

Aim:

Does the amount of hydrogen gas formed in the below reaction depend on the amount of magnesium used?

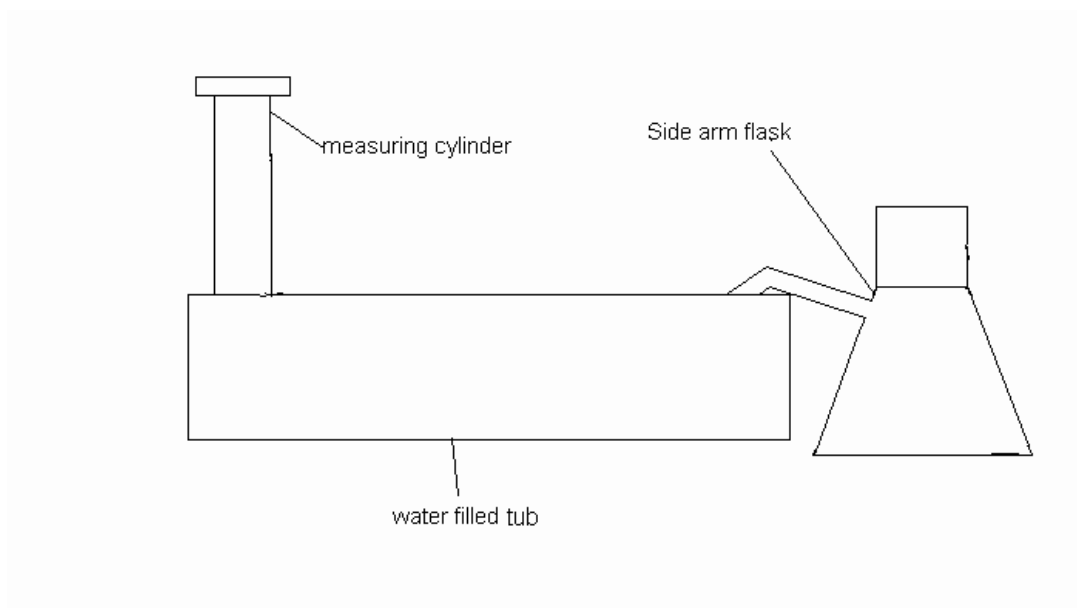
Prediction:

I predict that as the amount of magnesium used increase, so will the amounts of hydrogen gas produced. I will use the collision theory to explain this.

The collision theory involves a chemical reaction taking place between particles when they collide. There are a variety of factors that affect how frequently particles collide, and how successful these collisions are in making a chemical reaction:

- **Concentration of acid:** this is how many molecules are in the acid the higher the concentration the more molecules are in there. When there is a higher concentration the reaction will occur faster because there are more molecules to react with so the reaction takes place more frequently.
- **Type of acid:** different kinds of acids are more or less reactive than others so if you use different types of acids you will get different results.
- **Surface area of magnesium:** as the surface area increases it will also become more reactive because there will be a larger area for the acid to collide with.

In this particular experiment, my altering factor will be the length of the magnesium strip; this will be measured in cm.

Diagram:**Plan:****Equipment:**

- 100ml measuring cylinder
- Conical flask
- 30cm magnesium ribbon

- 100cm³ dilute sulphuric acid
- Plastic tub

Method:

I will take my 30cm magnesium strip and divide it up into different lengths starting with 1cm, 2cm, 3cm, and 4cm. I will repeat this twice more using all of each length. One piece of each length was used in the preliminary investigation and the other two pieces of each length in the main experiment.

