Po Kok Secondary School

S.1Integrated Science

Chapter 1.1 Classwork
What is Science?

Name: _____
Class: S.1 ( )
Date: _____

A. What is Science? P.3-4

- The study of things and phenomena in nature and how they affect us using scientific methods is called _____.
- People who work in science are called _____ .
- Scientists find answers by _____.

B. How do Scientists work? P.5

- The first step of scientific investigation is _____.
- Observation involves gathering and recording detailed _____ by using our five senses. We use our five senses to _____.

Experiment 1.1
Title: Learning to observe (P.5)

Aim

To practise careful observation

Materials and apparatus

A beaker, tap water, a vitamin C tablet

Procedures

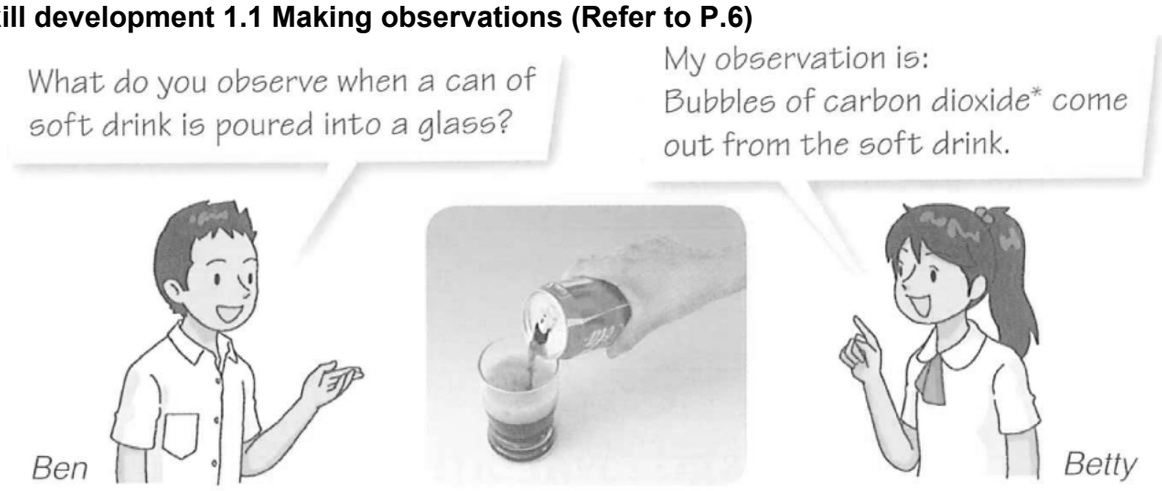
Actions + *The things the actions are done to* + How or when or where you do the actions)

1. _____a beaker with water.
2. _____ a _____ into the water and ***observe*** carefully.
3. _____ the changes in beaker.

Results

- ***The size of the vitamin C tablet*** _____
- ***The colour of the water*** _____.
- ***The temperature of the water*** (*increased / did not change / decreased*).
- Smell: _____
- Sound: _____
- Other observations: _____

Skill development 1.1 Making observations (Refer to P.6)



1. How does Betty know that the bubbles contain carbon dioxide? Can we know that a gas is carbon dioxide by looking at it?

_____

_____

2. How should Betty describe her observations?

_____

C. Great scientists and their contributions.

- Scientists have made many _____ and _____.

Great scientists (Refer to P.7)

Matching

The table below shows some scientific discoveries or inventions. Match the scientist on the left with their discoveries on the right.

	Scientist			**Discoveries or inventions**
(a)	Charles Kao (高錕)	***discovered or invented***	(i)	the structure of DNA
(b)	James Watson		(ii)	the basic relationship between energy and matter
(c)	David Ho (何大一)		(iii)	optical fibres for telecommunications.
(d)	Albert Einstein		(iv)	the cocktail therapy used to treat AIDS.

(a) _____ (b) _____ (c) _____ (d) _____

Making sentences: (Using the matching to make sentences)

Name of Scientist +Verbs (discovered/ invented) + nouns

(a) Charles Kao ***invented*** _____

(b) James Watson ***discovered*** _____

(c) David Ho _____

(d) Albert Einstein _____

D. Branches of Science P.8

The branches of Science

(i) _____

The study of matter, energy & forces.

(ii) _____

The study of substances and the reactions between substances.

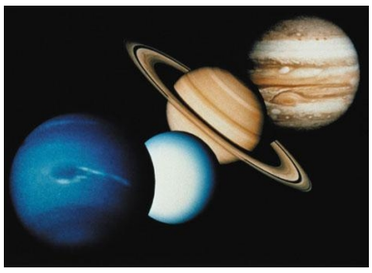
(iii) _____

The study of living things

(iv) _____

The study of rocks, soil and the structure of the Earth.

