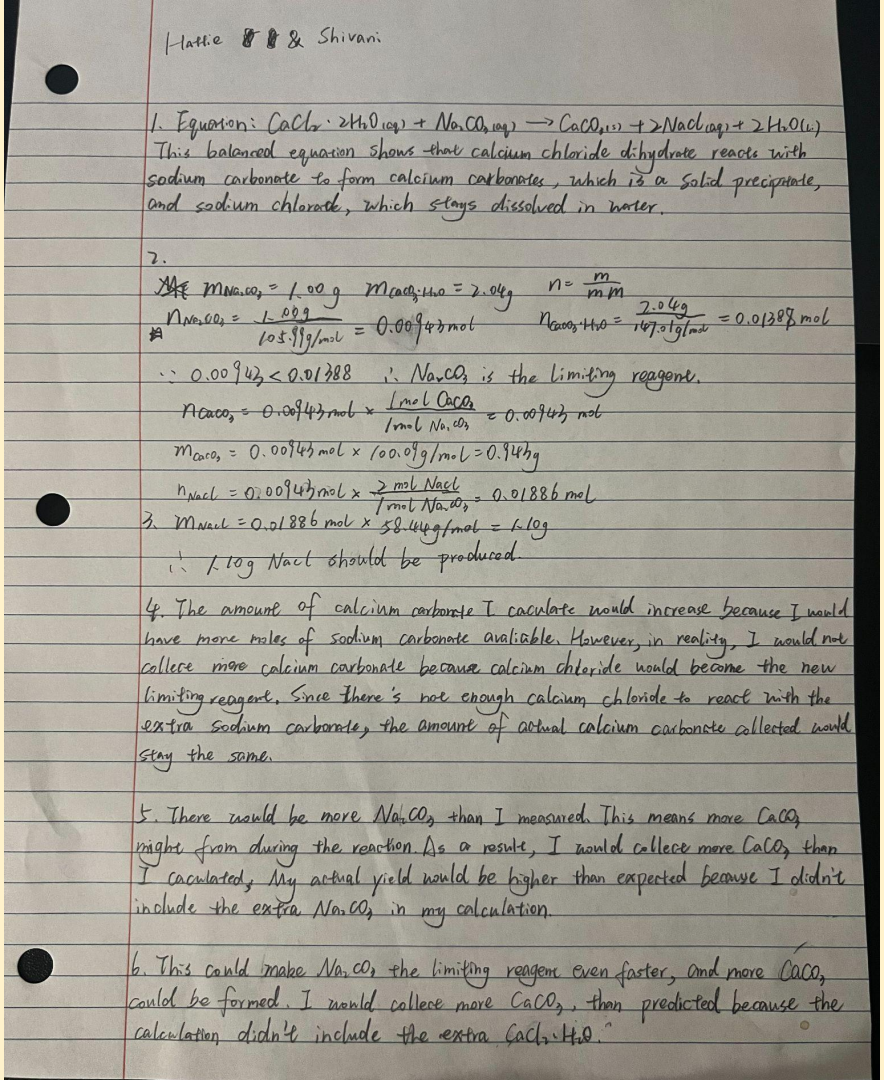
Link to original document:

https://docs.google.com/document/d/1yWURP5P_ywJJAff7J4n0miDUfFdznELkS21ZUyDE-Eo/edit?tab=t.0

# Extend: Household Products Activity

1. Justification for the product choice.
    - We chose baking soda and Lysol Toilet Bowl Cleaner to compare, in our comparison, baking soda and Lysol Toilet Cleaner have the same cleaning effect and baking soda is a more environmentally friendly cleaning product. However, for stubborn stains, I would recommend Lysol Toilet Bowl Cleaner because although it is not as environmentally friendly and baking soda, the titled bottle design makes it easier to usa. Users an utilize the Lysol Toilet Bowl Cleaner by using it properly, such as wearing gloves or glasses. On the other other hand baking soda does not provide the same deep cleaning and sanitizing as the Lysol Toilet Bowl Cleaner. So I would like to recommend using Lysol Toilet Bowl Cleaner.

