Air and Gases

Student Name: ..... **Class:** .....

Teacher Name: ..... **School:** .....

Question 1

Give two everyday uses of oxygen.

1.

2.

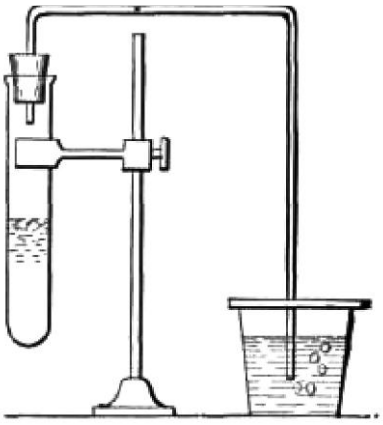
Why is it important that oxygen is soluble in water?

What happens when a lighted taper or wooden splint is lowered into a jar of carbon dioxide?

What does this tell you about carbon dioxide?

Does this give you an idea for a possible use for carbon dioxide?

Carbon dioxide was bubbled through purified water. When blue litmus paper was dipped into the water, the colour of the litmus paper changed to red.



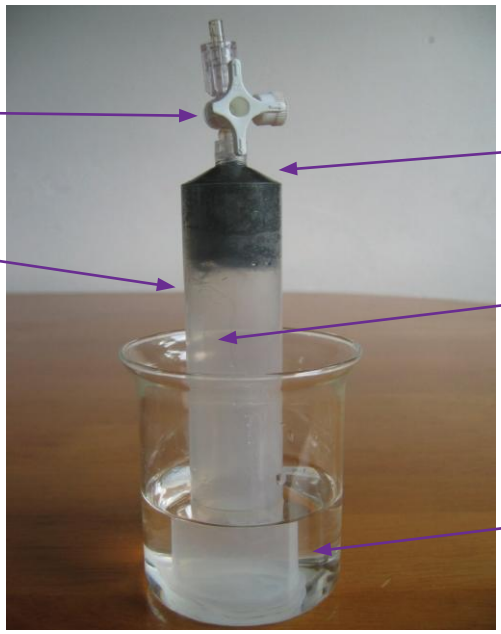
What does this tell you about carbon dioxide?

How would you test a gas to see if it was carbon dioxide?

Question 2

Fact: When iron rusts, it uses oxygen from the air. When there is sufficient iron and water present, rusting will continue to occur until all of the oxygen is used up.

A group of students did an investigation to find the percentage of oxygen in air. They placed some damp steel wool in an inverted syringe. The syringe was placed in a beaker of water as shown in the photo. The syringe as then sealed.



They recorded the volume of air in the syringe each day

Time	At start	After 1 day	After 2 days	After 3 days	After 4 days	After 5 days
Volume of air	200 cm^3	180 cm^3	170 cm^3	160 cm^3	160 cm^3	160 cm^3

Why do you think did the volume of air decreased?

What volume of air was used?

Why did the volume of air not decrease any further after day 3?

Calculate the percentage of air used up in the experiment?

What do you think happens to the level of the water

outside the syringe?

inside the syringe?

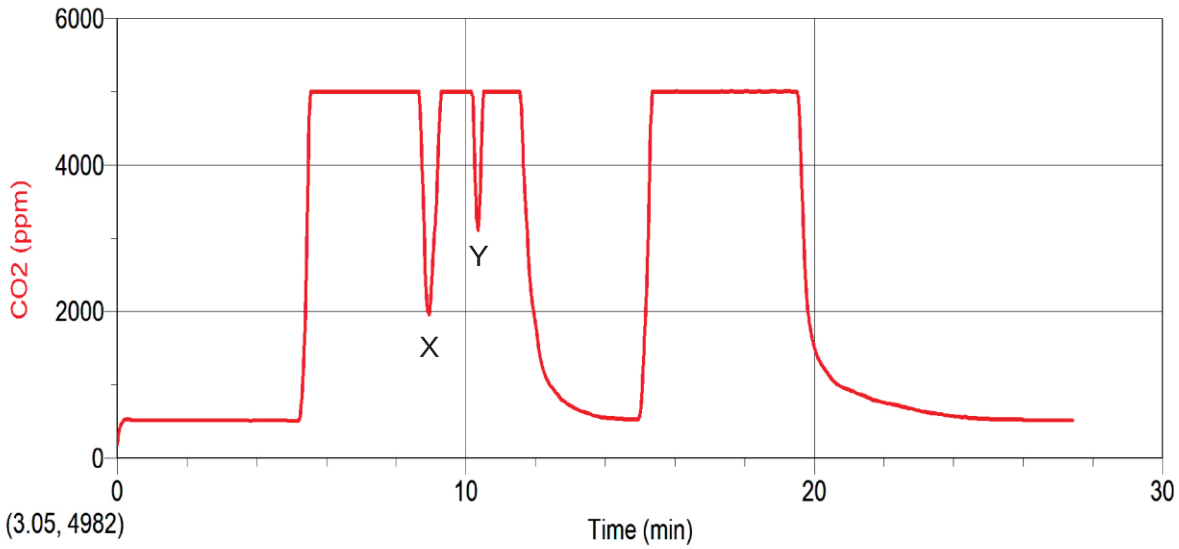
What do you think would happen to the mass of the steel wool after the three days?

