Brine **L**eas **S**CIENCE!
:D

The **SCIENCE** of your favourite snacks

Science is EVERYWHERE, even in your favourite tasty treats!

Brine **L**eas **S**CIENCE!
:D

The SCIENCE of your favourite snacks

Some of our Year 7 students have been experimenting with some of their most moreish morsels.

This is what they have been up to…

BLS Year 7s were asked about their favourite snacks…

What's your favourite snack?

'SNACKY SCIENCE'… science is EVERYWHERE, even in your favourite tasty treats!

We'd like to introduce next year's Y7s to some fun science about their favourite food and drink. Please reply below (click 'reply', rather than starting a new post) and **tell me what your favourite snack is**. If you're feeling super scientific, you might even include a short sentence about how your most moreish morsels are relevant to some of the science your have learnt this year… but you don't have to do this bit!

Before we investigate the science of snacks, we need to know what the best ones are. And the winner is….
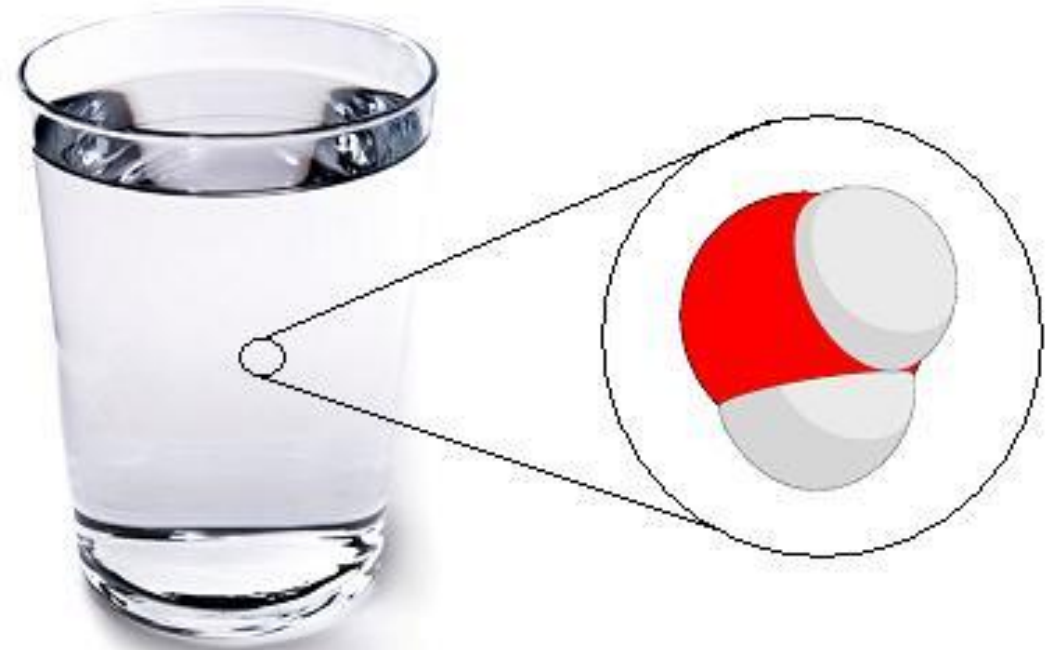
WINNER!

There's SO MUCH science in **biscuits**!

Here are just a few of the topics we study in Year 7 at BLS and how they can be linked to biscuits

- 7I Energy
    1. biscuits & energy
- 7A Cells, tissues, organs & systems
    2. biscuits & life processes
- 7G The particle model
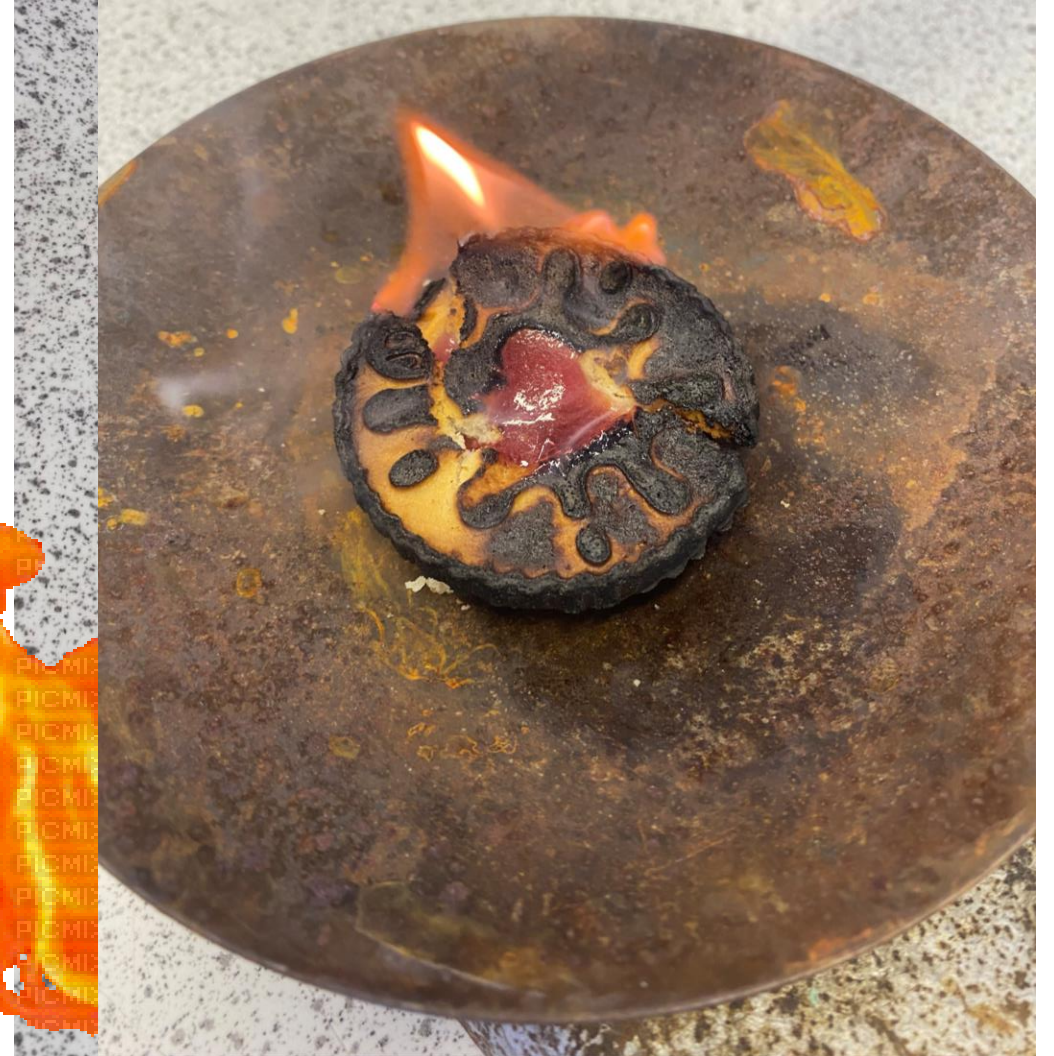   **3. biscuits & particles**