(v) _____



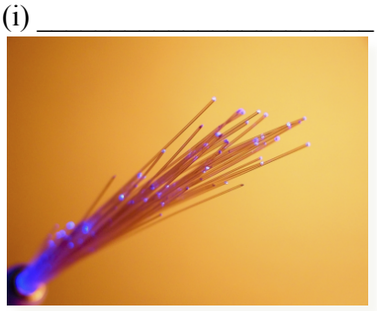
The study of the Sun, the Moon, the Stars and the Planets.

E. Science improves our quality of life P.9

Science is important in the development of _____ , which has improved our quality of life.

For example:

(i) _____



More data can be carried by this than metal wires of the same diameter.

(ii) _____

Development of paper batteries.

(iii) _____

Prevention of diseases.

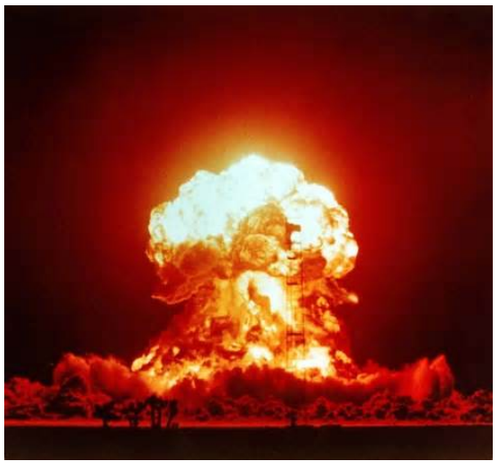
F. Limitations of Science P.10

Many problems and phenomena which scientists cannot _____ or _____. e.g. We can predict the path of typhoons, but we cannot stop them.

- 

G. Does Science always bring us good? P.10

Science knowledge may cause _____. e.g. Nuclear power can be used to generate _____, but nuclear weapons could be used to destroy cities and kill millions of people.



Po Kok Secondary School

S.1 Integrated Science

Chapter 1.2 Classwork

The Science laboratory

Name: _____

Class: S.1 ( )

Date: _____

A. Knowing your laboratory P.12

- A laboratory is a place for doing _____.
- Equipment in the school laboratory:

A school laboratory

(1) _____

(2) _____

(3) _____

(4) _____

(5) _____

(6) _____

(7) _____

(8) _____

B. Laboratory safety rules (P.15)

DO'S

1. Follow your teacher's instructions. Make sure you know what to do. Ask your teacher if you have any questions.
2. Wear _____ __ when heating and mixing substances
3. _____ long hair and fasten school ties.
4. Keep the laboratory _____ and _____.
5. _____ all accidents to your teacher at once.
6. Know the fire escape route.
7. _____ after doing experiments.

DON'TS

1. DO NOT _____ the laboratory without teachers' _____.
2. DO NOT do any experiment without your teachers' permission.
3. DO NOT eat or drink in the laboratory.
4. DO NOT _____ and _____ _____ in the laboratory.
5. DO NOT place any set-ups near the edge of the bench.
6. DO NOT _____ of a test tube towards anyone while heating.
7. DO NOT throw _____ into the sink.

B. Hazard Warning labels (P.15)

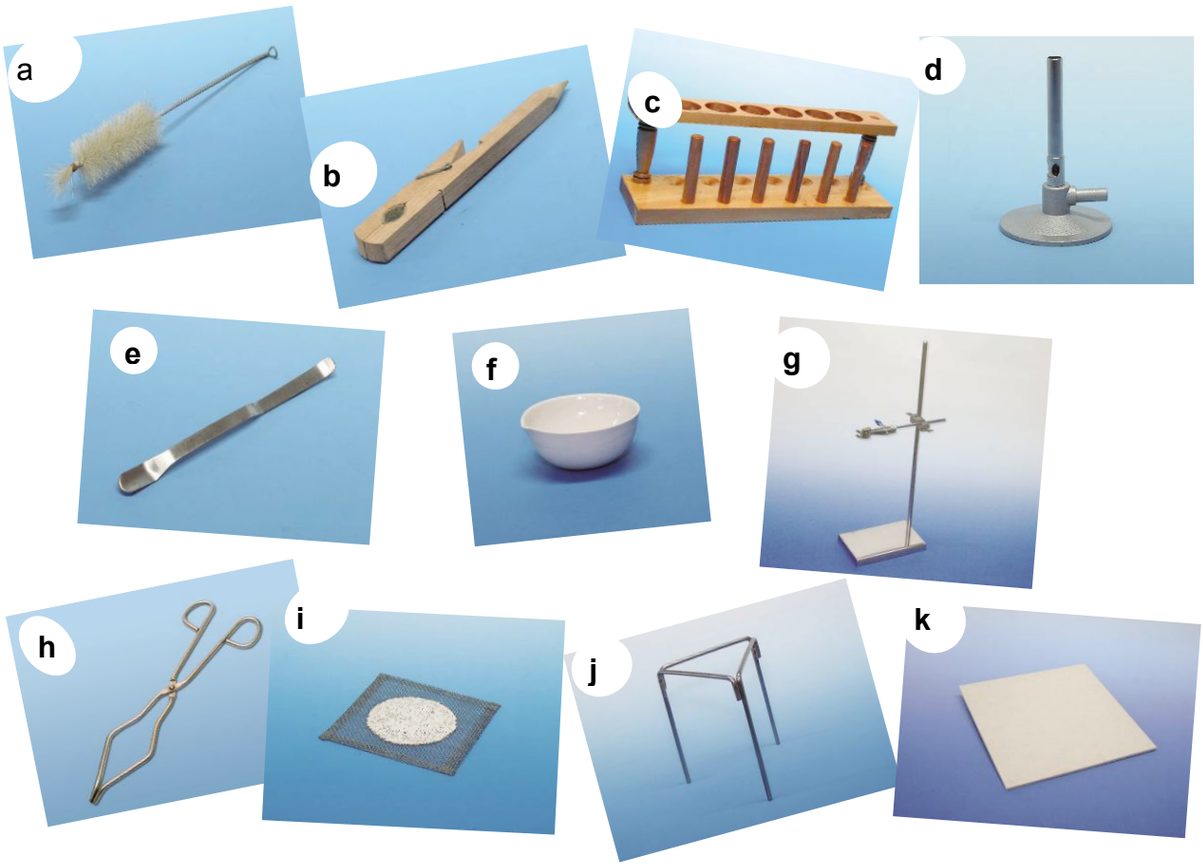
Write down the meanings of the following hazard warning labels.

