

S3 Chemistry

Topic 1

Physical/Chemical Changes & Reaction Rates

Name: _____

Teacher: _____ Class: _____

<i>Knowledge & Understanding</i>	Total	%	???
	/17		
<i>Problem Solving</i>	Total	%	???
	/17		

Q3. The grid below contains the names of some elements.

Information about the elements can be found in your *Data Booklet*.

A	B	C
potassium	neon	iron
D	E	F
plutonium	bromine	iodine

a) Which **box** in the grid contains a *soft metallic element that reacts vigorously with cold water*

A	B	C
D	E	F

1

b) Which **box** in the grid contains a *non-metallic solid element*

A	B	C
D	E	F

1

c) Which **box** in the grid contains a *very unreactive element*

A	B	C
D	E	F

1

d) Which **box** in the grid contains a *man-made element*

A	B	C
D	E	F

1

e) Which **box** in the grid contains a *transition metal*

A	B	C
D	E	F

1

Q4. The grid below contains the names of some elements.

Information about the elements can be found in your *Data Booklet*.

A	B	C
sodium	argon	fluorine
D	E	F
krypton	chlorine	lithium

a) Which *two boxes* in the grid contain a *noble gas*

A	B	C
D	E	F

1

b) Which *two boxes* in the grid contain an *alkali metal*

A	B	C
D	E	F

1

c) Which *two boxes* in the grid contain a *halogen*

A	B	C
D	E	F

1

Q5. The grid below contains descriptions of substances.

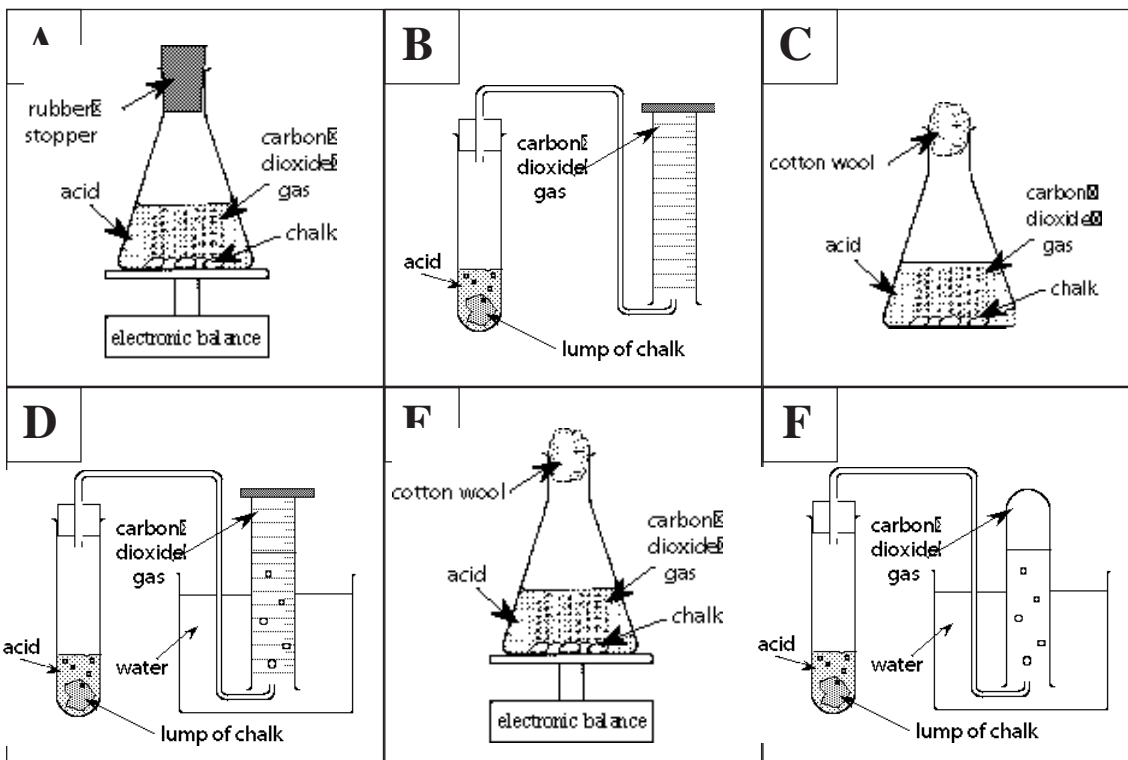
A	can be broken down into other elements only
B	cannot be broken down into other substances
C	can only be broken down into compounds
D	cannot react to form compounds

Which box contains the description of an *element*

A	B	C	D
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1

Q6. The grid shows the apparatus that could be used to measure the speed of a reaction. A stopwatch would also be available.

