

Po Kok Secondary School

S.1 Integrated Science

Chapter 1.1 Assignment

What is Science?

Name: _____

Class: S.1 ()

Date: _____

A. True or False

Study the following statements. Put a “T” in the box against a correct statement and a “F” against an incorrect statement.

1. Science involves finding out how and why things happen.

☐
2. Chemistry involves the study of matter, energy and forces.

☐
3. Air contains oxygen is an observation.

☐
4. Science can explain all the phenomena in nature.

☐
5. Albert Einstein invented the basic relationship between energy and matter.

☐

B. Fill in the blanks.

People who work in science are called (a) _____. They always make (b)_____ carefully. They have made many (c) _____ and (d) _____. They work in different branches, such as (e) _____, (f) _____, (g) _____, (h) _____ and Astronomy.

Science (i) _____ our quality of life. However, science has (j) _____. If the knowledge of science is not used properly, it may cause harm.

C. Multiple Choice

Put the best answer in each box below.

1. Which of the following statements about science is INCORRECT?

☐

A. Science is the study of things happening around us.

B. Science has limitations.

C. Doing experiments to test suggested answers to questions under study is important in scientific investigation.

D. Science always brings us good.
2. Which of the following statements is NOT an observation about lightning?

☐

A. It gives out light.

B. It usually appears for a short time only.

C. There is usually a loud sound following each lightning.

D. It is a form of electricity.



3. Which of the following is NOT a field in which a Nobel Prize is awarded?

A. Mathematics.

B. Physics.

C. Medicine.

D. Peace.



4. Which of the following is/are NOT (a) scientific invention(s)?

(1) Televisions

(2) Penicillin

(3) Mobile phones

(4) X-ray

A. (1) only

B. (4) only

C. (1) and (3) only

D. (2) and (4) only

5. In which of the following examples is science used properly?

A. Use nuclear technology to generate electricity.

B. Use nuclear technology to develop nuclear weapons.

C. Abuse drugs to escape from worries.

D. Use explosives in wars.

D. Matching

Match the branches of science on the left with the areas of study on the right.

Branch of science	Area of study
(a) Astronomy	(i) Living things
(b) Biology	(ii) Substances and the reactions between different substances
(c) Chemistry	(iii) Matter, energy and forces
(d) Geology	(iv) The Sun, Moon, planets, stars and the universe.
(e) Physics	(iv) Rocks, soil and the structure of the Earth.

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

E. Questions

Charles K. Kao won Nobel Prize in Physics

The 2009 Nobel Prize in Physics was awarded to Charles K. Kao, the father of optical fibres, for his groundbreaking achievements concerning transmission of light in fibres for optical communications.

In Kao’s own words, ‘fibre optics has completely changed the world of information in the last 40 years. It is certainly due to optical fibre networks that news nowadays spread almost instantly round the world.’ Despite his great achievements, Kao was surprised by the honour because the Nobel Prize had never been awarded for research work on applied science before.

Kao’s groundbreaking discoveries were made in the 1960s, when he was leading the optical communication research team in an international telecommunication company in England. Kao was the first person to propose that glass fibre could replace copper cables for long-distance communication purposes. His research work eventually led to the development of optical fibres which could be used in practical applications. The first practical fibre optics cable was installed in 1981.

Optical fibres are **bundles of glass fibres** which are thinner than our hair. Pulses of light are transmitted through the fibres by **total internal reflection**. Since the information is carried by pulses of light, a **huge** amount of information can be transmitted almost **instantly**.

Optical fibres have many advantages over copper cables. They are **light-weight, tough and can transmit signals with little loss**. Optical fibres can transmit information more efficiently and reliably than copper cables. Today, there are around 1 billion km of optical fibres in use around the world. This total length is enough to wrap around the Earth 25 000 times. Text, music, images and videos nowadays can be sent all over the world within seconds. The invention of optical fibres have made **real-time communication** possible.

Besides communication, there are other useful applications of optical fibres. For example, optical fibres are used in **endoscopes**. Endoscopes are instruments used by doctors to examine the internal organs of a patient. Optical fibres are used in endoscopes to transmit light to illuminate the organs, and also to send the images of the organs back to a viewing device.



Fibre optics greatly improves the network communication nowadays.

Discussion

1. How many years after the fibre optic cable was first launched did Charles K. Kao win the Nobel Prize in Physics?

2. Briefly describe the working principle of optical fibres to transmit information.
Optical fibres are (a)_____ which are thinner than our hair. Pulses of light are transmitted through the fibres by (b)_____. Since the information is carried by pulses of light, a (c)_____ amount of information can be transmitted almost (d)_____.
3. Optical fibres replaced copper wires as cables in long distance network communication. Give TWO advantages of using optical fibres over copper wires.

4. List TWO examples of the application of optical fibres.

Po Kok Secondary School

S.1 Integrated Science

Chapter 1.2 Assignment

The Science laboratory

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

A. Multiple Choice

Put the best answer in each box below.

1. Before we enter the laboratory, we must
(1) obtain the teacher’s permission
(2) wear safety goggles
(3) make sure that a laboratory technician is present.
A. (1) only
B. (1) and (2) only
C. (2) and (3) only
D. (1), (2) and (3).
2. What is the main reason why we should NOT eat or drink in the laboratory?
A. The food or drink may catch fire..
B. The food or drink may be contaminated by chemicals.
C. The food or drink may be knocked over.
D. The food or drink may give out a smell.
3. Which of the following apparatus are used to hold liquid for testing
(1) boiling tube
(2) conical flask
(3) wash bottle
A. (1) and (2) only
B. (1) and (3) only
C. (2) and (3) only
D. (1), (2) and (3).

B. Fill in the blanks

1. The laboratory is a place where we do _____.
2. The common facilities used to put out a fire in a laboratory include _____, _____ and _____.
3. _____ labels warn us of the potential dangers of chemicals





C. Laboratory apparatus

(i) Write down the name of the equipment or apparatus.

1. 	2. 	3. 

4.		5.		6.	
7.		8.		9.	
10.		11.		12.	

(ii) Write down the name and draw sectional diagrams of the following apparatus.

