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Levels 7 and 8

Levels 9 and 10

Science Understanding	
<b>Science as a human endeavour</b>	
Scientific knowledge and understanding of the world changes as new evidence becomes available; science knowledge can develop through collaboration and connecting ideas across the disciplines and practice of science	Scientific understanding, including models and theories, are contestable and are refined over time through a process of review by the scientific community
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	Advances in scientific understanding often rely on developments in technology and technological advances are often linked to scientific discoveries
	The values and needs of contemporary society can influence the focus of scientific research

- 1. Chemistry Articles special feature on indigenous Chemistry (Scroll to page 20)**  
[https://chemaust.raci.org.au/sites/default/files/pdf/2016/CiA\\_May\\_2016\\_final\\_0.pdf](https://chemaust.raci.org.au/sites/default/files/pdf/2016/CiA_May_2016_final_0.pdf)  
 Article regarding lack of indigenous people entering chemical sciences-participation gap – great article for class discussion & impact on society – can introduce David Unaipon & his scientific contribution and brilliance <http://adb.anu.edu.au/biography/unaipon-david-8898>
- 2. First Nations contribution to medicine (Scroll to page 63)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>  
 Use this information to explain to students the collaboration of ideas and the significant contribution to science by the first nation people way before any other civilization existed can also tie this in with space science.
- 3. Protecting Aboriginal and Torres Strait Islander knowledge in the commercialisation of plants and animals (Scroll to page 67)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>  
 Discuss with students the ethical considerations & why this must be protected
- 4. First Nations Multidisciplinary scientists in the production of material culture -scientific knowledge through collaboration (Scroll to page 101)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 5. First Nations Leaders in Embracing Technology – impact on society & ethical considerations (Scroll to page 111)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 6. Fire Stick Framing Agriculture – science understanding & skills to develop practices in areas of human activity crosses into ecological relationships (Scroll to page 115)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 7. Collaborating to ensure geological field work avoids and protects artefacts and heritage sites – ethical considerations (Scroll to page 120)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 8. Scientific Understanding - Fire an ecological must informing policy (Scroll to page 143)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 9. Scientific Understanding Modern Science validates Indigenous solutions to atmospheric pollution (Scroll to page 147)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 10. Scientific Understanding & Impact on Society- Traditional ecological knowledge & practices create carbon farming careers (Scroll to page 151)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 11. Torres Strait Islander frontline defenders (Scroll to page 155)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 12. Collaborating to understand damaged ecosystems (Scroll to page 165)**

- <https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 13. Science history of segregation - influence of society on scientific research (Scroll to page 188)**
- <https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 14. Scientific Understanding - First Nations treatment of infections (Scroll to page 193)**
- <https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 15. First Nations treatment of infections (Scroll to page 193)**
- <https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 16. Using scientific knowledge & communicate ideas and information – Indigenous Groundwater studies**
- <https://indigenousknowledge.unimelb.edu.au/curriculum/resources/groundwater>
- 17. Groundwater**
- [http://www.wetrocks.com.au/media/files/resources/national/18-Section-5\\_Aboriginal-People-and-Groundwater.pdf](http://www.wetrocks.com.au/media/files/resources/national/18-Section-5_Aboriginal-People-and-Groundwater.pdf)
- 18. Groundwater & Dreamtime**
- [http://www.wetrocks.com.au/media/files/resources/national/47-CS8\\_Aboriginal\\_Dreamtime\\_General\\_2.pdf](http://www.wetrocks.com.au/media/files/resources/national/47-CS8_Aboriginal_Dreamtime_General_2.pdf)
- 19. Mungalla Wetlands**
- <https://www.mungallaaboriginaltours.com.au/2016-07-20-04-14-12/wetlands-restoration-project>
- 20. Billabong**
- <https://indigenousknowledge.research.unimelb.edu.au/resources/billabongs>

**Biological sciences**

There are differences within and between groups of organisms; classification helps organise this diversity	Multicellular organisms rely on coordinated and interdependent internal systems to respond to changes to their environment
Cells are the basic units of living things and have specialised structures and functions	An animal's response to a stimulus is coordinated by its central nervous system (brain and spinal cord); neurons transmit electrical impulses and are connected by synapses
Interactions between organisms can be described in terms of food chains and food webs and can be affected by human activity	The transmission of heritable characteristics from one generation to the next involves DNA and genes
Multicellular organisms contain systems of organs that carry out specialised functions that enable them to survive and reproduce	The theory of evolution by natural selection explains the diversity of living things and is supported by a range of scientific evidence
	Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems

