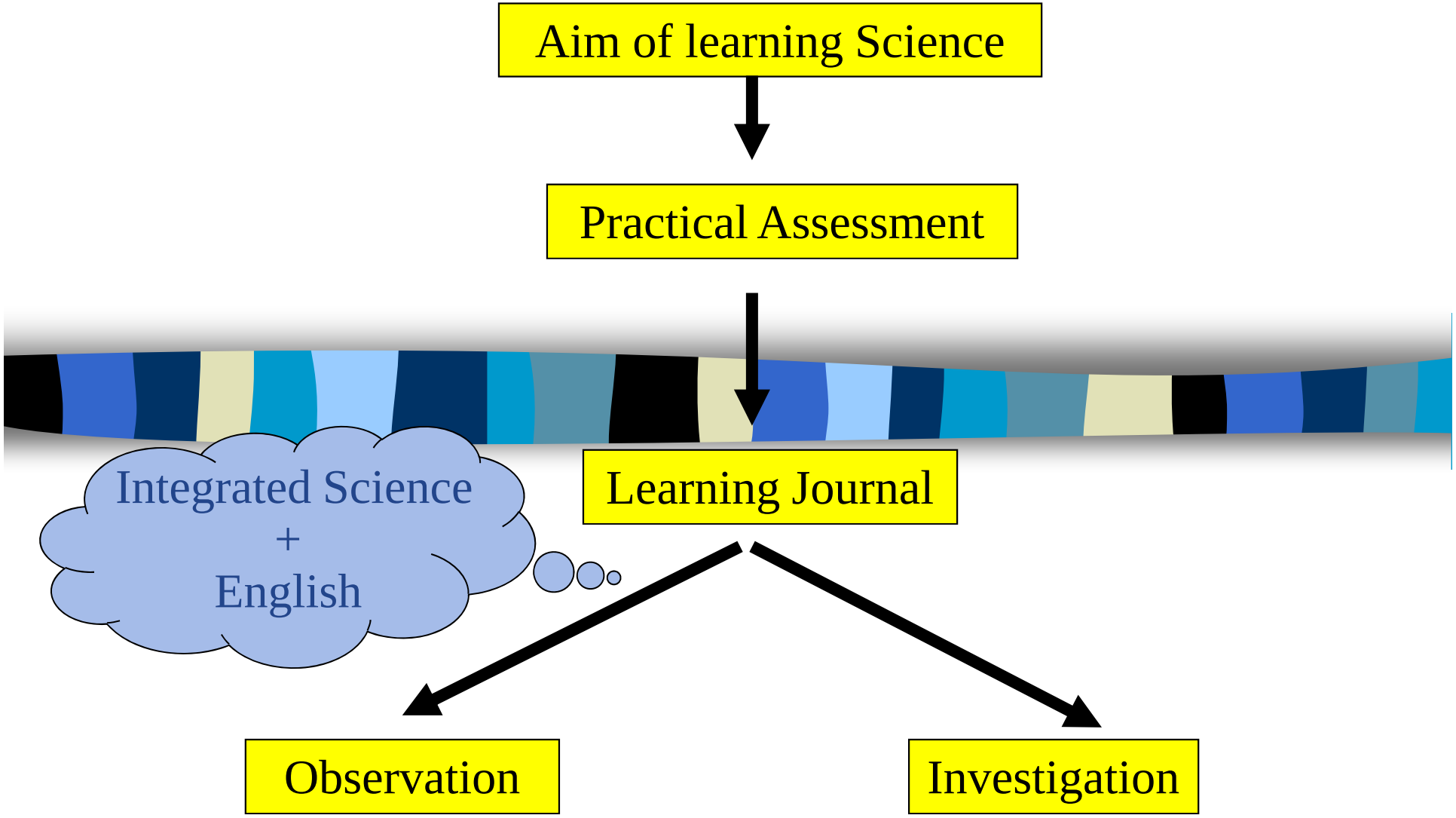
The collaborative teaching between two subjects

Munsang College

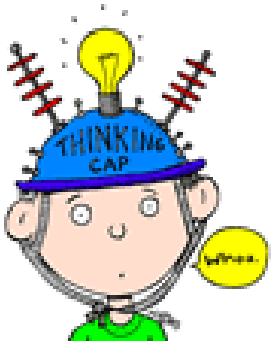
Ms Cheung Tung Ping

Mr. Kan Yu Hin, Kevin


Aim of learning Science
Practical Assessment
Integrated Science
+
English
Learning Journal
Observation
Investigation

Learning Science

- Cognitive domain

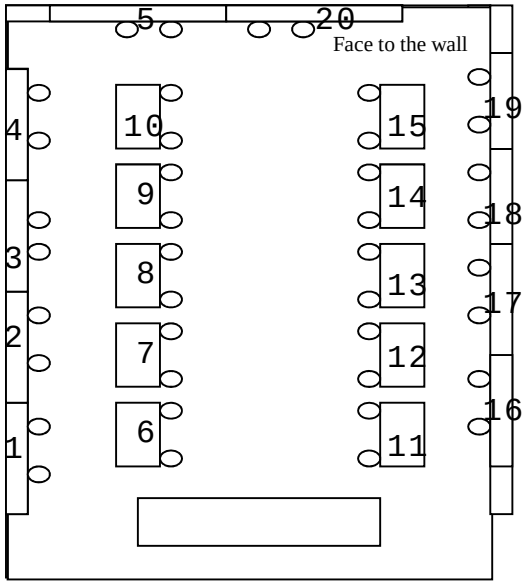


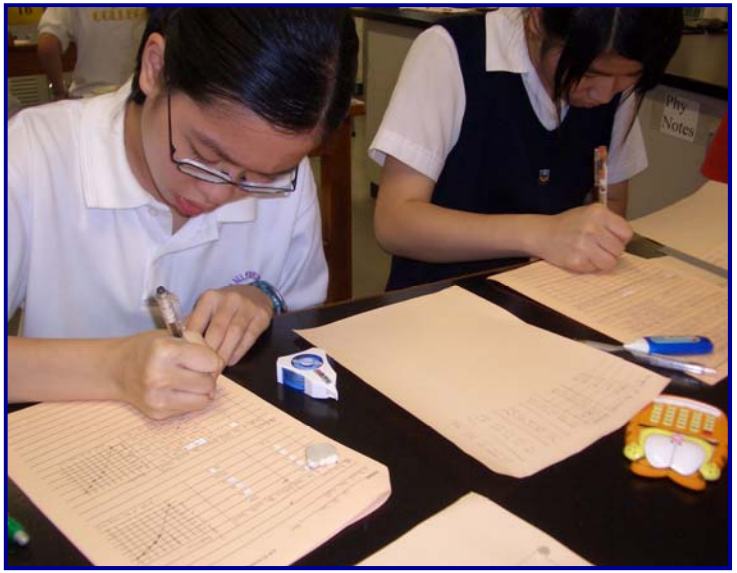
- Psychomotor domain

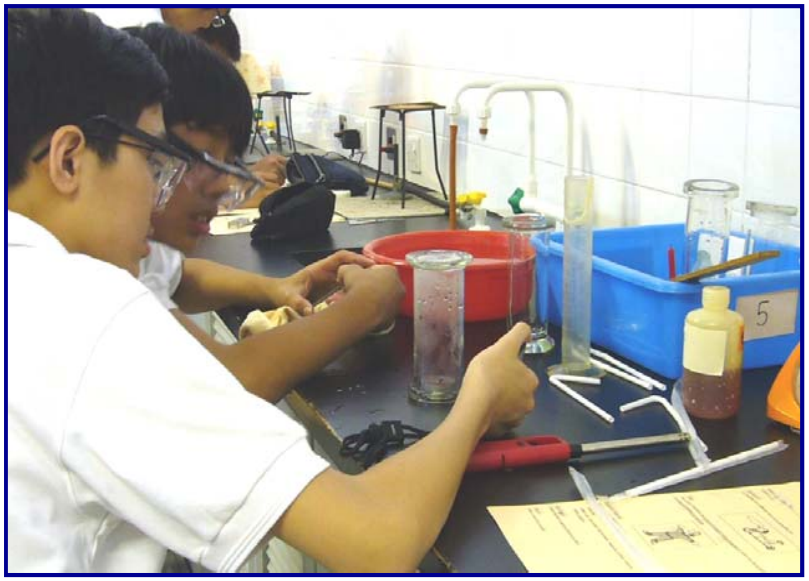
- Affective domain

Investigative Practical Assessment

5 min	Seating allocation (2 students in a group)
45 min	Read the question. Discuss, design & do the experiment
40 min	Write the laboratory report individually.