1.		Diagram:	2.		Diagram:
3.		Diagram:	4.		Diagram:

5. 	Diagram:	6. 	Diagram:
7. 	Diagram:	8. 	Diagram:
9. 	Diagram:	10. 	Diagram:
11. 	Diagram:	12. 	Diagram:

D. Naming

(i) Name the following common hazard warning labels:



Harmful

(ii) Below are some laboratory rules. Put a '✓' in appropriate boxes.

	Do	Don't	
(1)	<input type="checkbox"/>	<input type="checkbox"/>	report all accidents to the teacher at once.
(2)	<input type="checkbox"/>	<input type="checkbox"/>	do experiments without teacher's permission.
(3)	<input type="checkbox"/>	<input type="checkbox"/>	point the mouth of a test tube towards anyone when heating.
(4)	<input type="checkbox"/>	<input type="checkbox"/>	tie back long hair and fasten school ties when doing experiments.
(5)	<input type="checkbox"/>	<input type="checkbox"/>	leave a lighted Bunsen burner unattended.
(6)	<input type="checkbox"/>	<input type="checkbox"/>	keep all exits and passages clear.
(7)	<input type="checkbox"/>	<input type="checkbox"/>	wear safety goggles when heating or mixing substances.
(8)	<input type="checkbox"/>	<input type="checkbox"/>	keep the laboratory clean and tidy.

E. Matching

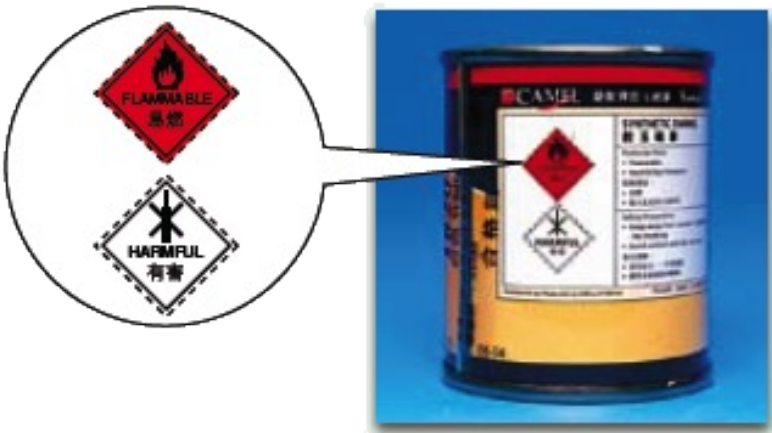
Match the accidents on the left with the actions on the right.

Accident	Action that should be taken
(a) Some chemical is spilled on your hand.	(i) Tell your teacher. Clean and sterilize it.
(b) Your finger is cut by a piece of broken glass.	(ii) Wash it with water and tell your teacher.
(c) You break a glass bottle.	(iii) Put it out with a fire blanket and tell your teacher.
(d) Your clothes catch fire.	(iv) Put is out with sand and tell your teacher.
(e) A dish of oil catches fire.	(iv) Tell your classmates nearby to be aware of it and tell your teacher.

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

F. Question

1. Look at this picture of a can of paint.



- (a) What are the two potential dangers represented by the hazard warning labels on the can?
- _____
- _____
- (b) What safety precautions should we take when using the paint?
- _____
- _____

End

Po Kok Secondary School
S.1 Integrated Science

Chapter 1.3 Assignment
Basic Experiment Skills

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

A. True or False

Study the following statements. Put a “T” in the box against a correct statement and a “F” against an incorrect statement.

1. Safety glasses are used to protect our eyes.

☐
2. We should open the air hole before lighting a Bunsen burner.

☐
3. When the air hole of a Bunsen burner is opened, the flame is yellow in colour.

☐
4. A luminous flame of a Bunsen burner is hotter than a non-luminous flame.

☐
5. A heat-proof mat is used to prevent the bench from being damaged by heat.

☐

B. Multiple Choice

Put the best answer in each box below.

1. When heating things with a Bunsen burner, we should
(i) wear safety goggles.
(ii) fully open the air hole.
(iii) not touch the chimney.
A. (i) and (ii) only B. (i) and (iii) only
C. (ii) and (iii) only D. (i), (ii) and (iii)

☐
2. Jacky lights a Bunsen burner and then half-opens the air hole. Which of the following are correct about the Bunsen flame which Jacky gets?
(i) The shape of the flame is regular.
(ii) The flame is quiet.
(iii) The flame is called a non-luminous flame.
A. (i) and (ii) only B. (i) and (iii) only
C. (ii) and (iii) only D. (i), (ii) and (iii)

☐

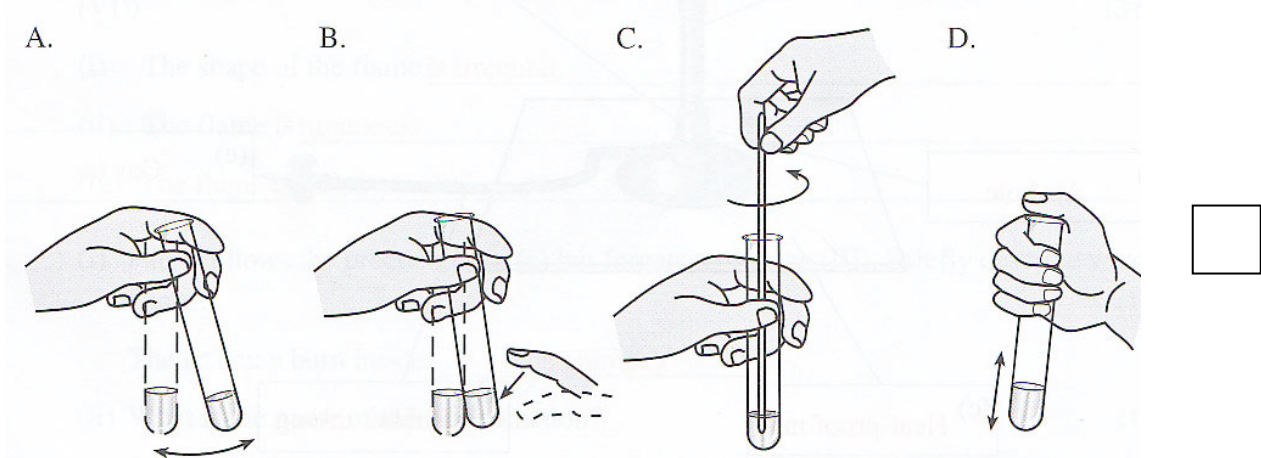
3. Which of the following methods of mixing solution in a test tube is INCORRECT?

