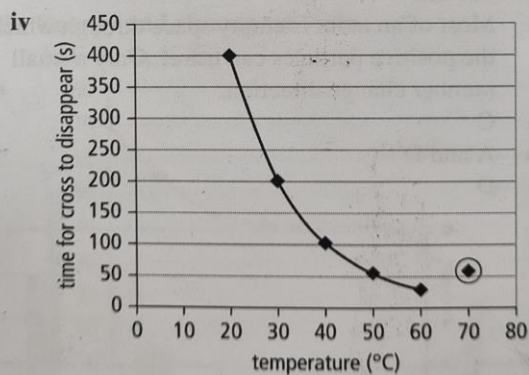
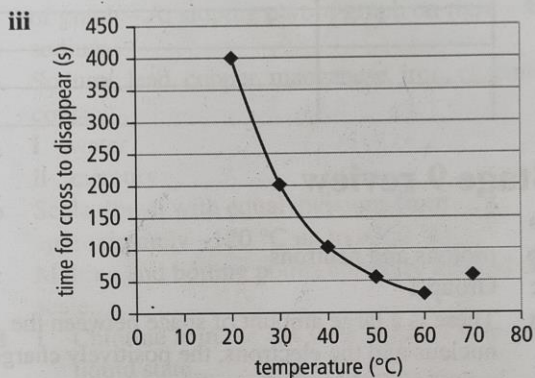


Textbook questions

- 2a
- i temperature
 - ii time taken for the cross to disappear
 - iii amount of sodium thiosulfate, amount of hydrochloric acid, concentration of sodium thiosulfate, concentration of hydrochloric acid, temperature
- b
- i To reduce error and increase the reliability of his results.
 - ii 200



- v As temperature increases, the time taken for the cross to disappear decreases.
- c
- At higher temperatures, particles have more energy so move around faster. This increase in movement leads to an increase in collisions between reacting particles, leading to an increase in rate of reaction.

3a carbon dioxide

- b

 - i The product that is formed as gas escapes into the air.
 - ii B

- c

 - i size of calcium carbonate – surface area
 - ii time taken for 1.0 g of gas to be made
 - iii the amount of calcium carbonate, temperature, amount of hydrochloric acid

iv

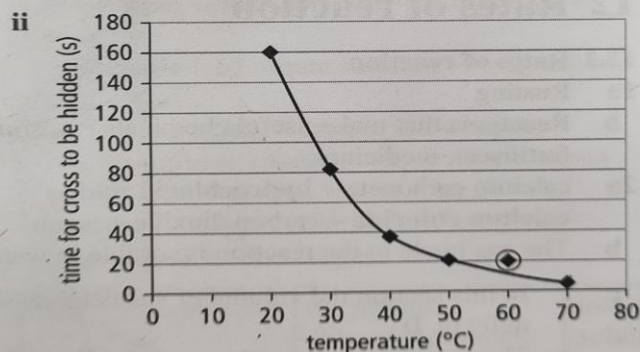
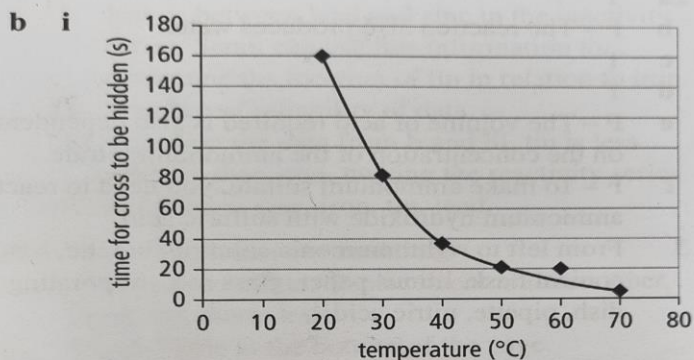
Size of calcium carbonate	Time taken for 1.0 g of gas to be produced
big lumps	
small lumps	
powder	

- v For a certain mass of calcium carbonate, the powder has the biggest surface area.

Workbook questions

12.3 Temperature and reaction rate

- 1a i Ebba
ii Wanda



iii By repeating the investigation, the student can reduce error and make the investigation more reliable.

iv The variables are both continuous.

- c At higher temperatures, the particles have more energy and collide more frequently. Therefore, the rate of reaction is faster.

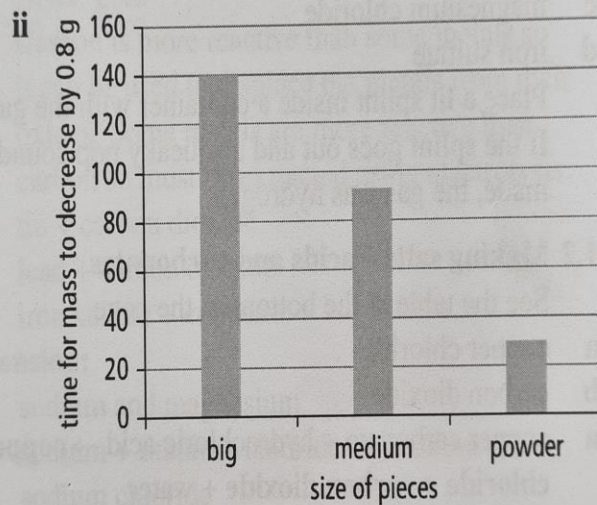
12.4 Surface area and reaction rate

1 A

2a Carbon dioxide is a gas and escapes into the air.

b i

Size of pieces	Time for mass to decrease by 0.8 g
Big	140
Medium	93
Powder	30



- iii Increasing the surface area of the calcium carbonate increases the number of particles that can react with the hydrochloric acid, increasing the rate of reaction.