2 laboratory reports from the same group

PAPER A

19/20

I. Task:

- to find out how the height of the ramp affects the distance a marble travelled in the track

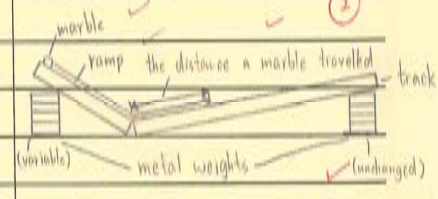
II. What will be measured:

- the distance a marble travelled in the track
- the height of the ramp

III. What will be keep constant:

- the marble
- the ruler
- the height of the track
- the length of the ramp

How to set up:



IV. What will be changed:

- the height of the ramp

V. Material:

- marble x 1
- ramp x 1
- ruler x 1
- metal weight x 8
- track x 1

VI. Procedure:

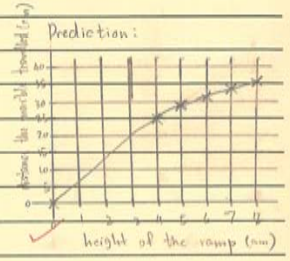
1. Put the marble at the top of the ramp of different height.
2. Let the marble roll from the ramp.
3. Measure the distance the marble travelled in the track.

4. Record the result.

VII. Prediction:

height of the ramp	distance the marble travel
0 cm	0cm
4cm	25cm
5 cm	29 cm
6 cm	33 cm
7cm	37 cm
8cm	41 cm

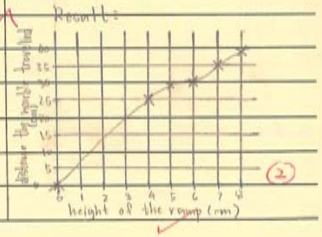
Prediction:



VIII. Result:

height of the ramp (cm)	distance the marble travel (cm) 1st	2nd	3rd	4th	5th
0					
4	27	28	25	23	23
5	29	28	32	32	28
6	28	~~25~~	27	31	30
7	~~25~~	39	39	39	35
8	36	30	37	39	35

Result:



IX. Conclusion:

I found that when the height of the ramp was higher, the distance the marble travelled was longer. Similarly, when the height of the ramp was lower, the marble would travel a shorter distance.

X. Evaluation:

During the above investigation, I faced a big problem. That was how to make the marble stop in a certain area. Because I found the marble would roll away when it rolled down from the ramp. But still we slove the problem with the above set up. Also I how to found an acurate reading is another difficulty. Because the marble rolled too fast so that we couldn't see an acurate reading easily. Finally, I think my result won't believable because the variation of the result is too large. We may use a track with a higher resistance next time. Then I can place it horizontally and find out the reading easily.

good suggestion !

2 laboratory reports from the same group

Investigation

Introduction.

A ball is put on the top of a slide and let it roll down along the ramp

Task.

I need to find out how the height of the ramp affects the distance a marble traveled in the track.

Material used.

marble x1 metal ruler x1

metal weights x8 ramp (long) x1

ramp (Short) x1

Method.

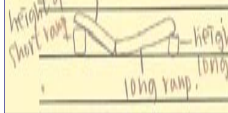
First I let the height of the ramp be 4cm. Then I used the short ramp. The long ramp is put near the short ramp.

After five measurement I go to the next height of ramp.

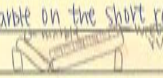
Each time I increase 1cm. until the fifth time, 8cm

Procedure.

First I set up the experiment.



Then I put the marble on the short ramp. The meter ruler is near the long ramp.



When it roll down from the short ramp, it will roll to the long ramp. where is the marble stop and roll back, the place is our result. Right

We do each 6cm five times, the long ramp's height doesn't change. The short ramp's height increase 1 cm each time.

Variables - to be change - the height of the Short ramp.

- to be keep contast - the metal ruler, the marble, the long and short ramp, the metal weights.
- to be compare - the distance that marble traveled

Result.

The height of the short ramp	Distance that the ball roll on the long ramp				
	First Time	Secon Time	Third Time	Forth Time	Fifth Time
4cm	27 cm	28 cm	25 cm	23 cm	23 cm
5cm	29 cm	28 cm	32 cm	32 cm	28 cm
6cm	28 cm	22 cm	27 cm	31 cm	30 cm
7cm	25* cm	39 cm	39 cm	39 cm	35 cm
8cm	36 cm	30 cm	37 cm	39 cm	35 cm

* Because this result is not appropriate to other result, so I calculate two result, one is include this and one isn't.

Average Distance.

Distance / Time	4cm	5cm	6cm	7cm	8cm
	25.2	29.8	27.6	38 (35.4)	35.4

Conclusion.

The result shows that if the height of the short ramp is ~~heig~~ higher, the distance that the marble roll is more. The degree of the short ramp is bigger, the marble moves faster and the distance that it rolls is longer.

Reflection.

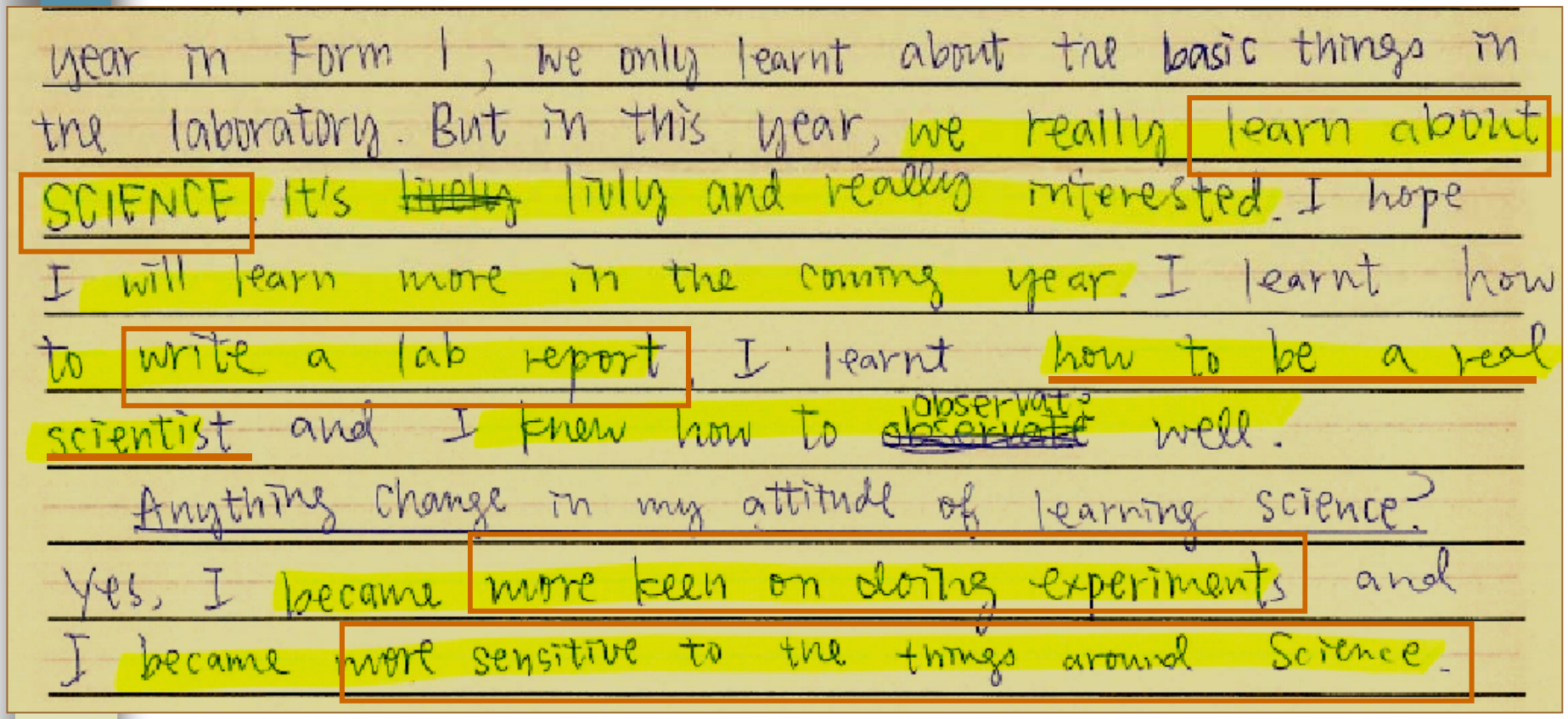
I think our expriment is not good enough. It can't clearly shows that how the height of the ramp affects the distance that marble travelled. For example the result of 5cm and 6cm, it is not increase but decrease.