A.

B.

C.

D.

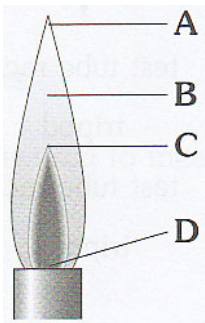


☐

4. Which of the following descriptions about the Bunsen flame is INCORRECT?
A. A non-luminous flame is noisy.
B. A non-luminous flame is hotter than a luminous flame.
C. A luminous flame is irregular in shape.
D. A luminous flame is obtained by opening the air hole.

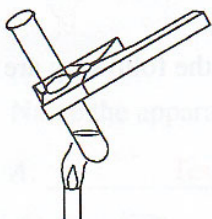
☐

5. Which part of the Bunsen flame is the hottest?

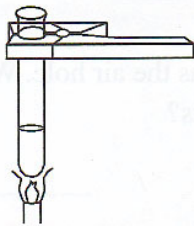


5. Which of the following diagrams shows the best way of heating water in a test tube?

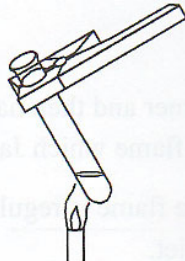
A.



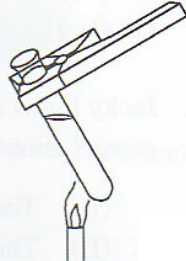
B.



C.



D.



C. Matching - Skills of transferring solutions:

- a Remove the dropper from the solution. Let the tip of the dropper touch the inner wall of the bottle.
- b Release the bulb. The solution will be sucked up.
- c Squeeze the rubber bulb and put the tip of the dropper into the solution.
- d Take the dropper to a test tube. Gently squeeze the bulb to add a few drops of the solution into the test tube.



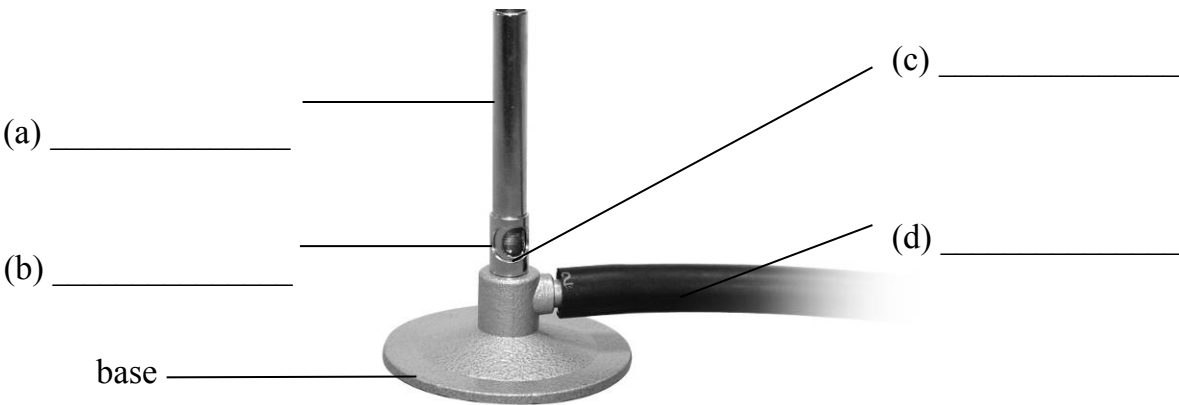
(1) _____

(2) _____

(3) _____

(4) _____

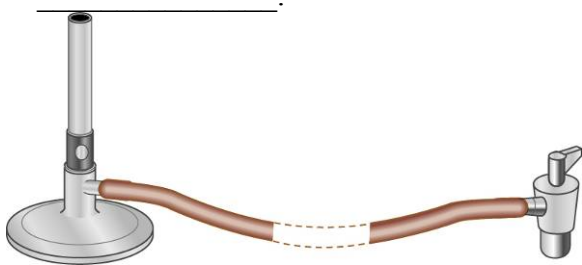
D. Labelling - Structure of a Bunsen burner:



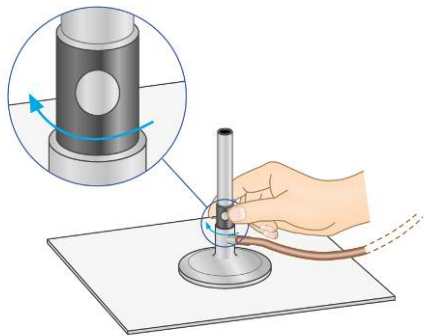
E. Fill in the blanks

(i) Steps of using the Bunsen burner:

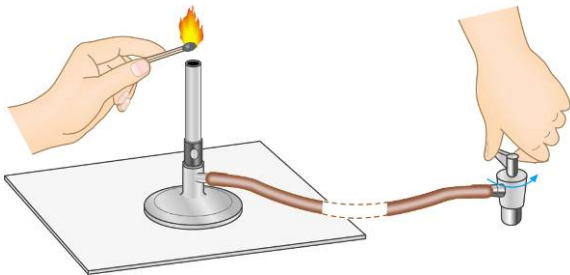
1 Make sure the rubber tubing of the Bunsen burner is connected to the _____.



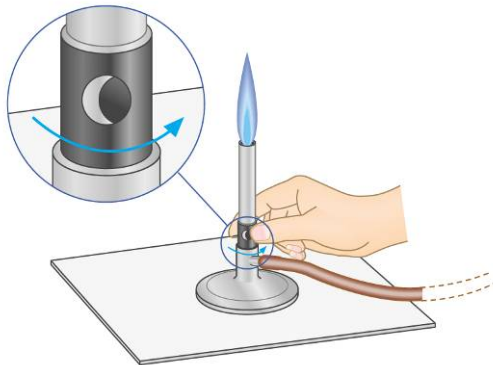
2 Close the _____ before lighting the Bunsen burner.



