

# Scheme of Learning: Energy Changes

## Topic Sequence:

1	2	3	4	5	6	7	8	9	10	11
Organisation	Electric Circuits	Chemical Changes	Mains Electricity	Quantitative Chemistry	Using Resources	Electro-Magnetism	Homeostasis & Response	Energy Changes	Ecology	Waves

## Topic Overview:

Energy changes are an important part of chemical reactions. The interaction of particles often involves transfers of energy due to the breaking and formation of bonds. Reactions in which energy is released to the surroundings are exothermic reactions, while those that take in thermal energy are endothermic. These interactions between particles can produce heating or cooling effects that are used in a range of everyday applications. Some interactions between ions in an electrolyte result in the production of electricity. Cells and batteries use these chemical reactions to provide electricity. Electricity can also be used to decompose ionic substances and is a useful means of producing elements that are too expensive to extract any other way.

## Lesson Sequence:

This topic begins with a practical investigation into temperature changes that occur during chemical reactions. We classify these reactions as exothermic or endothermic. We then quantify the energy change in graphical form with energy profiles and by calculating the bond energy.

Separate Chemistry students then look at chemical and fuel cells by describing how they work and evaluating their use.

## Sequence of Lessons:

1	Exothermic & Endothermic Reactions
2	<i>Required Practical:</i> temperature change
3	Required Practical Write Up <i>Mid-topic assessment</i>
4	Energy Profiles & Bond Energy Calculations
5	Chemical & Fuel Cells ( <i>Separate Chemistry Only</i> )
6	Revision
7	Test

## Resources:

1	Demo: Barium hydroxide + Ammonium chloride, block of wood, gloves. Class Practical: calcium chloride, sodium bicarbonate solution, citric acid, hydrochloric acid, sodium hydroxide, sulphuric acid, magnesium strips (3cm), magnesium powder, copper sulphate solution
2	Polystyrene cups & lids, HCl 1M, NaOH
3	Exam Qs
4	n/a
5	Lemons, Mg, Fe, Cu, Zn strips, voltmeters (or multimeter), croc clips, wires
6	Resources in shared folder
7	Test in shared area folder

## Supportive Reading:

TBC	
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## Assessment:

Knowledge:	Multiple choice and short answer questions.
Application of Knowledge:	Exam questions based on the skill of 'plan a method'