Give a reason for your answer:

Give one way to stop the steel wool from rusting

Question 3

Tom's car has failed the NCT (National Car Test) because the exhaust gases contained too much carbon dioxide (CO_2). Tom has decided to investigate the levels of Carbon dioxide gas coming from the exhaust using a CO_2 gas sensor and datalogging equipment. He placed the gas sensor behind the exhaust pipe and stated recording on the datalogger. The car was started, stopped and revved a number of times while remaining stationary. The graph below was produced by the logger.



Explain the change in the CO_2 level at 5 minutes?

What evidence is there that the engine was turned off at 12 minutes?

When was the engine restarted?

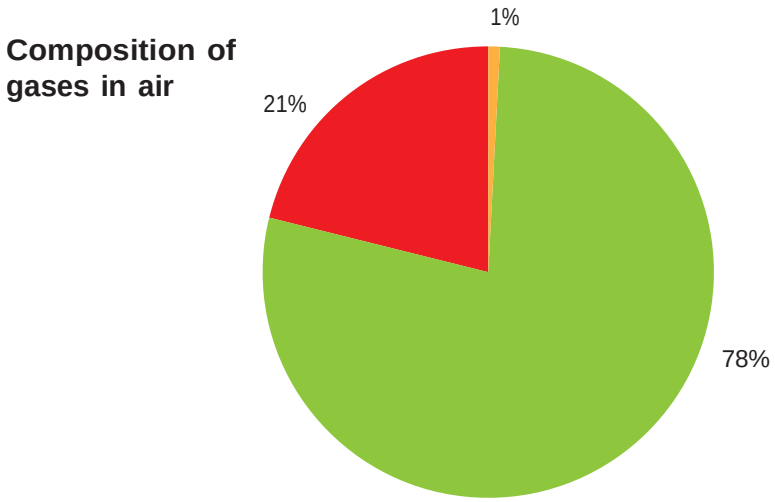
What do you think happened at 20 minutes?

What do you think happened at points **X** and **Y** on the graph?

Why was the level of CO_2 not 0 (zero) before the car was started.?

Question 4

a) The following pie chart represents the percentage of different gases in air.



What gases are represented by the three sections of the chart?

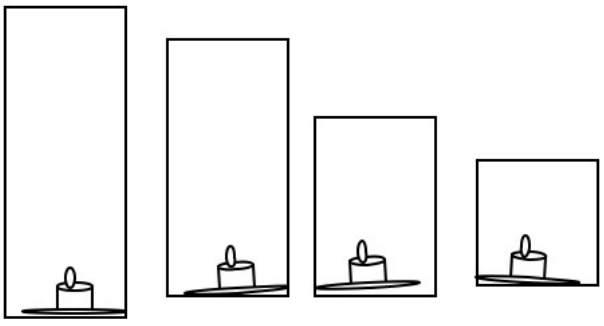
21% =

1% =

78% =

What is B used for?

b) Some pupils put lighted candles under jars of different volumes. The jar volumes varied from 200 cm^3 to 500 cm^3. They timed how long the candle took to go out under each jar.



Volume of Jar / cm^3	Time for candle to go out / s
200	9
300	15
400	21
500	25

b) Draw a line graph to represent this data

Using your graph, predict how long it would take the candle to go out in jars of the following volumes.

450 cm^3 .....

150 cm^3 .....

600 cm^3 .....

Read the four sentences below. In the box beside each sentence, write whether the sentence is **True or False**:

The greater the volume of the jar, the shorter the time for the candle to go out	
The biggest jar kept the candle lighting the longest	
As the volume of the jar increases, the candle burns for longer	
The candle went out quickest under the smallest jar	

In designing this investigation, name 2 things that the students should do to ensure that it was a fair test.

1. .....

2. .....

Question 5

A question for class/group discussion

Your teacher presents the class with three unlabelled bottles of colourless liquids. She tells the class that one is **water**, one is **hydrochloric acid** and one is **hydrogen peroxide.** She asks the class to design an investigation to discover which of the liquids is which.

Hint (optional)

She had some manganese dioxide powder and calcium carbonate (marble chips) in the laboratory. She also had all the apparatus for preparation, collection and testing of oxygen and carbon dioxide.

For teacher use only.

Comment:

How to improve: