

Airbags in cars are designed to prevent injuries in car crashes.

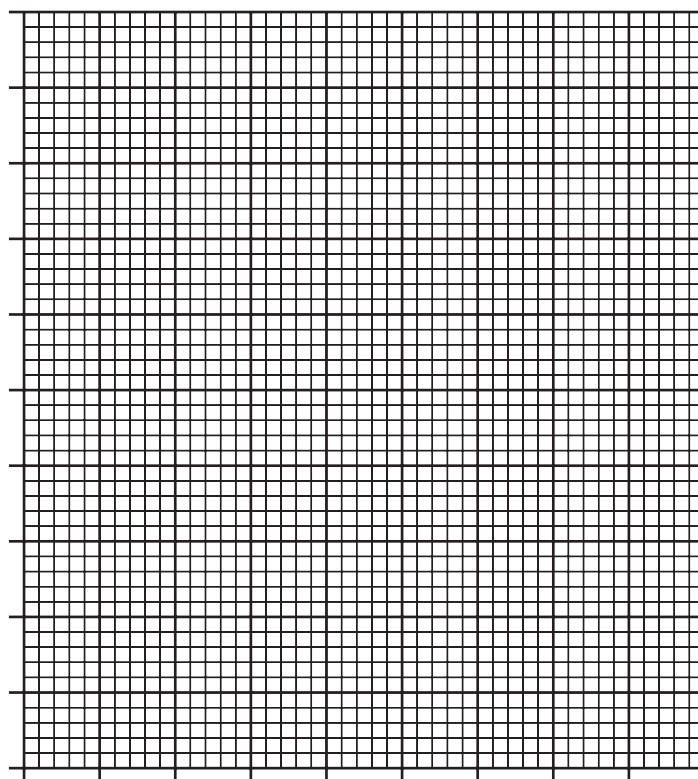
They contain sodium azide ( $\text{NaN}_3$ ) which produces nitrogen gas on impact.

The nitrogen inflates the airbag very quickly.

The table gives information on the volume of nitrogen gas produced.

Time/microseconds	Volume of nitrogen gas produced/litres
0	0
5	46
10	64
15	74
20	82
25	88
30	88

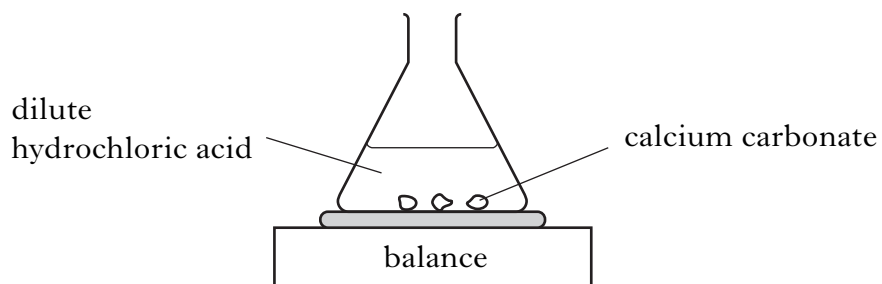
Draw a line graph of the results.



The apparatus below was used to investigate the reaction between lumps of calcium carbonate and dilute hydrochloric acid.

Excess acid was used to make sure all the calcium carbonate reacted.

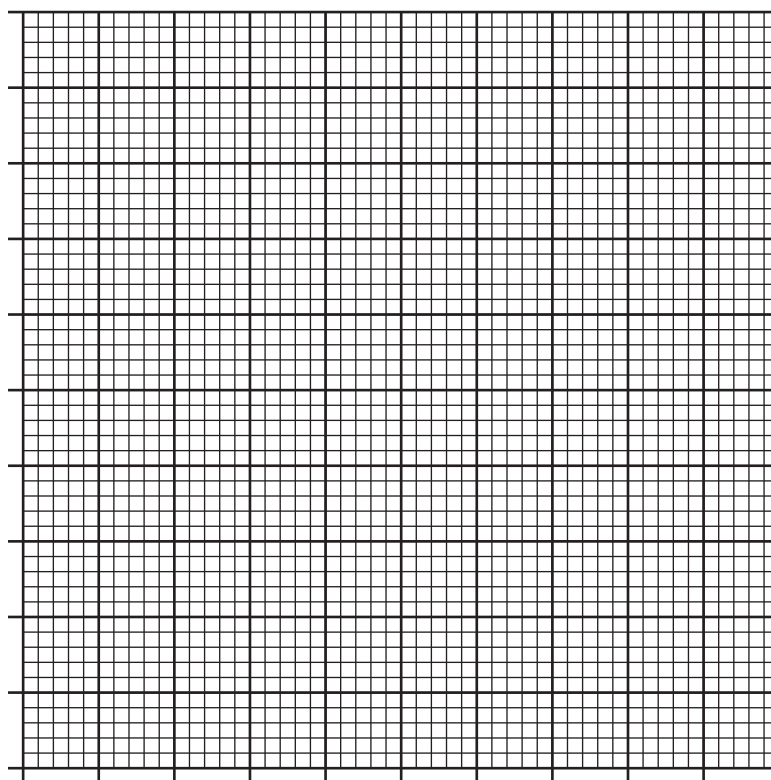
A balance was used to measure the mass lost during the reaction.