 ( )	 ( )	 ( )	 ( )
 ( )	 ( )	 ( )	 ( )

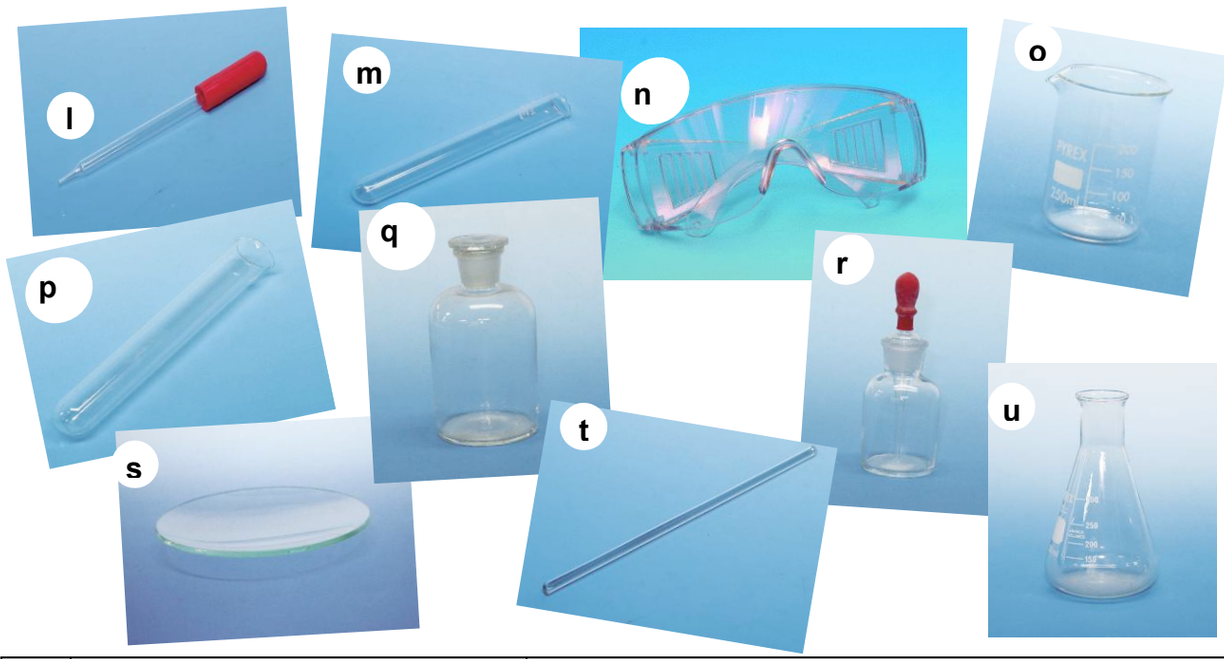
D. Laboratory first aid (P.17)

1. Cuts: Clean and _____ the cut.
2. Burns: Cool the burnt area under _____.
3. Chemicals on the skin: Wash the affected area under _____.
4. Chemicals in your eyes: Wash the affected eye with distilled water from an_____.
5. Fires: Put out a fire using a _____, _____ or _____.

