Lesson Plans

Year 9 Science Chapter 6

Chemical Reactions II

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 p129
End of Unit Test

Content Description (5 weeks)

Chapter 6 Chemical Reactions II

Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer (ACSSU179)

- ★ Investigate reactions of acids with metals, bases, and carbonates.
- ★ Investigate a range of different reactions to classify them as exothermic or endothermic.
- ★ Recognise the role of oxygen in combustion reactions and comparing combustion with other oxidation reactions.
- ★ Compare respiration and photosynthesis and their role in biological processes.
- ★ Describe how the products of combustion reactions affect the environment.

Content structure

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

Together, the three strands of the science curriculum provide students with understanding, knowledge and skills through which they can develop a scientific view of the world. Students are challenged to explore science, its concepts, nature and uses through clearly described inquiry processes.

Science Understanding

Science understanding is evident when a person selects and integrates appropriate science knowledge to explain and predict phenomena, and applies that knowledge to new situations. Science knowledge refers to facts, concepts, principles, laws, theories and models that have been established by scientists over time.

The **chemical sciences** sub-strand is concerned with understanding the composition and behaviour of substances. The key concepts developed within this sub-strand are that: the chemical and physical properties of substances are determined by their structure at an atomic scale; and that substances change and new substances are produced by rearranging atoms through atomic interactions and energy transfer. In this sub-strand, students classify substances based on their properties, such as solids, liquids and gases, or their composition, such as elements, compounds and mixtures. They explore physical changes such as changes of state and dissolving, and investigate how chemical reactions result in the production of new substances. Students recognise that all substances consist of atoms which can combine to form molecules, and chemical reactions involve atoms being rearranged and recombined to form new substances. They explore the relationship between the way in which atoms are arranged and the properties of substances, and the effect of energy transfers on these arrangements.

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.

Science as a Human Endeavour

Through science, humans seek to improve their understanding and explanations of the natural world. Science involves the construction of explanations based on evidence and science knowledge can be changed as new evidence becomes available. Science influences society by posing, and responding to, social and ethical questions, and scientific research is itself influenced by the needs and priorities of society. This strand highlights the development of science as a unique way of knowing and doing, and the role of science in contemporary decision making and problem solving. It acknowledges that in making decisions about science practices and applications, ethical and social implications must be taken into account. This strand also recognises that science advances through the contributions of many different people from different cultures and that there are many rewarding science-based career paths.

Science across Foundation to Year 12

Years 7–10, typically students from 12 to 15 years of age, Curriculum focus: explaining phenomena involving science and its applications

During these years, students continue to develop their understanding of important science concepts across the major science disciplines. It is important to include contemporary contexts in which a richer understanding of science can be enhanced. Current science research and its human application motivates and engages students.

Within the outlined curriculum, students should undertake some open investigations that will help them refine their science inquiry skills. The quantitative aspects of students' inquiry skills are further developed to incorporate consideration of uncertainty in measurement. In teaching the outlined curriculum, it is important to provide time to build the more abstract science ideas that underpin understanding.

Chapter 6 Chemical Reactions II (5 weeks)