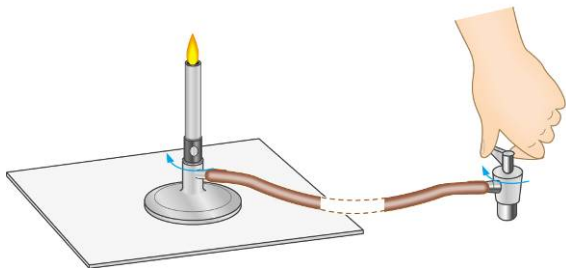
3 Bring a lighted match over the chimney. Turn on the _____.



4 Slowly open the air hole until the flame turns _____.



5 Turn off the flame, close the air hole and turn off the gas tap.



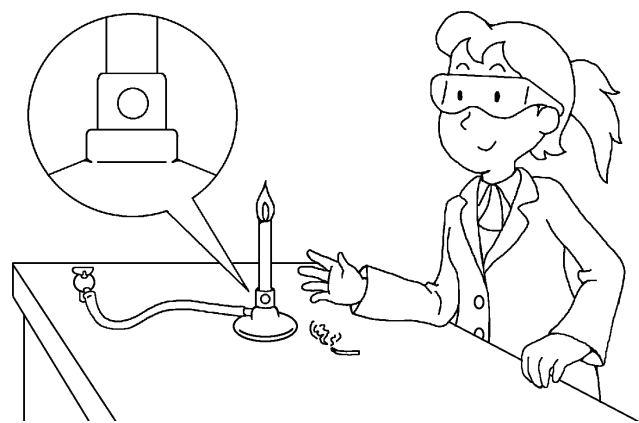
(ii) Differences between the Bunsen flames when the air hole is closed and opened:

	Air hole closed	Air hole opened
Colour of the flame	(a) _____	(b) _____
Shape of the flame	(c) _____	(d) _____
Brightness of the flame	(e) _____	(f) _____
Temperature of the flame	(g) _____	(h) _____

(iii) We usually use the _____ flame for heating.

F. Long Questions

Karen is doing an experiment with a Bunsen burner.



- (a) Write down THREE safety precautions taken by Karen.

- (b) Write down THREE mistakes that Karen has made. For each mistake, state one accident that may be caused.

- (c) In the laboratory, what should we do if there is a fire?

END

Po Kok Secondary School

S.1Integrated Science

Chapter 1.4 Assignment

Making Measurement

Name: _____

Class: S.1 ()

Date: _____

A. True or False

Study the following statements. Put a “T” in the box if the statement is true and a “F” if the statement is false.

1. Only alcohol is used to fill the bulb of a thermometer.

2. An alcohol thermometer is used to measure the temperature of boiling water.

3. A stop-watch is used to measure time accurately.

4. A beaker is the most accurate apparatus in the laboratory to measure the volume of a liquid.

B. Matching

Match what each of the following instruments measure.

Instrument		Measurement	
Thermometer	•	•	Volume
Ruler	•	•	Length
Measuring cylinder	•	•	Weight
Stop-watch	•	•	Temperature
Electronic balance	•	•	Time

Making sentences (Using the matching in Section D to make sentences)

We + use + (I . instrument) + to measure (II .noun)

e.g. We use **a thermometer** to measure **temperature**.

1. We use **a ruler** to measure _____

2. We use **a measuring cylinder** _____

3. _____

4. _____

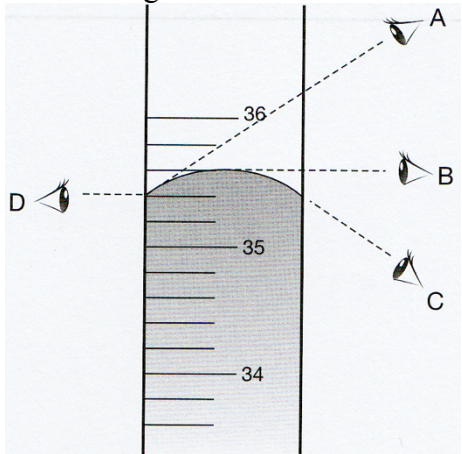
C. Multiple Choice

1. What can we use to measure a small volume of liquid accurately?

- A. A dropper B. A beaker C. A spatula D. A measuring cylinder

☐

Directions: Questions 2 and 3 refer to the diagram below.



2. Which of the above ways of taking reading is correct?

☐

3. The volume of the liquid is

- A. 35.4 cm³ B. 35.6 cm³ C. 36.0 cm³ D. 36.2 cm³

☐

4. Which one of the following combinations is INCORRECT?

<u>Quantity</u>	<u>Symbol for the unit</u>
A. rate of heart beat	min.
B. temperature	°F
C. length	m
D. volume	L

☐

5. Which of the following is the unit of length?

- A. L B. km C. cm³ D. g

☐

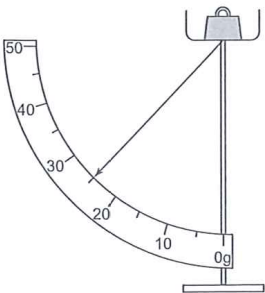
D. Questions

1. What is a laboratory instrument that you would use to:

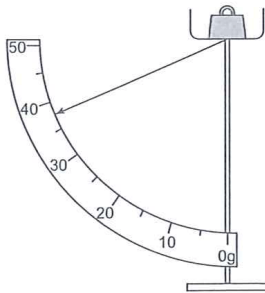
- a) measure out exactly 45ml of solution?
b) transfer a small amount of powder onto a balance?
c) stir the liquid in a beaker?
d) pick up and hold hot objects?
e) measure the temperature of boiling water?

cylinder

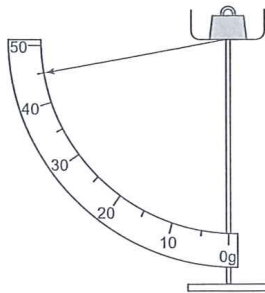
2. What are the readings of the following balances? (Don't forget the units.)