E. Laboratory apparatus (P.19)



	Apparatus	Function
a	Test tube brush	To clean test tubes
b		To hold a test tube when heating
c		To hold test tubes
d		To heat substances
e		To transfer small amounts of solids
f		To hold liquids for heating
g		To fix the position of apparatus
h		To pick up small or hot solids
i		To support the apparatus when heating
j		To support the wire gauze
k		To protect the bench from heating



	Apparatus	Function
l		To transfer a few drops of liquids
m		To hold liquids or small solids
n		To protect the eyes from chemicals
o		To hold liquids or solids
p		To hold a greater amount of liquids or solids
q		To store liquids
r		To store liquids that are used in drops
s		To hold liquids or solids
t		To stir liquids
u		To hold liquids or solids

Matching

The table below shows some apparatus. Match the apparatus on the left with their uses on the right.

Apparatus		**The use of apparatus**
1. Dropper		(a) Store chemicals
2. Fire extinguisher		(b) Stir liquid
3. Reagent bottle		(c) Pick up hot objects
4. Glass rod		(d) Transfer small amount of solution
5. Tongs		(e) Measure the volume of liquid
6. Test tube		(f) Put out fire
7. Measuring cylinder		(g) Do the testing

1	2	3	4	5	6	7

Making sentences: (Using the matching on section D to make sentences)

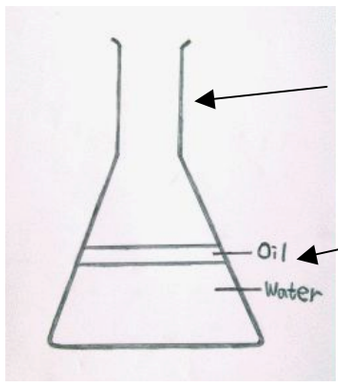
We + use + a (Ⅰ . apparatus) + to + (Ⅱ .the use of apparatus.)

e.g. We use a Bunsen burner to heat up substances.

1. We use a dropper to _____
2. We use _____
3. _____
4. _____
5. _____
6. _____
7. _____

F. Sectional diagrams of apparatus (P.21)

A conical flask containing oil and water



A sectional diagram of the set-up

(1) Use a simple line drawing to show the apparatus.

(2) Use a pencil and a ruler to draw the diagram.

(3) Label the parts of the diagram.

Examples of drawing experimental apparatus

Apparatus	Sectional diagram
	
	

Po Kok Secondary School

S.1 Integrated Science

Chapter 1.3 Classwork
Basic Experiment Skills

Name: _____
Class: S.1 ( )
Date: _____

A Heating

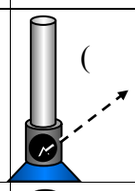
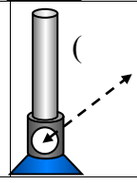
I. How to light up a Bunsen burner? (P.24)

1. Open the windows and wear safety goggle.
2. Connect the_____ to the gas tap.
3. Put the Bunsen burner on a _____.
4. Turn the_____ to close the air hole.
5. Put the tip of the _____ over the chimney,
6. Turn on the _____ and press to ignite the gas lighter.
7. Open the _____ to adjust the flame.
8. Turn off the_____after use.

II. Safety rules when using a Bunsen burner. (P.24)

Before lighting up the Bunsen burner,	① We should open _____.
	② We should wear _____ to protect our eyes.
	③ We should make sure the rubber tubing is_____.
	④ We should keep books and paper _____ the Bunsen burner.
⑤ Close the air hole to prevent _____.	
⑥ DO NOT fully_____ the air hole because it may cause striking back.	
⑦ DO NOT touch the_____, _____ or _____ after heating!	

III. Different type of Bunsen flame (P.26)

(Draw the shape of flame below)	Air hole	Type of flame	Colour of flame	Shape of flame	Noise level
	 ( )	Luminous			
	 ( )			Regular	Noisy

Experiment 1.3A

Title: Using a Bunsen burner (Refer to P.24)

Aim

To learn the correct method of lighting a Bunsen burner

Materials and apparatus

Bunsen burner, Heat proof mat, Gas lighter

Precautions

- ***Wear*** *safety goggles.*
- ***Do not touch*** *the chimney* after heating!

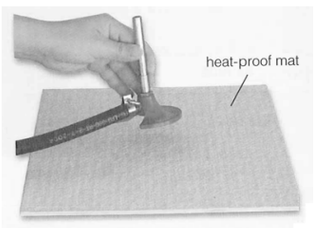
Procedures

Actions + *The things the actions are done to* + How or when or where you do the actions)

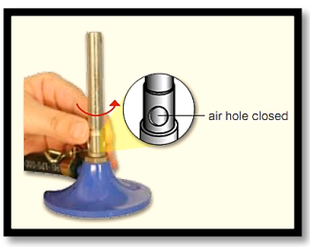
A. Lighting a Bunsen burner

1. ***Connect*** *the rubber tubing* to the gas tap.