Lesson	Method	Resources
1	□ General (covering book, ruling pages, paste study guide etc.) □ Purpose of chapter □ Introduce/discuss: Naming compounds p130 □ Demonstrate examples p130 followed by exercise p130 □ Learn prefixes by heart □ HW: Complete exercise p130	
2	□ Short test: Prefixes, naming compounds □ Naming polyatomic compounds p131 □ Demonstrate examples p131 followed by exercise p131 □ HW: Complete exercises p131	
3	□ Short test: Prefixes, naming compounds □ Ions p132 □ Demonstrate examples p132 then work exercise p132 (Repeat as necessary) □ Demonstrate examples p133 then work exercise p133 (Repeat as necessary) □ HW: Complete exercise p132, p133	
4	□ Short test: Prefixes, naming compounds, ions □ Ionic compounds p134 □ Demonstrate examples p134 then work exercise p134 (Repeat as necessary) □ Activity p135 'Periodic table of ions' □ HW: Complete exercise p134	Materials for activity p135
5	□ Short test: Prefixes, naming compounds, ions, ionic compounds □ Ionic compounds p134 □ Watch online videos 'writing formulas with ions' □ Demonstrate examples p135 then work exercise p135 (Repeat as necessary) □ Challenge p135 □ HW: Complete exercise p135	Internet
6	□ Short test: Prefixes, naming compounds, ions, ionic compounds □ Acids p136 and p137 □ Watch online videos 'measuring pH' □ Activity p137 'pH of household solutions' □ HW: Acids	Materials for activity p137
7	□ Short test: Acids □ Acids p136 and p137 □ Exercise p136 and exercise p137 □ Challenge p137 □ HW: Complete exercise p137, Challenge p137	
8	□ Short test: Acids □ Acids and bases p138 □ Exercise p138 □ Neutralisation p139 □ HW: Complete exercise	
9	□ Short test: Acids, bases, neutralisation □ Neutralisation p139 □ Activity p139 'neutralisation of softdrink' □ Exercise p139 □ HW: Complete exercise p139	Materials for activity p139
10	□ Short test: Acids, bases, neutralisation □ Acids and metals p140 □ Watch online videos 'acids and metals' and 'testing for hydrogen' □ Exercise p141 □ HW: Complete exercise p141	Internet

Chapter 6 Chemical Reactions II (5 weeks)

Lesson	Method	Resources
11	Short test: Acids, bases, neutralisation, acids and metals Activity p140 HW: Puzzles p161	Materials for activity p140
12	Short test: Acids, bases, neutralisation, acids and metals Acids and carbonates p142 Demonstrate examples p143 then work exercise p143 (Repeat as necessary) Watch online videos 'acids and carbonates' and 'testing for carbon dioxide' Exercise p143 HW: Complete exercise p143	Internet
13	Short test: Neutralisation, acids and metals, acids and carbonates Activity p142 HW: Sweet trick p161	Materials for activity p142
14	Short test: Neutralisation, acids and metals, acids and carbonates Discussion of sweet trick p161 Oxidation p145 Exercise p145 Challenges p145 HW: Complete exercises p145	
15	Short test: Neutralisation, acids and metals, acids and carbonates, oxidation Combustion p146 Exercise p147 Challenge p147 HW: Complete exercise p147	
16	Short test: Neutralisation, acids and metals, acids and carbonates, oxidation Combustion p146 Acidification p148 Warming p148 Incomplete combustion p149 Exercise p148 Exercise p149 Activity p149 Incomplete combustion HW: Complete exercise p148 and p149	Materials for activity p149
17	Short test: Neutralisation, oxidation, combustion Respiration p150 Activity p151 Gases in respiration Exercise p151 HW: Complete exercise p151 and Challenge p151	Materials for activity p151
18	Short test: Neutralisation, oxidation, combustion, respiration Photosynthesis p153 Activity p153 Gases in photosynthesis Exercise p153 HW: Complete exercise p153	Materials for activity p153
19	Short test: Neutralisation, oxidation, combustion, respiration, photosynthesis Reflux p154, exercise p154, acid rain p155, exercise p155 HW: Complete exercises p154, p155	
20	Science Inquiry p157 HW: Science Inquiry p157	

Chapter 6 Chemical Reactions II (5 weeks)

Lesson	Method	Resources
21	Chapter Review and Task □ Exercises p158, p159 □ Begin work on 'A Task' p129 □ HW: Complete exercises & work on task as required	
22	Chapter Review and Task □ Exercises p160 □ Continue work on 'A Task' p129 □ HW: Complete exercises & work on task as required.	
23	Chapter Review and Task □ Exercises p162 and Competition Questions p163 □ Continue work on 'A Task' p129 □ HW: Complete exercises & work on task as required	
24	Chapter Review and Task □ Harder test questions p164 □ Preparation for test □ Continue work on 'A Task' p129 □ HW: Prepare for test & work on task as required	
25	□ End of chapter/unit test	