**Year 10 Chemistry - semester 2**

**Activity 3 - Rates and Surface Area**

**Background**

The rate of the reaction between CaCO3 and HCl could be determined by measuring the rate at which a reactant disappears or the rate at which a product forms. Measuring how quickly a product (CO2) forms is the easiest to do. It can be collected in a graduated cylinder by the downward displacement of water to provide an accurate measure of reaction rate.

**Materials**

Electronic balance, marble chips, 2M HCl, stoppered test tube with delivery tube, ice cream container, 10 mL graduated cylinder, stopwatch, powdered CaCO3

**Method**

1. Add a small quantity of marble chips to a test tube
2. Add some acid so the test tube is about half filled
3. Place water into the ice cream container. Fill the cylinder with water and invert it in the ice cream container.
4. Bubble the gas from the reaction tube into the inverted 10 ml graduated cylinder and record the time to produce 10mL of CO2.
5. Decant the acid and add a greater quantity of marble chips to the test tube.

1. Add the same amount of acid as before and compare the rate of reaction.

**Results**

A difference in rate may be due to an increased mass of CaCO3 present or an increased surface area of the extra CaCO3  that was added.

Design a fair test using marble chips and powdered CaCO3  to find out what caused the change in reaction rate.

**Conclusion**

What do your results suggest about how the rate of a reaction is influenced by surface area?

**Question**

How this is applied to combustion reactions such as burning wood or fuel in a car?