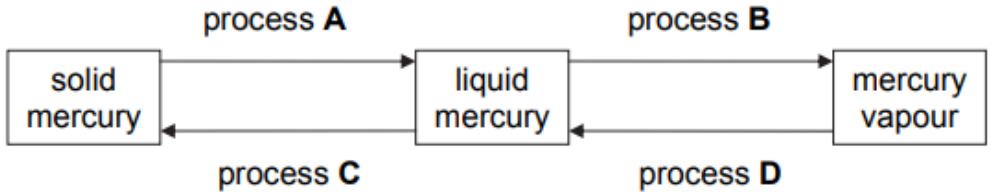
Chemistry booklet answer key

Mercury vapour is very poisonous.

Mercury is a silver coloured liquid at room temperature.

Liquid mercury has to be cooled to make solid mercury.



Complete the sentences.

(a) Process **A** changes solid mercury into liquid mercury.

This process is .....Melting..... .

(b) Process **B** changes liquid mercury into mercury vapour.

This process is .....Evaporation/Boiling..... .

(c) Process **C** changes liquid mercury into solid mercury.

This process is .....Freezing..... .

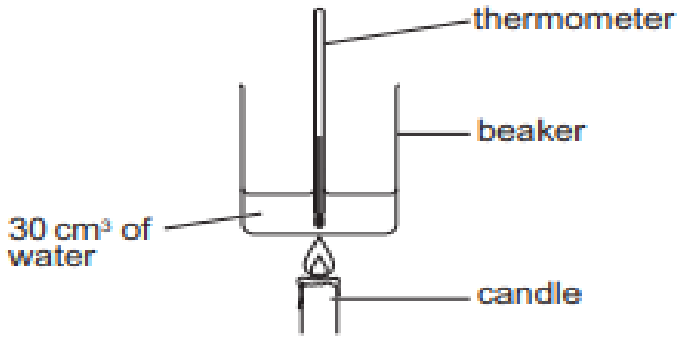
(d) Process **D** changes mercury vapour into liquid mercury.

This process is .....Condensation..... .

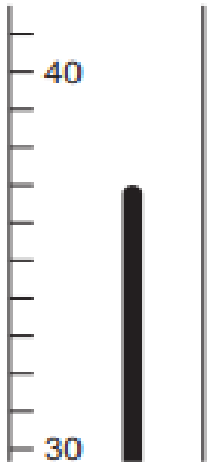
Page 38

Pierre uses a candle to heat a beaker of water.

Here is a diagram of his experiment.



(a) The diagram shows the thermometer after 10 minutes.



What is the temperature of the water after 10 minutes?

37 .....°C

Page 38+39

(b) At the start the temperature of the water was 20 °C.

What is the temperature increase?

37-20 = 17 °C

(c) Pierre continues to heat the beaker.

What happens to the water when its temperature reaches 100 °C?

