Lesson Plans

Year 8 Science Chapter 10 Energy

Some general points about the following lesson plans:

- ★ The lesson plans outline only one way of sequencing the learning material in this chapter of the textbook.
- ★ The content and sequence will obviously vary from class to class (The following guide is ambitious in many instances).
- ★ All activities and investigations in each chapter have been deliberately designed to support the National Curriculum content whilst keeping in mind the development and reinforcement of skills required in the study of science in Year 11/12.
- ★ The length of lessons vary from school to school and even within schools. The following guide is based on 35/40 min lessons because it was reasoned that adjustment to 60/75/90 mins lessons would be easier than reducing lesson plans.
- ★ Students may be challenged further by completing each chapter Task, Competition Questions, Challenges, and by finding and entering any of the many competitions, challenges, projects etc that may be found on the Internet. Such students may benefit by doing an Internet search early in the year and planning entries before they close.

Assessment

A Task
Inquiry Report
End of Unit Test

Content Description (5 weeks)

Chapter 10 Energy

Energy appears in different forms including movement (kinetic energy), heat and potential energy, and causes change within systems (ACSSU155)

- ★ recognise that kinetic energy is the energy possessed by moving bodies
- ★ recognise that potential energy is stored energy, such as gravitational, chemical and elastic energy
- ★ investigate different forms of energy in terms of the effects they cause, such as gravitational potential cause objects to fall and heat energy transferred between materials that have a different temperature
- ★ recognise that heat energy is often produced as a by-product of energy transfer, such as brakes on a car and light globes
- ★ use flow diagrams to illustrate changes between different forms of energy

Content strands

The Australian Curriculum: Science has three interrelated strands: Science Understanding, Science as a Human Endeavour and Science Inquiry Skills.

Science as a Human Endeavour

Scientific knowledge changes as new evidence becomes available, and some scientific discoveries have significantly changed people's understanding of the world (ACSHE134)

- investigating developments in the understanding of cells and how this knowledge has impacted on areas such as health and medicine
- discovering how people's understanding of the nature of matter has changed over time as evidence for particle theory has become available through developments in technology
- considering how the idea of elements has developed over time as knowledge of the nature of matter has improved
- investigating the development of the microscope and the impact it has had on the understanding of cell functions and division

Science knowledge can develop through collaboration and connecting ideas across the disciplines of science (ACSHE226)

- investigating how knowledge of the location and extraction of mineral resources relies on expertise from across the disciplines of science
- considering how advances in technology, combined with scientific understanding of the functioning of body systems, has enabled medical science to replace or repair organs
- researching the use of reproductive technologies and how developments in this field rely on scientific knowledge from different areas of science

Use and influence of science

Science and technology contribute to finding solutions to a range of contemporary issues; these solutions may impact on other areas of society and involve ethical considerations (ACSHE135)

- investigating requirements and the design of systems for collecting and recycling household waste
- investigating strategies implemented to maintain part of the local environment, such as bushland, a beach, a lake, a desert or a shoreline
- investigating how energy efficiency can reduce energy consumption
- investigating the development of vehicles over time, including the application of science to contemporary designs of solar-powered vehicles
- discussing ethical issues that arise from organ transplantation

Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management (ACSHE136)

- describing how technologies have been applied to modern farming techniques to improve yields and sustainability
- investigating how Aboriginal people recognise relationships in ecosystems by burning to promote new growth, attract animals and afford easier hunting and food gathering
- describing the impact of plant cloning techniques (asexual production) in agriculture such as horticulture, fruit production and vineyards
- investigating the role of science in the development of technology important to the economies and communities of the Asia–Pacific regions, for example car manufacture, earthquake prediction and electronic optics

People use understanding and skills from across the disciplines of science in their occupations (ACSHE227)

- recognising the role of knowledge of the environment and ecosystems in a number of occupations
- considering how engineers improve energy efficiency of a range of processes
- recognising the role of knowledge of cells and cell divisions in the area of disease treatment and control
- investigating how scientists have created new materials such as synthetic fibres, heat-resistant plastics and pharmaceuticals

Science Inquiry Skills

Science inquiry involves identifying and posing questions; planning, conducting and reflecting on investigations; processing, analysing and interpreting evidence; and communicating findings. This strand is concerned with evaluating claims, investigating ideas, solving problems, drawing valid conclusions and developing evidence-based arguments.