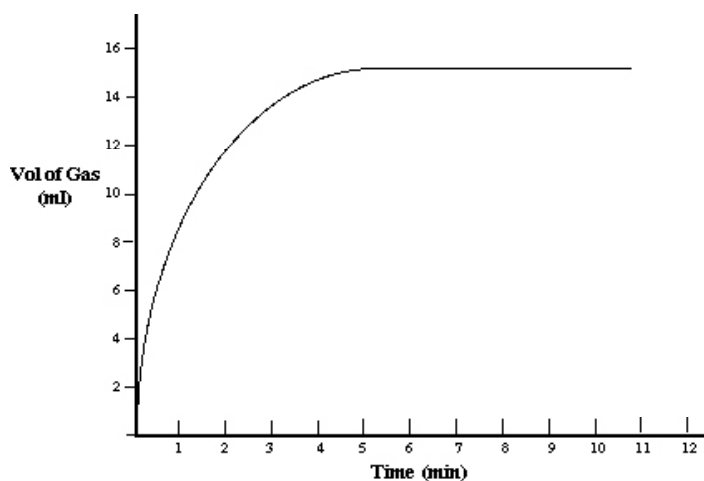


a) Select the box (or boxes) which show apparatus that would allow you to measure the speed of this reaction.

A	B	C
D	E	F

1

b) Identify the box which shows the apparatus which would have been used to produce the graph below.



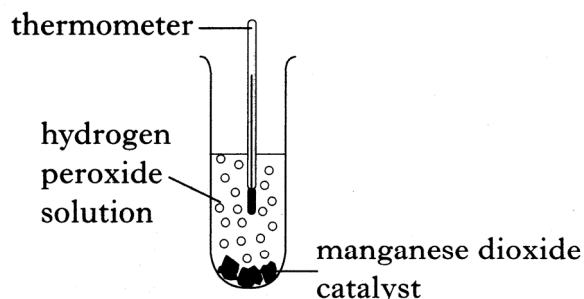
A	B	C
D	E	F

1

Q7. Manganese dioxide acts as a catalyst in the following reaction:



The diagram shows how the reaction can be carried out.



Several experiments were carried out using the same mass of manganese dioxide and the same volume of hydrogen peroxide solution.

	<i>Concentration of hydrogen peroxide solution (%)</i>	<i>Temperature (°C)</i>	<i>Form of manganese dioxide</i>
A	5	20	<i>powder</i>
B	10	30	<i>lump</i>
C	15	20	<i>lump</i>
D	15	30	<i>powder</i>
E	5	20	<i>lump</i>
F	20	20	<i>powder</i>

a) Identify the **two** experiments which should be compared to show the effect of particle size on the speed of the reaction.

A	B	C
D	E	F

1

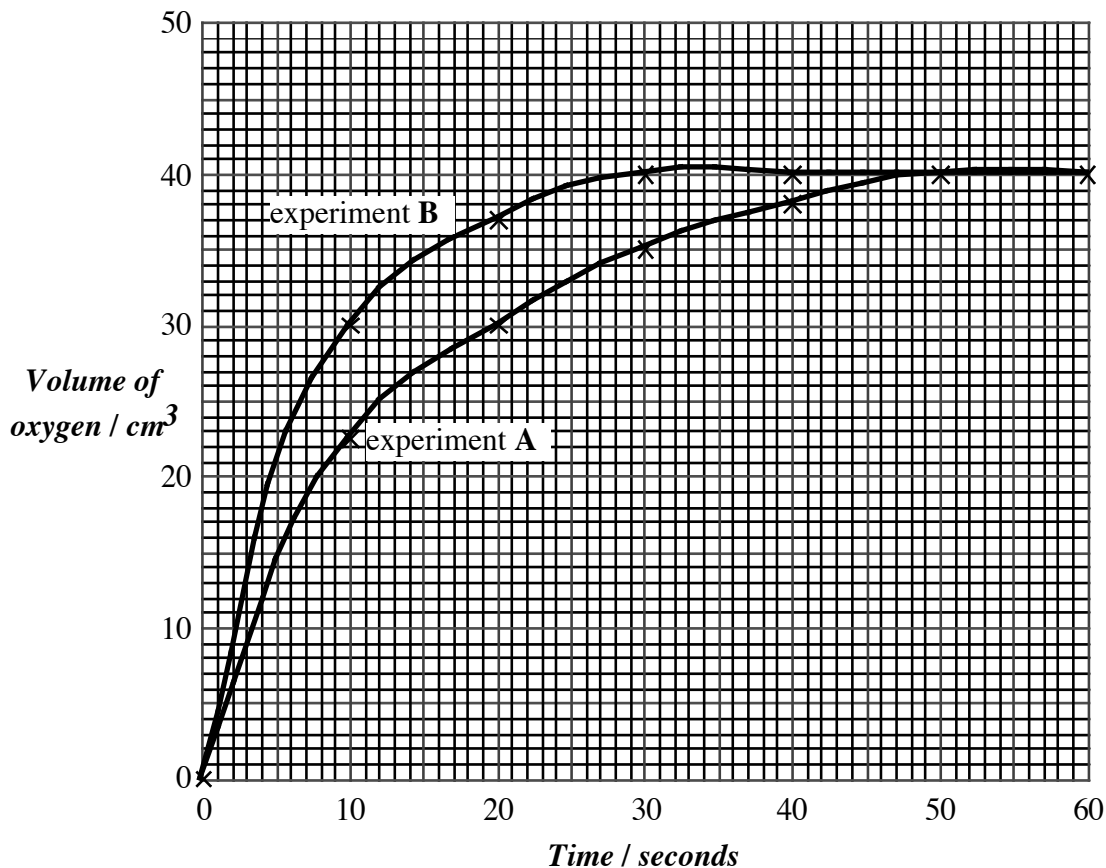
b) Identify the experiment with the **slowest** speed of reaction.