Biscuits & energy

Biscuits are full of energy. This energy can fuel our bodies.

- We can find out how much energy is in biscuits in a science lab, but first we need to…

set them on fire!

How to light a Bunsen burner

We use Bunsen burners for heating things in the science lab.

In science lessons at BLS you will learn how to light a Bunsen burner safely.

How to light a Bunsen burner

https://www.youtube.com/watch?v=gwhBzgXuxNk

How to light a Bunsen burner

TASK What is the correct order for the instructions below?

A Turn on the gas tap

B Place Bunsen in centre of mat

C Place a heatproof mat near a gas tap

D Place the splint on the heatproof mat

E Hold a lit splint over the chimney

F Ensure the air hole is closed

G Tie back long hair and tuck in loose clothing

H Wear safety goggles

I Securely attach the rubber tubing to the gas tap

How to light a Bunsen burner

This is the correct order :)

G Tie back long hair and tuck in loose clothing

H Wear safety goggles

C Place a heatproof mat near a gas tap

I Securely attach the rubber tubing to the gas tap

B Place Bunsen in centre of mat

F Ensure the air hole is closed

E Hold a lit splint over the chimney

A Turn on the gas tap

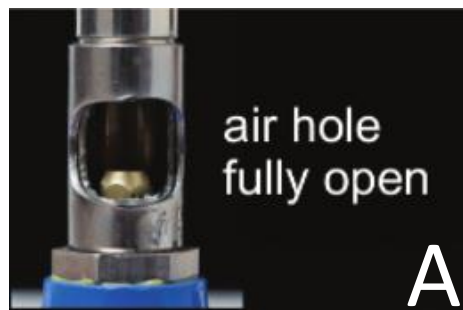D Place the splint on the heatproof mat

Bunsen burner flames

TASK

Match the numbered pictures to the lettered pictures to show how the size of the air hole affects the Bunsen flame

EXTENSION

What gas is needed for the gas to burn?

air hole fully open

A

air hole closed

B

air hole half open

C

quiet yellow flame

1

medium blue flame

2

The hottest part of the roaring flame is just above the pale blue cone.

3

Bunsen burner flames

ANSWERS

1 B

If the hole is closed we see a yellow safety flame

2 C

If the hole is half open, we get a medium blue flame

3 A

When the hole is fully open, the flame is hottest, it is a roaring flame

EXTENSION

Opening the hole allows **OXYGEN** from the air to enter, which helps the gas burn

Biscuits & energy

Now we know how to use a Bunsen burner, we can carry out an experiment to compare the energy of some different biscuits.

Scientific experiments must have certain 'variables', which are things that *can* change

Independent variable – is **changed** by the experimenter

Dependent variable – is **measured** by the experimenter

Control variables – are kept **constant**, to make the test fair

Scientific investigations

Independent variable (IV) – is **changed** by the experimenter
Dependent variable (DV) – is **measured** by the experimenter
Control variables (CV) – are kept **constant**, to make the test fair

For example, if we wanted to find out what type of pet was the fastest.
TASK can you work out what the variables would be:

IV - Type of pet
DV - The time it takes the pet to get to the finish line
CV - How far the pets have to run

How far the pets have to run

Type of pet

The time it takes the pet to get to the finish line

Biscuits & energy

Aim: Which biscuit has the most energy?