# Artifact: Limiting Lab Questions



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1. Equation: $CaCl_2 \cdot 2H_2O_{(aq)} + Na_2CO_{3(aq)} \longrightarrow CaCO_{3(s)} + 2NaCl_{(aq)} + 2H_2O_{(l)}$
This balanced equation shows that calcium chloride dihydrate reacts with sodium carbonate to form calcium carbonate, which is a solid precipitate, and sodium chloride, which stays dissolved in water.

2.
$m_{Na_2CO_3} = 1.00\,g$ $m_{CaCl_2 \cdot H_2O} = 2.04\,g$ $n = \frac{m}{mm}$

$n_{Na_2CO_3} = \frac{1.00\,g}{105.99\,g/mol} = 0.00943\,mol$ $n_{CaCl_2 \cdot H_2O} = \frac{2.04\,g}{147.01\,g/mol} = 0.01388\,mol$

$\therefore 0.00943 < 0.01388$ $\therefore Na_2CO_3$ is the limiting reagent.

$n_{CaCO_3} = 0.00943\,mol \times \frac{1\,mol\,CaCO_3}{1\,mol\,Na_2CO_3} = 0.00943\,mol$

$m_{CaCO_3} = 0.00943\,mol \times 100.09\,g/mol = 0.943\,g$

$n_{NaCl} = 0.00943\,mol \times \frac{2\,mol\,NaCl}{1\,mol\,Na_2CO_3} = 0.01886\,mol$

3. $m_{NaCl} = 0.01886\,mol \times 58.44\,g/mol = 1.10\,g$

$\therefore 1.10\,g$ NaCl should be produced.

4. The amount of calcium carbonate I caculate would increase because I would have more moles of sodium carbonate available. However, in reality, I would not collect more calcium carbonate because calcium chloride would become the new limiting reagent. Since there's not enough calcium chloride to react with the extra sodium carbonate, the amount of actual calcium carbonate collected would stay the same.

5. There would be more $Na_2CO_3$ than I measured. This means more $CaCO_3$ might form during the reaction. As a result, I would collect more $CaCO_3$ than I caculated. My actual yield would be higher than expected because I didn't include the extra $Na_2CO_3$ in my calculation.

6. This could make $Na_2CO_3$ the limiting reagent even faster, and more $CaCO_3$ could be formed. I would collect more $CaCO_3$ than predicted because the calculation didn't include the extra $CaCl_2 \cdot H_2O$.

