Lesson Plans

Year 7 Science

Chapter 8 Forces

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 (4 weeks)

Chapter 8

Change to an object's motion is caused by unbalanced forces acting on the object (ACSSU117).

- ★ Investigate the effects of applying different forces to familiar objects.
- ★ Investigate common situations where forces are balanced, such as stationary objects, and unbalanced, such as falling objects.
- ★ Investigate a simple machine such as lever or pulley system.

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 (ACSHE119)

- investigating how advances in telescopes and space probes have provided new evidence about space
- researching different ideas used in the development of models of the solar system developed by scientists such as Copernicus, Khayyám and Galileo
- researching developments in the understanding of astronomy, such as the predictions of eclipses and the calculation of the length of the solar year by Al-Battani in the tenth century

Science knowledge can develop through collaboration and connecting ideas across the disciplines of science (ACSHE223)

- considering how water use and management relies on knowledge from different areas of science, and involves the application of technology
- identifying the contributions of Australian scientists to the study of human impact on environments and to local environmental management projects
- investigating how land management practices of Aboriginal and Torres Strait Islander peoples can help inform sustainable management of the environment
- studying transnational collaborative research in the Antarctic
- recognising that traditional and Western scientific knowledge can be used in combination to care for Country and Place

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 (ACSHE120)

- relating regulations about wearing seatbelts or safety helmets to knowledge of forces and motion
- considering issues relating to the use and management of water within a community
- considering decisions made in relation to the recycling of greywater and blackwater
- considering how human activity in the community can have positive and negative effects on the sustainability of ecosystems
- investigating ways to control the spread of the cane toad

Science understanding influences the development of practices in areas of human activity such as industry, agriculture and marine and terrestrial resource management (ACSHE121)

- investigating everyday applications of physical separation techniques such as filtering, sorting waste materials, reducing pollution, extracting products from plants, separating blood products and cleaning up oil spills
- investigating how advances in science and technology have been applied to the treatment of water in industrial and household systems
- investigating how Aboriginal and Torres Strait Islander knowledge is being used to inform scientific decisions, for example care of waterways
- researching the different scientific responses to the rabbit plagues in Australian agricultural areas

People use understanding and skills from across the disciplines of science in their occupations (ACSHE224)

- recognising that water management plays a role in areas such as farming, land management and gardening
- investigating how separation techniques are used in the food and wine industries
- considering how seasonal changes affect people in a variety of activities such as farming
- considering how sports scientists apply knowledge of forces in order to improve performance

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 8 Forces (4 weeks)

Lesson	Method	Resources
1	General (covering book, ruling pages, paste study guide etc.) Purpose of chapter Introduce/discuss: Forces p171 Discuss: Newton p171 Discuss: Forces in everyday life HW: Thoughts about task p171	
2	Discuss: Forces p172 Activity: Memorise definition of force p172 Exercise p173 HW: Revise dfn force, challenge p173	
3	Test: Definition force and examples Discuss: Measuring force p174 Discuss: Units of force p174 Exercise p174 HW: Complete exercise as necessary, Revise measuring force	
4	Test: Definition force and examples Discuss: Gravity p175 Activity: Make a force meter p175 Activity: Calibrate the force meter p175 HW: Revise force and measuring force	Equipment for force meter
5	Test: Definition force, examples, measurement, gravity Internet: Torsion meters p175 Exercise p175 Challenge p175 (Work a few other examples?) HW: Complete exercise as necessary and revise forces	Internet
6	Test: Definition force, examples, measurement, gravity Discuss: Friction p176 Activity: Draw force diagram of object on a slope p176 Activity: Different surfaces, different resistance p176 Internet: Online experiments with interactive friction p176 HW: Revise forces	Flat surface and a variety of objects Internet
7	Test: Definition force, examples, measurement, gravity, friction Discuss: Usefiul friction with examples p177 Discuss: Problem friction with examples p177 Activity: Measure friction p176 HW: Revise Forces	Flat surface, variety of objects, spring balance (Newtons)
8	Test: Definition force, examples, measurement, gravity, friction Internet: Online videos of friction p177 Internet: Online videos of air resistance p177 Internet: Computer processor and heat p177 Internet: Brake fade? p177 Exercise p177 HW: Revise forces	Internet

Chapter 8 Forces (4 weeks)

Lesson	Method	Resources
9	Test: Definition force, examples, measurement, gravity, friction Discuss: Magnets and magnetic force p178 Activity: Magnets pull or push p178 Internet: Experiment with online magnets 'interactive magnet' p178 Exercise p159 HW: Revise manetic force and consider challenge p 178	Magnets Internet
10	Test: Definition force, measurement, gravity, friction, magnetic force Discuss: Earth's magnetic field p179 Activity: Make your own compass p179 Exercise p1179 HW: Revise magnetic force	Equipment to make compass Internet
11	Test: Definition force, measurement, gravity, friction, magnetic force Discuss: Balanced forces p180 Activity: Use force diagrams to explain a car getting faster, at constant speed, slowing down p180 Internet: How do aircraft wings create lift? p181 Exercise p181 HW: Complete exercise as necessary and revise forces	Internet
12	Test: Definition force, measurement, gravity, friction, magnetic force, balancing forces Discuss: Unbalanced forces p182 Activity: Draw force diagram of falling diagram p182 Activity: Use force diagrams to explain an object falling faster, at constant speed, still on the ground p183 Exercise p183 Discuss: Simple machines - the wheel p184 Discuss: Simple machines - the pulley p185 Exercise p185 HW: Complete exercises as required	
13	Test: Definition force, measurement, gravity, friction, magnetic force, balancing forces, simple machines Discuss: Levers - first class lever p186 Discuss: Levers - second class lever p187 Discuss: Levers - third class lever p187 Activity: First class lever p186 Activity: Second class lever p187 Exercise p187 HW: Complete exercises as required, revise simple machines/levers	Equipment for levers activity
14	Test: Simple machines and levers Discuss: Ramps p188 Activity: Calculate mechanical advantage p188 Discuss: Wedges and screws p189 Exercise p189 HW: Complete exercises & revise simple machines	
15	Test: Simple machines, levers, ramps, wedges, screws Discuss: Wheel and gears p190 Discuss: Pulleys Exercise p191 HW: Complete exercises as required & challenge p190	

Chapter 8 Forces (4 weeks)

Lesson	Method	Resources
16	Science inquiry • Group selection of an inquiry question from p193 • Group conduction of an investigation to answer the question.	
17	• Continuation of investigation • Write report (samples on p21 and p25) • HW: Complete report as required	
18	Chapter Review and Task • Exercise p194 and p195 • Puzzles p197 • Begin work on 'A Task' p171 • HW: Complete exercises & work on task as required	
19	Chapter Review and Task • Exercise p196 and p198 • Continue work on 'A Task' p171 • HW: Complete exercises & work on task as required	
20	Chapter Review and Task • Competition questions p199 • Harder test questions p200 • Preparation for test • Continue work on 'A Task' p171 • HW: Complete exercises & work on task as required	
21	• End of chapter/unit test	