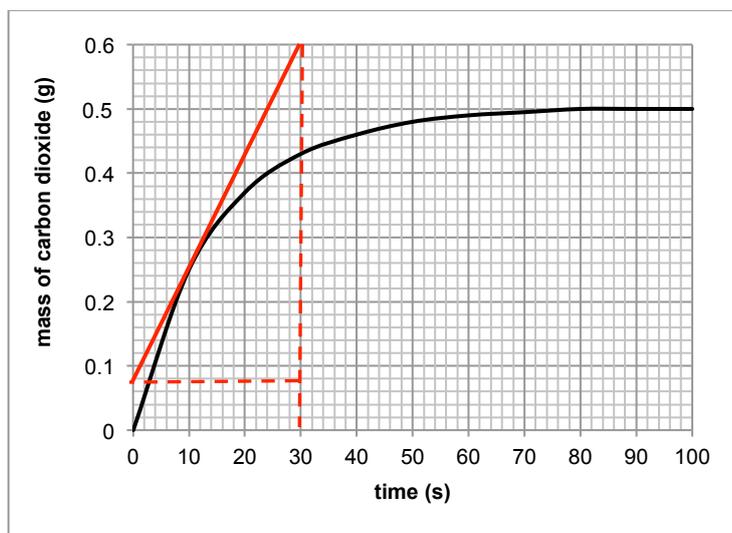
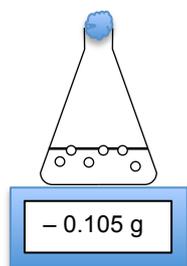




A student carried out an experiment where he recorded the mass of carbon dioxide gas formed as calcium carbonate reacts with hydrochloric acid.

The reaction was done on a set of scales. The student tared (zeroed) the scales at the start of the reaction so he could measure the mass of gas lost against time on a graph.



- 1 Why is cotton wool placed in the neck of the conical flask?

**allows CO<sub>2</sub> out**

**but stops any liquid spitting out**

- 2 Explain why the rate slows down and then stops.

**slows down: fewer reactant particles so less frequent successful collisions**

**stops: no reactant particles so no successful collisions**

- 3 Calculate the mean rate of reaction in the first 10 seconds in g/s

$$\text{rate} = \frac{0.26}{10} = 0.026 \text{ g/s}$$

- 4 Draw a tangent to the graph to find the rate at 10 seconds in g/s

$$\text{rate} = \frac{0.60 - 0.08}{30 - 0} = 0.017 \text{ g/s}$$

- 5 Explain why this reaction would be faster if more a more concentrated solution of acid was used.

**more concentrated: particles closer together so more frequent successful collisions**

**stops: no reactant particles so no successful collisions**