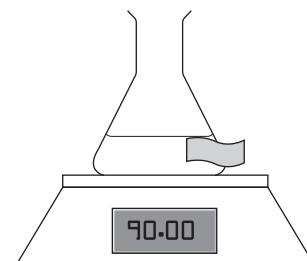


Worksheet 7.2

Rates of reaction

1 The diagram to the right shows a conical flask containing hydrochloric acid and a strip of magnesium ribbon on a top pan balance. After noting the weight, the strip of magnesium ribbon is dropped into the acid. It fizzes and eventually dissolves. During the reaction the reading on the balance decreases.



a Why did the reading on the balance decrease?

.....

b As well as the reading on the balance, what else would a student need to record in order to measure the rate of this chemical reaction?

.....

c When magnesium reacts with hydrochloric acid, it is a vigorous reaction with considerable fizzing (effervescence). The decrease in the reading on the balance is very small. Why is it a good idea to include a cotton wool bung in the neck of the flask when carrying out this experiment?

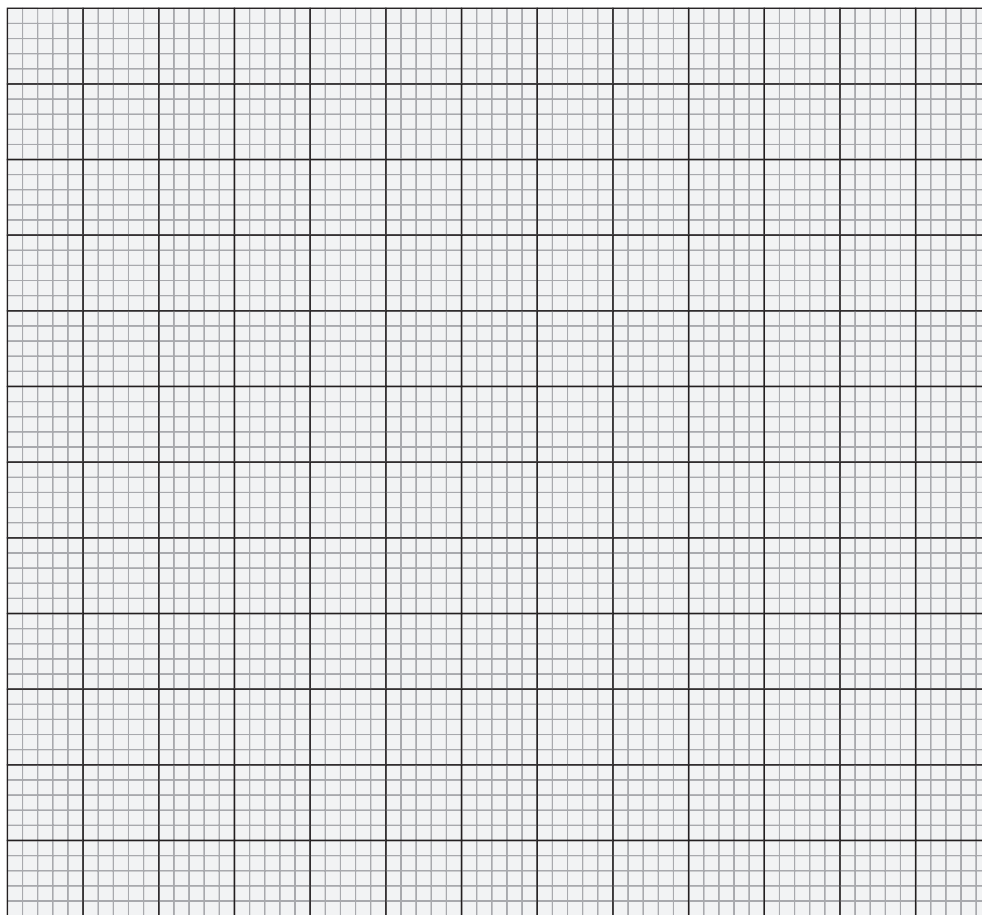
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.....

2 A group of students repeated the experiment above in which they added a piece of magnesium ribbon to hydrochloric acid in a flask on a top pan balance. In their experiment, they timed the loss of mass as the reaction took place and recorded their results in the following table:

Time / s	Mass of flask + contents / g	Total loss of mass / g
0	170.00	0.00
10	169.96	0.04
20	169.92	0.08
30	169.88	0.12
40	169.85	0.15
50	169.83	0.17
60	169.82	0.18
70	169.81	0.19
80	169.80	0.20
100	169.80	0.20

a Plot a graph of these results showing the line of best fit.



b What was the total mass of hydrogen produced in this reaction?

.....

c How long did it take for this hydrogen to be formed?

.....

d Use your answers to parts b and c to work out the average rate of reaction in g/s.

.....

.....

e From the values in the table, work out a value for the initial rate of reaction in g/s.

.....

.....

3 Complete each sentence using the correct ending from those listed below.

a A catalyst is

.....

b Chemical reactions can only happen when

.....

c Concentration, surface area and temperature can all affect

.....

d An enzyme is

.....

e The activation energy is

.....

Choose endings from:

- ◆ the minimum amount of energy that the particles must have to react.
- ◆ the rate of a chemical reaction.
- ◆ reacting particles collide with one another.
- ◆ a substance that can speed up the rate of a chemical reaction.
- ◆ a biological catalyst.

4 Complete these sentences using the words below to fill in the gaps.

compounds used up enzymes faster lower transition metals rate

Catalysts increase the of a chemical reaction without altering anything

else. They can be used to make a reaction go or they can be used to

make a reaction happen at a temperature. They are not

..... themselves in the course of the reaction and can be used time after time.

Catalysts are often or their

..... In living cells, biological catalysts called

control all the chemical reactions which go on.