Chapter 10 Energy (5 weeks)

Lesson	Method	Resources
1	□ General (covering book, ruling pages, paste study guide etc.) □ Purpose of chapter □ Introduce/discuss Energy p207 □ Internet: Investigate some of James Joule's achievements - conservation of energy, first law thermodynamics, Joule's first law, Kelvin temperature scale □ HW: What is a Joule?	Internet
2	□ Discuss: Energy p208 □ Discuss: Measuring energy p208 □ Internet: What is energy? p208 □ Activity: Try to memorise 8 forms of energy p208 □ Discuss: Kinetic energy p209 □ Exercise p209 □ HW: Complete exercise as necessary	Internet
3	□ Discuss: Measuring kinetic energy p210 □ Activity: Memorise kinetic energy formula and units p210 □ Examples and exercises p210 □ HW: Complete exercises as necessary	
4	□ Test: Forms of energy and kinetic energy formula with units □ Discuss: Potential energy p211 □ Activity: Using light to power an electric motor p211 □ Activity: Using lemons to power an electric motor p211 □ Exercise p211 □ HW: Complete exercise as necessary	Equipment for activities p211
5	□ Test: Forms of energy and kinetic energy formula with units □ Discuss: Potential energy p212 □ Internet: Online videos of gravitational potential energy p212 □ Discuss: Measuring gravitational energy p214 □ Activity: Memorise gravitational potential energy formula and units p213 □ HW: Revise gravitational potential energy	Internet
6	□ Test: Forms of energy, kinetic energy formula & GPE formula with units □ Examples and exercises p213 □ HW: Complete exercises as necessary	
7	□ Test: Forms of energy, kinetic energy formula & GPE formula with units □ Discuss: Elastic energy p214 □ Internet: Balloon rocket car p214 □ Activity: Build a balloon rocket car p214 □ HW: Revise examples of elastic potential energy	Internet Equipment for balloon car
8	□ Test: Forms of energy and elastic energy, better design for balloon car □ Discuss: Heat energy p215 □ Activity: Heat transfer p215 □ Exercise p215 □ HW: Complete exercise as necessary	Jars, thermometer, different covering materials

Chapter 10 Energy (5 weeks)

Lesson	Method	Resources
9	Test: Forms of energy Discuss: Light energy p216 Activity: Solar panel and LED p216 Discuss: Photosynthesis p216 Activity: Memorise photosynthesis equation p216 HW: Revise light energy	Solar panels, LEDs, connecting wirs
10	Test: Forms of energy Discuss: Measuring solar panel energy p217 Activity: Memorise energy formula and units p217 Examples and exercise p217 HW: Complete exercises as necessary	
11	Test: Forms of energy Discuss: Electrical energy p218 Activity: Memorise forms of energy into which electrical energy can be changed p218 Internet: Online videos motor LED torch p219 Activity: Kinetic energy to electrical energy p219 HW: Revise electrical energy	Internet small electric motor, LED, connecting wire
12	Test: Forms of energy Discuss: Joules and watts p219 Examples and exercise p219 HW: Complete exercise as necessary	
13	Test: Forms of energy Discuss: Chemical energy p220 Activity: Memorise coal combustion & respiration chemical equations p220 Activity: Memorise forms of energy into which chemical energy can be changed p220 Internet: Online video wet cell battery HW: Complete Exercise	Internet
14	Test: Forms of energy Activity: Wet cell battery p221 Exercise p221 HW: Complete exercise as necessary and revise chemical energy	Equipment for activity p221
15	Test: Forms of energy Discuss: Energy flow p222 Internet: Online video of energy flow p222 Activity: Play some online energy flow games p222 Activity: Draw some energy flow diagrams p222 HW: Revise energy flow	Internet
16	Test: Forms of energy and energy flow Discuss: Electromagnetic energy p223 Activity: Memorise 5 forms of electromagnetic energy p223 Discuss: Heat energy p223 Exercise p223 HW: Complete exercise as necessary and Challenge p223	

Chapter 10 Energy (5 weeks)

Lesson	Method	Resources
17	Test: Forms of energy and energy flow Discuss: Ecological energy p224 Discuss: Energy floww in ecosystems p224 Internet: Online videos of energy flow in ecosystems p224 Activity: Draw a diagram of energy flow in an ecosystem p224 HW: Revise ecological energy	Internet
18	Test: Forms of energy and energy flow Discuss: Energy efficiency p225 Activity: More efficient lighting p225 Exercise and example p225 HW: Complete exercise as necessary	
19	Science knowledge - Scramjet p226 Exercise p226 Science knowledge - Heat pump p227 Exercise p227 HW: Complete exercises as necessary	
20	Science inquiry Group selection of an inquiry question from p229 Group conduction of an investigation to answer the question.	
21	Continuation of investigation Write report (samples on p21 and p25) HW: Complete report as required	
22	Chapter Review and Task Exercises p230 and p231 Begin work on ‘A Task’ p207 HW: Complete exercises & work on task as required	
23	Chapter Review and Task Exercises p232 and p233 Continue work on ‘A Task’ p207 HW: Complete exercises & work on task as required	
24	Chapter Review and Task Competition questions p235 Harder test questions p236 Preparation for test Continue work on ‘A Task’ p207 HW: Complete exercises & work on task as required	
25	End of chapter/unit test	