

Year 10 Chemistry

C2: Rocks and Metals

Home Learning Tasks

Speeding Up and Slowing down

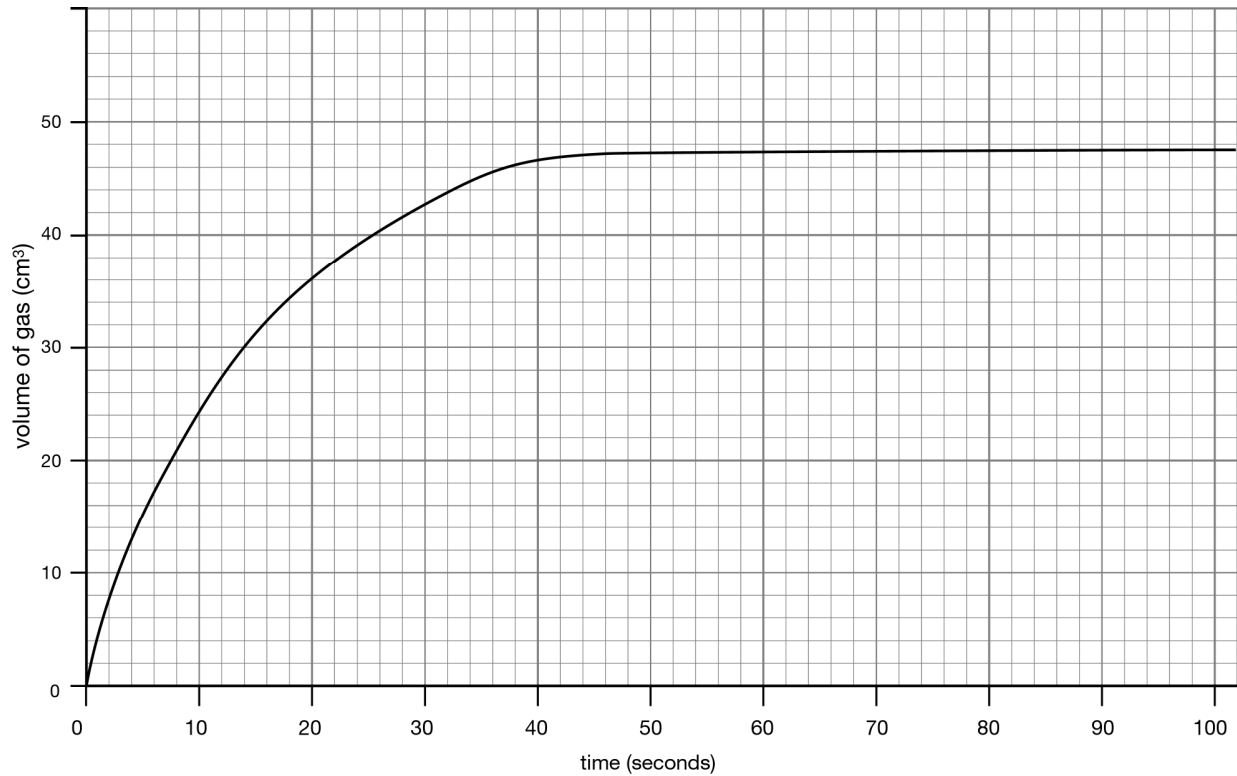
You are going to research and prepare a fact sheet detailing the factors that affect the rate of a chemical reaction

Using the internet or your home revision guide you should research the factors affecting rates of chemical reactions and answer the following questions:

1. Using suitable particle diagrams describe the four main factors that affect the rate of a chemical reaction.
2. For each factor that you find you must provide a chemical reaction that could be used to investigate this factor.
3. Complete the worksheets below.

Rate of reaction and graphs

Look at the graph and then answer the questions.

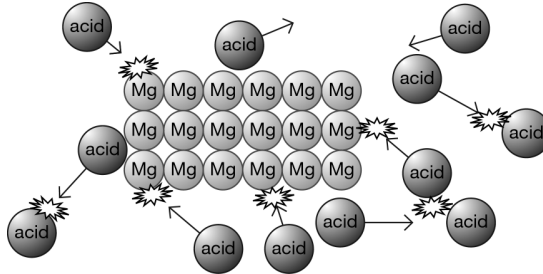


- 1 Write 'fast' on the graph where the reaction is going quickly.
- 2 Write 'slow' on the graph where the reaction is going slowly.
- 3 Write 'stopped' on the graph where the reaction has stopped.
- 4 How much gas was produced in this reaction?

