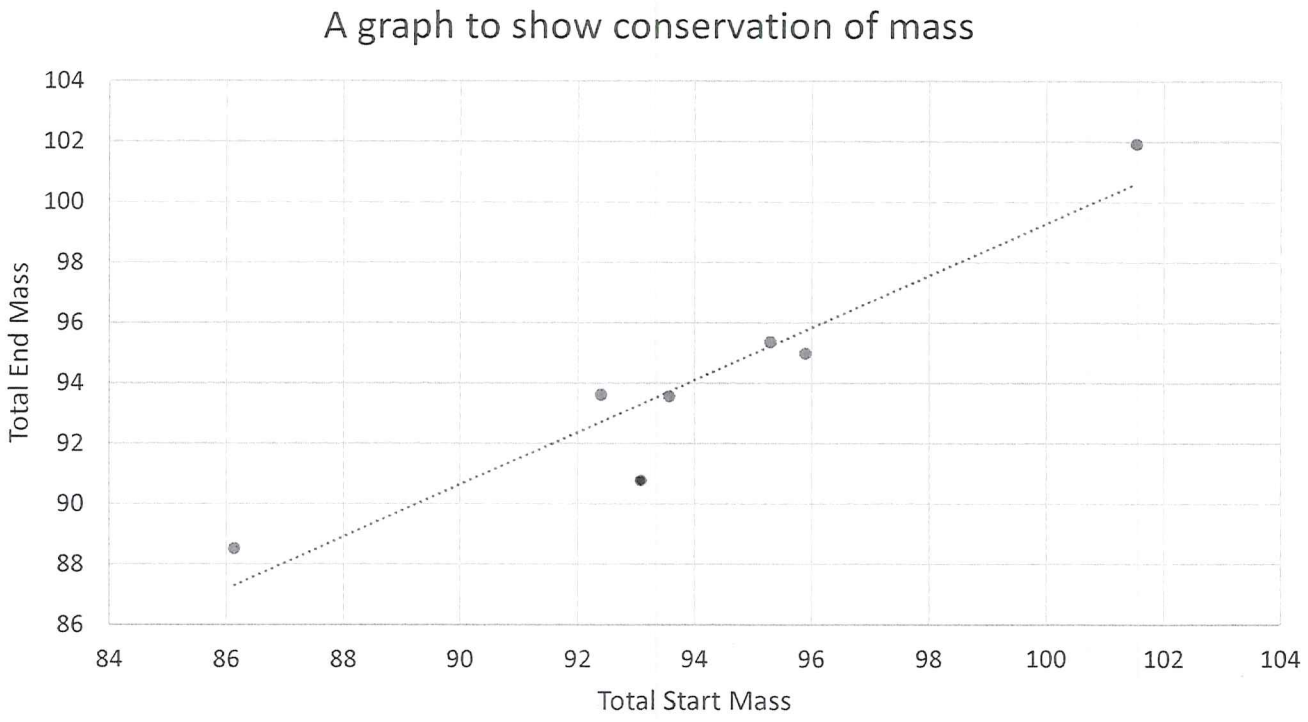
Method

Equipment:

- 7 conical flasks
- 1 measuring cylinder (100ml)
- Delivery tube
- 2M hydrochloric acid
- lime water
- Pot of marble chips (small)
- 7 balloons
- Test tube
- Weighing scales
- Goggles

1. First we poured 30ml of 2M hydrochloric acid into a conical flask
2. We then weighed the conical flask with the acid in it and writing the weight down on paper
3. After that put the marbles chips into the balloon and weigh them, again writing it on paper
4. Attach the balloon to the conical flask and hold it upright, this will allow the marble chips to fall into the acid and start the reaction
5. The reaction will create carbon dioxide and will fill the balloon
6. Once the reaction is finished (indicated by the fizzing stopping) hold the balloon to stop the gas escaping and take it off the conical flask
7. Attach the balloon to the delivery tube and put that into a test tube of lime water to prove the gas is carbon dioxide

8. Repeat this 7 times each time varying the amount of marble chips



Normal Results

Anomalies

	Test A	Test B	Test C	Test D	Test E	Test F	Test G
Starting mass of acid + conical flask	82.4g	76.94g	87.36g	85.58g	86.7g	86.8g	86.22g
Starting mass of marble chips + balloon	10g	9.2g	14.18g	7.5g	8.6g	9.1g	7.35g
Total Starting Mass	92.4g	86.14g	101.54g	93.08g	95.3g	95.9g	93.57g
Total End Mass	93.61g	88.51g	101.92g	90.77g	95.35g	94.97g	93.55g

Conclusion

According to our experiment's results, it is true that mass is conserved through a reaction. This agrees with the Law of Conservation of Mass, created in 1789 by French Chemist Antoine Lavoisier. This states that in a reaction, there can be no atoms that are lost or gained, and what happens is that the atoms just rearrange themselves. This is called conservation. The end product may have different properties to the starting reactants.

This is proved by our results, because from the graph we can see that whatever the starting mass is, it stays the same through the reaction and is equal to the end mass.

Evaluation

We decided to test the Law of Conservation of Mass by doing an experiment, whereof we put some marble chips into 30ml of 2M acid, and collected the carbon dioxide into a balloon. At the end, we weighed the excess solution and the carbon dioxide in the balloon and compared it to the weight of the marble chips, balloon and acid at the start.