We do this by letting the burning biscuits heat up some water

IV - type of biscuit

DV - temperature rise of water

CV - can you think of any?
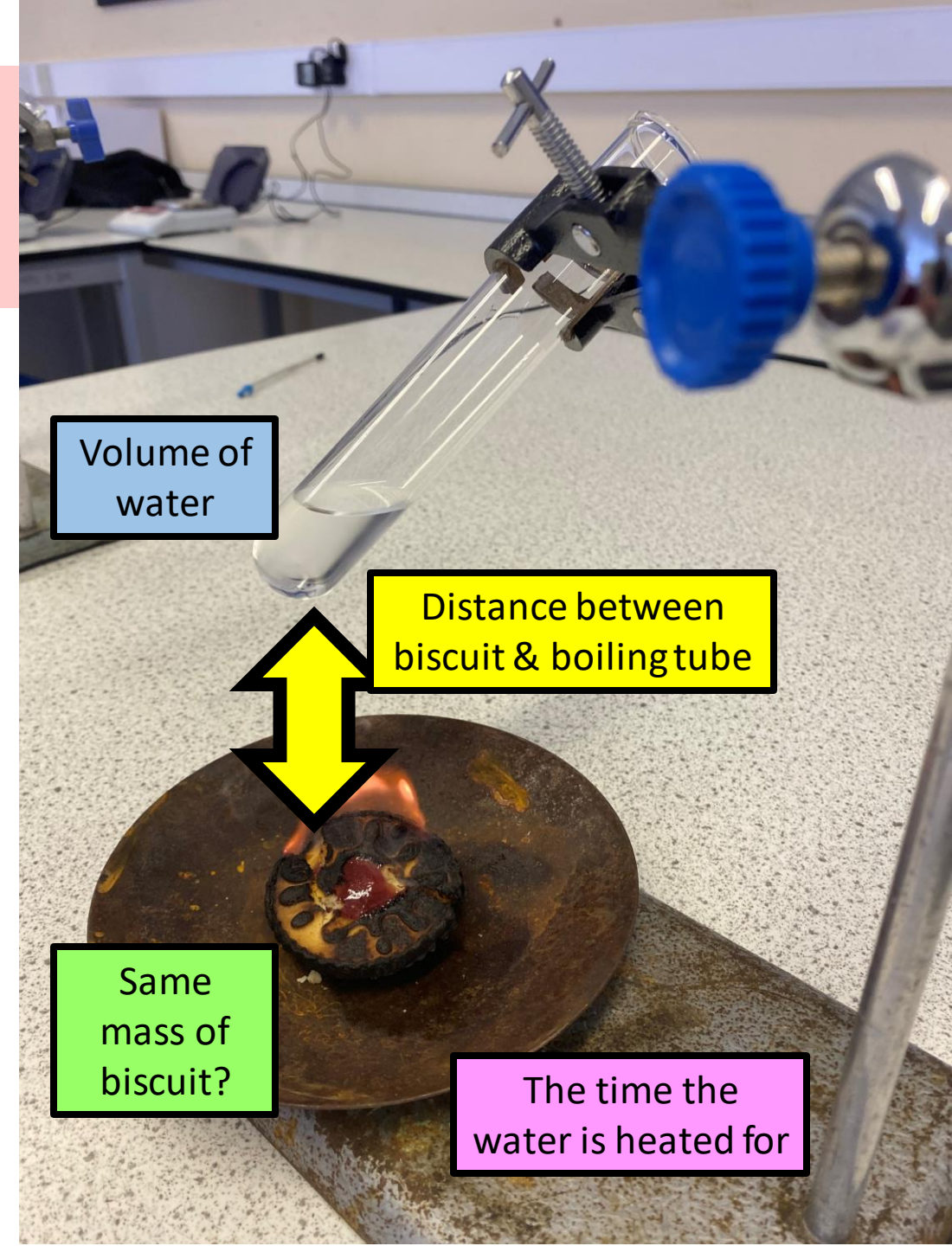
Biscuits & energy

Aim: Which biscuit has the most energy?

We do this by letting the burning biscuits heat up some water and measuring the change in temperature

IV - type of biscuit

DV - temperature rise of water

CV - can you think of any?

Volume of water

Distance between biscuit & boiling tube

Same mass of biscuit?

The time the water is heated for

Biscuits & energy

We set a biscuit on fire and heated some water for 20 seconds. We repeated with fresh water for each biscuit. This is what we found...

Biscuit	Temperature of water before (°C)	Temperature after (°C)	Temperature rise (°C)	Mass of biscuit (g)
Jammie dodger	22	26	4	17.64
Oreo	20	23	3	11.13
Chocolate digestive	20	21.5	1	14.84
Plain digestive	22	23	1.5	17.04

TASK Calculate the rise in temperature for the other 3 biscuits. Do this by subtracting the temp. before from the temp. after heating.

Biscuits & energy

Biscuit	Temperature of water before (°C)	Temperature after (°C)	Temperature rise (°C)	Mass of biscuit (g)
Jammie dodger	22	26	4	17.64
Oreo	20	23	**3**	11.13
Chocolate digestive	20	21.5	**1**	14.84
Plain digestive	22	23	**1.5**	17.04

1. Which biscuit released the most energy? How do you know from the results? The jammie dodger, the temperature of the water increased the most

2. Look at the mass of the biscuits. What problem might this have caused? Bigger biscuits might release more energy, which makes the test not fair

Biscuits & energy

Manufacturers tell us the amount of energy in their biscuits on the packets. Look at these nutrition labels and compare the energy of the jammie dodgers and oreos...

oreos

NUTRITION INFORMATION

	Per 100g	1 Oreo (11g)	%* / 1 Oreo (11g)
Energy	2010 kJ 480 kcal	220 kJ 53 kcal	3%
Fat	20g	2.2g	3%
of which Saturates	9.8g	1.1g	5%
Carbohydrate	69g	7.6g	3%
of which Sugars	38g	4.1g	5%
Fibre	2.5g	0.3g	-
Protein	5.0g	0.5g	1%
Salt	0.90g	0.10g	2%

*Reference intake of an average adult (8400 kJ/2000 kcal)

jammie dodgers

NUTRITION INFORMATION & RIs

Typical Values	Per 100g	Per serving (1 biscuit)*	% RI**per serving	RI**Adults
Energy	1829 kJ	329 kJ	4%	8400 kJ
Energy	435 kcal	78 kcal	4%	2000 kcal
Fat	14.1g	2.5g	4%	70g
of which Saturates	6.8g	1.2g	6%	20g
Carbohydrate	70.2g	12.6g	5%	260g
of which Sugars	29.7g	5.3g	6%	90g
Fibre	2.1g	0.4g	-	-
Protein	5.4g	1.0g	2%	50g
Salt	0.61g	0.11g	2%	6g

*Serving size = 1 biscuit (approx.18g). 8 servings per pack.
**Reference intake of an average adult (8400 kJ/2000 kcal).

Biscuits & energy

Q Does the energy per biscuit match our results?

