



# Lesson Plans

## Year 10 Science Chapter 5

### Chemical Reactions

#### 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 page 97  
End of Unit Test

### Content Description (5 weeks)

#### Chapter 5 Chemical Reactions

Different types of chemical reactions are used to produce a range of products and can occur at different rates (ACSSU187)

- ★ Investigate how chemistry can be used to produce a range of useful substances such as fuels, metals and pharmaceuticals.
- ★ Predict the products of different types of simple chemical reactions.
- ★ Use word or symbol equations to represent chemical reactions.
- ★ Investigate the effect of a range of factors, such as temperature and catalysts, on the rate of chemical reactions.

## 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 5 Chemical Reactions (5 weeks)

Lesson	Method	Resources
1	<ul style="list-style-type: none"> <li><input type="checkbox"/> General (covering book, ruling pages, paste study guide etc.)</li> <li><input type="checkbox"/> Purpose of chapter</li> <li><input type="checkbox"/> Introduce/discuss Chemical reactions and chemical equations p98</li> <li><input type="checkbox"/> Exercise p98</li> <li><input type="checkbox"/> HW: Complete exercise p98</li> </ul>	
2	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical formula</li> <li><input type="checkbox"/> Demonstrate examples p99</li> <li><input type="checkbox"/> Exercise p99</li> <li><input type="checkbox"/> HW: Complete exercise p99</li> </ul>	
3	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical equations</li> <li><input type="checkbox"/> Balancing equations p100</li> <li><input type="checkbox"/> Demonstrate examples p100</li> <li><input type="checkbox"/> Exercise p100</li> <li><input type="checkbox"/> HW: Complete exercise P101</li> </ul>	
4	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical equations, balancing equations</li> <li><input type="checkbox"/> Balancing equations p100, How to balance p101</li> <li><input type="checkbox"/> Demonstrate examples p101</li> <li><input type="checkbox"/> Watch a couple of online videos on 'Balancing chemical equations'</li> <li><input type="checkbox"/> Exercise p101</li> <li><input type="checkbox"/> HW: Complete exercise P101</li> </ul>	Internet
5	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical equations, balancing equations</li> <li><input type="checkbox"/> Types of reactions p102</li> <li><input type="checkbox"/> Watch a couple of online videos on 'Types of chemical reactions'</li> <li><input type="checkbox"/> Exercise p102</li> <li><input type="checkbox"/> HW: Complete exercise p102</li> </ul>	Internet
6	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical equations, balancing equations, types of reactions</li> <li><input type="checkbox"/> Synthesis reactions p103</li> <li><input type="checkbox"/> Exercise p103</li> <li><input type="checkbox"/> HW: Challenge p103 and complete exercise p103</li> </ul>	
7	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical equations, balancing equations, types of reactions</li> <li><input type="checkbox"/> Decomposition reactions p104</li> <li><input type="checkbox"/> Activity p104 'Decomposition of metal carbonates'</li> <li><input type="checkbox"/> Watch a couple of online videos on 'Decomposition of sugar &amp; H<sub>2</sub>O<sub>2</sub>'</li> <li><input type="checkbox"/> Exercise p104</li> <li><input type="checkbox"/> HW: Exercise p104</li> </ul>	Materials for activity p104 Internet
8	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical equations, balancing equations, types of reactions</li> <li><input type="checkbox"/> Single replacement reactions p105</li> <li><input type="checkbox"/> Activity p105 'Acids and metals'</li> <li><input type="checkbox"/> Watch a couple of online videos on 'Single replacement reactions'</li> <li><input type="checkbox"/> Exercise p105</li> <li><input type="checkbox"/> HW: Exercise p105</li> </ul>	Materials for activity p104 Internet
9	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical equations, balancing equations, types of reactions</li> <li><input type="checkbox"/> Double replacement reactions p106</li> <li><input type="checkbox"/> Watch a couple of online videos on 'Lead iodide - golden snow'</li> <li><input type="checkbox"/> Exercise p106</li> <li><input type="checkbox"/> HW: Exercise p106</li> </ul>	Internet
10	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical equations, balancing equations, types of reactions</li> <li><input type="checkbox"/> Precipitation reactions p107</li> <li><input type="checkbox"/> Demonstrate examples p107</li> <li><input type="checkbox"/> Exercise p107</li> <li><input type="checkbox"/> HW: Exercise p107</li> </ul>	Internet