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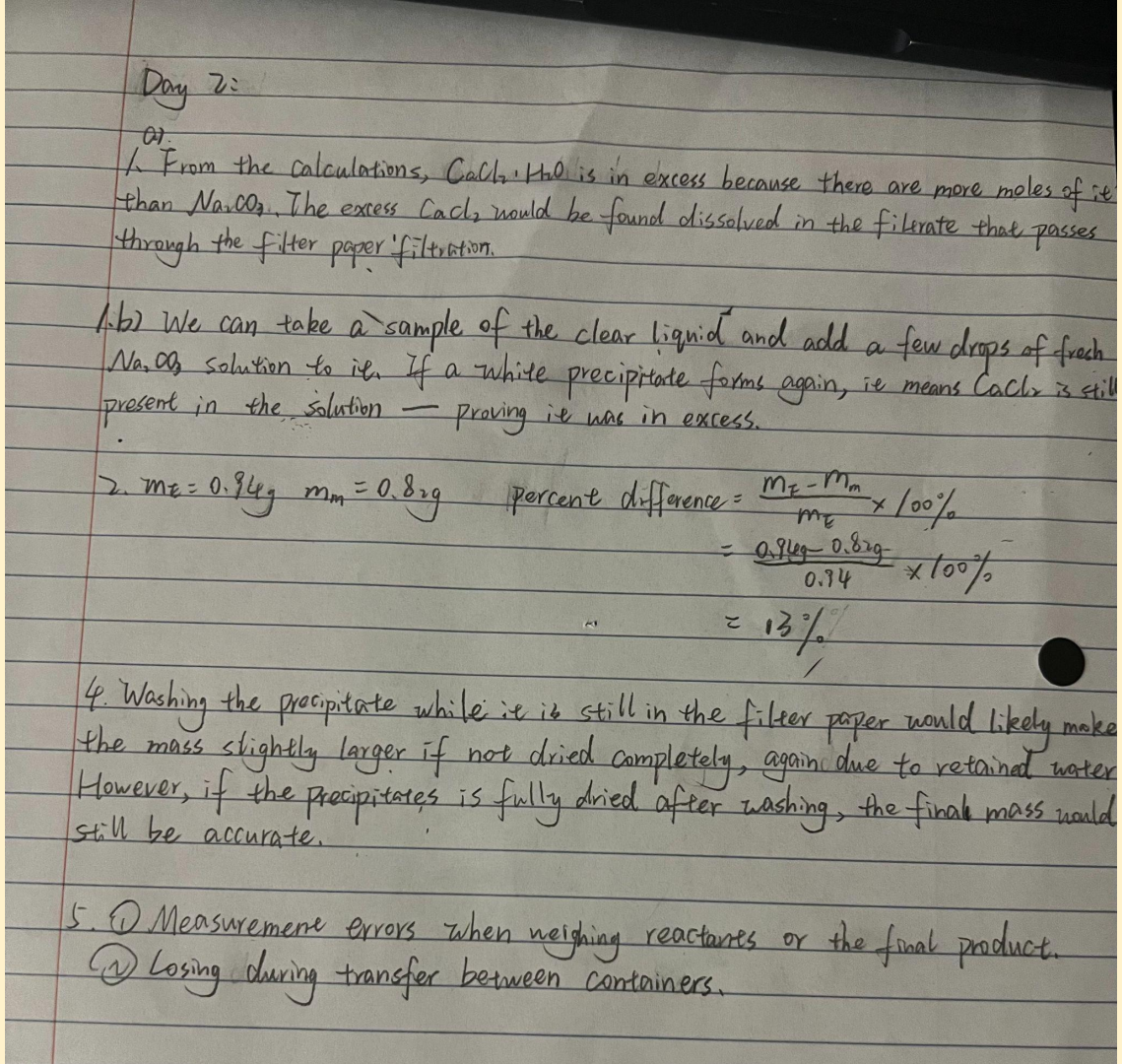
# Artifact: Limiting Lab Questions



Day 2:

Q1.

1.a) From the calculations, $CaCl_2 \cdot H_2O$ is in excess because there are more moles of it than $Na_2CO_3$. The excess $CaCl_2$ would be found dissolved in the filtrate that passes through the filter paper filtration.

1.b) We can take a sample of the clear liquid and add a few drops of fresh $Na_2CO_3$ solution to it. If a white precipitate forms again, it means $CaCl_2$ is still present in the solution — proving it was in excess.

2. $m_E = 0.94g$ $m_m = 0.8g$ percent difference $= \frac{m_E - m_m}{m_E} \times 100\%$

$= \frac{0.94g - 0.8g}{0.94} \times 100\%$

$\approx 13\%$

4. Washing the precipitate while it is still in the filter paper would likely make the mass slightly larger if not dried completely, again due to retained water. However, if the precipitates is fully dried after washing, the final mass would still be accurate.

5. ① Measurement errors when weighing reactants or the final product.
② Losing during transfer between containers.