The results are shown in the table.

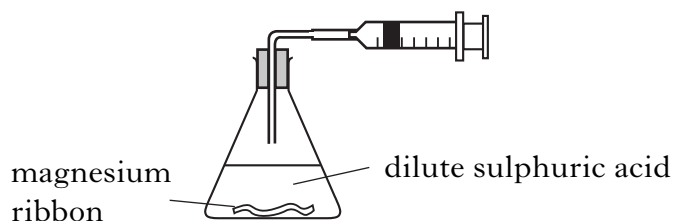
Time/minutes	0	0.5	1.0	2.0	3.0	4.0	5.0
Mass lost/g	0	0.36	0.52	0.70	0.80	0.86	0.86

Draw a line graph of the results.



A student added magnesium ribbon to an excess of dilute sulphuric acid and measured the volume of hydrogen gas produced.

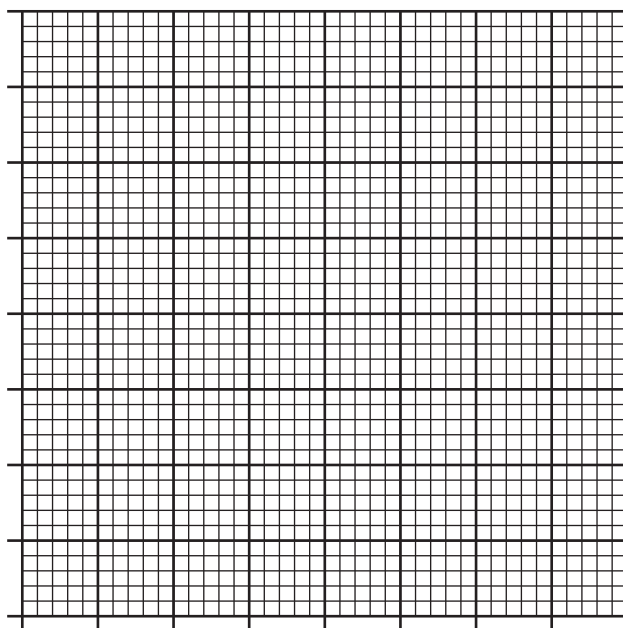
The reaction stopped when all the magnesium was used up.



The results are shown in the table.

Time/s	0	10	20	40	50	60	70
Volume of hydrogen gas/cm <sup>3</sup>	0	20	32	50	52	53	53

Draw a line graph of the results.

