

On-line Science Simulations - Marble Chip Teacher Instruction

This simulation investigates the effect on the production of carbon dioxide when hydrochloric acid is added to marble chips. The acid concentration and the number of chips can be adjusted. The results can be displayed in graphical and tabular form.

Mark scheme for worksheet

Task 1

- iv) From the graph, how does the rate of reaction change with time?

The rate decreases with time.

- v) Suggest two reasons for this change.

The concentration of the acid is decreasing as the reaction proceeds. The surface area of the marble chips decreases as the reaction takes place. These are better than 'the chemicals are being used up'.

Task 2

- iv) How does the rate of reaction in Task 2 compare with the rate in Task 1? Suggest a reason for the change.

The reaction is faster because the surface area of the marble chip has been increased and there are now more collisions between hydrochloric acid and the calcium carbonate.

- v) By comparing the two curves, predict the time it would take for the reaction to finish if 100 chips were used.

Time for 100 chips.....

The factor by which the time has decreased should be the same for 10 to 100 chips as it was for 1 to 10 chips.

Task 3

How long did it actually take for the reaction with 100 chips to finish?

Time taken is roughly **6.8 seconds**.....

Task 5

- iv) Give two ways in which the results for Task 4 differ from the results in Task 5 and suggest reasons for these differences.

The reaction is faster for task 4 because the concentration of the acid is twice the concentration used in task 5, the greater the concentration the greater the number of collisions etc.

The total mass change is less in Task 5 because the amount of acid is now too small to react with all the marble chips.