Boiling/Evaporation

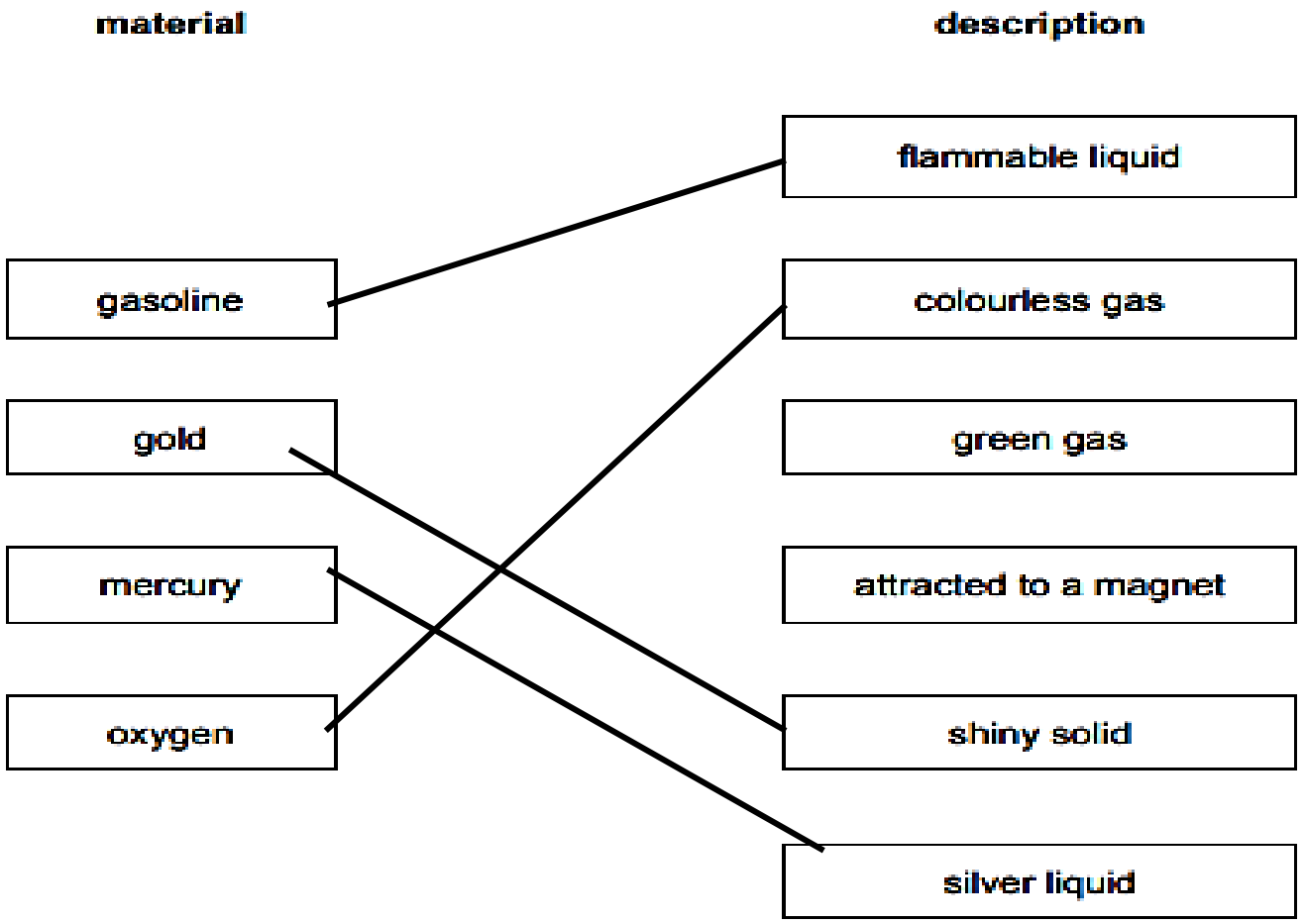
(d) Pierre sees some liquid wax at the top of the candle.

What process has happened to the solid wax?

Melting

Page 39

· Draw a line to match each **material** to its correct **description** at room temperature.



Page 40

5 Ahmed investigates the solubility of four substances **A**, **B**, **C** and **D**.

He wants to find which substance is the most soluble.

In his first experiment he

- uses 25 cm^3 of water at a temperature of 20 °C
- adds substance **A** to the water until it just stops dissolving
- records the mass of substance **A** that has dissolved.

Ahmed then tests substances **B**, **C** and **D**.

(a) Ahmed wants to do a fair investigation.

What volume of water should he use in each experiment?

25 cm³ / the same

(b) Ahmed wants to do a fair investigation.

What temperature of water should he use in each experiment?

20 °C/ the same

(c) Gabrielle suggests that Ahmed should do each experiment again.

Why is it a good idea to repeat experiments?

to make investigation or results (more) reliable /to check results

(d) Ahmed decides to investigate the solubility of substance **A** at higher temperatures of water.

Suggest a possible prediction for this investigation.

more can dissolve at (higher temperatures)

The freezing point of a material is the temperature when a liquid becomes a solid.