And sometimes the gap between the short ramp and the long ramp always affects our result. Although we had tried something to decrease it; friction, it didn't ~~have~~ work much.

Also, we had used too much time on thinking how to set up the experiment. Until we did the experiment, It only had fifteen minutes left.

You spent much time to solve the problem. Efficiently you still collected enough data. You did repeat measurement in the experiment, the data would be more accurate.

Students' Reflection



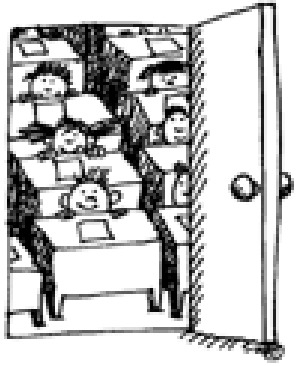
year in Form 1, we only learnt about the basic things in the laboratory. But in this year, we really learn about SCIENCE. It's ~~lively~~ truly and really interested. I hope I will learn more in the coming year. I learnt how to write a lab report. I learnt how to be a real scientist and I knew how to ~~observate~~ observation well.

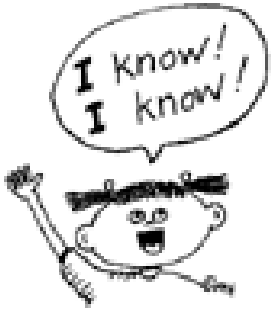
Anything change in my attitude of learning science?

Yes, I became more keen on doing experiments and I became more sensitive to the things around Science.

How do they learn?

Students’ Learning Journal



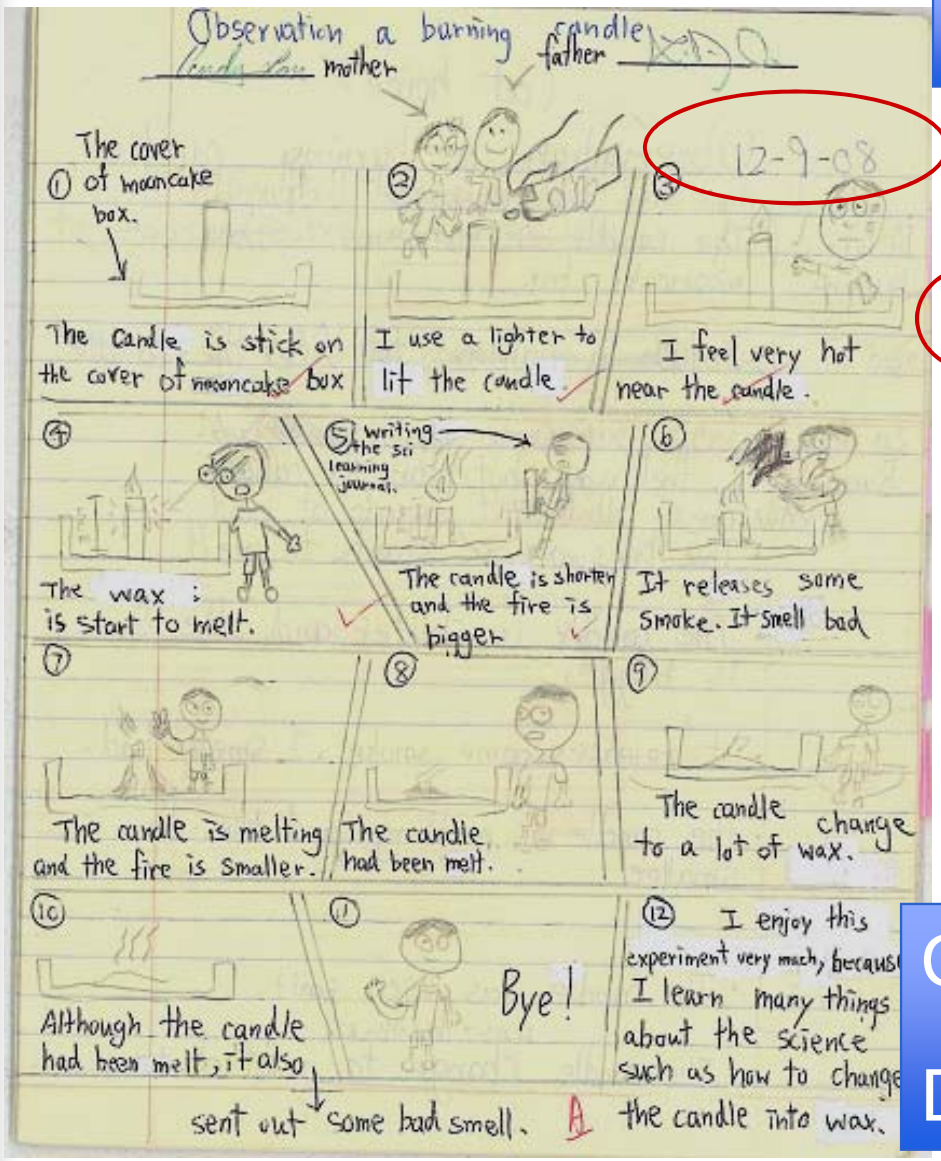


- A **Learning Journal** helps students learn science through the recording of their learning processes:
  - Observation
  - Scientific Investigation

