

Prior to the moderation exercise, please complete the following information and submit it to your facilitator with assessment evidence from one learner that you judge to have successfully attained the Es' and Os'.

Experiences and Outcomes:

Through experimentation, I can identify indicators of chemical reactions having occurred. I can describe ways of controlling the rate of reactions and can relate my findings to the world around me.

SCN 3-19a

Learning Intentions:

We are learning how to identify chemical reactions

We are learning about ways in which the rate of reactions can be controlled and where this is used in the world around us.

Success Criteria:

You will be successful if you

- Can state the signs of a chemical reaction
- Can carry out experiments demonstrating ways in which the rate of chemical reactions can increase
- Can give examples of where the rate of chemical reactions

Briefly outline the context and range of quality learning experiences that have been provided making reference to the chosen design principles.

Breadth – Pupils were able to investigate a number of different ways that the rate of reaction could be changed

Challenge and Enjoyment – pupils are challenged by taking on leading roles within the experimental work and applying their knowledge to the world around them. Enjoyment through experimental work

Depth – Pupils were able to use language relating to the kinetic theory

Personalisation and Choice –

Progression – Pupils had looked at simple chemical reaction for level 2. Reactions will also be covered at Nat 5

Coherence – Lessons flowed well

Relevance - Links with real life chemical reactions

Record the range of assessment evidence that was gathered to meet the success criteria (Say, Write, Make, and Do) considering breadth, challenge and application.

- Pupils were reminded of simple chemical reactions from previous learning
- Pupils carried out 3 chemical reaction experiment (evidence 1) where they had to record their observations and then think about the sign of the chemical reactions. Pupils completed a table in their jotters and then made a summary of their findings (evidence 2).
- Pupils were introduced to the speed of reactions
- Pupils carried out a further 3 experiments to observe the change of the rate of reaction due to particle size, temperature and concentration Pupils put result in their classwork jotters (evidence 3).
- Pupils were involved in a discussion about the 3 ways they had observed could change the rate of the reaction.
- Pupils they applied this knowledge by explaining chemical reactions which occur in the world around them (evidence 4)

Briefly outline the oral/written feedback given to the pupil on progress and next steps, referring to the learning intention and success criteria.

Evidence 2 – Feedback given to pupil on their experimental procedures and summary

Evidence 3 – Feedback given to pupil on their experimental procedures and summary

Evidence 4 – Feedback given to pupils explanations (applying knowledge)

Pupil Voice:

What have you learned? How did you learn? What skills have you developed?

After completing the topic (which including more than just this E&O, pupils evaluated their learning and made comments on their Onenote (Evidence 5).

Did the learner successfully attain the outcomes? YES/NO

C1.5 Indicators of a Chemical Reaction

Activity 1: What signs tell us that a chemical reaction has taken place?

Experiment 1

3 spatulas
Copper
Carbonate



heat



Experiment 2

1 spatula Calcium Carbonate
+
1 cm Hydrochloric acid



Experiment 3

Ammonium
Chloride +
Sodium Nitrate

5cm³ water + 1 spatula
ammonium chloride
measure temperature



Add 1 spatula sodium
nitrate
measure temperature

****Construct a table for your results before you start!**



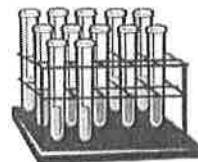
Activity 2

Complete the following summary in your jotter



The 3 signs of a chemical reaction are:

1. _____
2. _____
3. _____



In a chemical reaction a _____ is
always produced

Evidence 2

15/6/17 Indicators of a Chemical Reaction

Results

Reactant	Observations	Indicator
Copper-carbonate Calcium	changes colour	Colour change
Carbonate and hydrochloric acid	creates gas	Gas made
Ammonium chloride and sodium Nitrate	change in temperature	Energy change

Good job

The signs of a chemical reaction are

1. colour change
2. Fizzing - Gas
3. Temperature change - energy change

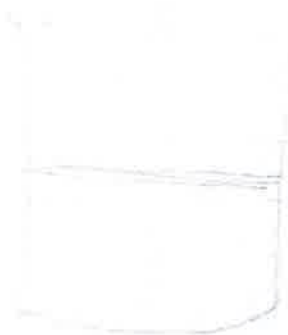
Remember
Indicators!

New products are always produced.

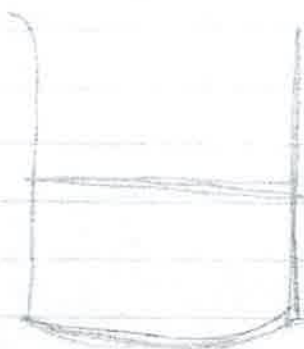
Evidence 3

Investigating particle size

To investigate the effect of particle size on the reaction rate.



g calcium carbonate
(powder) 25cm^3
Hydrochloric acid



2g calcium carbonate
(lumps) + 25cm^3 hydrochloric
acid.

Which experiment reacted fastest?

The powder reacted quicker than the lumps. ✓

The size of the particle should be different but the following has to be kept the same to make it a fair test.