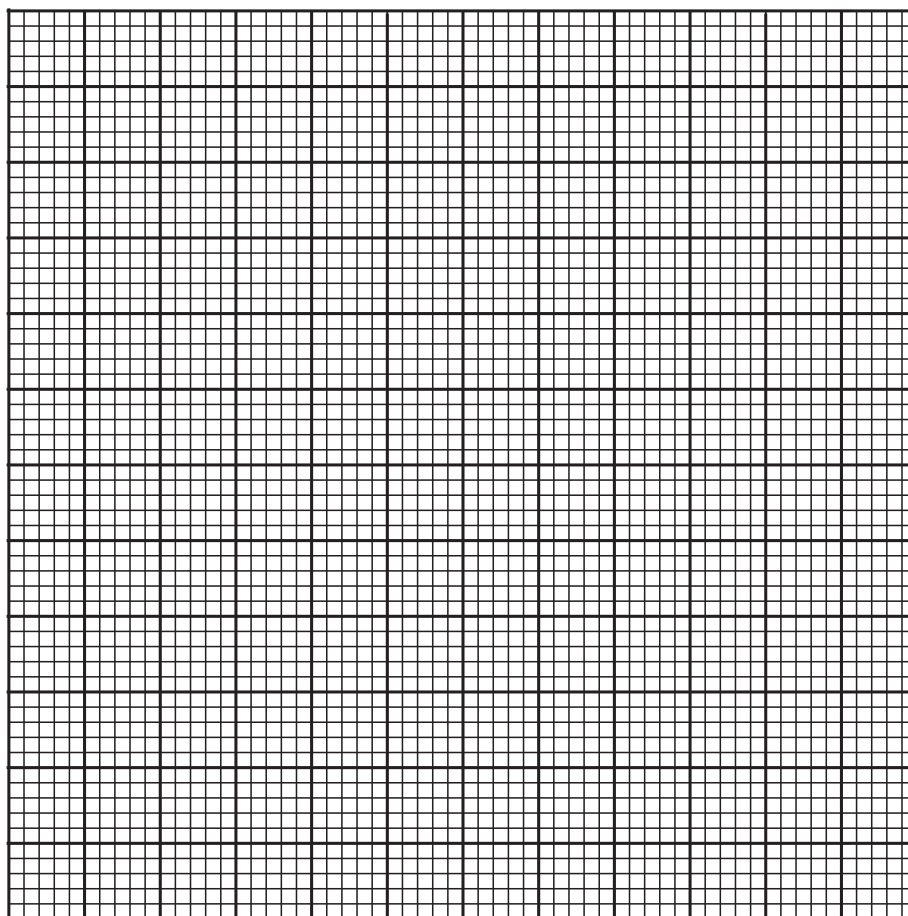


When sulphur dioxide dissolves in water in the atmosphere “acid rain” is produced

The table shows information about the solubility of sulphur dioxide.

Temperature /°C	0	20	30	40	50	60
Solubility in g/100 cm <sup>3</sup>	22·0	10·0	6·0	3·0	2·0	1·5

Draw a line graph of solubility against temperature.

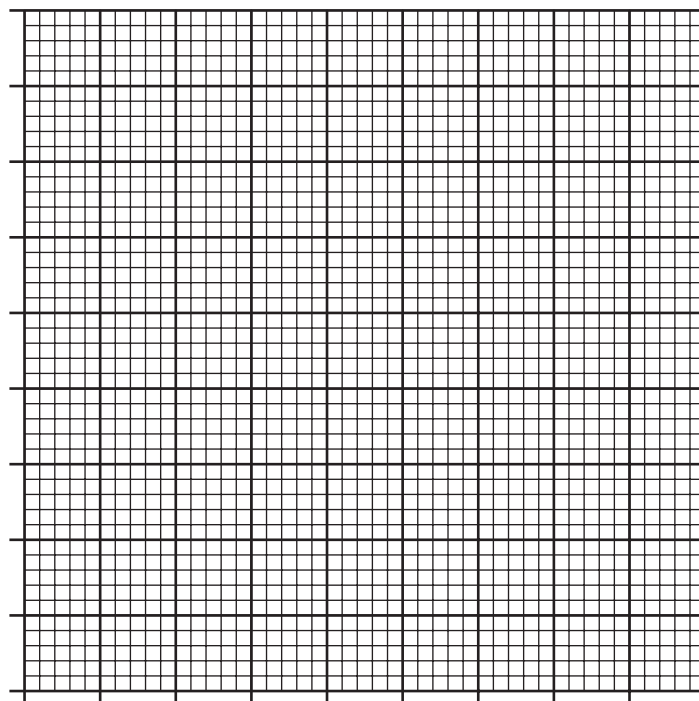


Ammonia is produced in the Haber process.

The percentage yield of ammonia, obtained at different pressures, is shown in the table.

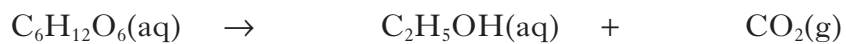
Pressure/ atmospheres	Percentage yield of ammonia
50	6
100	10
150	14
200	19
250	22
350	29
400	32

Draw a line graph of the results.