Observation

Observing a burning candle

Observing a burning candle



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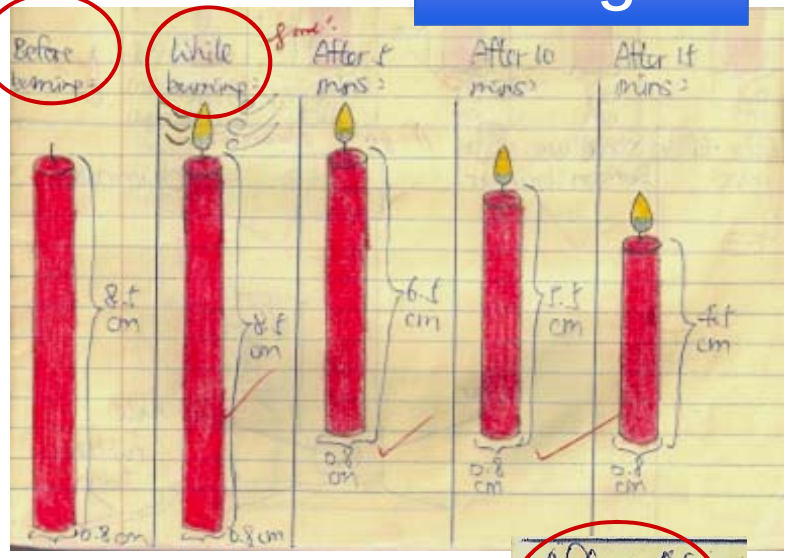
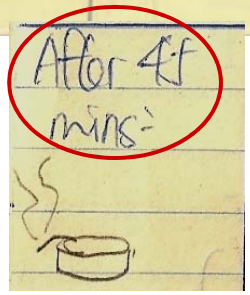
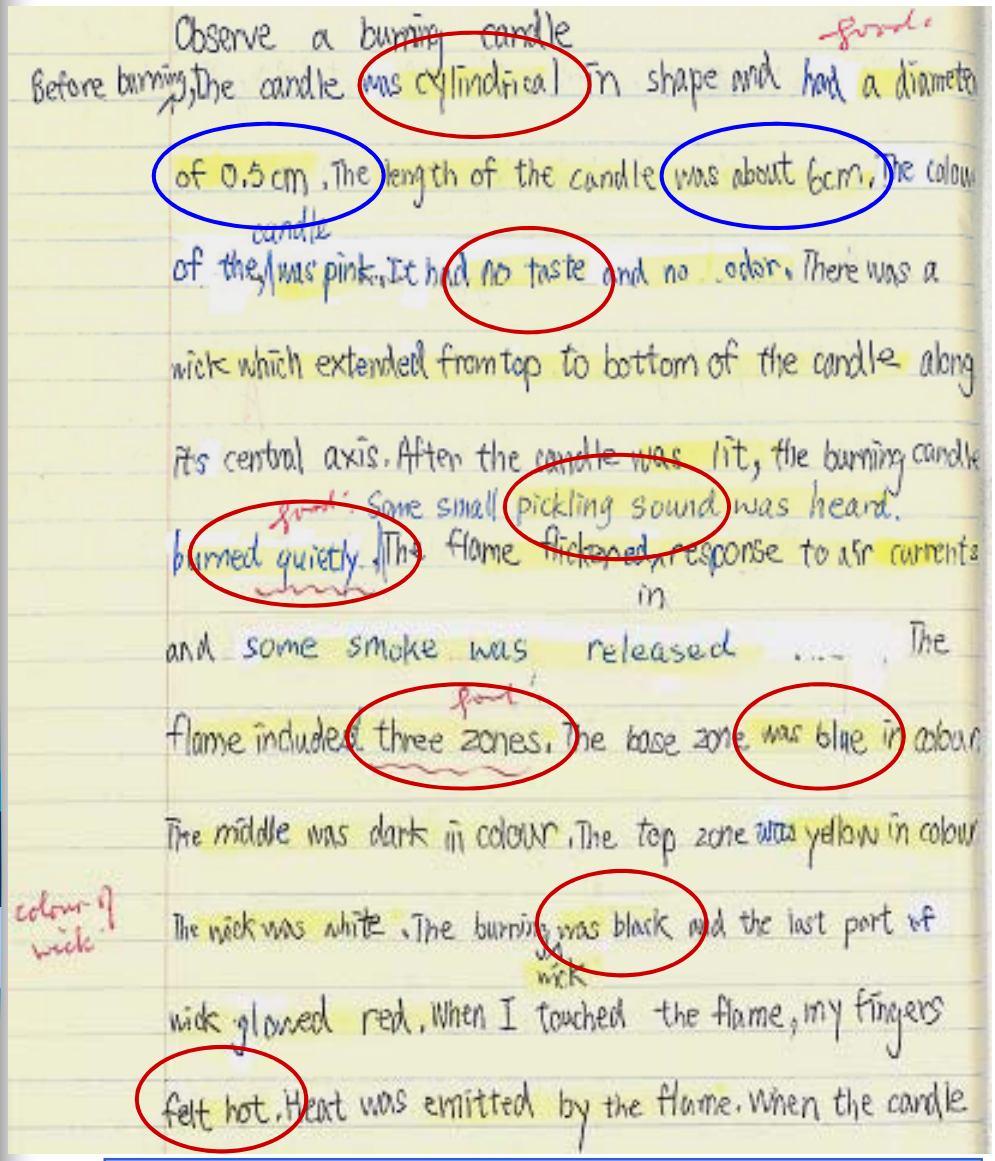
3 stages





Cartoon + Description

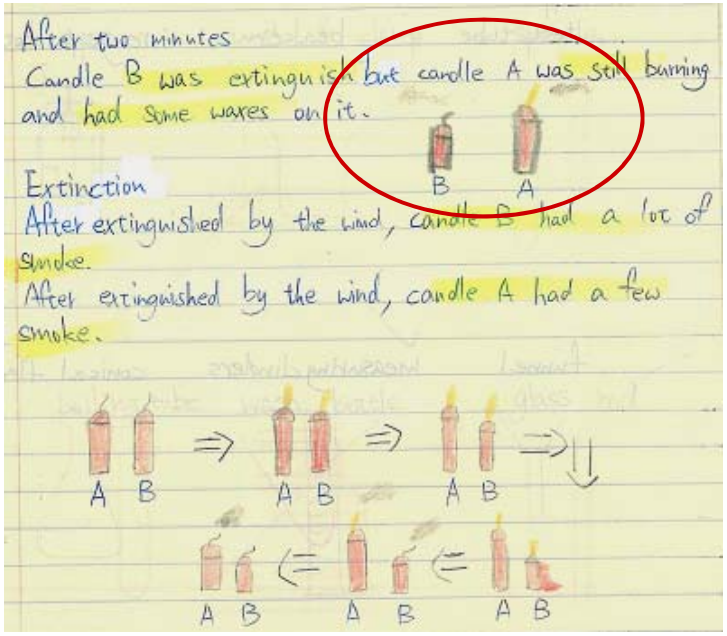
Observing a burning candle



Observe a burning candle

Before burning, the candle was cylindrical in shape and had a diameter of 0.5 cm. The length of the candle was about 6cm. The colour of the candle was pink. It had no taste and no odor. There was a wick which extended from top to bottom of the candle along its central axis. After the candle was lit, the burning candle burned quietly. Some small pickling sound was heard. The flame flickered in response to air currents and some smoke was released .... The flame included three zones. The base zone was blue in colour. The middle was dark in colour. The top zone was yellow in colour. The wick was white. The burning wick was black and the last part of wick glowed red. When I touched the flame, my fingers felt hot. Heat was emitted by the flame. When the candle

Quantitative, qualitative



After two minutes
Candle B was extinguished but candle A was still burning and had some waxes on it.

B A

Extinction
After extinguished by the wind, candle B had a lot of smoke.
After extinguished by the wind, candle A had a few smoke.