(a) What is the meaning of the words **boiling point**?

temperature at which liquid becomes a gas/vapour

(b) Write down the temperature of the boiling point of **water**.

Include the units.

100 °C

(c) What is the meaning of the words **melting point**?

temperature at which solid becomes a liquid

(d) Write down the temperature of the melting point of **water**.

Include the units.

0 °C

Page 42

Glucose dissolves in water to make glucose solution.

The table shows the maximum mass of glucose that dissolves in 100 g of water at different temperatures.

temperature in °C	maximum mass of glucose in g
10	40
20	47
30	54
40	61
50	67
60	75

(a) Describe the relationship between the temperature of the water and the maximum mass of glucose dissolved.

Explain your answer using ideas about particles.

description .....

temperature increases mass/glucose increases

explanation .....

particles have more energy or particles move faster

[2]

(b) Identify the **solvent** and the **solute** in the glucose solution.

The solvent is ..... water .....

The solute is ..... glucose .....

[1]

(c) Dissolving glucose in water is a physical change.

Explain why dissolving is a physical change.

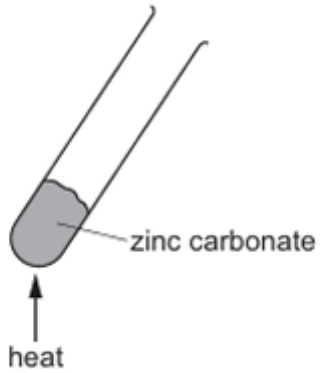
it can be reversed or no new substances made

..... [1]

Page 43

Jamila heats 3.5 g of solid zinc carbonate.

Look at the diagram of the equipment Jamila uses.



Jamila heats the solid zinc carbonate in the test-tube for five minutes.

She notices that during the heating a gas is made.

After heating she lets the test-tube and its contents cool.

She finds there is only 2.6 g of solid left in the test-tube.

(a) Calculate the decrease in mass of solid after heating.

0.9 g

(b) Explain why the mass of solid decreases during heating.

gas escapes or gas leaves

(c) One of the properties of a gas is that a gas has mass.

Write down **one other** property of a gas.

low boiling point /easy to compress /fill their container /exert a pressure

Rajiv adds a piece of iron to copper sulfate solution.

A chemical reaction takes place and the mixture becomes warmer.

Iron is a grey solid and copper sulfate is a blue solution.

After five minutes the iron is covered by a pink solid because copper is made.

The solution changes colour to green because iron sulfate is made.

(a) Write down the name of **one reactant** in this chemical reaction.

iron or copper sulfate

.....

(b) Write down **one observation** that shows this chemical reaction takes place

change in colour /temperature change

.....

(c) Describe **one measurement** Rajiv makes that shows a chemical reaction takes place.

.....temperature change.....

Chen finds information about the melting points and boiling points of some substances.

substance	melting point in °C	boiling point in °C
ethanol	−144	78
propanone	−95	56
salt solution	−6	106
water	0	100

(a) What is the meaning of the words **melting point**?

temperature at which solid becomes a liquid

(b) Which substance has the greatest difference between its melting point and its boiling point?

ethanol

(c) Salt solution is a mixture of salt and water.

Describe the effect of adding salt to the boiling point of water.

(boiling point) increases

Page 46

Look at the table of information about substances.

substance	property			
	electrical conductivity	thermal conductivity	melting point in °C	does it dissolve in water?
A	high	high	3670	no
B	low	low	10	yes
C	high	high	30	no
D	high	high	590	no
E	low	low	35	yes
F	high	high	970	no
G	low	low	870	no

Metals are substances that have these properties:

- high electrical conductivity
- high thermal conductivity

(a) Which substances in the table are metals?

A, C, D and F

(b) Blessy sorts the substances into two groups.

Group **1** contains **B**, **C** and **E**.

Group **2** contains **A**, **D**, **F** and **G**.

Explain how Blessy sorts the substances into these two groups.