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# Extend: Limiting Lab Questions

1. Why in a “real world” reaction you will always have a limiting and excess reactant?
   - Because in the real world, some reactants may stick to the container and not fully dissolve or react. In addition, there is the possibility that some reactants may react with their product twice, which can also lead to reactions that don’t produce the substance as one would like. So chemists will add excess reactants to cause another reactants to become a limiting reagent, which ensures that the reaction does not end prematurely and that the product is produced as desired.

2. Briefly explain at least two factors that should be considered in deciding which reactant to have in excess?
   - When deciding on the excess reactant, we should first choose a relatively cheap reactant, which will reduce the cost of experiment, so the cost of reactant is a factor of deciding on the excess reactant.
   - When deciding on the excess reactant, we should choose a reactant that is easy to separate from the product, as this will help to better confirm the yield of the product.

# Artifact: Double Displacement & Solubility Table Quia Quiz

8. Predict the products for the following equation. $Pb(NO_3)_{2(aq)} + KI_{(aq)} \Rightarrow$
   - My Result: No reaction.
   - My error: I answered with “No reaction” because I think K is more active than Pb, but I forget the active series is used for single displacement, and this questions is double displacement, I need to use solubility table to determine whether a reaction has occurred. Now I use solubility table to determine whether a reaction has occurred, and I find this reaction has a precipitate is $PbI_2$ . So this reaction products are $PbI_2$ and $KNO_3$.
   - Correct Answer: $PbI_{2\,(s)} + KNO_{3(aq)}$
   - Explanation: Because this reaction is a double displacement reaction, and in this reaction, the cations and anions from the two compounds will switch places. When $Pb(NO_3)_2$ and KI are mixed, $PbI_2$ forms a yellow precipitate, while $KNO_3$ remains dissolved in water. So $PbI_{2\,(s)} + KNO_{3(aq),}$ is the correct answer not the No reaction.

# Artifact: Double Displacement & Solubility Table Quia Quiz

9. Predict the products for the following equation. $CuCl_2 + H_2S \Rightarrow$
   - My Result: No reaction.
   - My error: I answered with “No reaction” because I thought that since both $CuCl_2$ and $H_2S$ were in solution, nothing would happen. I didn’t realize it was a double displacement reaction, and I didn’t use solubility to determine whether this reaction will produce a precipitate. Now I use solubility to find $Cu^{2+}$ from $CuCl_2$ and $S^{2-}$ from $H_2S$ will combine to form CuS, it is a precipitate because it is insoluble in water, so the reaction is occurred.
   - Correct Answer: $CuS_{(s)} + HCl_{(aq)}$
   - Explanation: Because this reaction also is a double displacement reaction, and the copper ions from $CuCl_2$ combine with the sulfide ions from $H_2S$ to form CuS, which is a black precipitate. This shows that a reaction happens because a solid form in solution. So $CuS_{(s)} + HCl_{(aq)}$ is the correct answer not the No reaction.