A B ⇒ A B ⇒ A B ⇒

A B ⇐ A B ⇐ A B

Comparing 2 candles

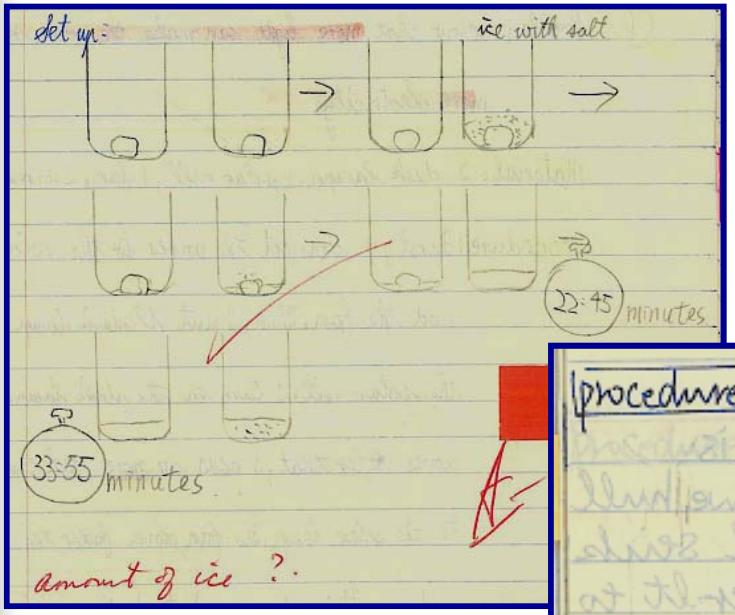
Using our 5 senses to do Observation

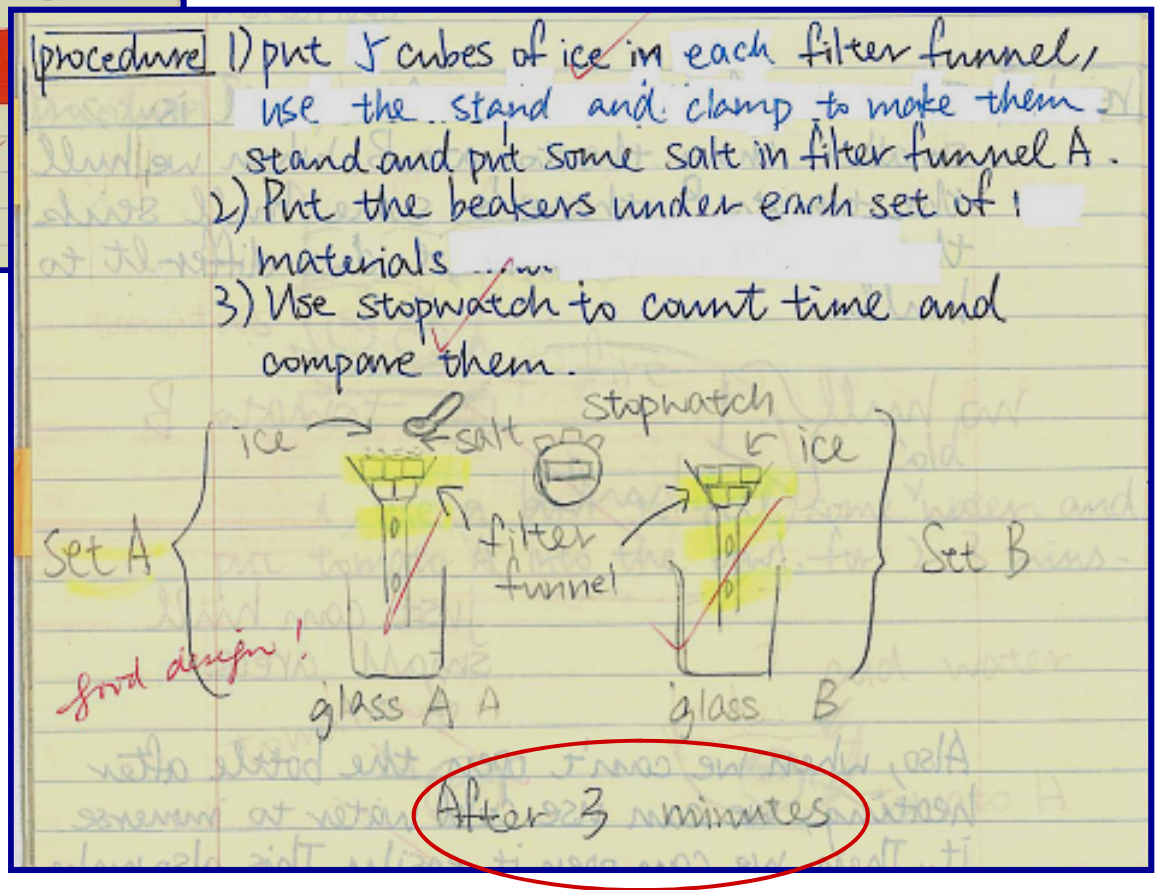
- A **Learning Journal** helps students learn science through the recording of their learning processes:

  - Observation
  - Scientific Investigation

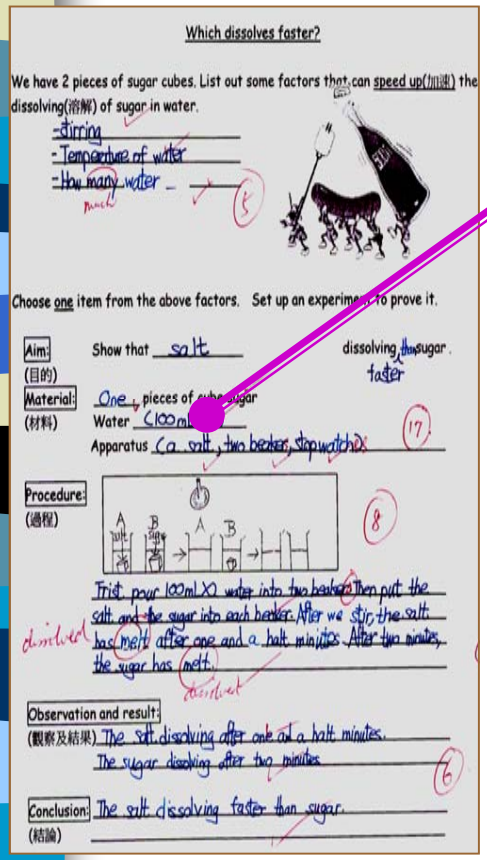
    - Setting an **Aim**
    - Writing the **Procedure**
    - Recording the **Result**
    - Coming up with a **Conclusion**
    - Doing **Evaluation** and **Reflection** on the investigation

Does adding salt to ice affect its melting rate?





Concept of a fair test - Assessment



Which dissolves faster?

We have 2 pieces of sugar cubes. List out some factors that can speed up(加速) the dissolving(溶解) of sugar in water.

- stirring
- Temperature of water
- How many water

Choose one item from the above factors. Set up an experiment to prove it.

Aim: (目的) Show that salt dissolving faster than sugar.

Material: (材料) One pieces of cube sugar
Water (100mL X2)
Apparatus (2 salt, two beakers, stopwatches)

Procedure: (過程)

Frist pour 100mL X2 water into two beakers. Then put the salt and the sugar into each beaker. After we stir, the salt has melt after one and a half minutes. After two minutes, the sugar has melt.

Observation and result: (觀察及結果)
The salt dissolving after one and a half minutes.
The sugar dissolving after two minutes

Conclusion: (結論) The salt dissolving faster than sugar.