## Chapter 5 Chemical Reactions (5 weeks)

Lesson	Method	Resources
11	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Chemical equations, balancing equations, types of reactions</li> <li><input type="checkbox"/> Rate of reaction p108 Exercise p108</li> <li><input type="checkbox"/> Rate of reaction: Temperature p109</li> <li><input type="checkbox"/> Watch some online videos 'Temperature and reaction rates'</li> <li><input type="checkbox"/> Exercise4 p109</li> <li><input type="checkbox"/> HW: Complete exercise p109</li> </ul>	Internet
12	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Balancing equations, types of reactions, rate of reaction</li> <li><input type="checkbox"/> Rate of reaction p108, Rate of reaction: Temperature p109</li> <li><input type="checkbox"/> Activity p109 'Temperature and rate of reaction'</li> <li><input type="checkbox"/> HW: Complete activity</li> </ul>	Materials for activity p109
13	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Balancing equations, types of reactions, rate of reaction</li> <li><input type="checkbox"/> Rate of reaction: surface area p110</li> <li><input type="checkbox"/> Activity p110 'Particle size and rate of reaction', Exercise p110</li> <li><input type="checkbox"/> HW: Complete exercise p110</li> </ul>	Materials for activity p110
14	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Balancing equations, types of reactions, rate of reaction</li> <li><input type="checkbox"/> Rate of reaction: concentration p111</li> <li><input type="checkbox"/> Activity p111 'Concentration and rate of reaction', Exercise p111</li> <li><input type="checkbox"/> HW: Complete exercise p111</li> </ul>	Materials for activity p111
15	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Balancing equations, types of reactions, rate of reaction</li> <li><input type="checkbox"/> Rate of reaction: catalysts p112, enzymes p113</li> <li><input type="checkbox"/> Activity p113 'Catalyst and rate of reaction', Exercise p113</li> <li><input type="checkbox"/> HW: Complete exercise p113</li> </ul>	Materials for activity p113
16	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Balancing equations, types of reactions, rate of reaction</li> <li><input type="checkbox"/> Chemical industry p114, pharmaceuticals p115</li> <li><input type="checkbox"/> Online videos 'Daphnia cultures', 'Daphnia cultures and ethical issues'</li> <li><input type="checkbox"/> Activity p115 'Stimulants and heart rate', Exercise p115</li> <li><input type="checkbox"/> HW: Complete exercise p115</li> </ul>	Internet Materials for activity p115
17	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Balancing equations, types of reactions, rate of reaction</li> <li><input type="checkbox"/> Plastics p116</li> <li><input type="checkbox"/> Activity p116 'make some rayon thread', Exercise p117</li> <li><input type="checkbox"/> Online videos 'make a bouncing polymer ball'</li> <li><input type="checkbox"/> HW: Complete exercise p117, challenge p117</li> </ul>	Materials for activity p117 Internet
18	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Balancing equations, types of reactions, rate of reaction, chemical industry</li> <li><input type="checkbox"/> Fuels p118</li> <li><input type="checkbox"/> Exercise p119</li> <li><input type="checkbox"/> Compile word bank p119</li> <li><input type="checkbox"/> HW: Complete exercise p119, complete word bank p119</li> </ul>	
19	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Balancing equations, types of reactions, rate of reaction, chemical industry</li> <li><input type="checkbox"/> Agrochemicals p120, Exercise p120</li> <li><input type="checkbox"/> Oleochemicals p121, exercise p121</li> <li><input type="checkbox"/> HW: Complete exercise p120, p121</li> </ul>	Materials for investigations p29
20	<ul style="list-style-type: none"> <li><input type="checkbox"/> Short test: Balancing equations, types of reactions, rate of reaction, chemical industry</li> <li><input type="checkbox"/> Science Inquiry - undertake some of the suggested investigations p123</li> <li><input type="checkbox"/> HW: Investigations p123</li> </ul>	Materials for investigations p123

## Chapter 5 Chemical Reactions (5 weeks)

Lesson	Method	Resources
21	Chapter Review and Task <input type="checkbox"/> Exercises p124, p125 <input type="checkbox"/> Begin work on 'A Task' p97 <input type="checkbox"/> HW: Complete exercises & work on task as required	
22	Chapter Review and Task <input type="checkbox"/> Exercises p126 and Competition Questions p129 <input type="checkbox"/> Begin work on 'A Task' p97 <input type="checkbox"/> HW: Complete exercises & work on task as required	
23	Chapter Review and Task <input type="checkbox"/> Exercises p128 and Harder test questions p130 <input type="checkbox"/> Continue work on 'A Task' p97 <input type="checkbox"/> HW: Complete exercises & work on task as required	
24	Chapter Review and Task <input type="checkbox"/> Preparation for test <input type="checkbox"/> Continue work on 'A Task' p97 <input type="checkbox"/> HW: Complete exercises & work on task as required	
25	<input type="checkbox"/> End of chapter/unit test	