(i) _____

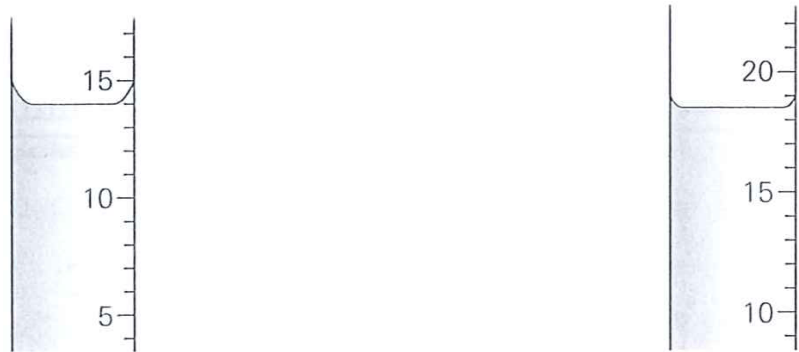


(ii) _____



(iii) _____

3. (a) What is the volume of water in each of the following measuring cylinders?

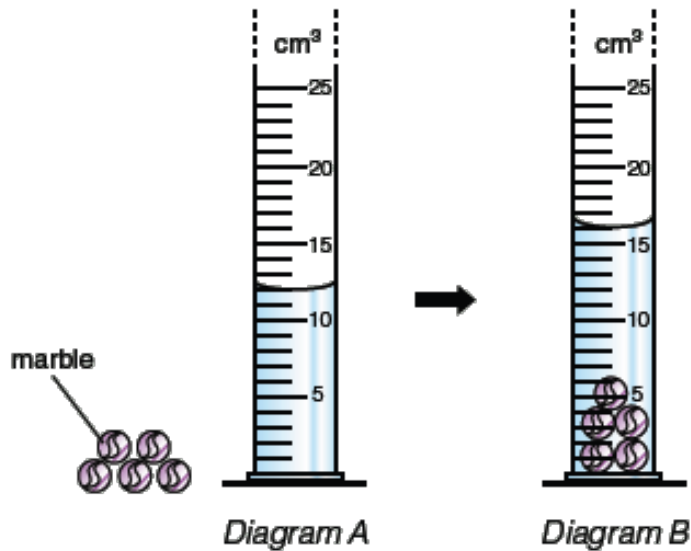


(i) _____ cm^3 (ii) _____ cm^3
 (b) Draw the meniscus in each of the following measuring cylinders.



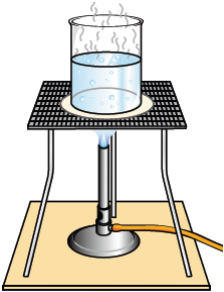




(i) 70 cm^3 (ii) 27 cm^3

4. Answer the following questions based on this diagram, which shows a method of measuring the volume of marbles.



- (a) What is the volume of the water in diagram A?
- _____
- (b) What is the total volume of the water and marbles in diagram B?
- _____
- (c) Calculate the average volume of a marble. Show your working out.
- _____

5. Complete the following table.

Measurement	(a) 	(b) 	(c) 	(d) 	(e) 
Suitable instrument for measurement					
Suitable unit					

End

Po Kok Secondary School
S.1 Integrated Science

Chapter 1.5 Assignment
Scientific investigation

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

A. True or False

Study the following statements. Put a “T” in the box against a correct statement and a “F” against an incorrect statement.

1. For a fair test, we should keep constant the variable being tested.

☐
2. We cannot draw a conclusion if the experiment is not a fair test.

☐
3. A hypothesis must be testable.

☐
4. When carrying out the experiment, we should record the results accurately and honestly.

☐

B. Multiple Choice

Put the best answer in each box below.

1. Which of the following combinations about a fair test is correct?

<u>Variable to be tested</u>	<u>All variable other than the one to be tested</u>
A. change	change
B. change	keep constant
C. keep constant	change
D. keep constant	keep constant

☐
2. Which of the following is a testable hypothesis?

A. Lemon juice helps plants grow faster.

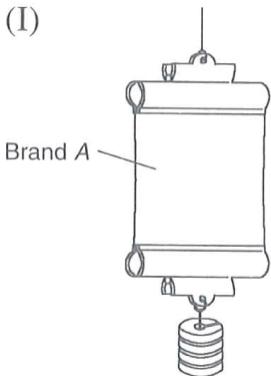
B. Lemon juice helps plants grow more beautifully.

C. Lemon juice helps plants grow healthier.

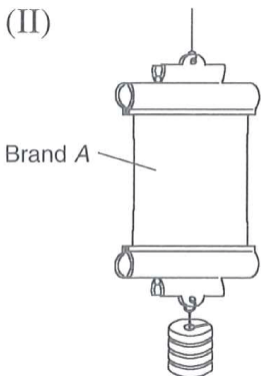
D. Lemon juice helps plants grow better.

☐
3. Peter wants to compare the strength of Brand A tissue and Brand B tissue by adding weights to clipped pieces of tissue.

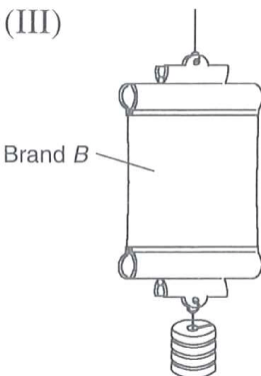
(I)



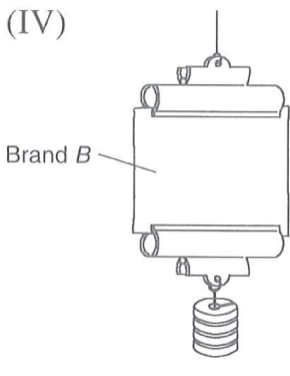
(II)



(III)



(IV)



☐

Which two of the above set-ups should Peter use for doing a fair test?

- A. (I) and (III) .

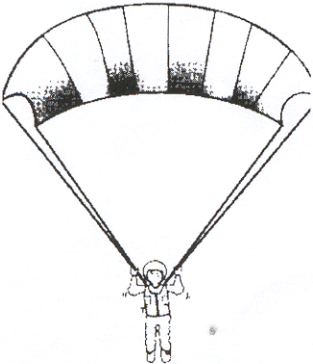


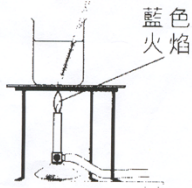
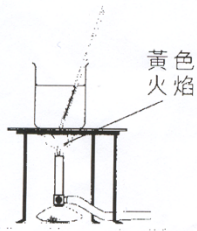
B. (II) and (III).
- C. (I) and (IV).