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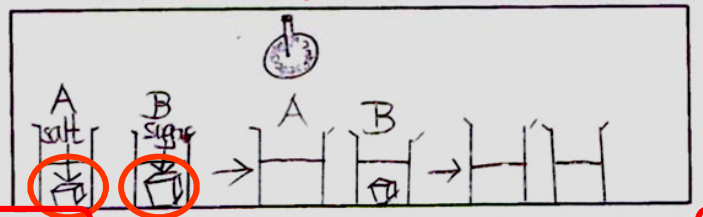

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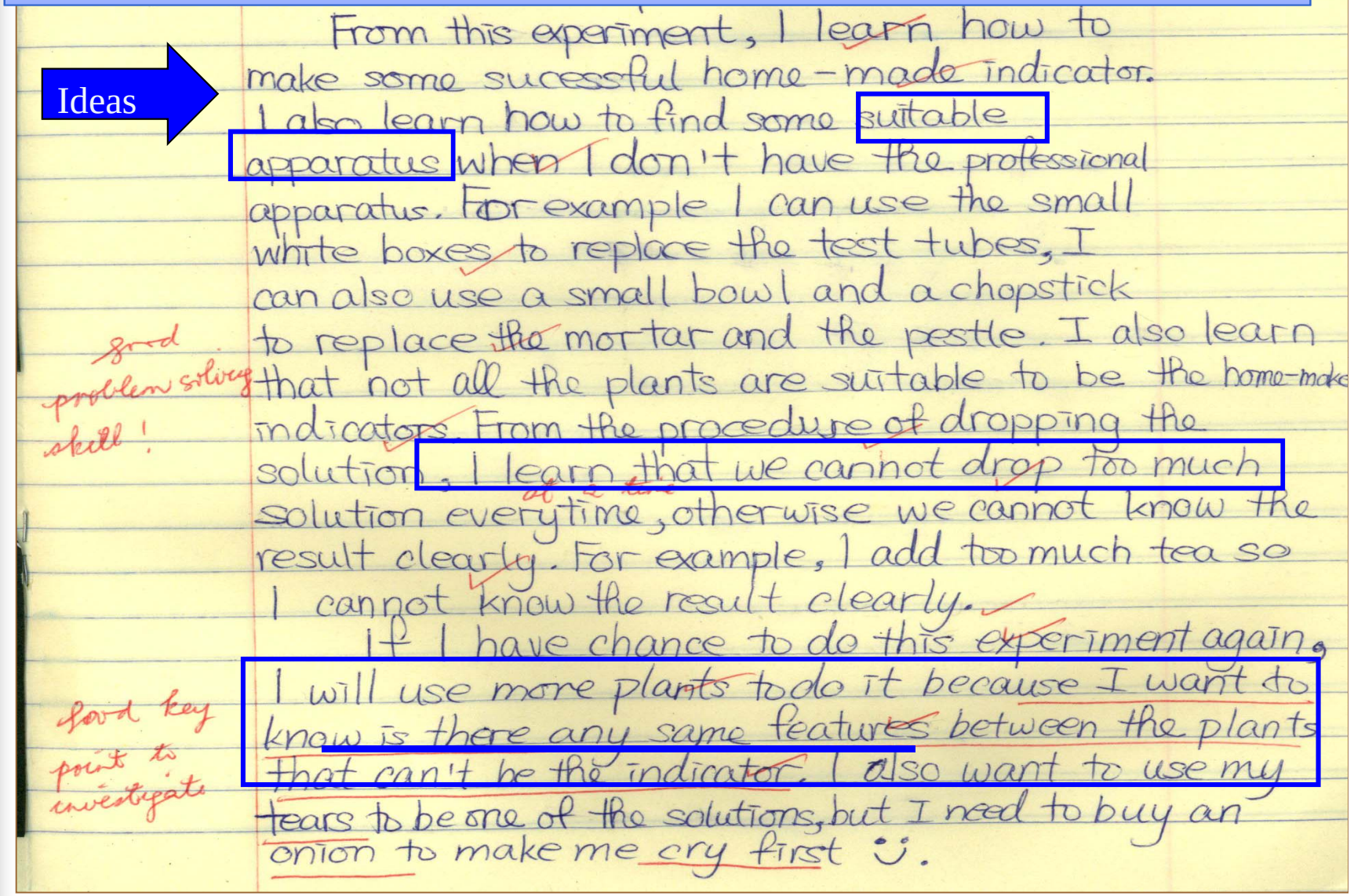
Study Journal – Evaluation & Reflection

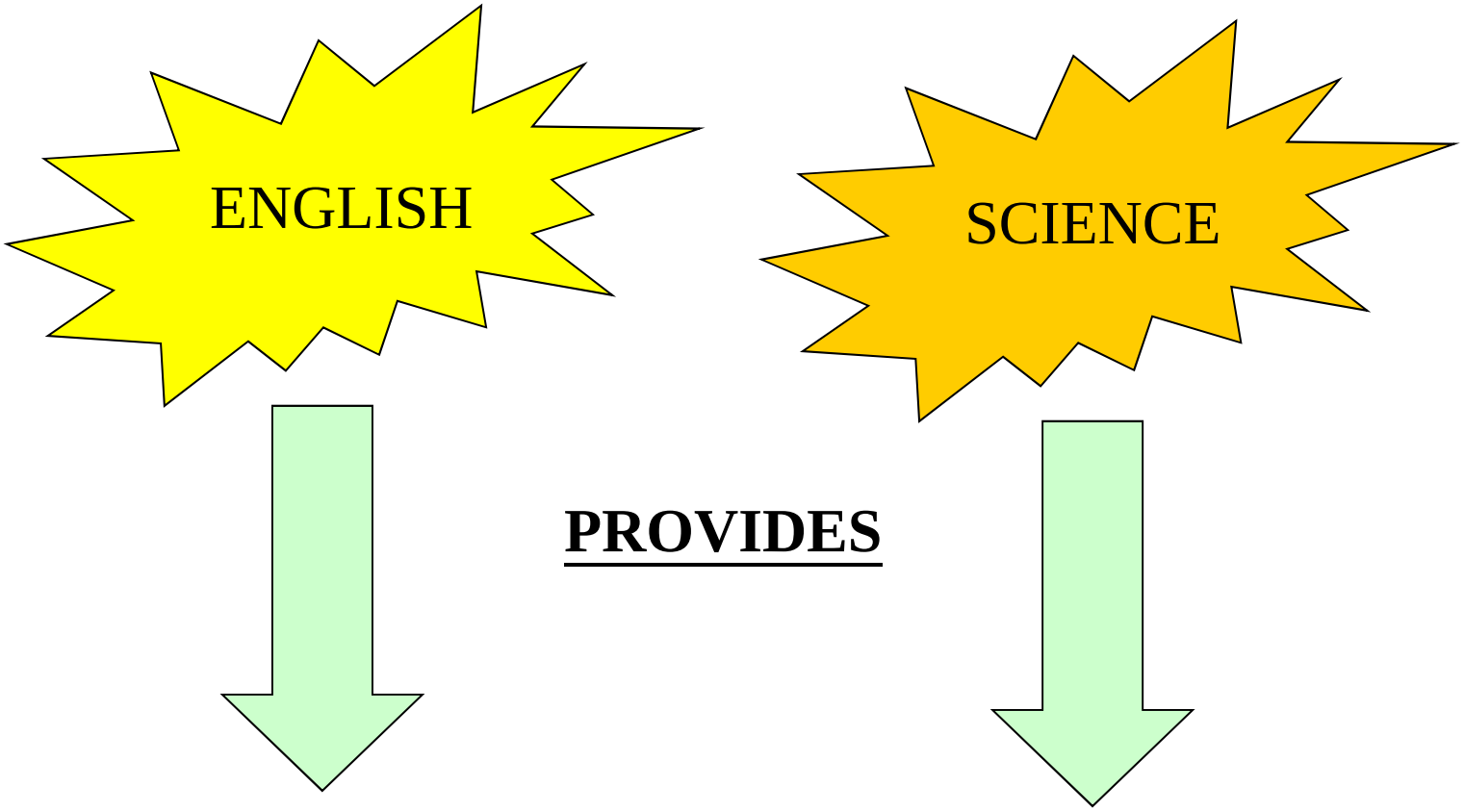
-Difficulties, improvement & further investigation