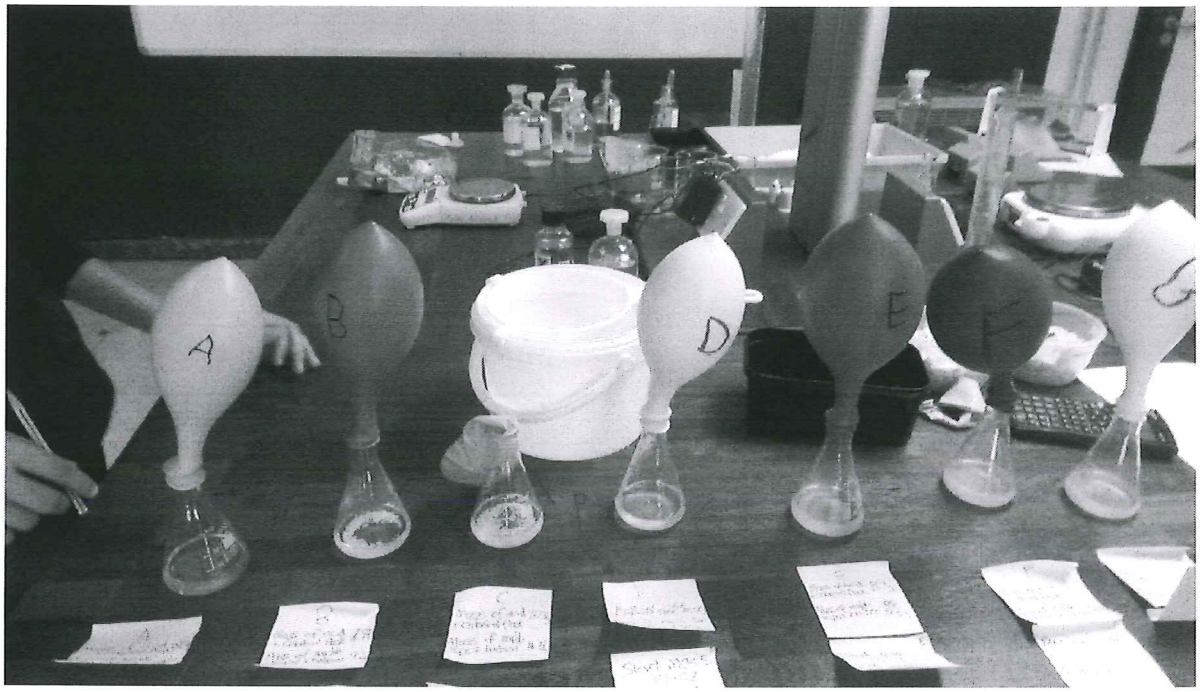
We knew that it was carbon dioxide we collected by testing our practise experiment: we used the gas from the practise balloon and put it into the lime water. The water turned cloudy, proving it was carbon dioxide. This is important to know, because if it was a gas that was lighter than air, such as helium, it wouldn't show up on the scales at the end, making our results inaccurate.

I think that overall it was a good experiment, which worked successfully without any anomalies. This is because it stuck to what we predicted would happen: that the mass of the reactants before a reaction equals the mass of the products (this is the Law of Conservation of mass). However, I think that if we were to do it again, we should try it different reactants to show that no matter what you use, the Law of Conservation of Mass will always apply.

Most of our equipment worked, but I understand that the balloons might not have been the best equipment: it might have leaked some of the gas into the air. Next time, we could use balloons that didn't leak as much gas. However, the magnitude of the effect of the balloons is very small, so won't count for much.

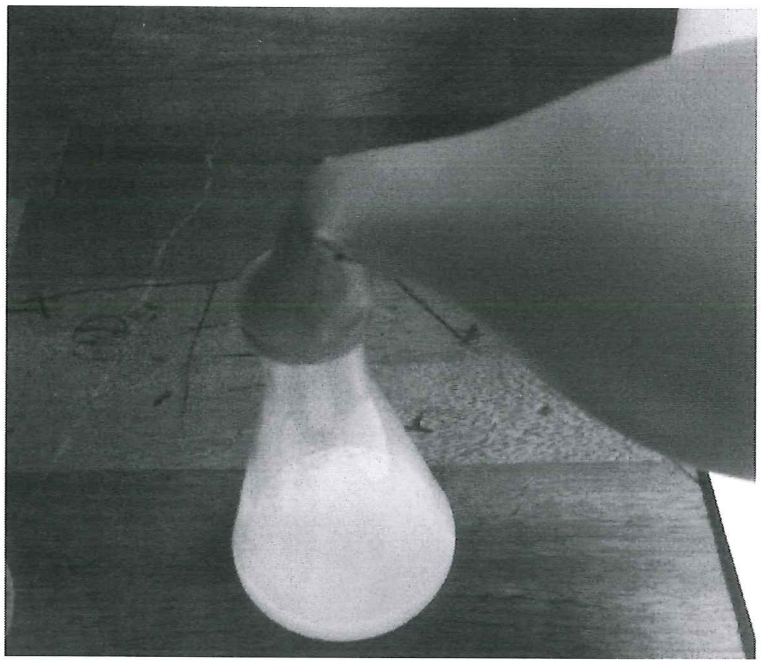
Also, our scales might have not recorded our results completely accurately, but the margin of error would be small and probably insignificant. However, just in case, next time we should use more scientific scales.

Using a range of different starting masses, we made sure that we had sufficient results to prove our theory (that of the Law of Conservation of Mass). Even if there were one or two anomalies, we would be able to tell by comparing these to the other results, using our graph. We collected appropriate data for our needs. If the masses did not match up exactly, it was probably just on account of small sources of error.



Our Test Setup

The reaction taking place



The test to show carbon dioxide