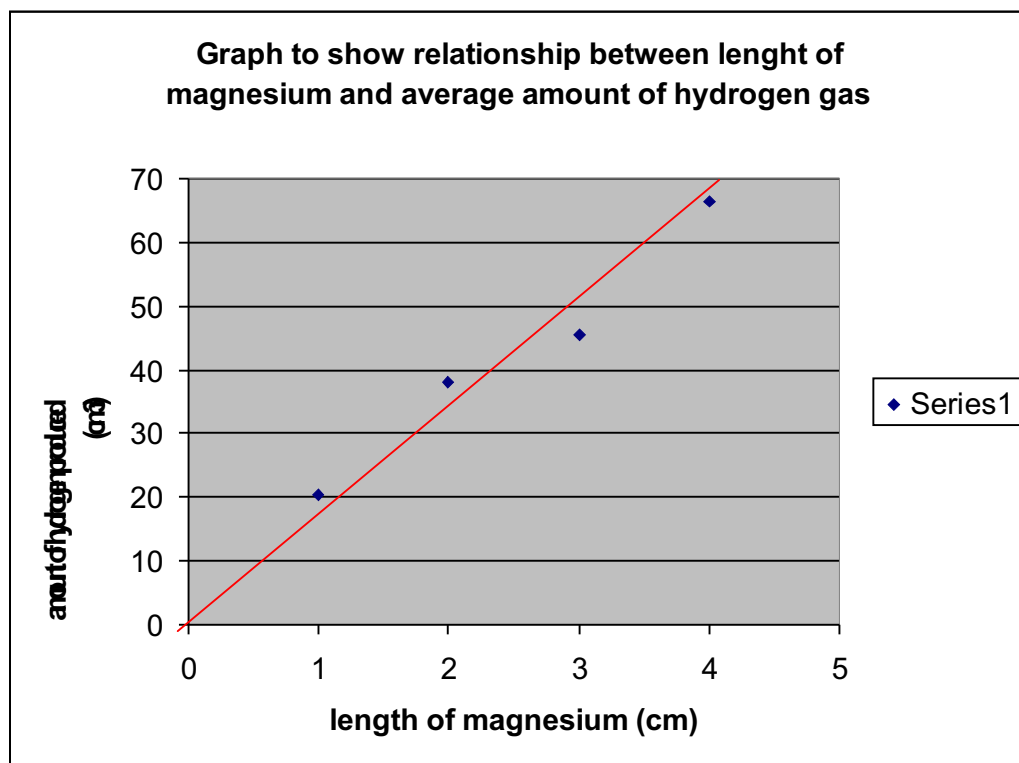
After setting up the equipment as shown in the diagram, I will pour 10 ml of the sulphuric acid into the side arm flask and then add the piece of magnesium to the acid in the side arm flask and put the bung on the side arm flask. It will be carried out in this order as it was found to be the most efficient in the preliminary work. I will then collect the hydrogen gas in the measuring cylinder.

To make sure it is a fair test I will keep certain factors constant. The factors I will keep constant are the same amount of acid (in ml), volume of acid, type of acid and concentration of acid. Also I will wash all equipment to stop contamination and I will not shake the flask because I cannot ensure that I will shake the flask the same way and amount each time, which will influence the results.

I will make it a safe experiment by wearing safety goggles at all times, dispose of all chemicals, clear up any spillages and by handling all glass equipment and care.

Results:

<i>Length of Magnesium</i>	<i>Total Gas</i>	<i>Total Gas</i>	<i>Average</i>
4cm	65 cm ³	68cm ³	66.5 cm ³
3cm	46 cm ³	45cm ³	45.5 cm ³
2cm	39 cm ³	37cm ³	38 cm ³
1cm	22 cm ³	19cm ³	20.5 cm ³



Conclusion:

I can see from the results I obtained from the experiment, that my prediction was correct. As the length of the magnesium increased, the volume of hydrogen gas produced increased. This also proved as the surface area of the magnesium increased so did the volume of hydrogen gas produced.

This is to do with the collision theory when we increase the surface area of the magnesium it has a higher probability of colliding with an acid particle which will create a chemical reaction which produces a by-product of hydrogen gas, thus the more collisions the more gas.

You can see from my graph that no anomalous results were taken which shows that my results were fairly accurate because I carried out the experiment to the guidelines laid out in my plan to ensure a safe and fair test.

Evaluation:

My experiment was not as accurate as it could have been which slightly lowers the reliability of my results. To make my experiment more accurate I could find a more accurate way of cutting the magnesium into strips or using the weight of magnesium instead of length. Also I could develop a way of releasing the magnesium into the acid without losing any gas from the flask. Also I could of changed the collecting method and used a gas cylinder which would be more accurate.

A way I could further this experiment is by changing the other variables, such as the type of acid, the strength of acid or the volume of acid.