A	B	C
D	E	F

1

Q8. Sam added manganese dioxide to hydrogen peroxide solution and measured the volume of oxygen produced.

Her results for two experiments at different temperatures are shown below.



a) What volume of oxygen was collected in experiment A?

_____ cm³

1

b) The same volume and concentration of hydrogen peroxide was used in both experiments A and B.

How can you tell this from the graph?

1

Q8. (continued)

c) At the start, experiment **B** was faster than experiment **A**.

How can you tell this from the graph?

1

d) Which of the experiments was done at the lower temperature?

1

e) 0.2g of the catalyst, manganese dioxide, was present at the start of experiment **A**.

What mass of catalyst would be left at the end of the experiment?

_____ g

1

Q9. The grid below gives the names or symbols of some elements.

Information about the elements can be found in your *Data Booklet*.

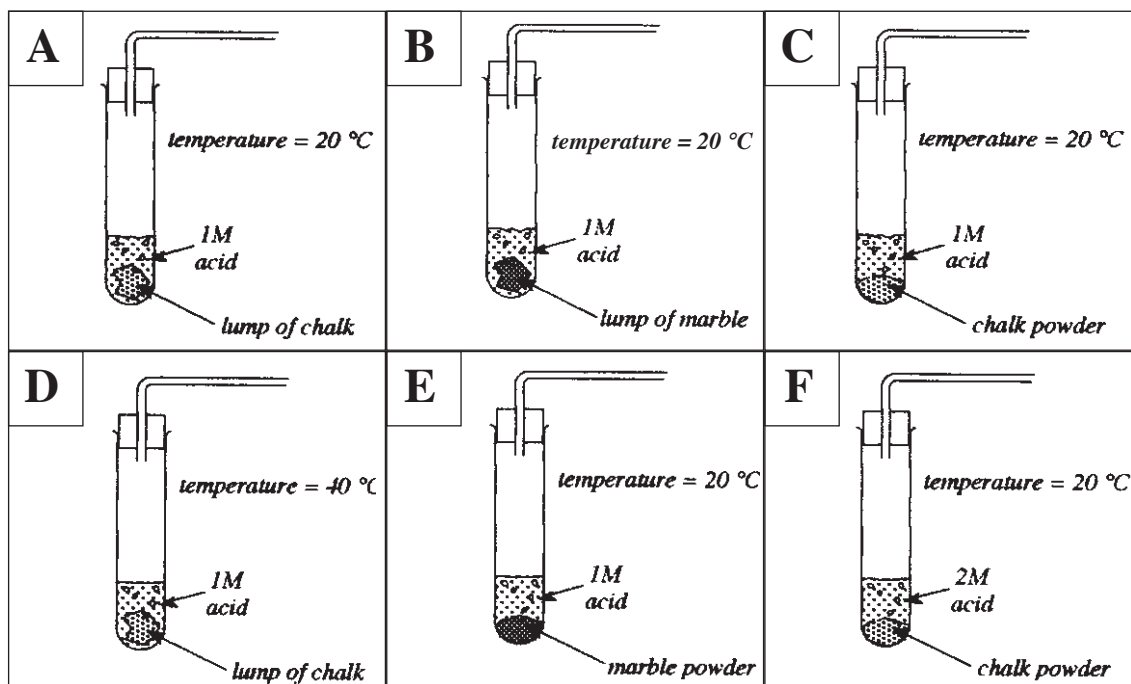
A	argon	B	carbon	C	Ca
D	K	E	Si	F	lithium

Select the box (or boxes) which contain an element that belongs to the same *period* as sodium.