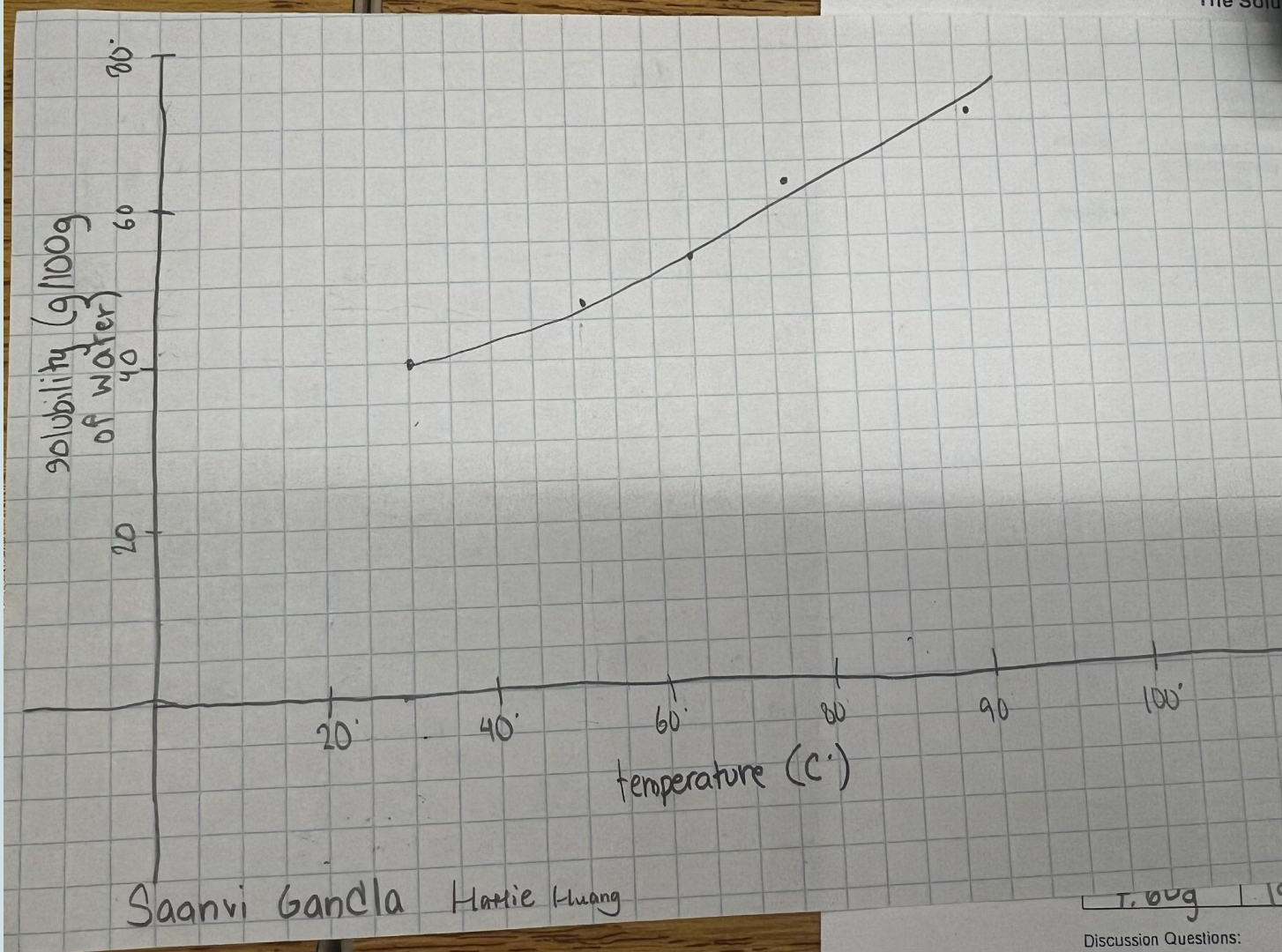
# Extend: Double Displacement & Solubility Table Quia Quiz

1. The difference between using the activity series and using the solubility table.
    - The activity series is used in single replacement reactions to determine whether an element in a compound is active enough to replace an element in another compound, and if the element is active enough then a single replacement reaction will occur, and vice versa.
    - The solubility table is used in double displacement reactions to determine whether he products of the reaction form a fixed precipitate, if the reaction produces a precipitate, this means that the reaction have occurred and vice versa.