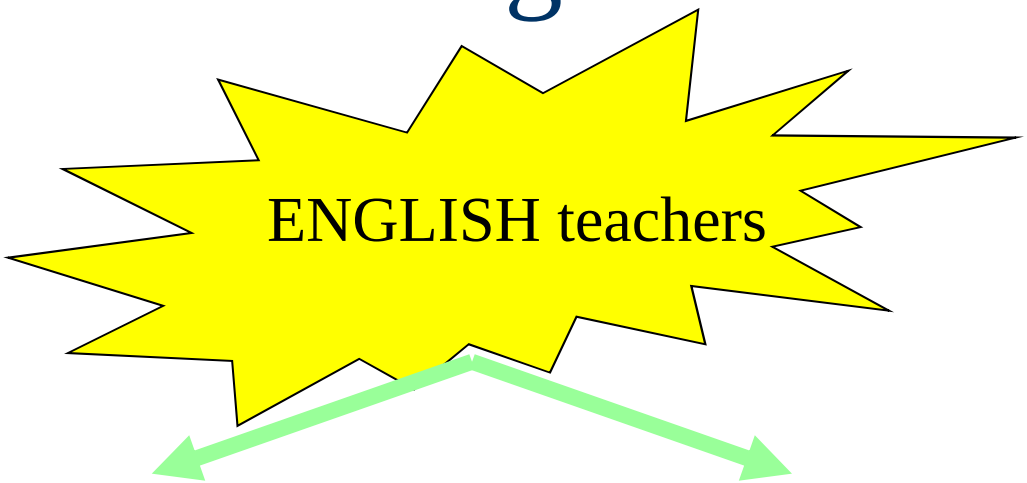
From this experiment, I learn how to make some sucessful home-made indicator. I also learn how to find some suitable apparatus when I don't have the professional apparatus. For example I can use the small white boxes to replace the test tubes, I can also use a small bowl and a chopstick to replace the mortar and the pestle. I also learn that not all the plants are suitable to be the home-make indicators. From the procedure of dropping the solution, I learn that we cannot drop too much solution everytime, otherwise we cannot know the result clearly. For example, I add too much tea so I cannot know the result clearly.

If I have chance to do this experiment again, I will use more plants to do it because I want to know is there any same features between the plants that can't be the indicator. I also want to use my tears to be one of the solutions, but I need to buy an onion to make me cry first ;.

Roles of the subjects



Roles of the English teachers



Language students **do not know**

Pre-teach the language patterns

Language students **already know**

Make the students aware of the language patterns

Language support--I

- Observation

Observation -- Learning Activity in English Lesson

Write 8 words related to the 5 senses respectively

Hearing	Smelling	Touching	Seeing	Tasting
loud, soft, quiet, noisy, raspy, high/ low-pitched, rumbling.	odors, rotten, flowery, burnt, delicious, putrid, bad, good, sweaty.	hard, soft, hot, cold, rough, smooth, grainy, sharp.	bright, dark, shiny, dull, colorful, purple, clear, twinkling.	sweet, sour, bitter, gooey, salty, syrupy, lemony, tart.

http://www.enchantedlearning.com/themes/senses.shtml

Language Support--II

- Laboratory Report

  There is a lot of **language** involved in writing a laboratory report.
  - Linking words
  - Modal verbs
  - Passive voice
  - Question words
  - Imperatives
  - Comparatives
  - Past/Present/Future tense

How to write a good Lab. Report?

- Components of a Lab. Report
  - Aim
  - Material
  - Set-up
  - Procedure
  - Result
  - Conclusion
  - Discussion and reflection

Lab. Report -- ✦Procedure

- Main language used:
- **Imperative** –

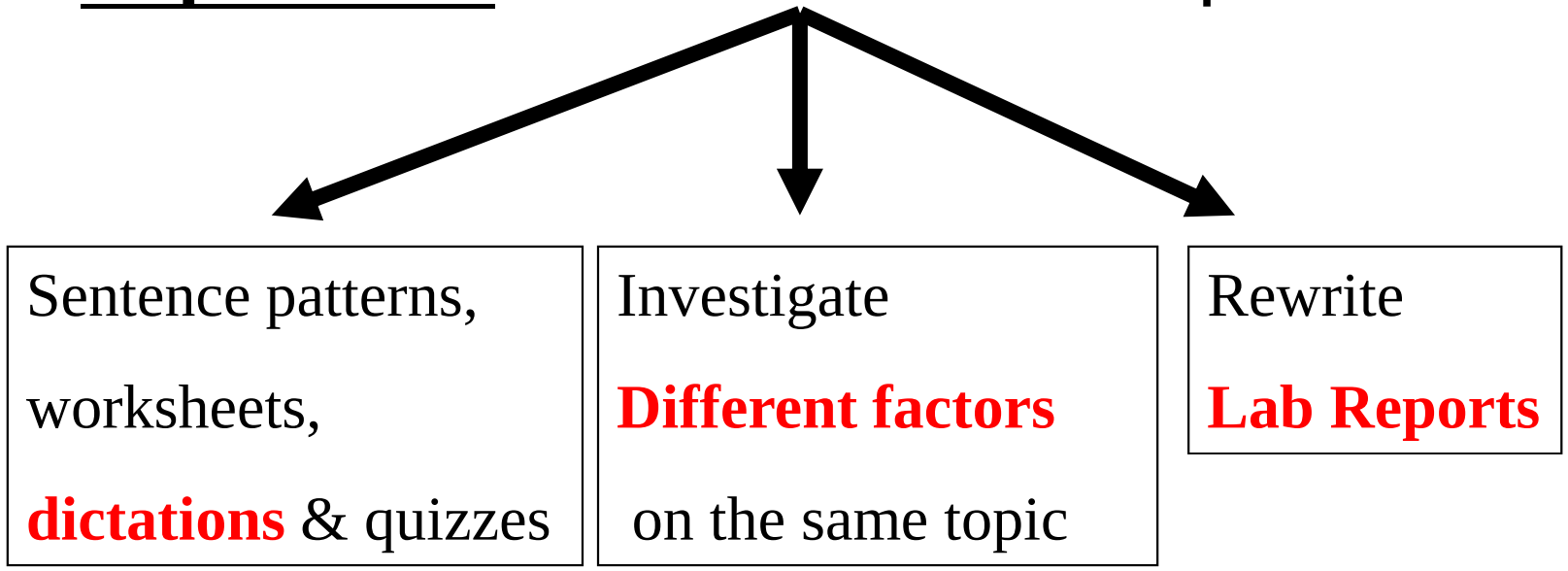
action verbs and phrases

Procedure Writing

 	Add Drop Transfer	5*g of solid A* 5*cm*^{3} *of solution B* 5 drops liquid C 5 pieces of solid D	into	a test tube/ test tube *A* a boiling tube a beaker a flask test tubes P & *Q* respectively