D. (II) and (IV) .
- ☐

4. Which of the following are involved in designing an experiment?
- (I) Making a list of the apparatus needed
 - (II) Writing down the experimental procedures
 - (III) Writing down the safety precautions
- A. (I) and (II) only.
- B. (I) and (III) only.
- C. (I) and (III) only.
- D. (I), (II) and (III) .

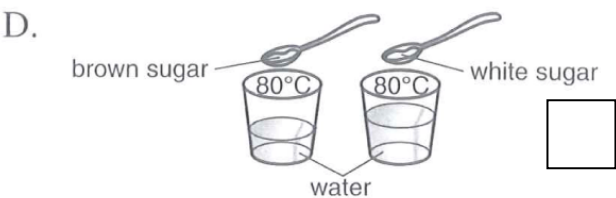
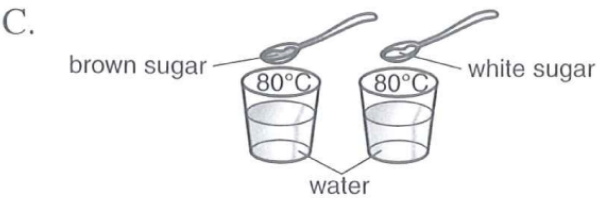
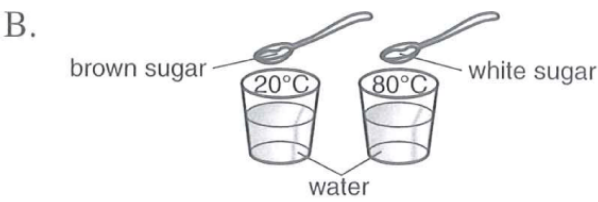
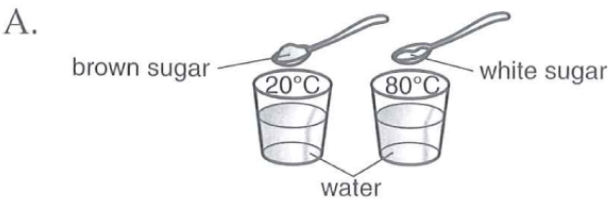
C. Questions

1. Study the following scientific investigations. Complete the variable table below by putting a “✓” in the appropriate boxes.

Investigation	Problem to investigate	Variables	Put a “✓” if	
			kept constant	changed
(a) The design of parachutes 	Will a bigger parachute fall faster than a smaller one?	(a) size of the parachute		
		(b) material used		
		(c) shape of the parachute		
		(d) weight of the person who uses the parachute		
		(e) the height at which it falls		
(b) The dissolving of salt and sugar  	Is salt more soluble in water than sugar?	(a) temperature of the water		
		(b) volume of the water		
		(c) Amount of each substances		
		(d) types of substance		
		(e) stirring speed		
(c) Type of Bunsen flame <div> Non-luminous flame  </div> <div> luminous flame  </div>	Which type of Bunsen flame is hotter?	(a) Time for water heating		
		(b) volume of the water		
		(c) Size and shape of the beaker		
		(d) Air hole state (Open / Close)		

2. Mary is going to test whether brown sugar or white sugar dissolves faster in water.

- (a) For the test to be fair, the temperature of water should be _____.
- (b) Which of the following set-ups should Mary use for doing a fair test? Put the best answer in the box below.

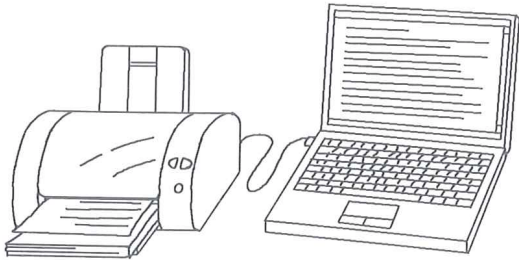


- (c) What result should Mary compare in the test?
- (d) If Mary did the experiment according to the correct answers in (a) to (c), she would obtain results as shown in the table below.

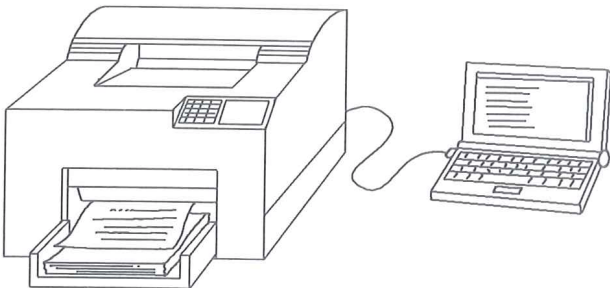
Type of sugar	Time/ s
Brown sugar	95
White sugar	80

According to the results obtained, what conclusion can Mary draw?

3. Tom wants to compare the speed of two printers using the following set-up.



Printer A



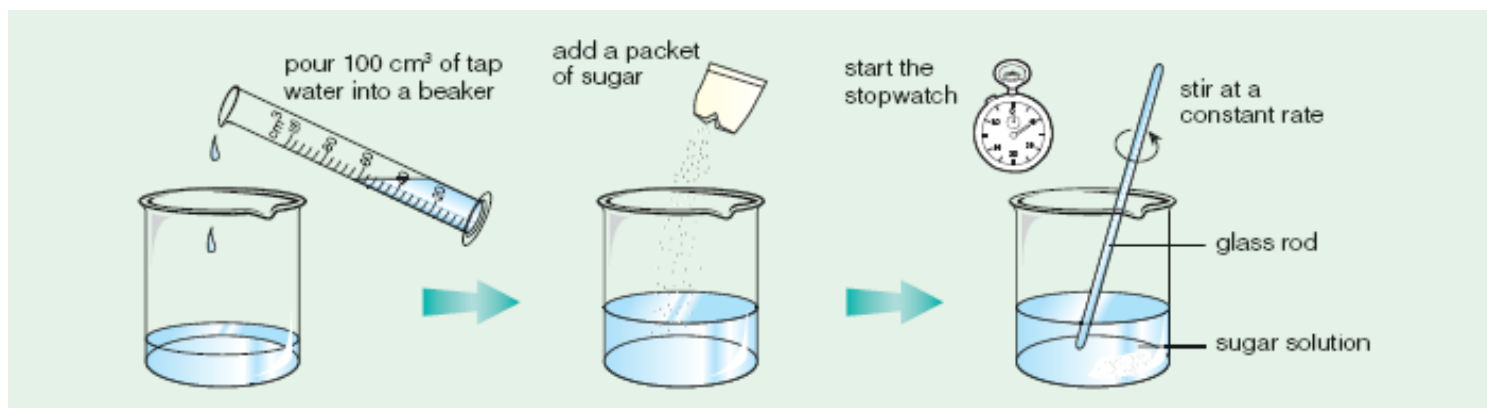
Printer B

- (a) Why is the above set-up NOT a fair test? How can Tom correct this?