A	B	C
D	E	F

1

Q10. A pupil used the set-up shown in Box A to investigate the speed of the reaction between chalk and hydrochloric acid.



a) Which box contains the other set-up the pupil should use to investigate the effect of *temperature*.

A	B	C
D	E	F

1

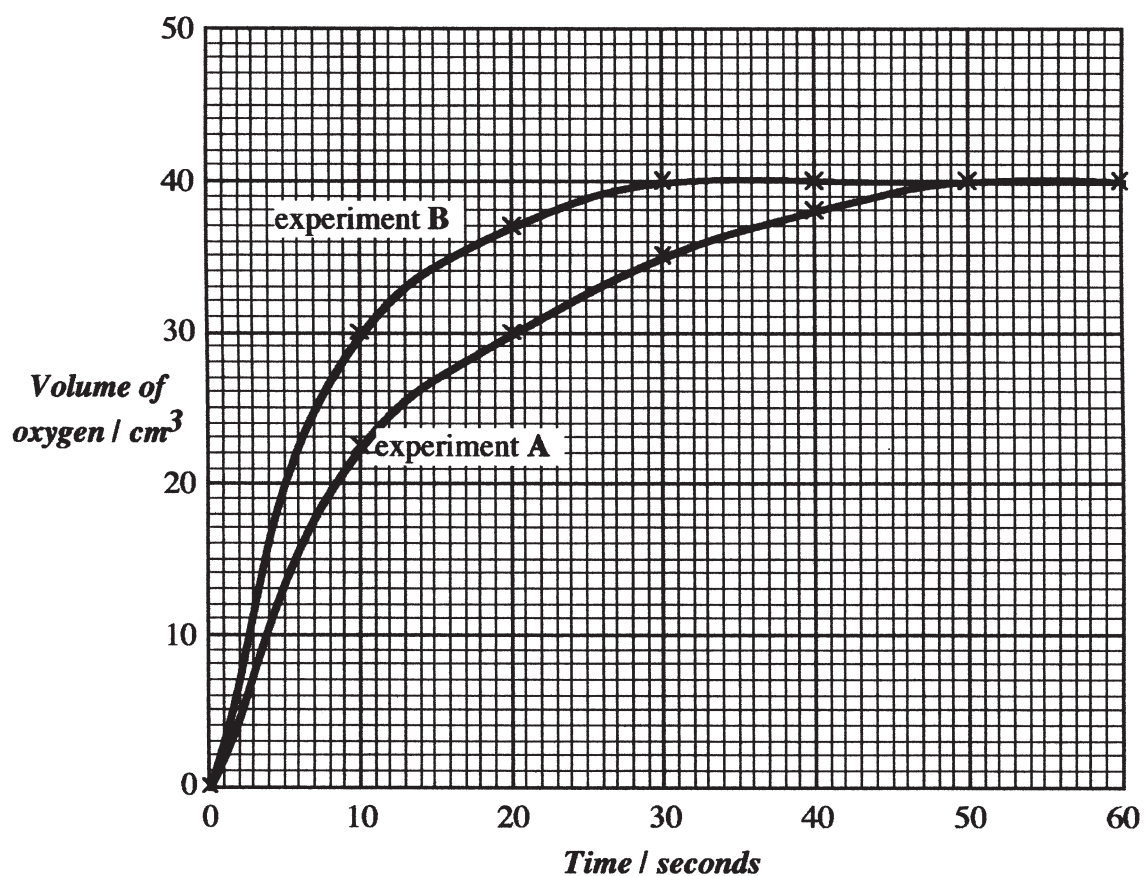
b) Which box contains the other set-up the pupil should use to investigate the effect of *particle size*.

A	B	C
D	E	F

1

Q11. Sam added manganese dioxide to hydrogen peroxide solution and measured the volume of oxygen produced.

Her results for two experiments at different temperatures are shown below.



The rate of a reaction can be calculated using the formula below:

$$\text{Rate} = \frac{\text{change in volume}}{\text{time taken for change}}$$

The grid below contains some rates.

