The National Orthodox School Shmaisani

**The National Orthodox School/ Shmessani**

**Name: .KEY...** **Lab report (1) /Concentration and reaction rate**

**Date:** **Grade 8CS all sections**

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## 1) Writing a fully focused research question

- ***Must include the independent variable with units***
- ***Must include the dependent variable***
- ***Method of measuring the dependent variable***

**What is the effect of -----changing the concentration of the acid---------- on the ----rate of reaction--------measured by -------the volume of hydrogen gas produced-----in ---- a period of time--------?**

## 2) Hypothesis: *Outline a hypothesis to predict the outcome of the experiment and explain it using logical scientific reasoning (what do you think is going to happen).*

**If the _____ concentration of the acid _____ __changes/ increases_____**

**(State the IV)** **(increase, decrease, or change)**

**then the __ rate of reaction (volume of gas produced) ____ will ___change/ increase___**

**(State the DV)** **(increase, decrease, stay the same, or change)**

## 3) Scientific explanation for hypothesis *(This is the explanation to the previous hypothesis. Why do you think that your hypothesis is correct? Explain it in detail with reasons and causes.*

The rate at which a chemical reaction is occurring can be investigated by measuring the volume at which a gas is given in a chemical reaction.
When a metal reacts with an acid, hydrogen gas is produced. The hydrogen can be collected in a gas syringe. The amount of the gas produced depends on the concentration of the acid.

## 4) Manipulating the variables:

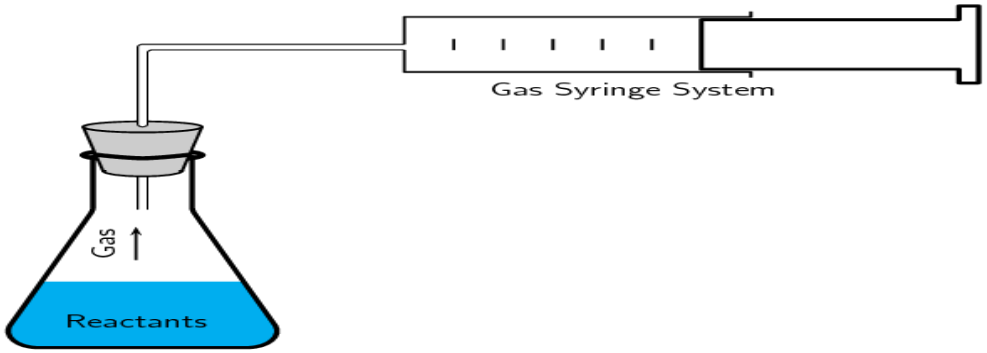
| Controlled Variable | How will you keep this controlled? Stating the values and the equipment that you will be using | How could it affect your results if not controlled? |
|---|---|---|
| The mass of the metal/ The volume of the acid | Using a top- pan balance/ a measuring cylinder | It will give different amount of the product |
| Surface area | Use the same size of the metal | More particles will be exposed to the acid, so the reaction rate will be faster |
| Temperature | Use a thermometer | Particles will have more kinetic energy, so they will have stronger collisions and higher rate of reaction |

## 5) Materials and Method:

- **State your materials [ number needed + units] (Be descriptive, example: 10cm$^3$ graduated cylinder)**

20 cm$^3$ Diluted hydrochloric acid
3 cm Magnesium ribbon
Clamp& stand
measuring cylinder
Stopwatch
gas syringe https://www.youtube.com/watch?v=CYZnXt85idA
conical flask with bung and delivery tube

- **Method : What are the steps of the investigation?**




1. 1. Measure a fixed volume of hydrochloric acid using the measuring cylinder. $20cm^3$
2. Pour the acid into a conical flask.
3. Add a known mass of magnesium( excess) into the flask 3cm (0.07g) , and attach the gas syringe.
4. Record the volume of hydrogen gas collected in the syringe.
5. Record your results in the table below.
6. Repeat the experiment using different concentration of the acid but using the same volume of it and the same mass of magnesium.

## 6) Safety precautions

Do not get hydrochloric acid (HCl) on your hands. Use gloves and safety glasses whenever handling acids and handle with care.

## 7) Results ( these results are not the real results collected in the lab)

- **Data**

| time (s) | Volume of gas ($cm^3$) | |
|---|---|---|
| | 2 $mol/dm^3$ | 1 $mol/dm^3$ |
| 0 | 0 | 0 |
| 10 | 32 | 10 |
| 20 | 48 | 19 |
| 30 | 48 | 28 |
| 40 | 48 | 36 |
| 50 | 48 | 43 |
| 60 | 48 | 48 |
| 70 | 48 | 48 |
| 80 | 48 | 48 |
| 90 | 48 | 48 |

## 8) Conclusion and evaluation:

- **Restating the purpose (hypothesis)**

  If the concentration of the acid changes (increases), the rate of reaction will change (increase).

- **Interpret your data and describe a conclusion based on your results.**

  The table shows that the time needed for the reaction to be done using 1M acid was 60sec (when no more hydrogen gas was produced), where it takes only 20sec for the reaction to finish using 2M acid.

  According to your results, you can write: the table shows that the volume of gas collected in 30sec using the diluted acid was …….$cm^3$, where ……..$cm^3$ were collected using the concentrated acid.

- **Determine whether the original hypothesis was supported or rejected by the investigation?**

  The hypothesis was supported. The results show that as the concentration changes, the rate of reaction changes. (As the concentration increases, the rate of reaction increases).