BUT! A jammie dodger **weighs 7g** more than an oreo!

Instead, we can fairly compare the **energy per 100g** of biscuits.

Yes! The jammie dodger has 109kJ more energy per biscuit

oreos

NUTRITION INFORMATION

	Per 100g	1 Oreo (11g)	%* / 1 Oreo (11g)
Energy	2010 kJ / 480 kcal	220 kJ / 55 kcal	3%
Fat	20g	2.2g	3%
of which Saturates	9.8g	1.1g	5%
Carbohydrate	69g	7.6g	3%
of which Sugars	38g	4.1g	5%
Fibre	2.5g	0.3g	-
Protein	5.0g	0.5g	1%
Salt	0.90g	0.10g	2%

*Reference intake of an average adult (8400 kJ/2000 kcal)

jammie dodgers

NUTRITION INFORMATION & RIs

Typical Values	Per 100g	Per serving (1 biscuit)*	% RI** per serving	RI** Adults
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Fibre	2.1g	0.4g	-	-
Protein	5.4g	1.0g	2%	50g
Salt	0.61g	0.11g	2%	6g

*Serving size = 1 biscuit (approx.18g) 8 servings per pack.
**Reference intake of an average adult (8400 kJ/2000 kcal).

TASK 1

Biscuits & energy

Task Sheet

1 Look at the food labels below, then fill in the table.

Wholewheat Breakfast Cereal
Typical values	per serving	per 100g
Energy	518 kJ	1440 kJ

Low-fat Yogurt
Typical values	per serving	per 100g
Energy	235 kJ	196 kJ

Raspberry JAM
TYPICAL VALUES
	per serving	per 100g
Energy	158 kJ	1052 kJ

SAUSAGES
Typical values	per serving	per 100g
Energy	601 kJ	1059 kJ

WHOLEMEAL BREAD
Typical values	per serving	per 100g
Energy	330 kJ	956 kJ

BUTTER
Typical values	per serving	per 100g
Energy	243 kJ	3046 kJ

Type of food	Energy value in 100 g (kJ per 100 g)	Energy value in one serving (kJ per serving)
cereal		
jam		
yoghurt		
sausages		
bread		
butter		

2 Which food gives the most energy per 100 g? _____

3 Which food gives the most energy per serving? _____

4 a How much energy would you get if you had a slice of bread and butter with jam on it?

Show your working. _____

_____

b How much energy would you get if you ate a sausage sandwich made with two sausages?

Show your working. _____

_____

TASK 2

Biscuits & energy

Task Sheet

Aim

You are going to compare the amounts of energy stored in different foods.

Introduction

Our bodies get the energy we need from the energy stored in food. Different kinds of food store different amounts of energy.
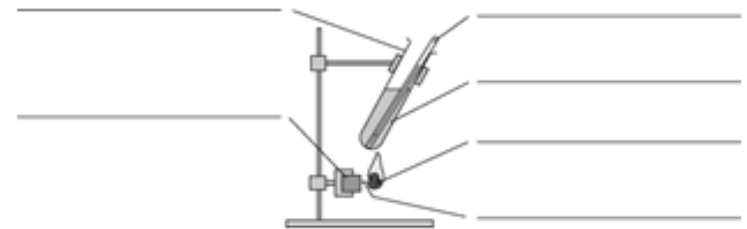
Method

Apparatus

- different kinds of food
- eye protection
- cork
- water
- clamp stand

- measuring cylinder
- Bunsen burner
- pin
- thermometer
- boiling tube

⚠ Wear eye protection.
Do not eat any of the foods.

Label this diagram using words from the box.

| boiling tube | cork | food |
| pin | thermometer | water |

Fill in the missing words using words from the box below.

A   I will heat some water using the energy from a _____.

B   I will make it a fair test by using the _____ amount of water each time
     and holding the burning food the same _____ from the boiling tube.

C   I will measure the volume of the water using a _____ and
     pour it into a boiling tube.

D   I will measure the temperature of the water using a _____.

E   I will _____ the experiment with the other foods.

| distance | measuring cylinder | piece of food | repeat | same | thermometer |

TASK 2

Biscuits & energy

Task Sheet

Biscuit	Temperature of water before (°C)	Temperature after (°C)	Temperature rise (°C)	Mass of biscuit (g)
Jammie dodger	22	26	4	17.64
Oreo	20	23	3	11.13
Chocolate digestive	20	21.5	1	14.84
Plain digestive	22	23	1.5	17.04

When the food burned the energy stored in it was transferred to the water and made it hotter.

The food that gave the highest temperature was the _____.

This is the food which stores the _____ energy.

Biscuits & energy

Task Sheet

Type of food	Energy value in 100 g (kJ per 100 g)	Energy value in one serving (kJ per serving)
cereal	1440	518
jam	1052	158
yoghurt	196	235
sausages	1059	601
bread	956	330
butter	3046	243

1 Look at the food labels below, then fill in the table.

Wholewheat Breakfast Cereal Typical values	per serving	per 100g
Energy	518 kJ	1440 kJ

Low-fat Yogurt Typical values	per serving	per 100g
Energy	235 kJ	196 kJ

Raspberry JAM TYPICAL VALUES	per serving	per 100g
Energy	158 kJ	1052 kJ

SAUSAGES Typical values	per serving	per 100g
Energy	601 kJ	1059 kJ

WHOLEMEAL BREAD Typical values	per serving	per 100g
Energy	330 kJ	956 kJ

BUTTER Typical values	per serving	per 100g
Energy	243 kJ	3046 kJ

Type of food	Energy value in 100 g (kJ per 100 g)	Energy value in one serving (kJ per serving)
cereal		
jam		
yoghurt		
sausages		
bread		
butter		

2 Which food gives the most energy per 100 g? __butter__

3 Which food gives the most energy per serving? __sausages__

4 a How much energy would you get if you had a slice of bread and butter with jam on it?
    Show your working. __330 + 243 + 158 = 731 kJ__

   b How much energy would you get if you ate a sausage sandwich made with two sausages?
    Show your working. __(2 × 330) + (2 × 243) + (2 × 601) = 2348 kJ__

Biscuits & energy

Task Sheet

Aim

You are going to compare the amounts of energy stored in different foods.