A	0.5 cm ³ s ⁻¹	B	1.5 cm ³ s ⁻¹	C	2.0 cm ³ s ⁻¹
D	2.5 cm ³ s ⁻¹	E	3.0 cm ³ s ⁻¹	F	3.5 cm ³ s ⁻¹

Q11 (continued)

Marks

	KU	PS
1		
1		
2		
1		

- a) Which box contains the rate of reaction for *experiment B* over the first 10 seconds of the reaction.

A	B	C
D	E	F

- b) Which box contains the rate of reaction for *experiment A* over the first 20 seconds of the reaction.

A	B	C
D	E	F

Q12. Read this description of an experiment that you may have seen recently.

“When I first mixed the Rochelle salt with the hydrogen peroxide there seemed to be no reaction so I decided to try heating the chemicals.

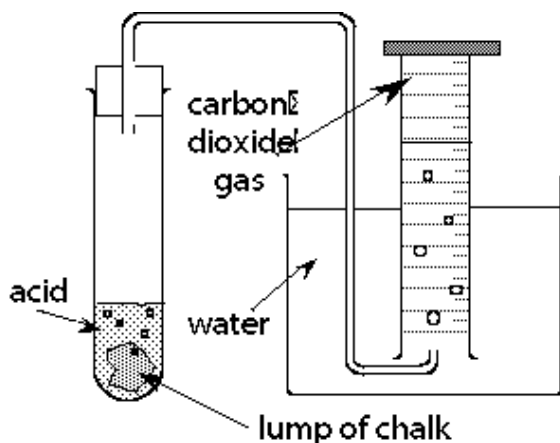
Even when heated, all I could see was a few bubbles of gas slowly forming on the glass walls of the test-tube. Then I added some pink cobalt chloride solution and suddenly there were so much gas being produced that it frothed over the top of the beaker.

At the same time the solution went green, but as the bubbling slowed and stopped the original pink colour returned. I realised that the cobalt chloride had been a catalyst for this reaction”.

- a) What **two** pieces of evidence in the report above show that the cobalt chloride has been a catalyst for this reaction.

- b) Catalysts (and enzymes) are found everywhere.
Give one example of a catalyst in use outside the school laboratory.

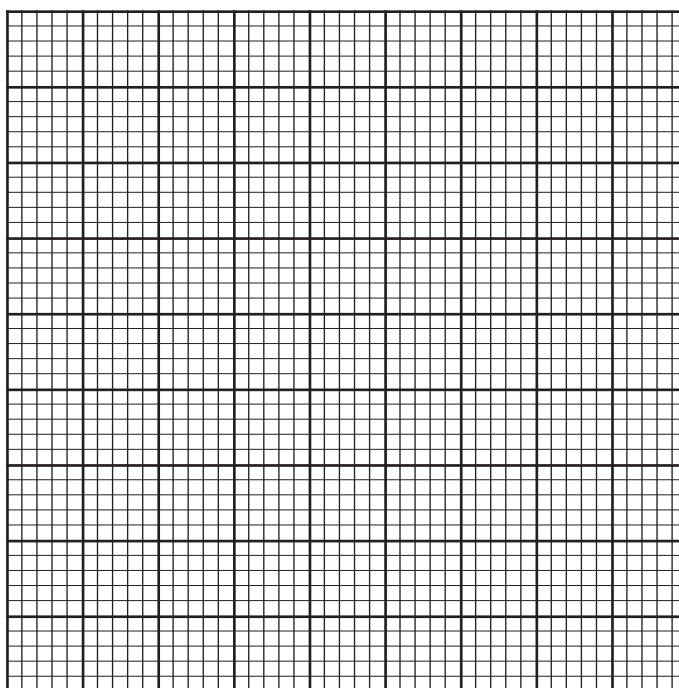
Q13. Lori and Fred were studying the reaction between chalk and dilute hydrochloric acid.



Their results were as follows.

Time (s)	0	20	40	60	80	100	120	140
Volume of gas (g)	0	18	35	48	59	65	67	67

- a) Plot a graph of *volume of gas* against *time*.
Use appropriate scales to fill most of the graph paper.



Q13 (continued)

Marks

KU	PS
1	
1	

b) The experiment was repeated under two different conditions. *For both reactions, the **volume** and **concentration** of the hydrochloric acid remained **the same**.*

i) What would have happened to the volume of gas produced in the first 20 seconds when the *temperature was increased*?

ii) What would have been the final volume of gas produced when the *same mass of chalk powder* was used?

ADDITIONAL SPACE FOR ANSWERS

ADDITIONAL GRAPH PAPER FOR QUESTION 13 (a)

