



Lesson Plans

Year 10 Science

Chapter 6

The Universe

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 131
End of Unit Test

Content Description (4 weeks)

Chapter 6 The Universe

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 **Earth and space sciences** sub-strand is concerned with Earth's dynamic structure and its place in the cosmos. The key concepts developed within this sub-strand are that: Earth is part of a solar system that is part of a larger universe; and Earth is subject to change within and on its surface, over a range of timescales as a result of natural processes and human use of resources. Through this sub-strand, students view Earth as part of a solar system, which is part of a galaxy, which is one of many in the universe and explore the immense scales associated with space. They explore how changes on Earth, such as day and night and the seasons relate to Earth's rotation and its orbit around the sun. Students investigate the processes that result in change to Earth's surface, recognising that Earth has evolved over 4.5 billion years and that the effect of some of these processes is only evident when viewed over extremely long timescales. They explore the ways in which humans use resources from the Earth and appreciate the influence of human activity on the surface of the Earth and the atmosphere.

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 The Universe (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 The Universe p133 <input type="checkbox"/> Demonstrate examples p133 <input type="checkbox"/> Watch online videos 'How to use a calculator to do scientific calculations' <input type="checkbox"/> Exercise p133 <input type="checkbox"/> HW: Complete exercise p98 | Internet |
| 2 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: The Universe <input type="checkbox"/> The Earth p134 <input type="checkbox"/> Exercise p134 <input type="checkbox"/> HW: Complete exercise p134 | |
| 3 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: The Universe, the Earth <input type="checkbox"/> Our Solar System p135, Online video 'The Solar System' <input type="checkbox"/> Exercise p135 <input type="checkbox"/> Activity p135 'Use a star chart app', Online video 'How to use a star chart' <input type="checkbox"/> HW: Complete exercise p135, challenge p135 | Internet Materials for activity p135 |
| 4 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: The Universe, the Earth, the Solar System <input type="checkbox"/> Star life cycles p137 <input type="checkbox"/> Watch a couple of online videos on 'Life cycle of stars' <input type="checkbox"/> Exercise p137 <input type="checkbox"/> HW: Complete exercise P137 | Internet |
| 5 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: The Universe, the Earth, the Solar System, star life cycles <input type="checkbox"/> Galaxies p138 <input type="checkbox"/> Watch a couple of online videos on 'How to find Andromeda Galaxy' <input type="checkbox"/> Exercise p139 <input type="checkbox"/> HW: Complete exercise p139, challenge p139 | Internet |
| 6 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: The Universe, the Solar System, star life cycles, galaxies <input type="checkbox"/> Big bang theory p140 <input type="checkbox"/> Watch online videos on 'The big bang theory' <input type="checkbox"/> Watch online videos on 'Evolution of the Universe' <input type="checkbox"/> HW: Puzzles p153 | Internet |
| 7 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: Universe, the Solar System, star life cycles, galaxies, big bang <input type="checkbox"/> Big bang theory p141 <input type="checkbox"/> Exercise p141 <input type="checkbox"/> HW: Exercise p141 | |
| 8 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: Universe, the Solar System, star life cycles, galaxies, big bang <input type="checkbox"/> Evidence for the big bang p142, p143 <input type="checkbox"/> Watch online videos on 'Hubble's expanding universe' <input type="checkbox"/> HW: Sweet Trick p153 | Internet |
| 9 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: Universe, the Solar System, star life cycles, galaxies, big bang <input type="checkbox"/> Discuss/demonstrate sweet trick p153 <input type="checkbox"/> Evidence for the big bang p142, p143 <input type="checkbox"/> Exercise p143 <input type="checkbox"/> HW: Complete exercise p143 | |
| 10 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: Universe, the Solar System, star life cycles, galaxies, big bang <input type="checkbox"/> Microwave evidence for big bang p144, Age of the Universe p145 <input type="checkbox"/> Watch online videos on 'Evidence for big bang', 'Age of the Universe' <input type="checkbox"/> HW: Age of the Universe | Internet |

Chapter 6 The Universe (4 weeks)

| Lesson | Method | Resources |
|--------|---|-----------------------------------|
| 11 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: Universe, the Solar System, star life cycles, galaxies, big bang <input type="checkbox"/> Microwave evidence for big bang p144, Age of the Universe p145 <input type="checkbox"/> Exercise p145 <input type="checkbox"/> Compile word bank p145 <input type="checkbox"/> HW: Complete exercise p145, complete word bank p145 | |
| 12 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: Universe, the Solar System, star life cycles, galaxies, big bang <input type="checkbox"/> Asteroids p146 <input type="checkbox"/> Online videos 'Near Earth objects' <input type="checkbox"/> Exercise p146 <input type="checkbox"/> HW: Complete exercise p146 | Internet |
| 13 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: Universe, the Solar System, star life cycles, galaxies, big bang <input type="checkbox"/> dark matter & dark energy p147 <input type="checkbox"/> Online videos 'Dark matter', 'Dark energy' <input type="checkbox"/> Exercise p147 <input type="checkbox"/> HW: Complete exercise p147 | Internet |
| 14 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: Universe, the Solar System, star life cycles, galaxies, big bang <input type="checkbox"/> Science Inquiry - undertake some of the suggested investigations p149 <input type="checkbox"/> HW: Investigations p149 | Materials for investigations p149 |
| 15 | <ul style="list-style-type: none"> <input type="checkbox"/> Short test: Universe, the Solar System, star life cycles, galaxies, big bang <input type="checkbox"/> Science Inquiry - undertake some of the suggested investigations p149 <input type="checkbox"/> HW: Investigations p149 | Materials for investigations p149 |
| 16 | Chapter Review and Task <ul style="list-style-type: none"> <input type="checkbox"/> Exercises p150, p151 <input type="checkbox"/> Begin work on 'A Task' p131 <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 p152 and Competition Questions p155 <input type="checkbox"/> Begin work on 'A Task' p131 <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 p154 and Harder test questions p156 <input type="checkbox"/> Continue work on 'A Task' p131 <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' p131 <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 | |