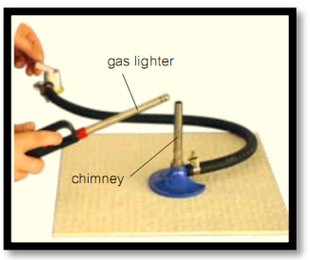
2. _____ *the* _____ on a heat-proof mat



3. _____ the _____ by turning the collar.



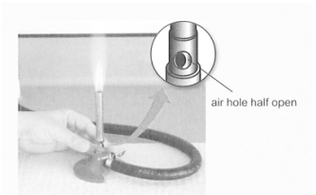
4. _____ *the tip of the gas lighter* over the chimney.



5. _____ *the* _____ and ***press to ignite*** *the gas lighter.*

6. _____ *the* _____ slowly to adjust the flame.

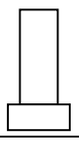
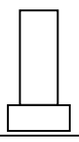
7. ***Turn off*** *the gas tap* after use.



B. Observing the flame of the Bunsen burner

1. ***Observe*** *the flame of the Bunsen burner* when *the air hole* ***is*** *closed.*
2. ***Draw*** *the outline of the flame* in the diagram below and ***colour*** *it.* ***Record*** *your observation* in the table below.
3. ***Turn*** *the collar* slowly until *the air hole* ***is*** *half open.* ***Observe*** *the flame.*
4. ***Draw*** *the outline of the flame* in the diagram below and ***colour*** *it.* ***Record*** *your observation* in the table below.

C. Results and observation

Air hole	Type of flame	Colour of flame	Noise level (quiet/ noisy)	Outline of the flame
Open	**Non-luminous**			
Closed				

B. Transferring Solutions (P.29)

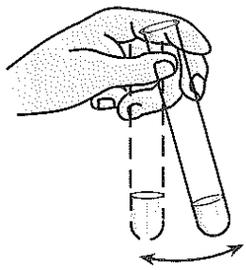
- We use _____ to transfer small amount of solution.
- We _____ solutions directly to the test tube.
- We use a _____ to help us to pour the solution.

Tips for transferring a solution

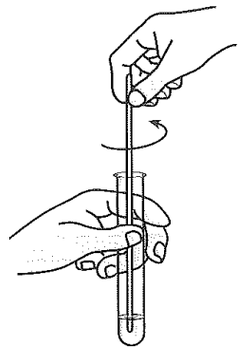
The stopper of the reagent bottle should be _____.

DO NOT let the dropper touch _____.

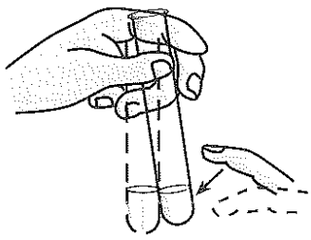
C, Mixing solutions (P.31)



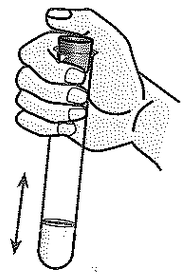
We usually _____ the test tube.



We use a _____ to _____ the solution.



We use a finger to _____ the base of the test tube.



We use a _____ to cover the test tube. We shake the solution up and down.

Experiment 1.3D Mixing solutions (Refer to P.31)

Aim

To observe and record results correctly.

Precaution

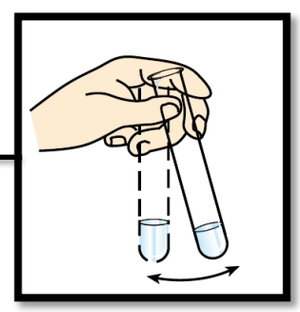
Wear safety goggles.

Procedure

Actions + *The things the actions are done to* + How or when or where you do the actions)

You are given four bottles of solutions labeled A,B,C and D.

1. _____ *the colour of each solution* in the table below.
2. _____ *10 drops of solution A* to a test tube.
3. _____ *10 drops of solution B* to the same test tube.
4. _____ *the test tube* ***to mix*** *the solutions.*
5. _____ *your observations* in the table below.



6. _____ *steps 3 to 6* with the other pairs of solutions.

7. _____ *all the used solution* into a beaker.

8. Then _____ *them* into a waste bottle.

9. _____ *the test tubes* under the water tap ***using*** *a test tube brush* and _____ *them* back into the test tube rack.