Introduction

Our bodies get the energy we need from the energy stored in food. Different kinds of food store different amounts of energy.
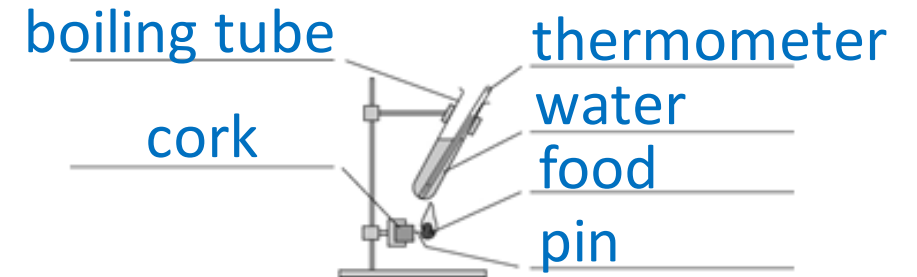
Method

Apparatus
- different kinds of food
- eye protection
- cork
- water
- clamp stand
- measuring cylinder
- Bunsen burner
- pin
- thermometer
- boiling tube

⚠ Wear eye protection.
Do not eat any of the foods.

Label this diagram using words from the box.

| boiling tube | cork | food |
| pin | thermometer | water |

boiling tube
cork
thermometer
water
food
pin

Fill in the missing words using words from the box below.

A I will heat some water using the energy from a **biscuit/piece of food**

B I will make it a fair test by using the ____**same**____ amount of water each time and holding the burning food the same ____**distance**____ from the boiling tube.

C I will measure the volume of the water using a ____**measuring cylinder**____ and pour it into a boiling tube.

D I will measure the temperature of the water using a ____**thermometer**____

E I will ____**repeat**____ the experiment with the other foods.

| distance | measuring cylinder | piece of food | repeat | same | thermometer |

Biscuits & energy

Task Sheet

Biscuit	Temperature of water before (°C)	Temperature after (°C)	Temperature rise (°C)	Mass of biscuit (g)
Jammie dodger	22	26	4	17.64
Oreo	20	23	3	11.13
Chocolate digestive	20	21.5	1	14.84
Plain digestive	22	23	1.5	17.04

When the food burned the energy stored in it was transferred to the water and made it hotter.

The food that gave the highest temperature was the _jammie dodger_.

This is the food which stores the _____most_____ energy.

Biscuits & life processes

MRS GREN is a kind granny who helps us to remember 7 life processes that all living things do…

M

R

S

G

R

E

N

TASK (wordsearch handout)
Use the clues to complete the wordsearch and find out what the 7 life processes are

Life processes wordsearch

Life process	Clue
M	Living things do this when they are not still
R	Living things do this to release energy from food
S	Living things can see, feel, smell, taste & hear
G	Living things get bigger when they do this
R	Livings things make babies
E	Living things get rid of waste
N	Living things feed

R	E	P	R	O	D	U	C	T	I	O	N
A	B	C	E	D	F	G	H	I	J	K	L
S	E	N	S	I	T	I	V	I	T	Y	I
T	X	Z	P	E	B	R	O	V	T	S	U
L	C	U	I	M	R	U	P	H	A	S	K
W	R	G	R	O	W	T	H	O	N	M	B
Q	E	R	A	V	F	J	Y	P	U	O	I
U	T	O	T	E	H	N	I	L	R	V	S
D	I	U	I	M	J	O	D	G	R	M	C
H	O	N	O	E	X	K	R	M	I	E	U
A	N	D	N	N	M	A	E	E	K	G	I
S	X	N	U	T	R	I	T	I	O	N	T

Life processes wordsearch

Life process	Clue
M	Living things do this when they are not still
R	Living things do this to release energy from food
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G	Living things get bigger when they do this
R	Livings things make babies
E	Living things get rid of waste
N	Living things feed

R	E	P	R	O	D	U	C	T	I	O	N
A	B	C	E	D	F	G	H	I	J	K	L
S	E	N	S	I	T	I	V	I	T	Y	I
T	X	Z	P	E	B	R	O	V	T	S	U
L	C	U	I	M	R	U	P	H	A	S	K
W	R	G	R	O	W	T	H	O	N	M	B
Q	E	R	A	V	F	J	Y	P	U	O	I
U	T	O	T	E	H	N	I	L	T	V	S
D	I	U	I	M	J	O	D	G	R	M	C
H	O	N	O	E	X	K	R	M	I	E	U
A	N	D	N	N	M	A	E	E	K	G	I
S	X	N	U	T	R	I	T	I	O	N	T

ANSWERS

MRS GREN is a kind granny helps us to remember 7 life processes that all living things do...