Group **1**

have low melting point

Group **2**

have high melting points

Acetone is a solvent.

It has a low boiling point and evaporates easily.

(a) What is the meaning of the word **solvent**?

Liquid that dissolve other substances

(b) Complete the sentence about the meaning of **boiling point**.

Boiling point is the temperature at which a liquid becomes a gas.

(c) The evaporation of acetone is a reversible process.

Explain why.

Gas can be changes into liquid

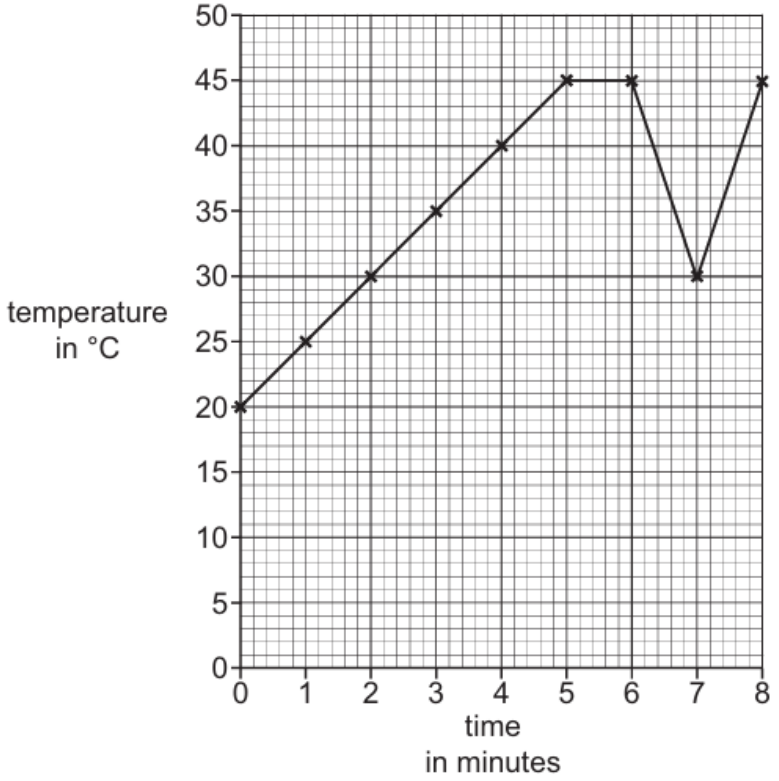
Page 48

Safia heats a white solid substance.

She measures the temperature of the substance every minute.

She plots her results on a line graph.

Here is her graph.



(a) Safia thinks the result at 7 minutes is **incorrect**.

Suggest why she thinks the result is **incorrect**.

the temperature goes down

(b) Safia says,

'The temperature keeps going up the longer I heat the substance.'

Tick (✓) to show if Safia is correct.

yes ☐ no ☑

Explain your answer using information from the line graph.

temperature stops going up or temperature stays the same

(c) Safia decides to repeat her experiment to get a second set of results.

Explain why this is a good idea.

to get reliable results

Diesel is a liquid fuel used in the engines of some motor cars and trucks.

(a) Diesel evaporates slowly at room temperature.

Write down what happens during evaporation.

changes to a gas/vapour

.....

.....

(b) Suggest **one** way to increase the speed of evaporation.

heat (it) or increase the temperature

.....

(c) Evaporation is a reversible change.