How to describe the colour.
- Colourless. (No colour)
- Dark green/ Green/ Pale green

Results and Observations

Solution mixed	Colour of the mixture	Is the mixture clear or cloudy?	Is a precipitate formed?	
			Yes/ No	If yes, what colour is it?
A + B				
A + C				
A + D				
B + C				
B + D				
C + D				

Po Kok Secondary School

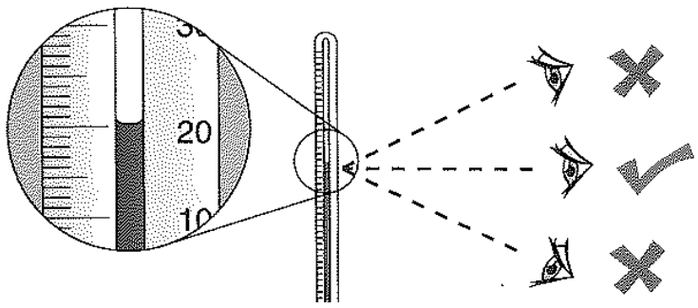
S.1 Integrated Science

Chapter 1.4 Classwork
Making Measurements

Name: _____
Class: S.1 ( )
Date: _____

A. Measuring Temperature (P.34)

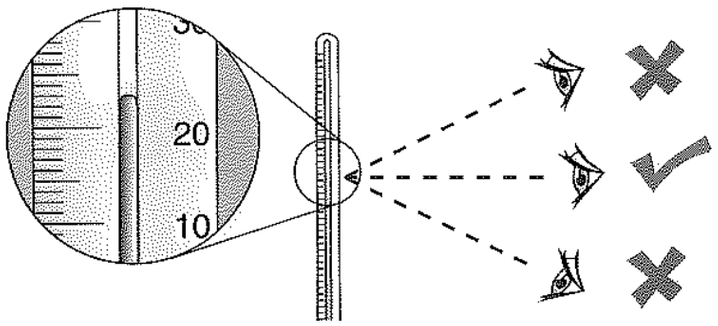
- We use a _____ to measure temperature.
- The unit is _____(_____).
- Alcohol thermometer



Temperature = _____°C

Less accurate
Alcohol stained in red

- Mercury thermometer



Temperature = _____°C

More accurate
Mercury inside

Experiment 1.4A Measuring temperature (P.35)

Aim

To practise using a thermometer to measure temperature.

Precaution

Be careful when handling a glass thermometer. If the thermometer breaks, tell your teacher immediately. DO NOT pick up any of the broken pieces.

Procedure

1. _____ the room temperature with the thermometer by ***placing*** it on the bench.
2. _____the reading when it is steady.
3. _____ the temperature in the table below.
4. _____ the bulb of the thermometer in your hand until the temperature is steady.
5. _____ the temperature in the table below.
6. _____ the temperatures of some tap water and some hot water.
7. _____ the temperatures in the table below.

Results

	Room	Hand	Tap water	Hot water
Temperature (℃)				

B. Measuring Time (P.37)

- We use _____ to measure time.
- The units are _____

Experiment Heat the water with a luminous flame.

Aim

To practice using a Bunsen burner

Materials and apparatus

- Bunsen burner
- Heat proof mat
- Gas lighter
- Beaker
- Tripod
- Wire gauze

Precautions

- ***Wear*** *safety goggles.*
- ***Do not touch*** *the chimney , tripod, wire gauze and beaker* after heating!

Procedures

Actions + *What you have to do the actions to* + (How or when or where you do the actions

1. ***Put*** *the Bunsen burner* on_____.
2. ***Put*** _____ on a tripod and wire gauze
3. ***Pour*** *100cm³ of water*

   into_____ *and*

   put *the beaker of water* on the wire gauze.

4. ***Turn*** _____ to close the air hole.

5. ***Put*** *the tip of the gas lighter* over the chimney.

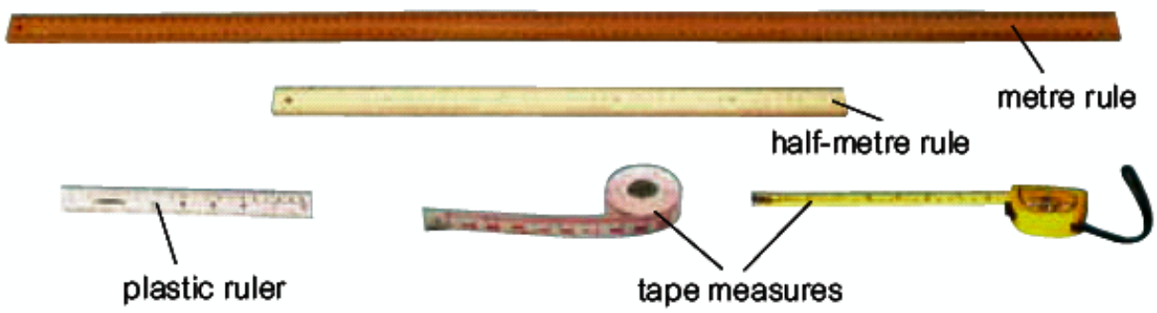
6. ***Turn on*** _____ and ***press to ignite*** *the gas lighter*.

7. ***Turn off*** *the gas tap* after use.