- (b) What is the result to be compared in the above test? How can Tom measure this result?

- (c) Apart from the variable mentioned in (a), name TWO other variables that should be kept constant.

4. Ben does the following experiment to test whether ‘sugar dissolves faster in hot water than in cold water.’ Write down the steps in the experiment.



- (a) Pour _____ into a beaker.
- (b) Add (i) _____ into (ii) _____ and immediately start (iii) _____.
- (c) Stir (i) _____ at a constant rate using (ii) _____.
- (d) Stop _____ when all the sugar has dissolved.
- (e) Record _____ for all the sugar to dissolve.
- (f) Repeat steps (a) to (e) using _____.

END

Po Kok Secondary School
S.1 Integrated Science

Chapter 1.5 Assignment
Scientific investigation

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

A. True or False

Study the following statements. Put a “T” in the box against a correct statement and a “F” against an incorrect statement.

1. For a fair test, we should keep constant the variable being tested.

☐
2. We cannot draw a conclusion if the experiment is not a fair test.

☐
3. A hypothesis must be testable.

☐
4. When carrying out the experiment, we should record the results accurately and honestly.

☐

B. Multiple Choice

Put the best answer in each box below.

1. Which of the following combinations about a fair test is correct?

<u>Variable to be tested</u>	<u>All variable other than the one to be tested</u>
A. change	change
B. change	keep constant
C. keep constant	change
D. keep constant	keep constant

☐
2. Which of the following is a testable hypothesis?

A. Lemon juice helps plants grow faster.

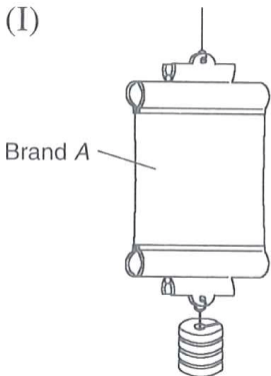
B. Lemon juice helps plants grow more beautifully.

C. Lemon juice helps plants grow healthier.

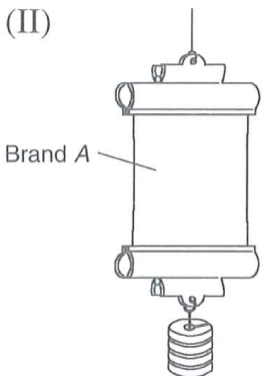
D. Lemon juice helps plants grow better.

☐
3. Peter wants to compare the strength of Brand A tissue and Brand B tissue by adding weights to clipped pieces of tissue.

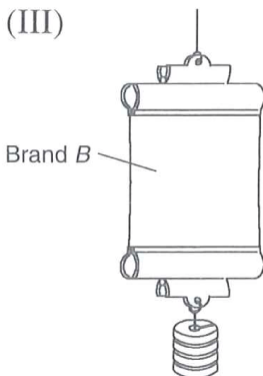
(I)



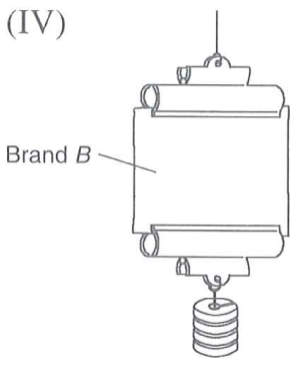
(II)



(III)



(IV)



☐

Which two of the above set-ups should Peter use for doing a fair test?

- A. (I) and (III) .

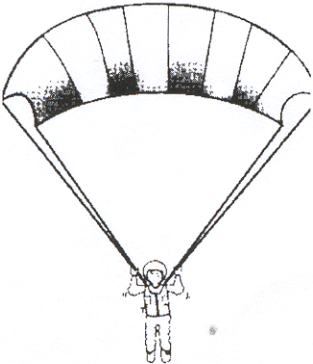


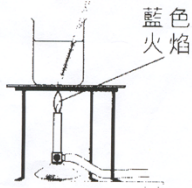
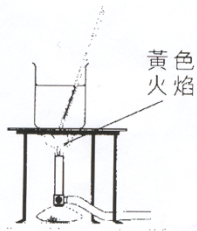
B. (II) and (III).
- C. (I) and (IV).

D. (II) and (IV) .
- ☐

4. Which of the following are involved in designing an experiment?
- (I) Making a list of the apparatus needed
 - (II) Writing down the experimental procedures
 - (III) Writing down the safety precautions
- A. (I) and (II) only.
- B. (I) and (III) only.
- C. (I) and (III) only.
- D. (I), (II) and (III) .

C. Questions

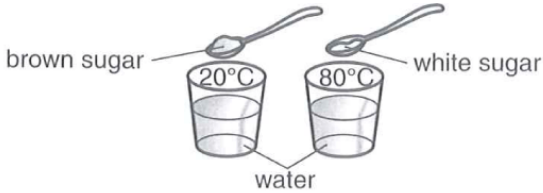
1. Study the following scientific investigations. Complete the variable table below by putting a “✓” in the appropriate boxes.

Investigation	Problem to investigate	Variables	Put a “✓” if	
			kept constant	changed
(a) The design of parachutes 	Will a bigger parachute fall faster than a smaller one?	(a) size of the parachute		
		(b) material used		
		(c) shape of the parachute		
		(d) weight of the person who uses the parachute		
		(e) the height at which it falls		
(b) The dissolving of salt and sugar  	Is salt more soluble in water than sugar?	(a) temperature of the water		
		(b) volume of the water		
		(c) Amount of each substances		
		(d) types of substance		
		(e) stirring speed		
(c) Type of Bunsen flame <div> Non-luminous flame  </div> <div> luminous flame  </div>	Which type of Bunsen flame is hotter?	(a) Time for water heating		
		(b) volume of the water		
		(c) Size and shape of the beaker		
		(d) Air hole state (Open / Close)		

2. Mary is going to test whether brown sugar or white sugar dissolves faster in water.

- (a) For the test to be fair, the temperature of water should be _____.
- (b) Which of the following set-ups should Mary use for doing a fair test? Put the best answer in the box below.

