Scheme of Learning: Using Resources

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:

Industries use the Earth's natural resources to manufacture useful products. In order to operate sustainably, chemists seek to minimise the use of limited resources, use of energy, waste and environmental impact in the manufacture of these products. Chemists also aim to develop ways of disposing of products at the end of their useful life in ways that ensure that materials and stored energy are utilised. Pollution, disposal of waste products and changing land use has a significant effect on the environment, and environmental chemists study how human activity has affected the Earth's natural cycles, and how damaging effects can be minimised.

Lesson Sequence:

We begin by defining renewable and finite resources as this forms the basis for the topic. We spend several lessons learning about how water is made safe to be released into the water ways and to drink. We move onto to learning about how metals – a finite resource – are extracted from their ores, and then the impact that products and services have on the environment by carrying out a life cycle assessment on them. We look at how to reduce the impact we have on the environment with recycling and reducing waste with a particular focus on the rusting and waste of metals.

Separate Chemistry pupils then go onto learn about the Haber process for making ammonia – a key ingredient in fertilisers

Sequence of Lessons:

1	Finite & Renewable Resources
2	Water Safe to Drink
3	Treating Waste Water
4	*Water Required Practical & mid topic assessment*
5	Extracting Metals from Ores – *Higher tier only*
6	Life Cycle Assessments
7	Reduce, Reuse, Recycle,
8	Rusting & Useful Alloys – *Separate Chemistry Only*
9	The Properties of Material - *Separate Chemistry Only*
10	The Haber Process - *Separate Chemistry Only*
11	Making Fertilisers - *Separate Chemistry Only*
12	Revision
13	Test

Supportive Reading:

Comprehension activity	Life Cycle Assessment Comprehension activity

Assessment:

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

Resources:

1	n/a
2	Pringles tubes, Filter paper, Elastic bands Sand, Meshes, Gravel, Washing up bowls Dirty water containing mud, sand, bits of twigs etc.
3	n/a
4	Sea water (produced by dissolving 25g sodium chloride in 1dm^3 water, add sodium carbonate until the pH reaches 8.0-8.5), Spring water (0.1M magnesium sulphate solution, should have a pH of 5.5-6.5). Rainwater (distilled water acidified to produce a pH of 5.0 – 5.5). Sample X (any one of the above in an unlabelled bottle) , UI, Conical flask delivery tubes
5	Fact sheets on phytomining and bioleaching
6	LCA Comprehension sheet and questions
7	n/a
8	Iron nails, Bungs for test tubes, Cotton wool, Salt, Oil, Anhydrous calcium chloride Kettle (for the boiled water tube), Fact sheets on alloys (slides 16-17)
9	n/a
10	n/a
11	Possible practical if time: Burettes, Ammonia solution, Sulphuric acid
12	n/a
13	Test in shared area