Experiment 1.4B (Refer to Investigation Worksheet)

C. Measuring Length (P.39)

- We use _____to measure the length of pencil.
- We use _____ to measure the circumference of a ball.
- We use_____ to measure the length of the bench.
- The units of the length are _____



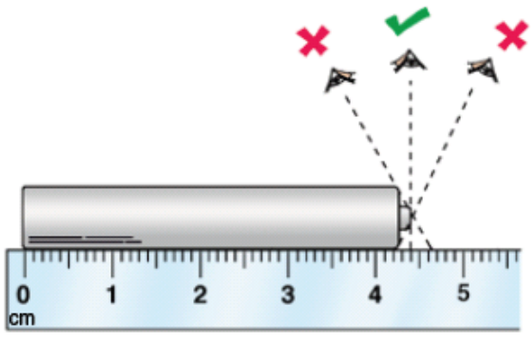
- Unit of Length

Unit = _____

Unit = _____

Unit = _____

- The correct way of taking a reading from a ruler



Length of the object = _____cm

Experiment 1.4C Measuring length (P. 40)

Aim

To choose a suitable ruler to measure length.

Materials and apparatus

- Metre ruler
- Half-metre ruler
- Plastic ruler
- Tape measure

Procedures

A. Choosing a suitable ruler and measuring the length.

1. ***Choose*** *a suitable ruler* to measure the length of each object below.

2. ***Measure*** *the length* and ***record*** *the result* in the table below.

B. Measuring the thickness of one page of this book.

1. ***Use*** *a plastic ruler* ***to measure*** *the thickness of 100 pages.*

2. ***Calculate*** *the thickness of 1 page.*

   (The thickness of 1 page = The thickness of 100 pages÷100)

3.

C. Measure the diameter of one pencil lead

1. ***Using*** _____ ***to measure*** _____.

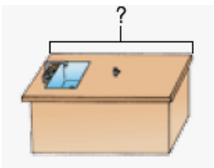
2. _____.

   ( )

Results

A. Choosing a suitable ruler and measuring the length

B.

Object to be measured	 Length of the bench	 Circumference of your head	 Diameter of a HK$1 coin	 Length of your I.S. textbook
Suitable ruler				
Length (cm)				

B. Measuring the thickness of one page of I.S. book

The thickness of 100 page of the I.S. book is _____.

The thickness of 1 page of the I.S. book is _____.

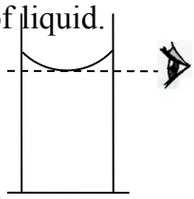
C. Measure the diameter of one pencil lead

_____.

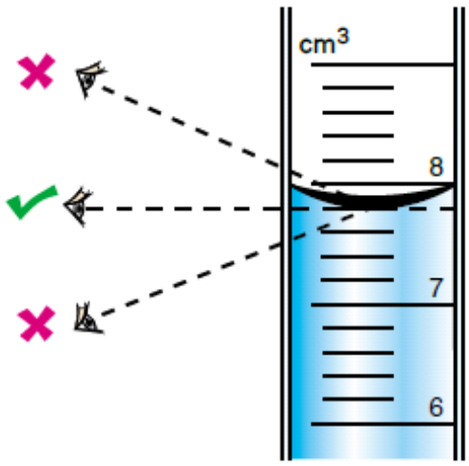
_____.

D. Measuring Volume (P.41)

- We use a _____ to measure the volume of liquid.
- The water surface in a measuring cylinder is _____.
- The curved surface is called a_____.
- The units of volume are _____



- The correct way to take a reading from a measuring cylinder:



Volume of water = _____cm^3

1.4D Measuring volume (P. 42)

Aims

- To practise measuring the volumes of liquid.
- To practise measuring the volumes of objects with irregular shapes.

Materials and apparatus

Measuring cylinder, Plasticine block, Boiling tube, Conical flask, Thread, Test tube

Procedures

A. Measuring the volume of water that a container can hold

1. ***Pour*** *some water* into a test tube until it is fully filled.
2. ***Pour*** *the water* from the test tube into the measuring cylinder.
3. ***Record*** *the results* in the table below.
4. ***Repeat*** *steps 1-3* with boiling tube and conical flask.

B. Measuring the volume of an object with an irregular shape

1. ***Pour*** *some water* into a measuring cylinder. ***Record*** *the volume of the water* *(V_1).*
2. ***Tie*** *a piece of thread* to a plasticine block.

3. ***Put*** *the plasticine block* gently into the measuring cylinder.
4. ***Record*** *the total volume of the block and the water (V_2).*
5. ***Calculate*** *the volume of the plasticine block.*

   (The volume of the plasticine block= V_2-V_1)

C. Measuring the volume of one drop of water from a dropper

1. ***Use*** _____to ***add*** _____.
2. ***Measure*** the _____.
3. ***Calculate*** _____.