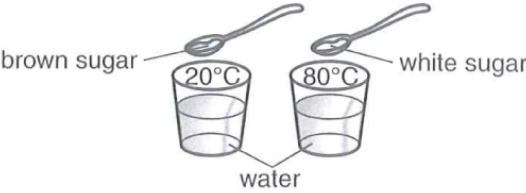
A.



brown sugar 20°C 80°C white sugar

water

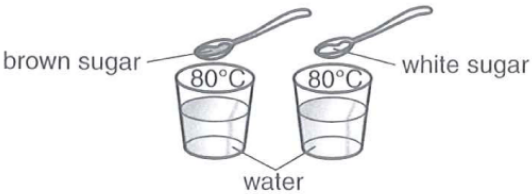
B.



brown sugar 20°C 80°C white sugar

water

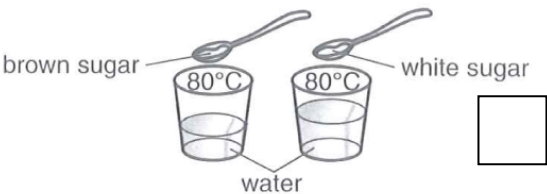
C.



brown sugar 80°C 80°C white sugar

water

D.



brown sugar 80°C 80°C white sugar

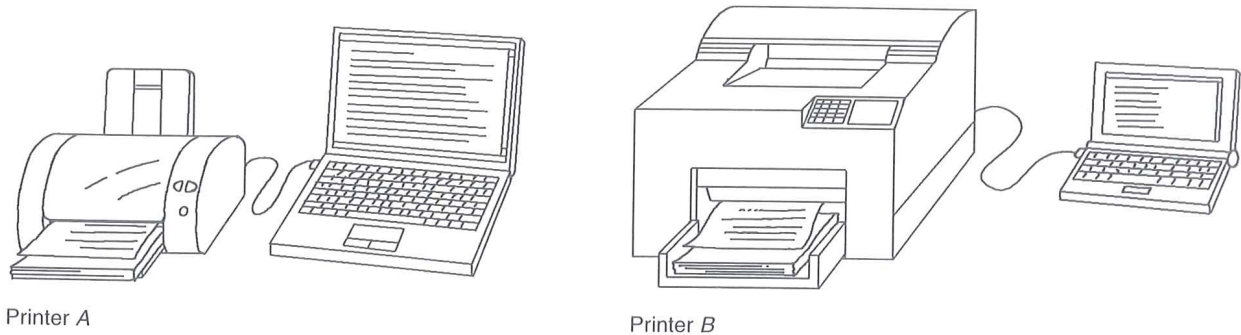
water

- (c) What result should Mary compare in the test?
- (d) If Mary did the experiment according to the correct answers in (a) to (c), she would obtain results as shown in the table below.

Type of sugar	Time/ s
Brown sugar	95
White sugar	80

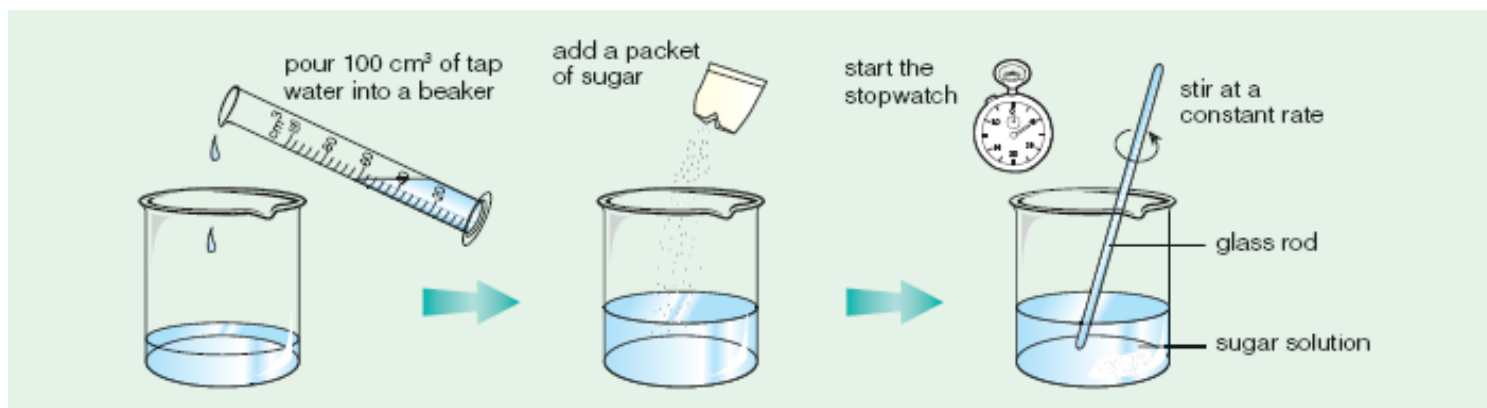
According to the results obtained, what conclusion can Mary draw?

3. Tom wants to compare the speed of two printers using the following set-up.



- (a) Why is the above set-up NOT a fair test? How can Tom correct this?
- _____
- _____
- (b) What is the result to be compared in the above test? How can Tom measure this result?
- _____
- _____
- (c) Apart from the variable mentioned in (a), name TWO other variables that should be kept constant.

4. Ben does the following experiment to test whether ‘sugar dissolves faster in hot water than in cold water.’ Write down the steps in the experiment.



- (a) Pour _____ into a beaker.
- (b) Add (i) _____ into (ii) _____ and immediately start (iii) _____.
- (c) Stir (i) _____ at a constant rate using (ii) _____.
- (d) Stop _____ when all the sugar has dissolved.
- (e) Record _____ for all the sugar to dissolve.
- (f) Repeat steps (a) to (e) using _____.

END