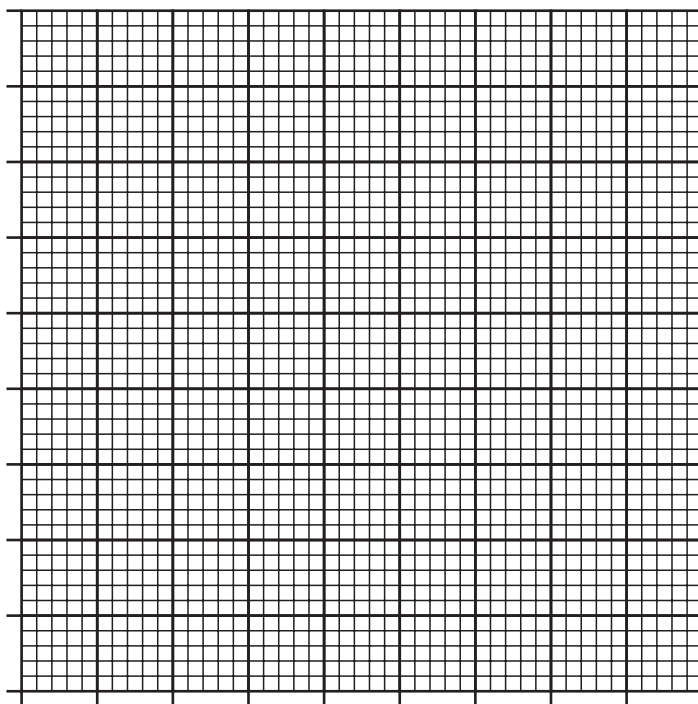
A series of fermentation experiments were carried out at different temperatures and the volume of carbon dioxide was measured.

The fermentation of glucose is catalysed by the enzyme zymase.



Experiment	Temperature (°C)	Volume of CO <sub>2</sub> (cm <sup>3</sup> )
1	15	8
2	20	25
3	25	35
4	30	42
5	35	27
6	40	14

Plot a line graph of these results, showing the temperature of the reaction against the volume of CO<sub>2</sub> collected.

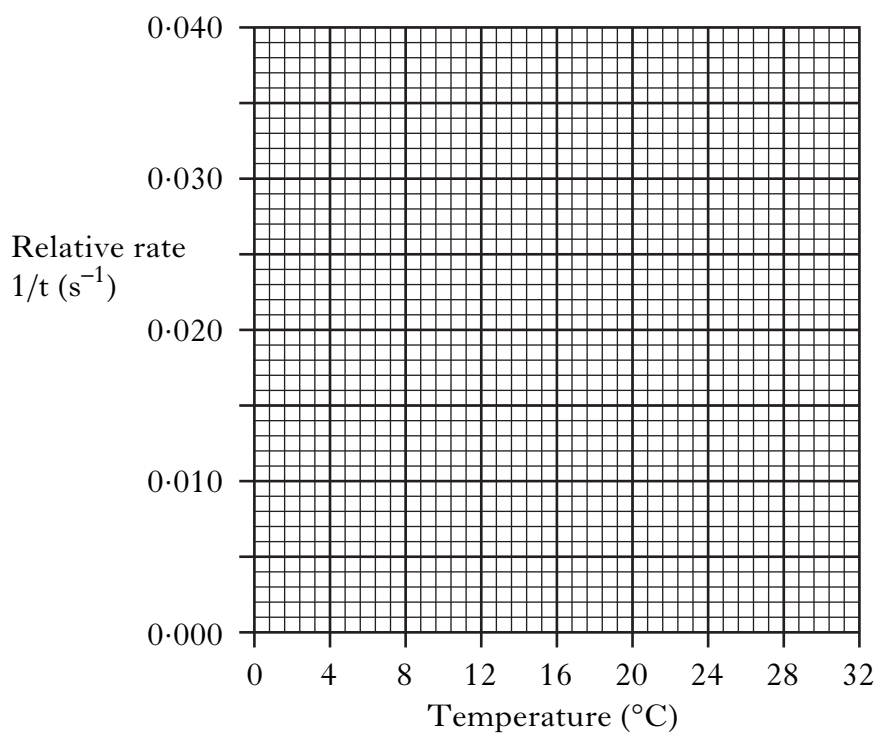


The enzyme phosphorylase catalyses the formation of starch from sugars.

