

CALCH LESSON PLAN			
Subject	Unit	Lesson	Key stage
Science	3	Limestone and chalk	KS2/3
<p>Learning objectives: By the end of this lesson pupils should learn:</p> <ul style="list-style-type: none"> Some pupils will make detailed observations of chemical reactions and be able to provide a theory for the reaction. Most pupils will understand there are reactions when calcium carbonate is combined with different liquids. They will also understand that heat changes limestone into quicklime. All pupils will understand the difference between acids and alkalis and that limestone is an alkali. 			
<p>Keywords: Limestone, calcium carbonate, acid, alkali, neutralisation, pH Scale</p>			
<p>Introduction: As a quick introduction a quick quiz on the interactive whiteboard will refresh pupil's memory on acids and alkalis</p> <p><u>True or false</u></p> <ol style="list-style-type: none"> Alkalis are in cleaning products. T Our stomach produces too much acid. T Universal Indicator turns red in alkalis. F Universal Indicator turns red in acids. T Universal Indicator turns yellow in weak acids. T Universal Indicator turns blue in weak alkalis. T Toothpaste is an acid. F Lemons, Limes and Oranges are weak alkali. F Car batteries contain a very strong acid that can burn metal. T Limestone is alkaline. T 			<p>Timings (Based on 60 min)</p> <p>10 mins</p>

<p>Main : This lesson is an introduction to Calcium carbonate. Following the PowerPoint pupils are introduced to how limestone is formed over millions of years and then onto the limestone cycle and the chemical formulas.</p>	<p>5-10 mins</p>
<p><u>Activity one.</u></p> <p>Pupils can be shown the reaction when chalk (The chalk must be made of calcium carbonate) is dropped into vinegar and can compare with dropping the chalk into water. (videos can be found on YouTube if none available) Pupils should think about the reaction and why it has occurred; pupils can then add their observations to the observation sheet.</p> <p>When chalk is added to vinegar, it fizzes, as the oxygen in the vinegar combines with the calcium carbonate. Tiny particles fall to the bottom of the glass. The particles are calcium acetate - calcium from the chalk combined with hydrogen from the vinegar. Set the glasses in a place where they will not be disturbed. Observe them and make notes of what is happening. The chalk in the water gets wet, but the size does not change, the weight of the chalk will increase as it absorbs water. The chalk in vinegar dissolves just as limestone and marble are dissolved by acid rain. Pupils should write down the reactions they have observed so far and return to note any other changes before the end of the lesson.</p>	<p>10 mins</p>
<p><u>Activity two</u></p> <p>Pupils are to organise the chemical formulas and processes into the limestone cycle (use PowerPoint or worksheet – if using worksheet pupils will need to cut out the boxes to organise them) This activity can be completed in groups or on their own. When they have found the correct cycle pupils may draw the cycle into their workbooks.</p> <p>Pupils should return to the chalk in vinegar and water to make any further observations. As part of the on-going study of calcium carbonate, pupils will leave an egg and chicken bones in vinegar to be examined during a follow up lesson. Please see attached worksheet on this (Please note this experiment may take a few weeks to complete – however pupils can observe reactions over a series of lessons) Pupils to discuss in groups what will happen to both the chicken bones and hardboiled egg when soaked in vinegar.</p> <p>As an extension of the project leave this egg exposed to the air for a day. The calcium in the egg absorbs carbon from the carbon dioxide in the air and hardens again. Put the egg back into the vinegar for a day? What happens? The egg becomes rubbery. Drop it from about a foot above the floor. The egg will bounce back.</p>	<p>20 – 25 mins</p> <p>10 mins</p>
<p>Plenary: Conclude with class discussion on what pupils believe will happen to the egg and chicken bones that are left to soak in vinegar.</p>	<p>5 mins</p>
<p>Differentiation: ALN pupils should be helped with the quiz if needed, and can also be assisted in the ‘limestone cycle’ exercise (pupils can cut out and stick into books rather than draw into their books)</p>	
<p>Assessment: Through classroom discussion and marking of workbooks/observation sheets.</p>	
<p>Resources: PowerPoint presentation, limestone cycle sheet, observation sheet. The chicken and the egg worksheet, vinegar, chicken bones and a hardboiled egg!</p>	

Links to literacy/numeracy:

This lesson can link to literacy in the following ways:

- *Gather and organise information from various sources.*
- *Identify how a text is organised e.g. logically or thematically to make the content clear and informative.*
- *Collate and summarise relevant information e.g. pull together and sum up facts and ideas about an issue, from different texts.*
- *Use a variety of strategies and resources to spell familiar and unfamiliar vocabulary and subject-specific words correctly.*

Cross curricular links to geography and geology.