( )

Results

A. Measuring the volume of water that a container can hold

Container	Test tube	Boiling tube	Conical flask
Maximum volume of water of container. (cm^3)			

B. Measuring the volume of an object with an irregular shape

	V_1	V_2	The plasticine block
Volume (cm^3)			

C. Measuring the volume of one drop of water from a dropper

The volume of _____ drops of water from a dropper is_____.
_____.

E Measuring Weight (P.44)

- We use _____ to measure the weight of powder.
- We use_____to measure the weight of shoes.
- The units of weight are _____

1.4E Measuring Weight (P.45)

Aim

- To choose a suitable balance to measure weight.
- To measure the weight of a liquid.

Materials and apparatus

- Top pan balance
- Electronic balance
- Beaker
- Measuring cylinder

Procedures

A. Choosing a suitable balance and measuring the weight

1. ***Choose*** *a suitable balance* to measure the weight of each object below.
2. ***Measure*** *the weight* and ***record*** *the result* in the table below.

B. Measuring the weight of a liquid

1. ***Using*** *an electronic balance* to ***measure*** *the weight of a dry measuring cylinder* (W_1).
2. ***Add*** *50cm³ of water* to the measuring cylinder.
3. ***Measure*** *the weight of 50cm³ of water and the measuring cylinder* (W_2).
4. ***Calculate*** *the weight of 50cm³ of water.*

   (The weight of 50cm^3 water = W_2-W_1)

C. Measuring the weight of a spoon of sugar

1. ***Using*** _____ to ***measure*** _____.
2. ***Put*** *the sugar* on the spoon.
3. _____.
4. _____.

Results

A. Choosing a suitable balance and measuring the weight

	A $10 coin	The I.S. textbook	My pen
Suitable balance for measurement			
Weight			

B. Measuring the weight of a liquid

	W_1	W_2	50cm^3 of water
Weight			

C. Measuring the weight of a spoon of sugar

	W3	W4	A spoon of sugar
Weight			

- Key Point

Measurement	temperature	time	length	volume	weight
Instrument(s)					
Units commonly used and their symbols					

Po Kok Secondary School

S.1 Integrated Science

Chapter 1.5 Classwork
Scientific investigation

Name: _____
Class: S.1 ( )
Date: _____

A. Conducting a simple scientific investigation (P. 48)

- Scientific investigations usually consist of the following steps:

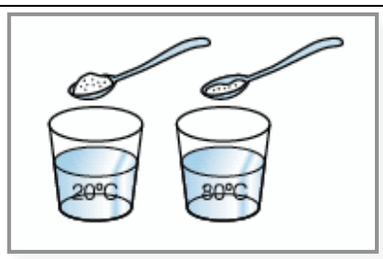
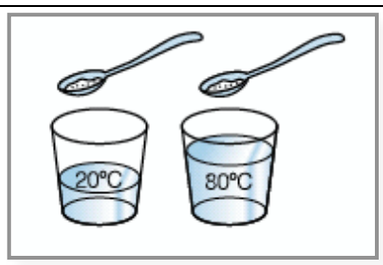
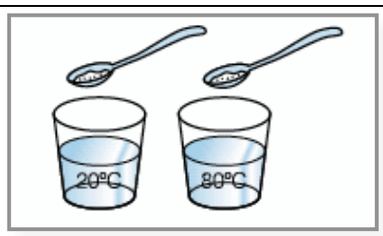
1. _____ the problem to be investigated.
2. Making a _____ .
3. _____ an experiment .
4. _____ the experiment.
5. Drawing a _____ .

B. Fair test (P.50)

- An experiment in which all variables are kept the same, except the one we are investigating, is called _____.

Albert

I did three tests on the hypothesis 'Sugar dissolves ***faster*** in hot water than in cold water.'
Are the tests fair or unfair?

Test	Is the test fair or unfair?
1. 	The test is (fair/ unfair) Reason: _____ _____
2. 	The test is (fair/ unfair) Reason: _____ _____
3. 	The test is (fair/ unfair) Reason: _____ _____

- The '3Cs' to be considered in a fair test are:
  1. The variable to be _____;
  2. The variable(s) to be kept _____; and
  3. What we want to _____.

- Identify the variables in a fair test (P.52):
  Some people say that adding sugar to water helps cut flowers stay fresh for longer. We want to find out if this is true by comparing two groups of flowers. One group will be given just water and the other group will be given water with sugar added.

1. Identify which variable is to be changed and which variables should be kept constant.

Variables	Variable to be changed	Variables to be kept constant
Volume of water		
Type of flower		
Size of flower		
Where the flowers are obtained		
Shape of the container		
Whether sugar is added		

2. What do we have to compare? – the _____ that the flowers stay fresh.
3. Apart from those listed above, are there other variables to be considered? How should we handle them?

_____

_____

C. Example of a scientific investigation (Refer to investigation WS)