Procedure

- Strategies used:
- **Imperative** - action verbs and phrases



Investigate different factors on the same topic

__?____ can speed up the dissolving of sugar in water

- **Stirring**
- Using hotter water
- Using more water

Lab.report --✦Result

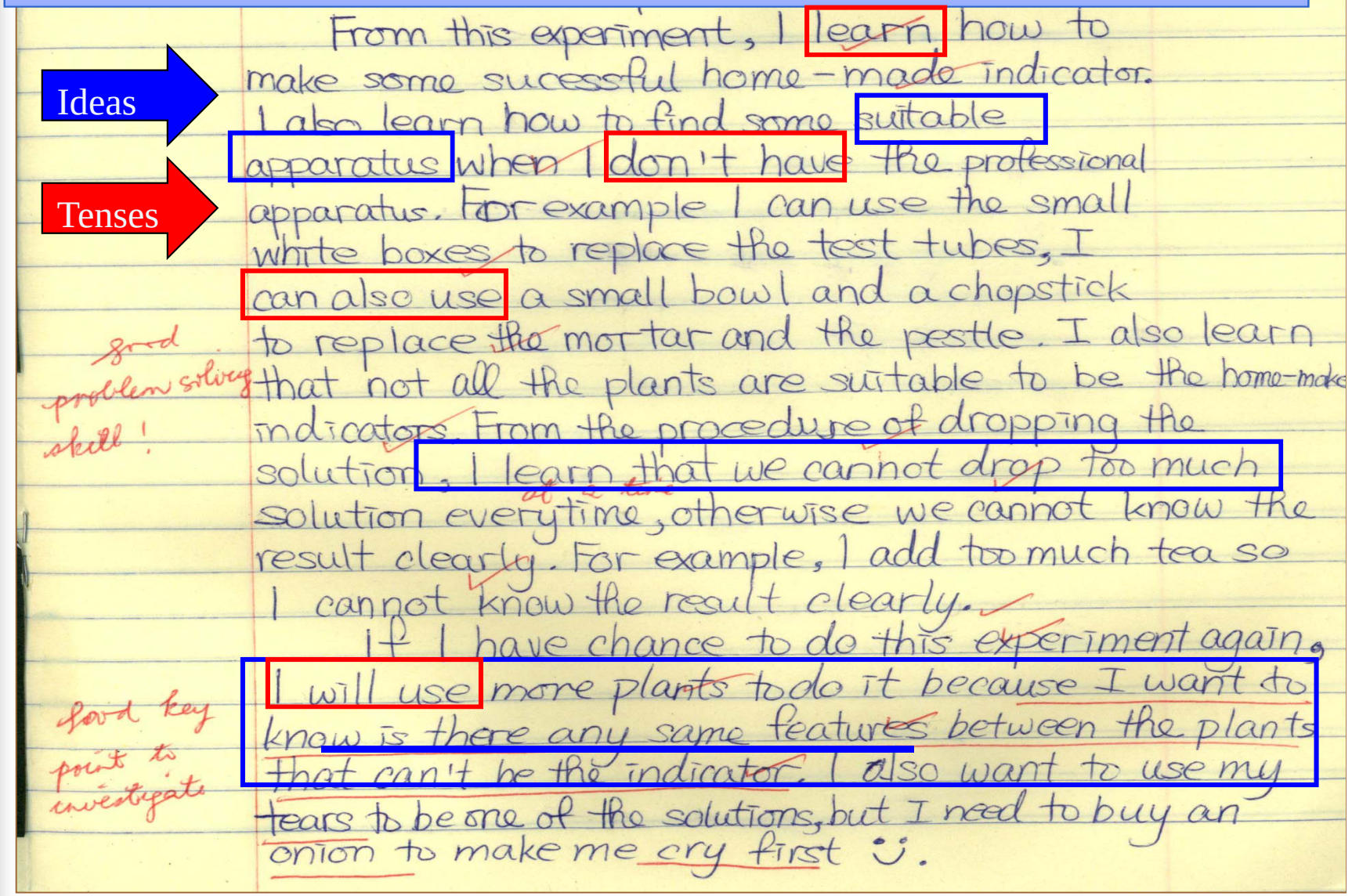
- Main language used:
- **<u>Comparative</u>** - sentence patterns
  - – Beaker B has **less** water so it heats up **faster**.
  - – the same as, takes longer, more than…etc

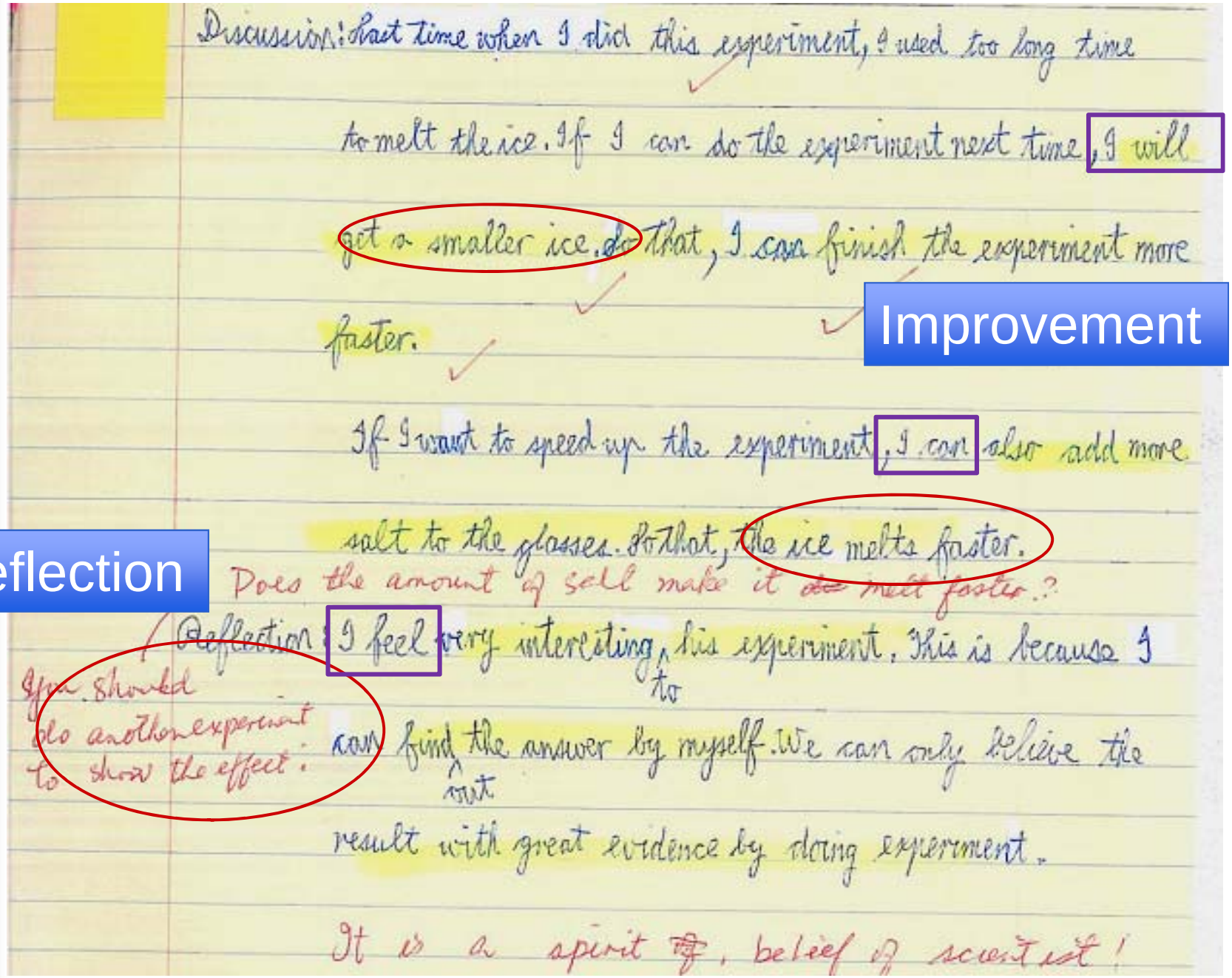
Lab. Report--✦Discussion/Reflection

- Language used:
- **Modal verbs**
  - will, must, should…etc
- **Different tenses** for the past/future
  - past tense for **reflection**
  - future tense for **discussing** what can be done **next time**

Study Journal – Evaluation & Reflection

-Difficulties, improvement & further investigation





Discussion: Last time when I did this experiment, I used too long time to melt the ice. If I can do the experiment next time, I will get a smaller ice. So that, I can finish the experiment more faster.

If I want to speed up the experiment, I can also add more salt to the glasses. So that, the ice melts faster.

Does the amount of salt make it melt faster?

Reflection: I feel very intereting, his experiment. This is because I can find the answer by myself. We can only believe the result with great evidence by doing experiment.

If you should do another experiment to show the effect.

It is a spirit of, belief of scientist!

Improvement

Reflection

The End - Thanks for listening!