



Activity type	classroom <input type="checkbox"/> homework <input checked="" type="checkbox"/> independent learning <input checked="" type="checkbox"/> other <input type="checkbox"/>		
Activity objectives(s)	At the end of this topic, students should be able to: <ul style="list-style-type: none"> • State that reaction rates can be controlled by chemists. • Explain that if reaction rates are too low a manufacturing process will not be economically viable. However, if reaction rates are too high there is a risk of thermal explosion. • Describe using collision theory effects of concentration, pressure, surface area (particle size), temperature and collision geometry on reaction rates. • Calculate the relative rate of a reaction using the formula $\text{Rate} = 1/t$. 		
Activity resources(s)	Students will need access to the internet and their SCHOLAR login details. Students may wish to use calculator for the calculation based questions.		
Delivery mode	teacher led <input checked="" type="checkbox"/> student led <input checked="" type="checkbox"/>	Collaboration type	individual <input checked="" type="checkbox"/> pairs <input type="checkbox"/> groups <input checked="" type="checkbox"/>



SCHOLAR Lesson Outline

Task description

Get pupils to navigate to the correct topic - Higher (CfE) Chemistry Unit 1 Topic 1.1 - reaction rates - Collision Theory. Navigate through the topic and complete the end of topic test for homework.

Practical Work that will enhance this topic

Several experiments and animations can be used to demonstrate factors that affect reaction rates.

Concentration

Students can investigate the effect of concentration on reaction rate by dropping a strip of magnesium into various concentrations of hydrochloric acid and recording the time taken for the effervescence to stop.

An unusual experiment demonstrating the effect of concentration on reaction rate is provided in the decolourisation of permanganate using rhubarb as described in the Practical Chemistry website from the Royal Society of Chemistry and the Nuffield Foundation.

Particle Size

Students can investigate the effect of particle size on reaction rate by dropping a strip of magnesium into dilute hydrochloric acid recording the time taken for the effervescence to stop. The experiment is then repeated with Magnesium powder and the results compared.

Temperature

The effects of temperature on reaction rate can be demonstrated by the reaction of acidified potassium permanganate and oxalic acid. The acidified potassium permanganate is purple and is decolourised slowly by oxalic acid at room temperature but is very fast at higher temperatures. (Old Higher PPA)

Students can be shown a photochemical reaction between hydrogen and chlorine to demonstrate that light can be used to increase the number of particles with energy greater than the activation energy.

Card sorts can be a good way of checking students understanding of the concepts covered in this topic.

Students could be set questions to calculate the rates of chemical reactions.



SCHOLAR Lesson Outline

Differentiation (Alternative use)	<p>With an able group of students, you may wish to set this as a homework task to review the collision theory topic when you have completed it.</p> <p>With weaker students, you may wish to carry this out as an in class activity so you can answer any questions they may have as they attempt the exercise.</p>
Hints & Tips	<p>This task is best done in pairs or individually.</p> <p>Go round the class and get students to explain their answers. Focus on the need to show all working.</p> <p>It is a good idea to get students to show you their score when they finish the exercise. If they do not get full marks you can send them back to have another try while the rest of the class finish off.</p> <p>Some teachers like to generate a report while students are logged in so that they can be shown what the teacher can see. This will highlight progress and any pupils who are just clicking reveal, as full marks can only be achieved by entering correct answers.</p> <p>There is online training available to help you learn how to do this. When you are logged in you will see a course called Succeed with SCHOLAR. Unit 1 Topic 7 introduces you to the reporting system.</p> <p>Choose some questions for students to try from the textbook / past paper questions in advance so faster pupils can move onto these.</p> <p>Questions in the end of topic test give extra practice.</p>
Notes	<p>Many pupils will be familiar with calculating average rates of reaction from Nat 5. It takes pupils time to see the benefit of SCHOLAR. It is available 24/7. It allows pupils to work independently and gives instant feedback. It is a very flexible online learning system and lends itself to in class lessons, homework tasks, revision materials, supporting students during periods of absence and helping them to catch-up on missed topics.</p>