

Scheme of Learning: Energy

Topic Sequence:

1	2	3	4	5	6	7	8	9	10
Cell Biology	Particle Model of Matter	Infection & Response	Atomic Structure & the Periodic Table	Atomic Structure (Physics)	Bonding & Structure	Energy	Bioenergetics	Rates of Reaction	Chemistry of the Atmosphere

Topic Overview:

The concept of energy emerged in the 19th century. The idea was used to explain the work output of steam engines and then generalised to understand other heat engines. It also became a key tool for understanding chemical reactions and biological systems. Limits to the use of fossil fuels and global warming are critical problems for this century. Physicists and engineers are working hard to identify ways to reduce our energy usage.

Lesson Sequence:

The topic begins with a look at the idea of energy as a means to calculate if it possible for something to happen. This involves looking at the stores of energy and the 'pathways' or energy transfers that occur. The next part of the topic looks in more detail at how we calculate the amount of energy in the kinetic, gravitational, elastic and thermal energy stores, including the required practical on specific heat capacity. Next it covers work done and relates this to the transfer of energy/pathways linking with the concepts of power and efficiency. The required practical on insulation fits into this section of the topic by looking at how unwanted energy transfers can be reduced. Finally, the topic moves onto the energy resources used to generate electricity. Finishing with a lesson looking at how exam questions might be related to current environmental issues relating to climate change.

Sequence of Lessons:

Resources:

1	Energy stores and pathways	1	Energy analogy demo (coloured water, 2 containers, 2 tubes), worksheet
2	Kinetic energy	2	Kinetic energy calculation sheet
3	Gravitational energy	3	Gravitational potential energy sheet
4	Elastic energy mid-topic assessment	4	Spring toys, Hooke's Law practical – springs, 100g masses and hanger, metre rulers, elastic energy sheet, mid-topic assessment sheet,
5	Specific Heat Capacity	5	Resource sin shared area
6	Power	6	1kg of 100g masses, metre ruler, timer, power worksheet
7	Efficiency mid-topic assessment	7	Sankey diagram sheet, efficiency sheet, Mid-topic assessment sheet
8	Conduction	8	Conduction box demo and kettle (different rods into metal trough)
9	Convection (optional)	9	Tea bag demo, potassium permanganate 'tea bag' demo, chimney demo
10	Insulation (<i>required practical</i>)	10	Class set: insulation practical (kettles, thermometers, beaker lids, different insulating materials, paper towels, elastic bands) +instruction sheet
11	Energy resources	11	Laminated energy resources sheets, blank summary sheet, poster making resources
12	Evaluating energy resources	12	'we do' and 'you do' GCSE questions
13	Revision	13	n/a
14	Test	14	test

Supportive Reading:

TBC

Assessment:

Knowledge: Multiple choice and short answer questions.

Application of Knowledge: Exam questions based on the skill of calculate