



Lesson Plans

Year 10 Science

Chapter 4

Periodic Table

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 67
End of Unit Test

Content Description (4 weeks)

Chapter 4 Periodic Table

The atomic structure and properties of elements are used to organise them in the Periodic Table (ACSSU186)

- ★ Recognise that elements in the same group of the periodic table have similar properties.
- ★ Describe the structure of atoms in terms of electron shells.
- ★ Explain how the electronic structure of an atom determines its position in the periodic table and its properties.
- ★ Investigate the chemical activity of metals.

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 4 Periodic Table (4 weeks)

Lesson	Method	Resources
1	<ul style="list-style-type: none"> <input type="checkbox"/> General (covering book, ruling pages, paste study guide etc.) <input type="checkbox"/> Purpose of chapter <input type="checkbox"/> Introduce/discuss Atoms p68 <input type="checkbox"/> Watch a couple of online videos on 'Atomic structure' <input type="checkbox"/> Exercise p69 <input type="checkbox"/> HW: Challenge p69, and complete exercise p39 	Internet
2	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Atomic structure <input type="checkbox"/> Electron shells p70 <input type="checkbox"/> Watch a couple of online videos on 'Electron configuration' <input type="checkbox"/> Demonstrate a number of electron shell examples <input type="checkbox"/> HW: Challenge p70 	Internet
3	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Atomic structure, electron shells <input type="checkbox"/> Electron shells p70 <input type="checkbox"/> Exercise p71 <input type="checkbox"/> HW: Complete exercise p71 	
4	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Atomic structure, electron shells <input type="checkbox"/> Atomic mass number p72 <input type="checkbox"/> Demonstrate a number of atomic mass/isotopes examples p72/p73 <input type="checkbox"/> Watch a couple of online videos on 'Atomic mass number' <input type="checkbox"/> HW: Puzzles p93 	Internet
5	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Atomic structure, electron shells, atomic mass number <input type="checkbox"/> Atomic mass number p72 <input type="checkbox"/> Exercise p73 <input type="checkbox"/> HW: Complete exercise p73 	
6	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Atomic structure, electron shells, atomic mass number <input type="checkbox"/> The periodic table p74 <input type="checkbox"/> Write from memory name/symbol of first 18 elements. Repeat as necessary. <input type="checkbox"/> Watch a couple of online videos on 'The periodic table and electron shells' <input type="checkbox"/> HW: Challenge p74 	Internet
7	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Electron shells, atomic mass number, periodic table <input type="checkbox"/> The periodic table p74 <input type="checkbox"/> Activity p75 'The periodic table and electron shells' <input type="checkbox"/> Exercise p75 <input type="checkbox"/> HW: Complete exercise p75 	Materials for activity p75
8	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Electron shells, atomic mass number, periodic table <input type="checkbox"/> Group 1 - The alkali metals p76 <input type="checkbox"/> Watch a couple of online videos on 'Group 1 elements and water' <input type="checkbox"/> Exercise p77 <input type="checkbox"/> HW: Complete exercise p77 	Internet
9	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Electron shells, atomic mass number, periodic table <input type="checkbox"/> Group 2 - The alkaline earths p78 <input type="checkbox"/> Activity p79 'Reactivity of group 2 metals' <input type="checkbox"/> Exercise p79 <input type="checkbox"/> HW: Complete exercise p79 	Materials for activity p79
10	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Electron shells, atomic mass number, periodic table <input type="checkbox"/> Group 17 - The halogens p80 <input type="checkbox"/> Activity p81 'Halogens in displacement reactions' <input type="checkbox"/> Exercise p81 <input type="checkbox"/> HW: Complete exercise p81, Challenge p81 	Materials for activity p81

Chapter 4 Periodic Table (4 weeks)

Lesson	Method	Resources
11	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Electron shells, atomic mass number, periodic table <input type="checkbox"/> Groups 3 to 12 - The transition metals p82 <input type="checkbox"/> Activity p83 ‘Transition metal precipitates’ <input type="checkbox"/> Exercise p83 <input type="checkbox"/> HW: Complete exercise p83, Challenge p83 	Materials for activity p83
12	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Electron shells, atomic mass number, periodic table <input type="checkbox"/> Groups 18 - The noble gases p84 <input type="checkbox"/> Exercise p85 <input type="checkbox"/> Compile a Word Bank p85 <input type="checkbox"/> HW: Complete exercise p85, Challenge p85 	
13	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Electron shells, atomic mass number, periodic table <input type="checkbox"/> Lead - Pb p86, Exercise p86 <input type="checkbox"/> Gold - Au p87, Exercise p87 <input type="checkbox"/> HW: Complete exercises p86, p87 	Internet
14	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Electron shells, atomic mass number, periodic table <input type="checkbox"/> Science Inquiry - undertake some of the suggested investigations p89 <input type="checkbox"/> HW: Investigations p89 	Materials for science inquiry p89
15	<ul style="list-style-type: none"> <input type="checkbox"/> Short test: Electron shells, atomic mass number, periodic table <input type="checkbox"/> Science Inquiry - undertake some of the suggested investigations p89 <input type="checkbox"/> HW: Investigations p89 	Materials for science inquiry p89
16	Chapter Review and Task <ul style="list-style-type: none"> <input type="checkbox"/> Exercises p90, p91 <input type="checkbox"/> Begin work on ‘A Task’ p67 <input type="checkbox"/> HW: Complete exercises & work on task as required 	
17	Chapter Review and Task <ul style="list-style-type: none"> <input type="checkbox"/> Exercises p92 and Competition Questions p95 <input type="checkbox"/> Begin work on ‘A Task’ p67 <input type="checkbox"/> HW: Complete exercises & work on task as required 	
18	Chapter Review and Task <ul style="list-style-type: none"> <input type="checkbox"/> Exercises p94 and Harder test questions p96 <input type="checkbox"/> Continue work on ‘A Task’ p67 <input type="checkbox"/> HW: Complete exercises & work on task as required 	
19	Chapter Review and Task <ul style="list-style-type: none"> <input type="checkbox"/> Preparation for test <input type="checkbox"/> Continue work on ‘A Task’ p67 <input type="checkbox"/> HW: Complete exercises & work on task as required 	
20	<ul style="list-style-type: none"> <input type="checkbox"/> End of chapter/unit test 	