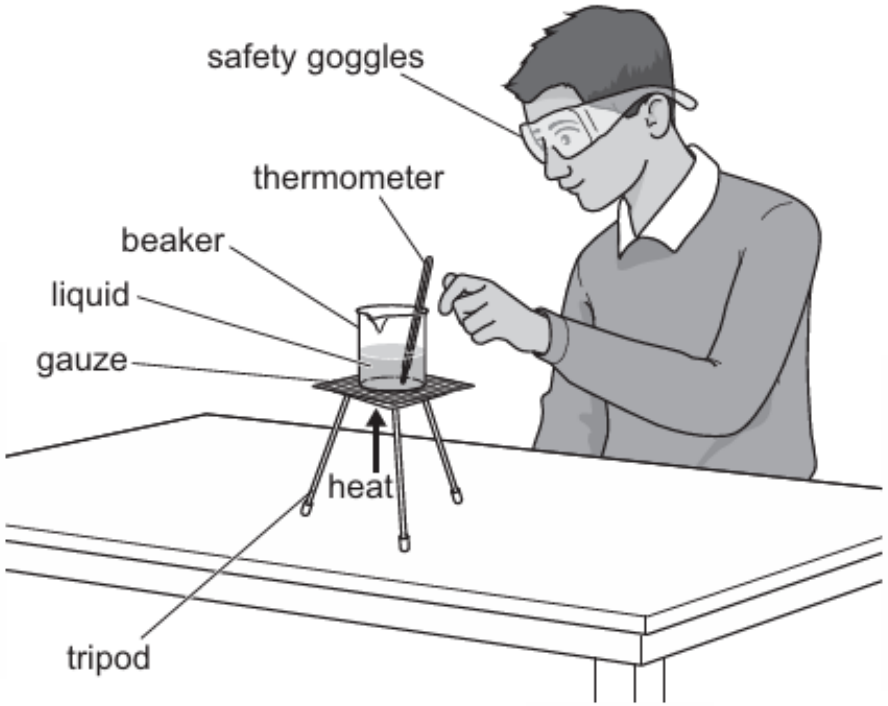
Name the process that is the **reverse** of evaporation.

condensation

.....

Rajiv heats a liquid until it boils.

Here is the equipment he uses.



(a) Rajiv is wearing safety goggles.

Explain why.

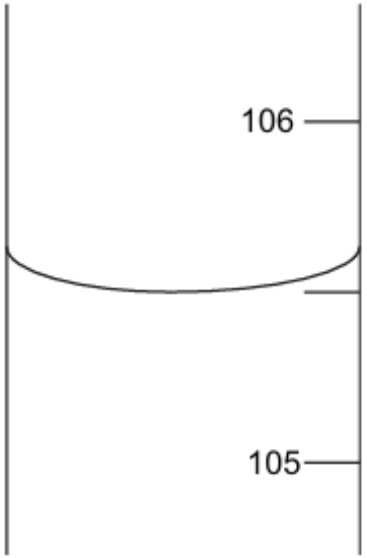
to stop liquid getting into the eye(s)

(b) Suggest the name of the equipment he uses to heat the liquid in the beaker.

Bunsen burner or candle

Page 51

(c) Look at the diagram of the thermometer.



Write down the temperature reading on the thermometer.

105.5 °C

(d) Before he starts the experiment Rajiv predicts that the liquid is pure water.

Tick (✓) to show if his prediction is correct.

yes ☐ no ☑

Explain your answer.

(the boiling point of pure) water is 100 (°C)

