

Po Kok Secondary School**S.1 Integrated Science**

Chapter 1 Introducing Science

Science Investigation – Flame of Bunsen Burner

Name : _____ ()

Class : **S.1**

Date : _____

Objective:

Develop students' ability to use the scientific method and improve their problem solving skills

1. Introduction

This is a Bunsen Burner. It has an **air hole** on it, which is controlled by a _____ and **the air hole should be closed** before you turn on the Bunsen Burner. Why should it be closed? _____

When the Bunsen Burner is turned on, you can use the _____ to control the size of the air hole. You will observe that the colour of the flame when the air hole is opened and when it is closed are different. So, for which situation do you think the flame temperature is higher? Is it when the air hole is opened or when it is closed?

Now, let's do an Investigation to see if your prediction is correct.

2. Aim

To find out _____.

3. Hypothesis

The Bunsen flame is hotter when the air hole is (opened / closed).

4. Experiment Design**(A) Design concept:**

Use **five minutes** to discuss the design of the experiment with your classmates, then express your concepts in words or pictures.

(B) Duty:

Use **one minute** to distribute on the following duty, and fill in the name list below.

Duty	Name of students
Experiment supervisor and time counter	
Instrument Manager(s)	
Experiment technicians	
Recorder and reporter	

(C) Apparatus & Material:

You have **five minutes** to put a tick 『✓』 in the box if you need the equipment and material.

(If you need to, refer to your science text book 1A)

- | | | | |
|--|--|---|--|
| <input type="checkbox"/> 250cm ³ beaker | <input type="checkbox"/> a dropper | <input type="checkbox"/> a Match or lighter | <input type="checkbox"/> a Bunsen burner |
| <input type="checkbox"/> a meter ruler | <input type="checkbox"/> A stop watch | <input type="checkbox"/> A cylinder | <input type="checkbox"/> a conical flask |
| <input type="checkbox"/> A heat-proof mat | <input type="checkbox"/> A glass rod | <input type="checkbox"/> A tripod | <input type="checkbox"/> A wire gauze |
| <input type="checkbox"/> a watch glass | <input type="checkbox"/> A stand and clamp | <input type="checkbox"/> a filter funnel | <input type="checkbox"/> A thermometer |

(D) Variables (“3Cs” of a fair test):

Variable to be changed :	The variables that are studied in the experiment. (only one in each experiment)
Variable(s) to be kept constant :	The variable(s) that should remain the same within the whole experiment. (e.g. same temperature, same weight, same volume.)
The variable to compare :	The variable(s) that are being measured in the experiment. (e.g. temperature, weight, volume.)

Here are the variables in the investigation, put them in the table below.

- The state of the air hole (Open / Close)
- Size and shape of the beaker
- Volume of the water
- Time for water heating
- Changes in water temperature

Variables to be kept constant (Control Variable)	Variable to be changed (Independent Variable)	What to compare (Dependent Variable)

(E) Procedure:

According to your design concept in **Part A**, in **ten minutes**, draw your setup with the experimental devices and complete the steps of your experiment.


(E) Procedure:

1. *Set up the instrument according to the diagram.*
2. *Pour 100cm³ of*
water _____
_____ *and put the beaker of water on the wire gauze.*
3. *Measure the temperature of water before turning on the Bunsen burner (T₁).*
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. *Heat up the water for 5 minutes.*
8. *Measure the temperature of water after heating (T₂). Record the result in the*
table of Part H.
9. *Turn off the gas tap after use.*
10. *Repeat steps 1 to 9, but have to* _____ *the air hole of Bunsen*

burner.

(F) Safety Precautions:

Use **two minutes** to complete the safety precautions in this experiment.

- i) Wear _____ .
- ii) Do not touch _____ after heating.
- iii) When heating, the volume of water _____, otherwise it is easy to splash when boiling.

**Let your teacher check your experiment design first,
and then, after it has been approved, carry out the experiment.**

(G) Experiment:

Now you have **20 minutes** for your experiment. **Teacher's approval:** _____

(H) Result:

Carry out the experiment and fill in the results in the following table:

	$T_1(^{\circ}\text{C})$	$T_2(^{\circ}\text{C})$	Increase in water temperature($^{\circ}\text{C}$)
Air hole is opened			
Air hole is closed			

(I) Conclusion:

When the air hole is _____, the increase in water temperature is _____ so, the Bunsen flame is hotter when the _____.

(J) Discussion:

1. What other methods are possible to compare Bunsen Burner's flame temperature when the air hole is opened and closed?

End



INTEGRATED SCIENCE

MY STUDY JOURNEY

Chapter 1
Topic : Introducing Science

Name : _____

Class : _____ ()

A. Self-assessment

After you finished this chapter, do you understand the content of the chapter? Scan through your textbook and put a “✓” in the appropriate box to indicate your understanding of the content. (5 represents the highest level of understanding.)

Chapter	Contents	Level of understanding				
		Do not understand ← → Fully understand				
		1	2	3	4	5
1.1 What is science	How do scientists work (p.4-5)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Great scientists and their contributions (p. 6-7)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Branches of science (p. 8)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Science improves our quality of life (p. 9)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Limitations of science (P.10)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Does science always bring us good? (P.10-11)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2 The science laboratory	Knowing your laboratory (P.12)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Laboratory safety rules (P.13)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Hazard warning labels (P.15)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Laboratory first aid (P. 17-18)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Common laboratory apparatus (P.19-20)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Sectional diagrams of apparatus (P.21-22)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3 Basic experimental skills	Heating (P.23-28)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Transferring solutions (P.29-30)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Mixing solutions (P.31-33)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4 Making measurements	Measuring temperatures (P.34)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Measuring time (P.37-38)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Measuring lengths (P.39-40)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Measuring volumes (P.41-43)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Measuring weight (P.44-46)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5 Simple scientific investigation	Conducting a simple scientific investigation (P.48)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Fair test (P. 50-53)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	Example of a scientific investigation (P.53-57)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

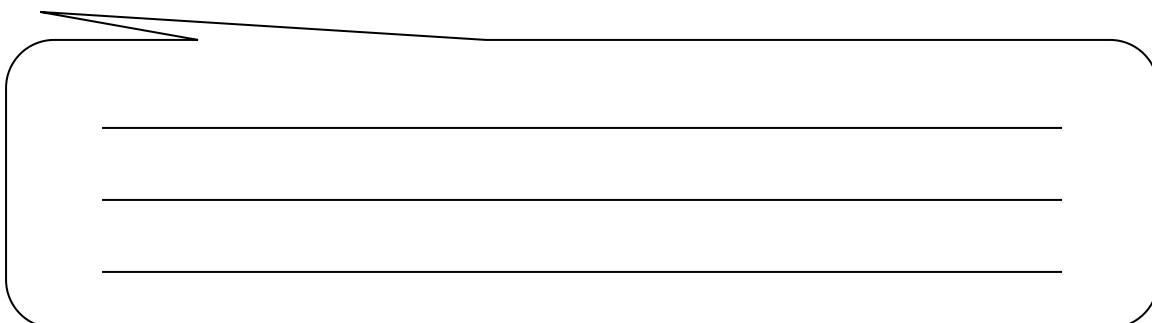
B. Reflection

After finishing this chapter, what have you learnt? Express what you learnt either in words or in pictures in the space on the next page.

C. Draw an diagram of this topic

- 1) Write down the topic of this chapter in the center of the space below.
- 2) Branch out the related main points from the center.
- 3) Use arrows to link the related branch.

D. Feedback from my teacher:



A large rounded rectangular box with a pointer on the top left, containing three horizontal lines for writing feedback.