Movement

Respiration

Sensitivity

Growth

Reproduction

Excretion

Nutrition

Life processes

Use the life processes to help you sort the images on the next slide into two categories:

Living (Alive)	Non-living (Not alive)
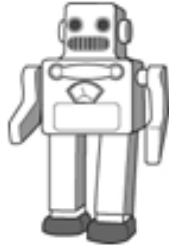
ANSWERS

living	non-living	non-living	living
non-living	living	living	living
non-living	non-living	living	non-living
non-living	non-living	living	living

Biscuits & particles

There are there states of matter:

Watch the video clip to find out more…
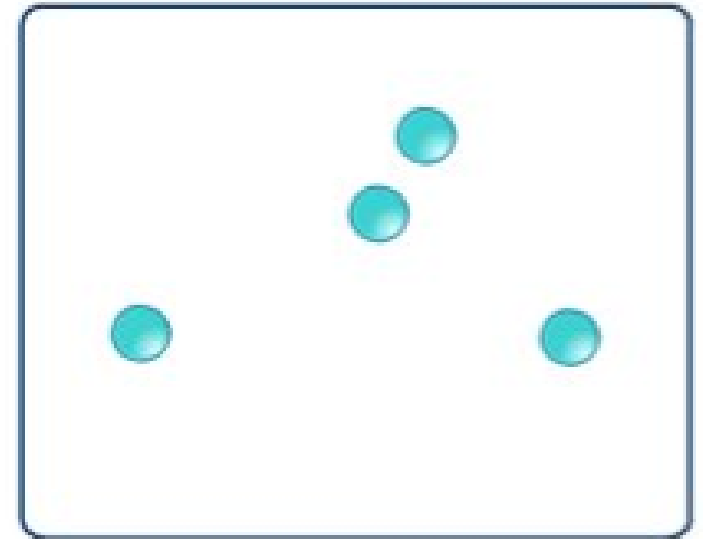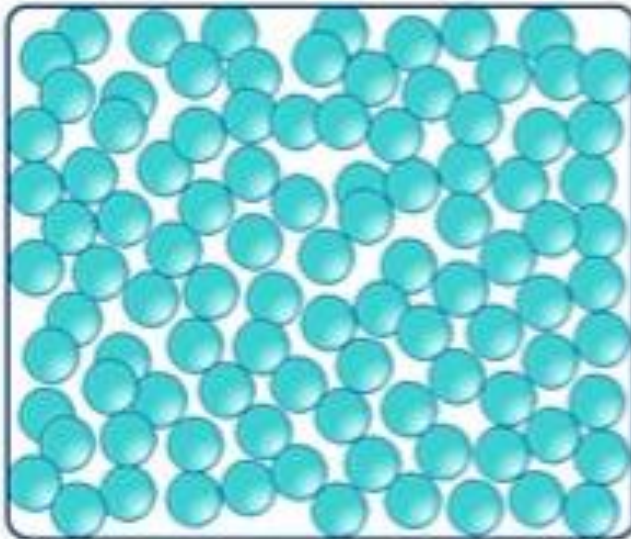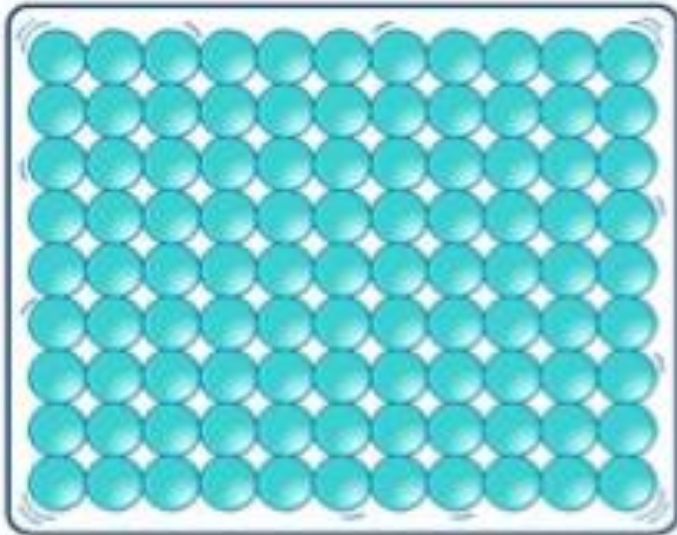
Biscuits & particles

1 Tick (✓) the correct boxes to summarise the properties of solids, liquids and gases.

Property	Solids	Liquids	Gases
Have a fixed shape	√		
Can change shape		√	√
Have a fixed volume	√	√	
Volume can change			√
Can easily be compressed			√
Cannot easily be compressed	√	√	
Can flow easily		√	√

* Volume is how much space something takes up

* compressed means squashed

Biscuits & particles

We can pick out all three states of matter if we think back to our investigation into the energy in biscuits.

TASK

Click to the next slide to match up the substance from the substance from the investigation to the correct state of matter. There are **two** of each.

Biscuits & particles

TASK

Match up the substance from the substance from the investigation to the correct state of matter. There are **two** of each.

Substance
Fuel for Bunsen burner
Water in boiling tube
Biscuit
Glass boiling tube
Air in the room
Melted chocolate drips

State of matter
Solid
Liquid
Gas

Biscuits & particles

TASK

Match up the substance from the substance from the investigation to the correct state of matter. There are **two** of each.

Substance
Fuel for Bunsen burner
Water in boiling tube
Biscuit
Glass boiling tube
Air in the room
Melted chocolate drips

State of matter
Solid
Liquid
Gas

Extra tasks

Bunsen burner flames

	Type of Flame	When is this flame used?
Air hole fully open	Roaring flame	To heat things strongly and quickly
Air hole half open	Blue flame	To heat things gently
Air hole fully closed	Yellow Safety flame	When the Bunsen isn't being used to heat anything The flame can be seen more easily