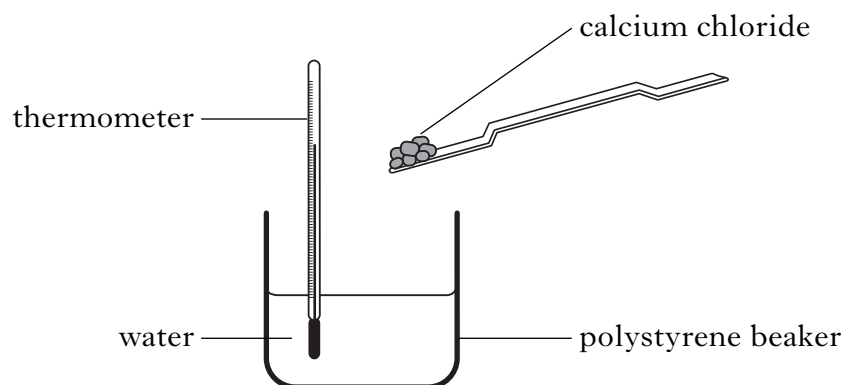
A student investigated the effect of temperature on the rate of starch formation. The results are shown.

Temperature (°C)	Relative rate $1/t$ ( $s^{-1}$ )
4	0.003
12	0.010
16	0.016
20	0.022
24	0.033

Plot these results as a line graph.



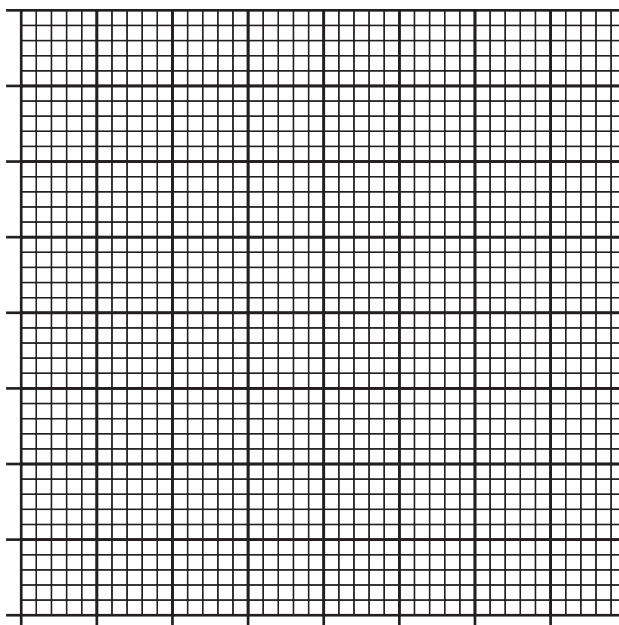
A student investigated how changing the mass of calcium chloride affects the heat released



The results are shown.

Mass of calcium chloride used (g)	Highest temperature reached (°C)
0	20
5	28
10	34
15	41
20	50
25	57

Plot a line graph of these results.





Research is being carried out into making chemicals that can be used to help relieve the side effects of chemotherapy.

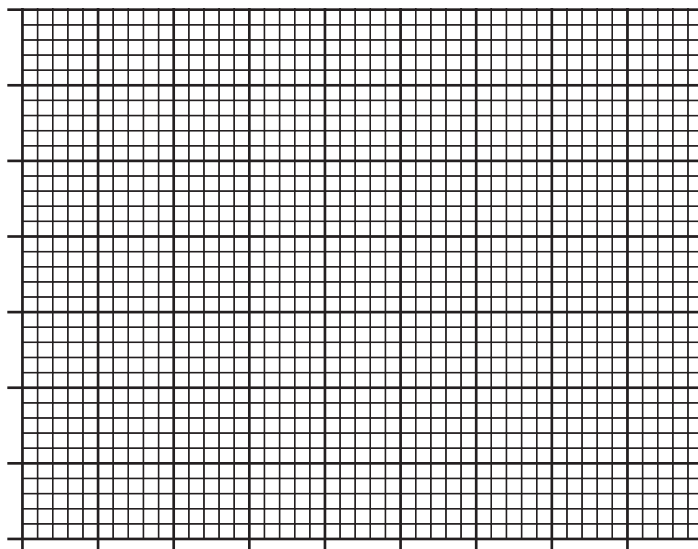
Part of the process is shown.



As the reaction proceeds the hydrogen is used up and the pressure decreases

Time (min)	0	5	10	15	20	30	35	45
Decrease in pressure (bar)	0	0.6	1.2	1.7	2.2	2.9	3.1	3.1

Draw a line graph showing the decrease in pressure as time proceeds



Egg shells are made up mainly of calcium carbonate. A pupil carried out an experiment to react egg shells with dilute hydrochloric acid. A gas was produced.

The volume of gas produced during the reaction was measured.

Time (min)	Volume of gas (cm <sup>3</sup> )
0	0
2	47
4	92
6	114
8	118
10	118

Plot these results as a line graph.