- 5 At what time did the reaction come to a stop?

Concentration and collisions

Fred draws a diagram to show how acid particles react with magnesium.



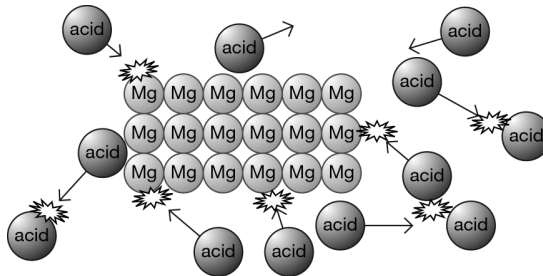
6 Put a ring around any places on the diagram where you think a reaction has happened.

7 Explain why you chose the places that you did.

8 When Mary does the experiment, her acid is twice as concentrated. Change the diagram to show:

a what Mary's acid is like.

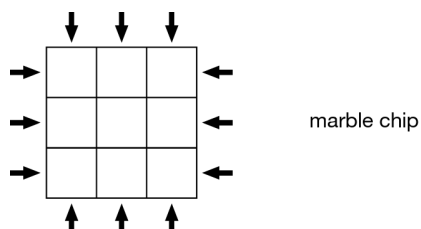
b the collisions that take place.



9 Use the altered diagram to explain why the reaction is faster for Mary.

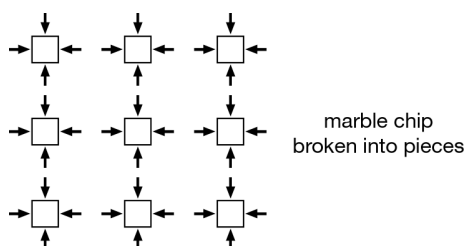
Surface area and collision theory

The diagram below shows a marble chip reacting with acid. Each arrow shows an acid particle colliding with the marble chip.



10 How many acid particles can collide with the marble chip at any one time?

If the marble chip is broken into small pieces, it has a larger surface area. There are more places for acid particles to attack.



11 Count the number of acid particles that can now collide with the marble chips at any one time.

12 How much faster will the reaction be?

13 The two diagrams aren't really good enough. A dimension has been missed out. Explain how the diagrams could be improved.

Rates of reaction

Use words from the list to fill in the gaps in each sentence, so that it makes sense. Some words may be used more than once.

collision frequency
gas
rate of reaction
solid

concentration
kinetic energy
reactants
surface area

effective collisions
gradient
reaction time
temperature

fast
product
slow

When two _____ meet in a chemical reaction the resulting substance is called the _____.
The amount of product made every second is the _____.

Lots of different things can affect the rate of reaction, for example:

- the _____ of any solid reactant
- how often the particles hit each other every second (called the _____)
- whether the reactants are _____, liquid or _____
- the pressure if the reactant is a _____
- the amount of reactant dissolved in every cm^3 (the _____)
- the _____ of the reactants (how hot they are)

Higher temperatures mean that the movement energy (the _____)
of the particles is greater, and so more of the collisions lead to reaction – there are more _____.

Reactions may go slowly or quickly. Corroding metal is an example of a _____ reaction.

When the latest spy film shows a car going up in flames, it is showing a _____ reaction.









































We often measure the time taken for all of a particular reactant to be used up – the _____.

We can plot the course of a reaction on a graph, and then compare reactions by measuring the angle
of the line on the graph – its _____.

Changing the rate

14 Colour in the arrows in the boxes to show how the rate of reaction changes.

- If the statement in the box describes something that will speed up a reaction, colour in the **up** arrow.
- If the statement in the box describes something that will slow down a reaction, colour in the **down** arrow.

more time between collisions  	more pressure on gas  	collision energy higher  	less pressure on gas  
more kinetic energy  	more solvent  	worse cooling of container  	less time between collisions  
bigger container for gas  	collision energy lower  	better cooling of container  	lower concentrations  
less space between particles  	collision frequency higher  	less solvent  	less kinetic energy  
more space between particles  	collision frequency lower  	higher concentrations  	smaller container for gas  

15 Now cut out the boxes and organise them into **two** piles.

Pile 1 Boxes that are mainly about the energy of collisions.

Pile 2 Boxes that are mainly about the frequency of collisions.