- 1. First Nations Classifications (Scroll to page 27)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 2. Indigenous classification of Fungi**  
<https://www.anbg.gov.au/fungi/aboriginal.html>
- 3. First Nations food web/food chain restoration – influence on ecosystems (Scroll to page 31)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 4. Traditional fire regimes protect biodiversity within the ecosystem (Scroll to page 73)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 5. Indigenous perspectives interdependence within an ecosystem**  
<https://indigenousknowledge.unimelb.edu.au/curriculum/resources/interdependence-in-the-environment>
- 6. Traditional practices for land management maintaining the ecosystem (Scroll to page 77)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 7. Fire Stick Framing Agriculture – science understanding & skills to develop practices in areas of human activity crosses into ecological relationships (Scroll to page 115)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 8. First Nations maintaining the ecosystem, abiotic & biotic factors & ecocentric perspectives (Scroll to page 122)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 9. First Nations acknowledging understanding and communication of internal systems (Scroll to page 161)**

- <https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
10. First Nations Skin group-marriage laws heritable characteristics (Scroll to page 167)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
11. Adaptations of First Nations people – evolution by natural selection (Scroll to page 171)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
10. First Nations treatment of infections (Scroll to page 193)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
11. Scientific understanding with technological advances Ancient evidence in cultural relics (Scroll to page 196)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
12. First Nations Restorative Ecology (Scroll to page 200) – can also be used as SHE  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
13. Research on First Nations Medicine (Scroll to page 204)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
14. Bush Food & Medicines  
[http://livingknowledge.anu.edu.au/learningsites/kooricoast/06\\_bush.htm](http://livingknowledge.anu.edu.au/learningsites/kooricoast/06_bush.htm)

### Chemical sciences

Mixtures, including solutions, contain a combination of pure substances that can be separated using a range of techniques	All matter is made of atoms which are composed of protons, neutrons and electrons; natural radioactivity arises from the decay of nuclei in atoms
The properties of the different states of matter can be explained in terms of the motion and arrangement of particles	The atomic structure and properties of elements are used to organise them in the periodic table
Differences between elements, compounds and mixtures can be described by using a particle model	Chemical reactions involve rearranging atoms to form new substances; during a chemical reaction mass is not created or destroyed
Chemical change involves substances reacting to form new substances	Different types of chemical reactions are used to produce a range of products and can occur at different rates; chemical reactions may be represented by balanced chemical equations
	Chemical reactions, including combustion and the reactions of acids, are important in both non-living and living systems and involve energy transfer

1. First Nations Traditional Separation Techniques (Scroll to page 36)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
2. First Nations Chemical Reactions employed in the production of new substances (Scroll to page 87)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- (i) Calination  
(ii) Pyrolysis  
(iii) Fermentation  
(iv) Combustion
3. First Nations development of pigments and dyes – biology & geology aspects also formation of mixtures (Scroll to page 106)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
10. First Nations Antiquity – Carbon Dating to pin point age of indigenous civilisation (Scroll to page 126)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
4. Chemical reactions Fire facilitated nutrient flow (Scroll to page 130)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
5. Chemical reactions First Nations detoxification practices (Scroll to page 174)  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>

### Earth and space sciences

**Levels 7 and 8**

**Levels 9 and 10**

Predictable phenomena on Earth, including seasons and eclipses, are caused by the relative positions of the Sun, Earth and the Moon	The theory of plate tectonics explains global patterns of geological activity and continental movement
Some of Earth's resources are renewable, but others are non-renewable	Global systems, including the carbon cycle, rely on interactions involving the atmosphere, biosphere, hydrosphere and lithosphere
Water is an important resource that cycles through the environment	The Universe contains features including galaxies, stars and solar systems; the Big Bang theory can be used to explain the origin of the Universe
Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales	

- 1. First Nations Solar & Lunar Eclipses (Scroll to page 42)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 2. First Nations Lunar Cycles & Tides (Scroll to page 46)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 3. First Nations Seasons & Cycles (Scroll to page 50)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 4. First Nations Water values & management (Scroll to page 54)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 5. First Nations Water values & management (Scroll to page 54)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 6. First Nations Geology (Scroll to page 93)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 7. First Nations Multidisciplinary scientists in the production of material culture – use of different rocks (Scroll to page 101)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 8. First Nations Astronomy (Scroll to page 178)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 9. Global systems – greenhouse gas reduction through traditional practice (Scroll to page 161)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
- 10. Indigenous Astronomy & the solar system**  
<https://indigenouknowledge.unimelb.edu.au/curriculum/resources/indigenous-astronomy-and-song-series>
- 11. Stellar Scintillation**  
<https://indigenouknowledge.unimelb.edu.au/curriculum/resources/stellar-scintillation>
- 12. Indigenous solar system & Astronomy (states year 5 BUT great resource for year 7 with indigenous vocabulary for the planets with meanings)**  
<https://indigenouknowledge.unimelb.edu.au/curriculum/resources/indigenous-astronomy-and-the-solar-system>
- 13. The Australian Indigenous Astronomy - Amazing Website for Indigenous Astronomy for all levels by Indigenous Astronomists**  
<http://www.aboriginalastronomy.com.au>
- 14. History of Aboriginal Astronomy - Video of Kirsten Banks – Indigenous Astronomer**  
[https://www.youtube.com/watch?v=mYr7ZCn04eA&fbclid=IwAR0oVq0uqARwnwpLc2chkWk8LWAqB1hd49pS\\_u-t9iu972D5Dx-InMYMkqk](https://www.youtube.com/watch?v=mYr7ZCn04eA&fbclid=IwAR0oVq0uqARwnwpLc2chkWk8LWAqB1hd49pS_u-t9iu972D5Dx-InMYMkqk)
- 15. Indigenous Astronomy - Songlines**  
<https://www.commonground.org.au/learn/songlines>