- * volume of acid
- * type of acid
- * concentration of acid
- * the mass of chalk
- * the temperature of the acid.

good idea

18/8/17

Investigating Temperature

Aim - To investigate the effects of temperature on the reaction rate by measuring the time taken for the 'x' to become obscured

remember to use a ruler for results table

Results -

Experiment	1	2	3	4
Temperature (°C)	25	30	40	
Time taken (s)	60	12	10	

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Investigating Concentration

Aim - To investigate the effects of concentration on the reaction rate by measuring the time taken for the reaction mixture to turn blue/black.

Results -

Experiment	1	2	3	4
Concentration of sodium persulphate decreasing →				
Volume of sodium persulphate solution (cm ³)	10	8	6	4
Volume of deionised water (cm) ³	0	2	4	6
Time taken for blue/black colour to appear (s)	41	50	69	99.

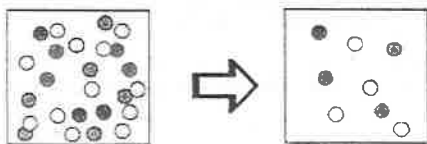


Activity 4

(c) Concentration

When an acid is diluted, the rate of reaction between the acid and magnesium decreases.

As concentration decreases, there are fewer opportunities for reactant particles to collide and so the reaction rate decreases.



high concentration of reactants

low concentration of reactants

With gases, pressure is a measure of the concentration. The rate of reaction of gases in industry is increased by increasing the pressure of the reactants.

What happens to the rate of a chemical reaction as the concentration decreases?

The rate of a chemical reaction gets slower as the concentration decreases.

Summary

Factor	Effect on Rate of Reaction	Why?
↓ Particle Size	↑	↓ in particle size ↑ surface area at which a reaction can take place so ↑ no. of collisions
↑ Concentration	↑	↑ concentration ↑ no. of reactant particles in the same volume so ↑ no. of collisions
↑ Temperature	↑	↑ temperature ↑ K.E. of reactant particles so ↑ no. of collisions

Evidence 4

OUTSIDE THE CLASSROOM

Explain each of the following.

Food is preserved longer when stored in a fridge.

because a fridges temperature is low so it slows down the reaction of the food going bad. (lower temperature, reaction slower, fewer collisions)

Plants grow faster in a green-house than in the open-air.

higher temperature, reaction faster, more collisions.

Large potatoes take longer to cook than small potatoes.

large particle size, smaller surface area, fewer collisions, rate decreased.

An oxy-acetylene flame is hot enough to cut through metal.

The flame obtained by burning acetylene in air is not.

higher concentration of oxygen, more collisions, rate increases.

Great answers - you have shown a good understanding of how the rate of reaction can influence everyday reactions! Keep it up!



The speed of reactions

Chemists are interested in the **speed** at which chemical reactions take place and how they can make them go **faster** or **slower**. This is very important in the chemical industry, since the amount of product a chemical manufacturer can produce will determine the amount of profit they make. Obviously, the greater the amount they can produce in a given time will result in a larger profit margin!

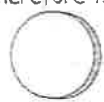
Changing the Rate of a Chemical Reaction

Chemists are not only interested in the rate of a chemical reaction. They also want to know how to make them go faster or even how to slow reactions down.

(a) Surface area/particle size

Calcium carbonate powder reacts faster with dilute acid than calcium carbonate lumps.

As the particle size decreases, the surface area of reactant particles increases. The new surfaces give more opportunities for collisions between the reactant particles to occur. Therefore the rate of reaction increases.



solid particle



cut into two pieces



new surfaces exposed

What happens to the rate of a chemical reaction as the particle size decreases (surface area increases)?

As the particle size decreases the reaction rate increases in speed.



Activity 2



(b) Temperature



Activity 3

Coal burns (reacts with oxygen) in a hot fire but it doesn't react with oxygen to any extent at room temperature. All substances have a certain amount of kinetic energy associated with them and as a result the particles move around. The higher the temperature of a substance the more kinetic energy the particles will have hence the faster they will be able to move. If the particles are moving faster this will increase the chance of collisions hence result in a faster reaction speed.

As a rough guide, the rate of reaction doubles for every increase in temperature by 10°C.

What happens to the rate of a chemical reaction as the temperature increases?

The rate of a reacting reaction gets faster as the temperature increases because the particles are moving faster so collisions/reactions are more likely.

OUTSIDE THE CLASSROOM

Explain each of the following.

Small sticks of wood burn faster than log

because there is more room for the flame to light in different places - so it is faster. also a log has less surface area.

When bellows are used to blow air on to a fire, the fire burns brighter.

Evidence 5

Class Notebook Print Tell me what you want to do Open In OneNote Give Feedback To Microsoft Sa

Normal Heading 1 Heading 2 Heading 3
AaBbCc AaBbCc AaBbCc AaBbCc

Tag Spelling Meeting Details
Tags Spelling Meetings

New skills I learned:

I am continuing to improve my lab skills as we did a lot of experiments in the topic. I am also improving my analysing skills by using the results table and thinking of a conclusion for the experiment.

What I found challenging in this topic:

I found the part about catalysts the most difficult – being able to state if a catalyst is heterogenous or homogenous.

What I enjoyed in this topic:

I enjoyed doing the different experiments to help me understand what we were learning about.

What steps I will take to improve these areas:

I will revise my notes at home after each lesson to make sure that I am confident in what I was taught. I will also ask the teacher more if I don't understand something.