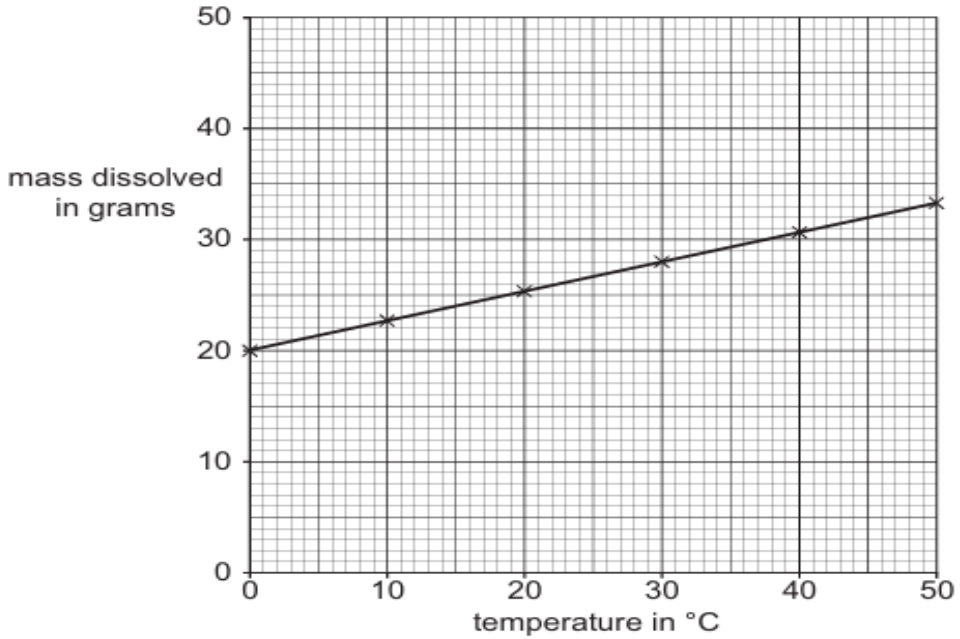
Page 52

Rajiv dissolves a fertiliser in water.

He records the mass of fertiliser that dissolves in 5 cm^3 of water.

Rajiv makes measurements at 6 different temperatures.

He shows his results in a graph.



(a) Rajiv wants to make his results more reliable.

Suggest **two** ways he can make his results more reliable.

1 do more than one set of results

2 use more temperatures

(b) Describe the pattern of his results.

as temperature increases the mass (that dissolves) increases

(c) What mass of fertiliser is dissolved in 5 cm^3 of water at 30 °C?

28 g

(d) Predict the mass of fertiliser that dissolves at 60 °C.

34(g) to 49(g) g

Page 53

The table shows information about two substances.

substance	property	
	does it dissolve in water?	does it dissolve in ethanol?
salt	yes	no
sugar	yes	yes

Blessy wants to separate a mixture of salt and sugar.

(a) She tries to use a magnet to separate the substances.

This does **not** work.

Explain why using a magnet does **not** work.

as temperature increases the mass (that dissolves) increases

(b) Blessy adds water to some of the mixture.

She stirs the mixture and then filters it.

Explain why this does **not** separate the mixture of salt and sugar.

Because salt and sugar dissolve

(c) Blessy separates the remaining mixture of salt and sugar.

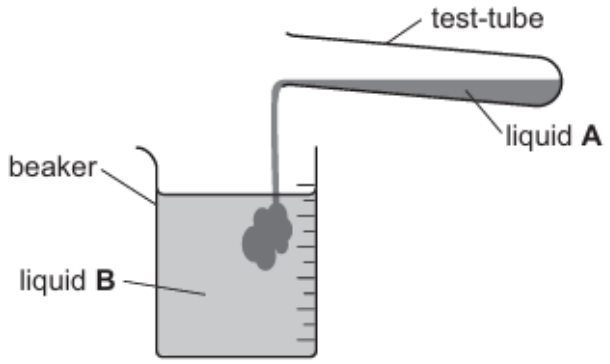
Describe what she does.

Add ethanol then filter then evaporation

Page 54

Lily investigates chemical reactions.

Look at the diagram of her equipment.



Lily adds liquid **A** from the test-tube into liquid **B** in the beaker.

A chemical reaction happens.

(a) Complete the sentences about the chemical reaction using words from the list.

Each word can be used once, more than once or not at all.

product **reactant** **solid** **temperature**

Liquid **A** is a reactant

Liquid **B** is a reactant

A new liquid substance forms when liquid **A** and liquid **B** are added together.

The new substance is a product

[2

(b) Lily knows there is a chemical reaction because she observes bubbles.

Write down what is produced to make bubbles.

gas or carbon dioxide [1

(c) Write down **two other** observations that show a chemical reaction happens.

1 colour change

2 temperature change

Hassan and Yuri are investigating different chemical processes.

(a) Yuri observes some solid water changing to liquid water.

Write down **one** reason why this is a physical change.

reversible

(b) Hassan heats some liquid water to exactly 100 °C.

Name the process that **only** happens at exactly 100 °C.

boiling