

Changing Materials

Homework Exercise 4

1. Sea shells (mainly calcium carbonate, like marble) react with vinegar (an acid) to produce carbon dioxide gas. What would be the effect on the speed of reaction if:

- (a) the shells were crumbled
- (b) the vinegar was diluted with water
- (c) a catalyst was added
- (d) hot vinegar was used
- (e) the experiment was carried out in a refrigerator
- (f) the ordinary vinegar (5% acid) was replaced by another vinegar (7% acid)?

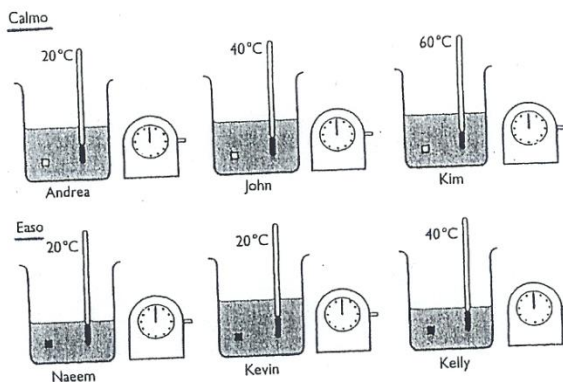
(6)

2.

Indigestion can be caused by too much acid in the stomach.

Six pupils set up experiments as part of an investigation. They were trying to find out which of two indigestion tablets dissolved in water more quickly.

Three used Calmo tablets and three used Easo tablets. (See illustration)



- (a) Why would Andrea and Kevin's experiments, taken together, provide the fairest way of comparing how quickly Calmo and Easo dissolved? (2)
- (b) The results of the experiments carried out by Andrea, John and Kim can be compared. What would this comparison be designed to show? (1)

3. Milk bottle tops are made from aluminium. Mhairi used some clean tops to study the rate of reaction between aluminium and dilute hydrochloric acid. She measured the volume of hydrogen given off at various times during the reaction and obtained the following results:

Volume of hydrogen/cm ³	0	1	2	12	25	38	50	58	60	60
Time/minutes	0	1	2	3	4	5	6	7	8	9

- (a) Draw a line graph to show these results.
- (b) Use your graph to estimate the time taken for 30cm³ of hydrogen gas to be produced.

(Your teacher will need to give you graph paper.)

(4)

(1)