<b>Physical sciences</b>	
Change to an object's motion is caused by unbalanced forces acting on the object ; Earth's gravity pulls objects towards the centre of Earth	Electric circuits can be designed for diverse purposes using different components; the operation of circuits can be explained by the concepts of voltage and current
Energy appears in different forms including movement (kinetic energy), heat, light, chemical energy and potential energy; devices can change energy from one form to another	The interaction of magnets can be explained by a field model; magnets are used in the generation of electricity and the operation of motors
Light can form images using the reflective feature of curved mirrors and the refractive feature of lenses, and can disperse to produce a spectrum which is part of a larger spectrum of radiation	Energy flow in Earth's atmosphere can be explained by the processes of heat transfer
The properties of sound can be explained by a wave model	The explanation of the motion of objects involves the interaction of forces and the exchange of energy and can be described and predicted using the laws of physics

1. **First Nations Indigenous Ballistics – interaction of forces (Scroll to page 59)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
2. **First Nations Indigenous Ballistics – motion of objects (Scroll to page 185)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
3. **First Nations Fire by Friction – energy transformation (Scroll to page 97)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
4. **Sound energy – First Peoples traditional sound knowledges and practices(Scroll to page 134)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>
5. **Energy transfer – First people’s traditional clothing & blankets (Scroll to page 138)**  
<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>

**Science Inquiry Skills**

**Questioning and predicting**

Identify questions, problems and claims that can be investigated scientifically and make predictions based on scientific knowledge

Formulate questions or hypotheses that can be investigated scientifically, including identification of independent, dependent and controlled variables

**Planning and conducting**

Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed

Independently plan, select and use appropriate investigation types, including fieldwork and laboratory experimentation, to collect reliable data, assess risk and address ethical issues associated with these investigation types

In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task

Select and use appropriate equipment and technologies to systematically collect and record accurate and reliable data, and use repeat trials to improve accuracy, precision and reliability

**Recording and processing**

Construct and use a range of representations including graphs, keys and models to record and summarise data from students’ own investigations and secondary sources, and to represent and analyse patterns and relationships

Construct and use a range of representations, including graphs, keys, models and formulas, to record and summarise data from students’ own investigations and secondary sources, to represent qualitative and quantitative patterns or relationships, and distinguish between discrete and continuous data

**Analysing and evaluating**

Use scientific knowledge and findings from investigations to identify relationships, evaluate claims and draw conclusions

Analyse patterns and trends in data, including describing relationships between variables, identifying inconsistencies in data and sources of uncertainty, and drawing conclusions that are consistent with evidence

Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method

Use knowledge of scientific concepts to evaluate investigation conclusions, including assessing the approaches used to solve problems, critically analysing the validity of information obtained from primary and secondary sources, suggesting possible alternative explanations and describing specific ways to improve the quality of data

**Communicating**

Science Inquiry Skills

**1.First Nations Science Inquiry Skills**

<https://australiancurriculum.edu.au/media/5157/ccp-tbi-7-10.pdf>

- (i) Collaborating to ensure research is conducted in appropriate locales (Scroll to page 81)
- (ii) Consulting with local knowledge - where can I go? (Scroll to page 82)
- (iii) Collaborating to establish reciprocal research partnerships (Scroll to page 83)
- (iv) Acknowledging knowledge as sources of scientific data (Scroll to page 84)
- (v) Collaborating through digital technologies (Scroll to page 85)
- (vi) Consulting Aboriginal & Torres Strait Islander Knowledge – Not just Art (Scroll to page 160)
- (vii) Acknowledging cultural heritage acts & obligations of scientists (Scroll to page 162)

- (viii) Acknowledging two-way science can lead to new solutions and knowledge (Scroll to page 163)**
- (ix) Acknowledging cultural records – questions & hypothesis (Scroll to page 164)**
- (x) Collaborating in accordance with UN (Scroll to page 209)**
- (xi) Acknowledging first People misrepresented due to cultural bias (Scroll to page 210)**