Lab safety

TASK
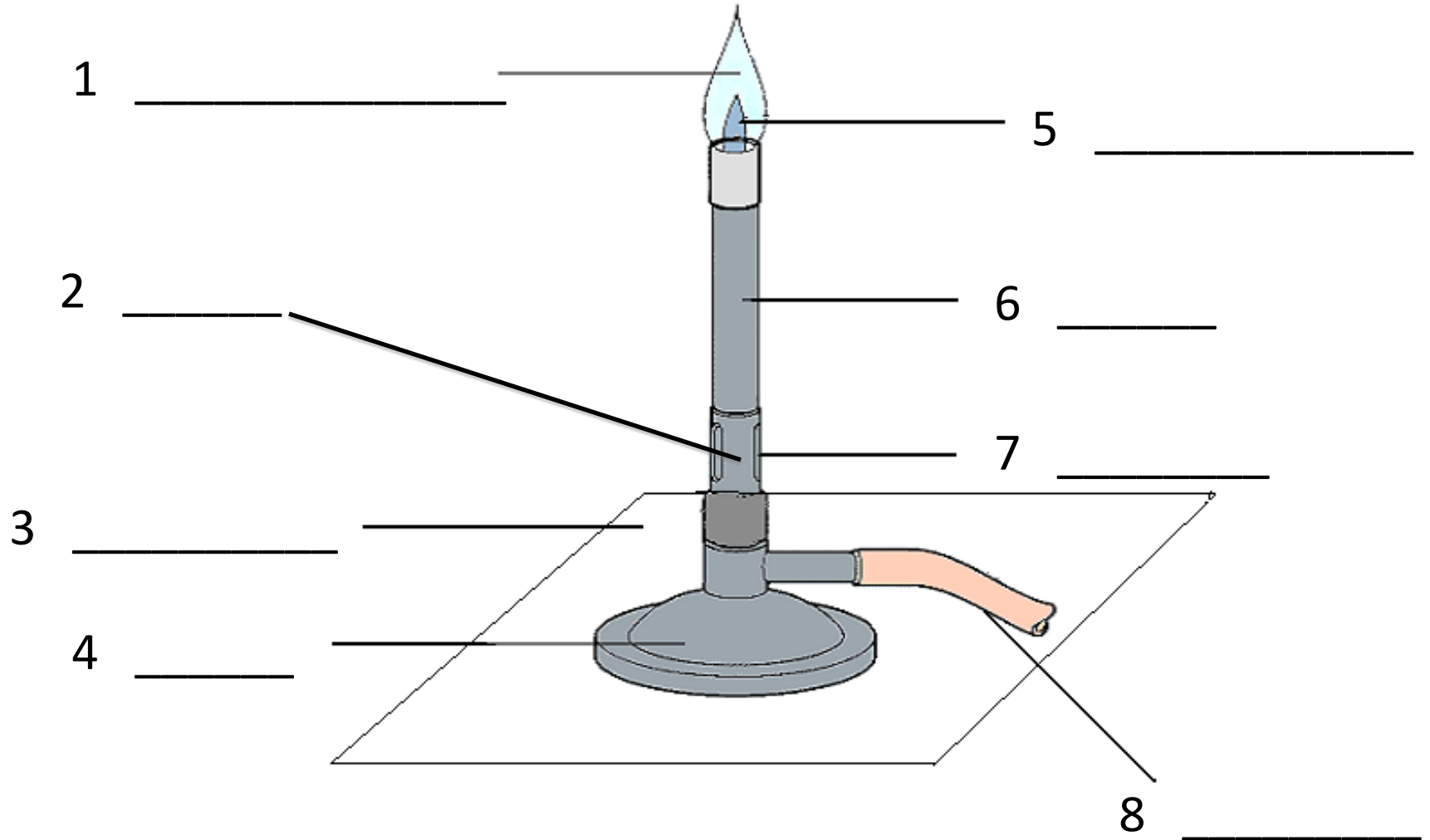Complete the worksheet then come up with your own lab safety rules. Think about all the things you have learnt today.
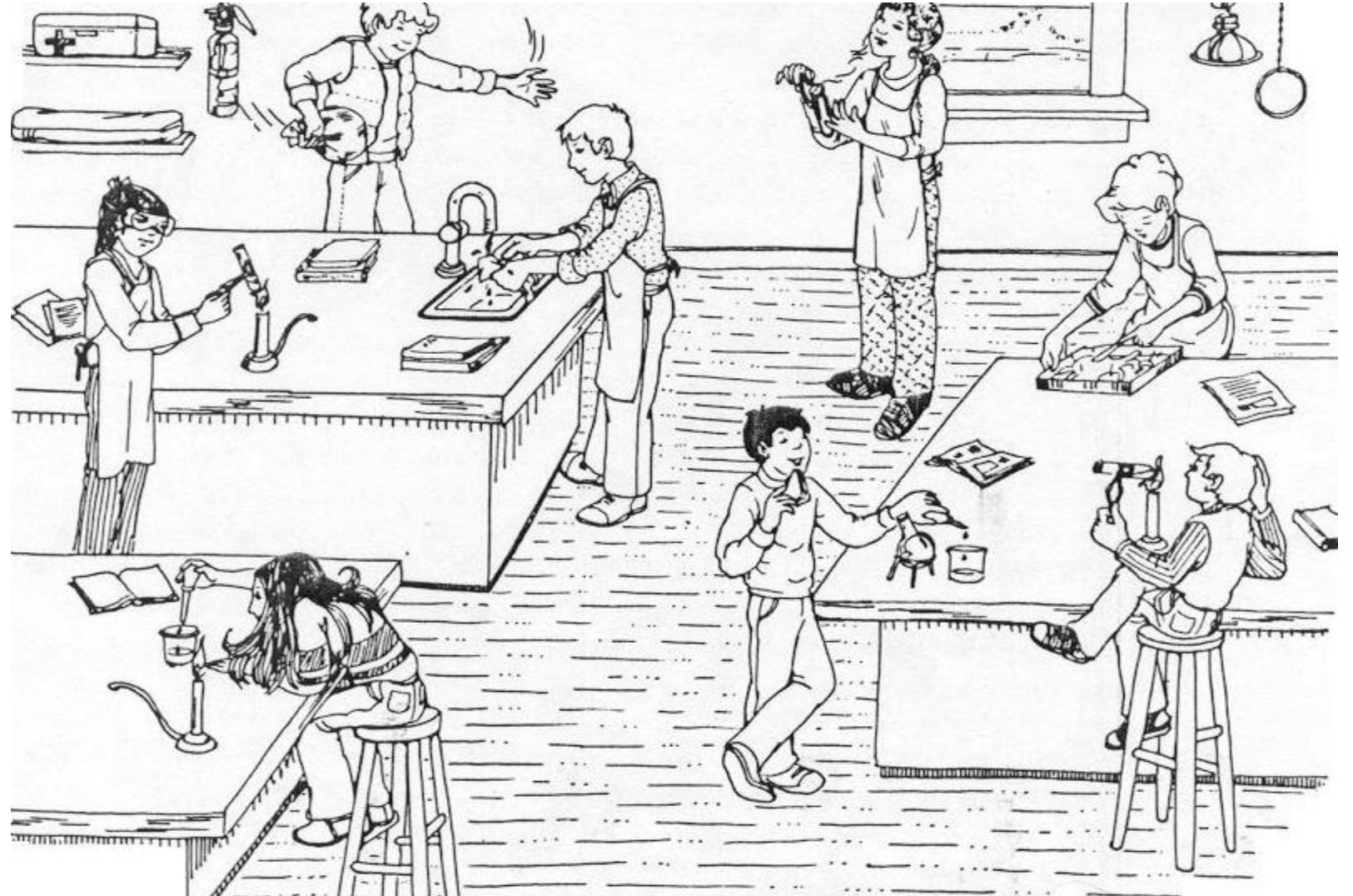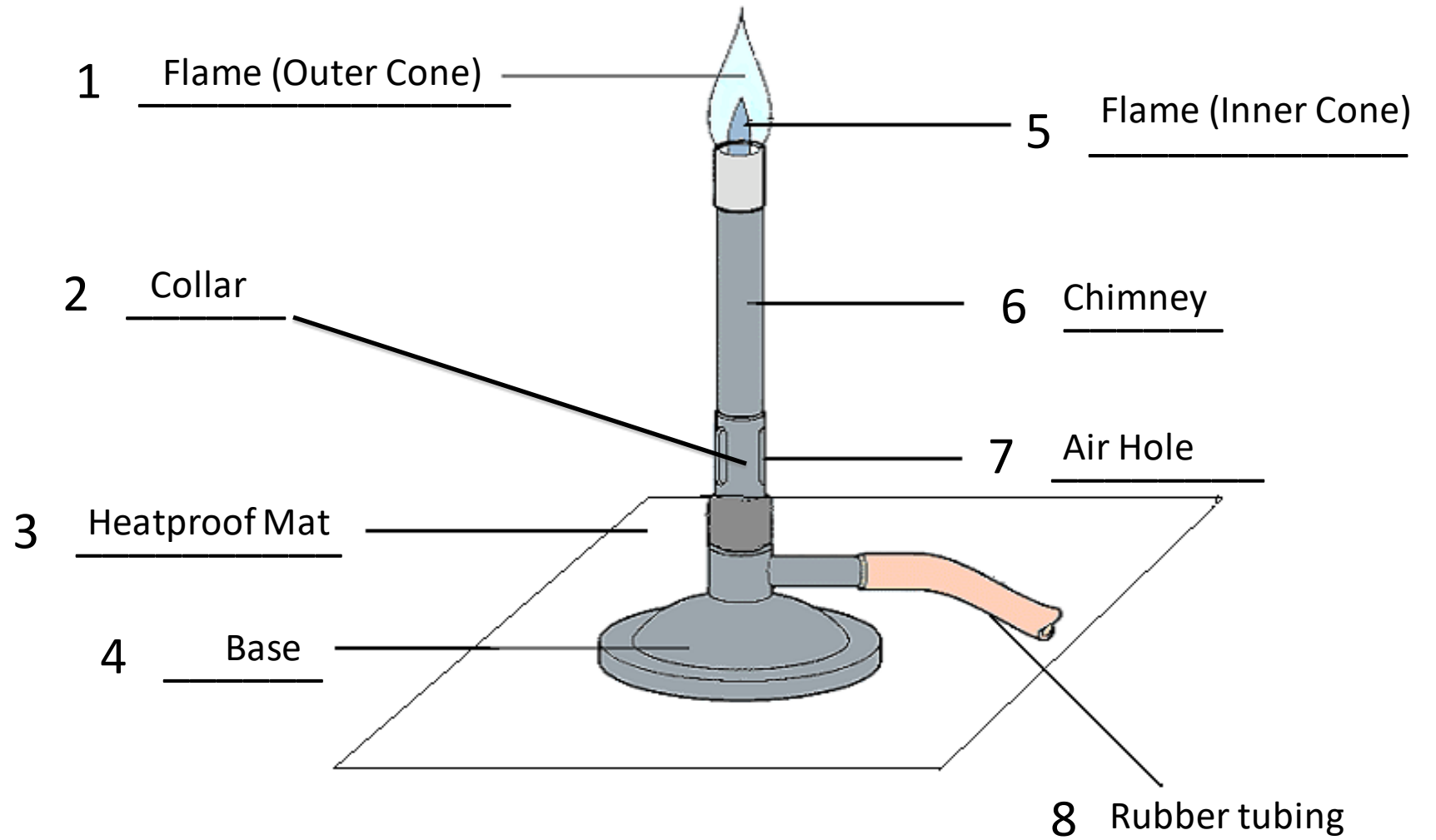
Labelling a Bunsen burner

WORD BANK

- Collar
- Chimney
- Base
- Rubber tubing
- Heatproof mat
- Flame (inner cone)
- Flame (outer cone)

1 _____

5 _____

2 _____

6 _____

7 _____

3 _____

4 _____

8 _____

ANSWERS

1   Flame (Outer Cone)

5   Flame (Inner Cone)

2   Collar

6   Chimney

3   Heatproof Mat

7   Air Hole

4   Base

8   Rubber tubing

See you in September!