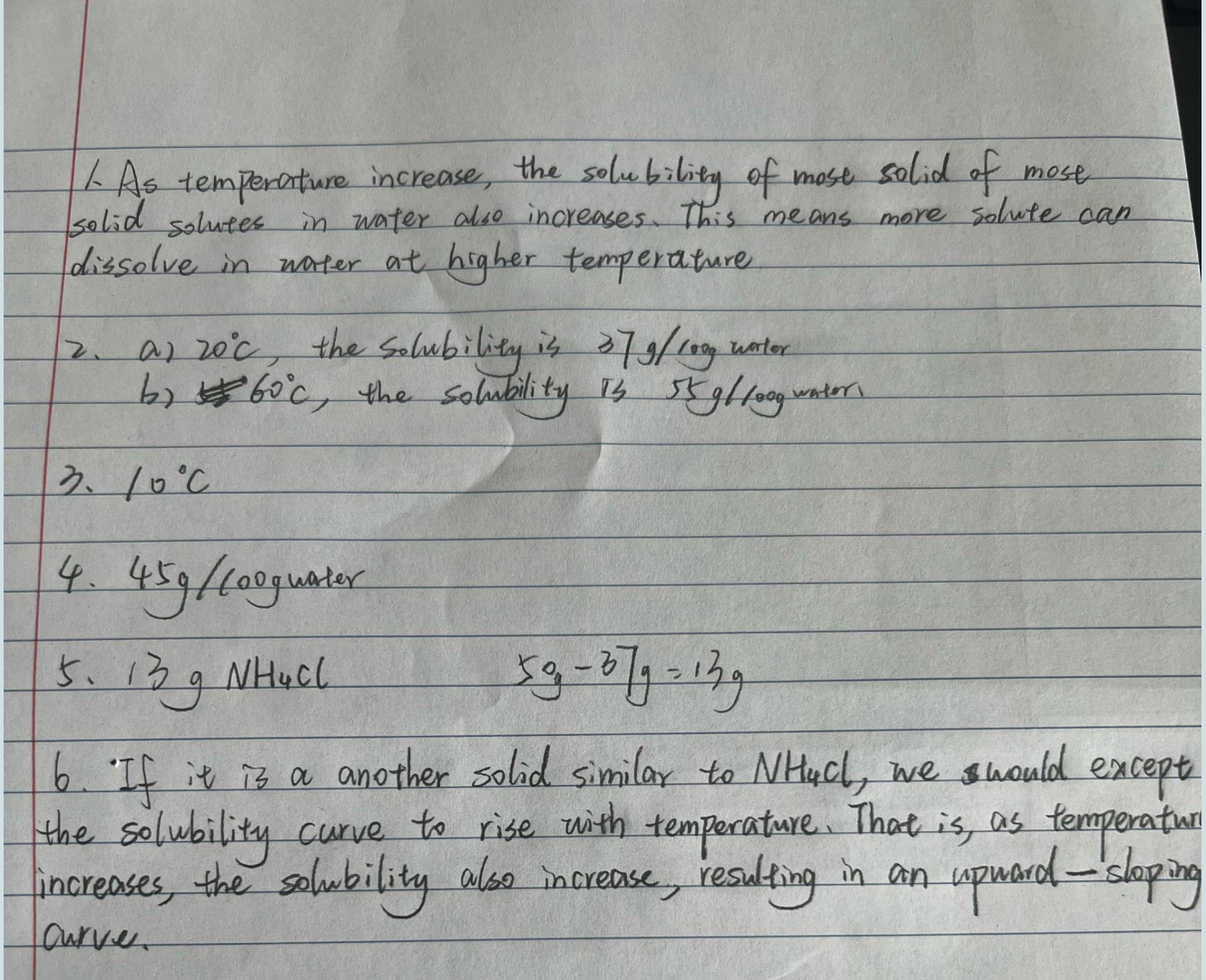
# Artifact: Solubility Curves Lab

| Mass of $NH_4Cl$ (g) | Mass of Water (g) | Concentration (g of solute/g of water) | Solubility (g of solute/100 g of water at saturation) | Temperature (°C) |
|---|---|---|---|---|
| 7.60g | 10.0g | 0.76 | 76.0 | 91°C |
| 7.60g | 12.0g | 0.63 | 63.3 | 78°C |
| 7.60g | 14.0g | 0.54 | 54.3 | 65°C |
| 7.60g | 16.0g | 0.48 | 47.5 | 52°C |
| 7.60g | 18.0g | 0.42 | 42.2 | 40°C |

# Artifact: Solubility Curves Lab



# Artifact: Solubility Curves Lab



1. As temperature increase, the solubility of most solid of most solid solutes in water also increases. This means more solute can dissolve in water at higher temperature

2. a) 20°C, the solubility is 37 g/100g water
   b) ~~6~~60°C, the solubility is 55 g/100g water

3. 10°C

4. 45g/100g water

5. 13g $NH_4Cl$ 50g − 37g = 13g

6. If it is a another solid similar to $NH_4Cl$, we would except the solubility curve to rise with temperature. That is, as temperature increases, the solubility also increase, resulting in an upward-sloping curve.

# Extend: Solubility Curves Lab

1. Briefly research and describe in a paragraph, on practical application of understanding solubility curves.
    - The practical application of the solubility curve is in industrial production, where it goes to not only purify and collect solid products but also remove impurities in many industries. To accomplish this, workers can control the temperature by applying the solubility curve to saturate the amount of solute dissolved in hot water, and then lower the temperature of the solution to purify the solute they want. Such a method can help industrial production to reduce the waste of materials, thus reducing costs.

# Extension Artifact: Anki Deck for Stoichiometry & Solubility

https://ankiweb.net/decks

**DO NOT MOVE OR ALTER THIS SLIDE. LEAVE IT AT THE END OF ALL YOUR ARTIFACTS (last portfolio Slide)**

**Marking Checklist will be inserted here.**

Marks added to Portfolio 1:

# IMPROVED Submission 1 Artifacts

Include AFTER this orange slide by copying in original work then improved. Only work below Level 3 (ie 3- and less) may be improved.

NOTE you MUST copy in the Portfolio 1 Marking checklist I inserted into Portfolio 1 so I ~~can~~ compare to improved work.

# IMPROVING PREVIOUS PORTFOLIO?
# PLEASE FOLLOW THESE INSTRUCTIONS

Copy and paste this New stamp to any slide that is New --->


- Copy in the **marker checklist** (one that I put into your portfolio with comment) from Portfolio 1.
- Copy in only items your are improving, ensuring you DO NOT ALTER the original work
- If you are ADDING to a slide (eg adding a new explanation with better understanding), make it clear (eg RED text is new/new image added etc)
- If you are adding a new slide (eg leaving images of original work but putting in new slide with images of improved work) please mark the slide with the New Stamp

# YOU MUST Copy in Portfolio 1 Marking Checklist Slide

| #1 Submission | | | |
|---|---|---|---|
| **Item** | | **Level** | **Comments** |
| ORGANIZATION (only whole number levels 1, 2, 3, 4, & 4+) | | 4 | perplexing that you used "cells" table of contenst.. suggests copying from a pior biology student but edit history looks like you did your own work. Be careful! Remember to put your full name on all pieces of paper. |
| Aluminum 3-2-1 with improvements(Exp 3) | | 4+ | |
| Extend (explain importance) | | | |
| *Periodic Trends (Exp 1)* | | 3 | Trends: Remember you are allowed to improve an item after feedback & include best work in portfolio. Shape of second graph has large errors. Check that your axis and question answers have units when needed. answers are done but predicted radii are incorrect and others needed more detail to show understanding. The limited coverage of quantum in the course suggests that the answer to 11b is not reflecting your own understanding and thinking. Please avoid this if that is the case in all future work. |
| Extend (relate ioniz & ion formation to radius) | | | good |
| **Nomenclature Quiz (Exp2) & explain 2** | | 4- | report your result. |
| Extend (acid naming examples & descrip) | | | |
| ***Building Molecules (Exp2) & feedback reflect*** | | 4- | Build mol: Good, at least one error in name, shape or polarity to check over. Show calc for bond polarity. Feedback is not commented on... anything you corrected after reading it? |
| Extend (Explain 2 factors shape & polarity) | | | good |
| Extension artifact (Exp 1/3) | | 4+ | |
| Overall | | | |