# PULSE@Parkes in the Curriculum

PULSE@Parkes <https://research.csiro.au/pulseatparkes/> uses the context of pulsars and radio astronomy to engage and challenge students.

As the program is targeted at students in Years 10 -12, the following content descriptors from the Year 10 Science Curriculum <https://www.australiancurriculum.edu.au/f-10-curriculum/science/> and the Year 11-12 Physics Curriculum <https://www.australiancurriculum.edu.au/senior-secondary-curriculum/science/physics/> provide guidance as to what can be addressed through participation in PULSE@Parkes:

## Stage 5 Science

*Science Understanding*

**Earth and Space Science:**

* The universe contains features including galaxies, stars and solar systems, and the Big Bang [theory](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=theory) can be used to explain the origin of the universe [(ACSSU188)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSSU188)

*Science as a Human Endeavor*

**Nature and development of science:**

* Scientific understanding, including models and theories, is contestable and is refined over time through a process of review by the scientific community [(ACSHE191)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE191)
* Advances in scientific understanding often rely on technological advances and are often linked to scientific discoveries [(ACSHE192)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE192)

**Use and influence of science:**

* People use scientific knowledge to [evaluate](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=evaluate) whether they accept claims, explanations or predictions, and advances in science can affect people’s lives, including generating new career opportunities [(ACSHE194)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSHE194)

*Science Inquiry Skills*

**Planning and conducting:**

* Select and use appropriate equipment, including [digital technologies](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=digital+technologies), to collect and record [data](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=data) systematically and accurately [(ACSIS200)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS200)

**Processing and analysing data and information:**

* [Analyse](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=analyse) patterns and trends in [data](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=data), including describing relationships between variables and identifying inconsistencies [(ACSIS203)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS203)
* Use knowledge of scientific concepts to draw conclusions that are consistent with [evidence](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=evidence) [(ACSIS204)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS204)

**Evaluating:**

* [Evaluate](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=evaluate) conclusions, including identifying sources of uncertainty and possible alternative explanations, and describe specific ways to improve the quality of the [data](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=data) [(ACSIS205)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS205)

**Communicating:**

* Communicate scientific ideas and information for a particular purpose, including constructing evidence-based arguments and using appropriate [scientific language](http://www.australiancurriculum.edu.au/glossary/popup?a=S&t=scientific+language), conventions and representations [(ACSIS208)](http://www.australiancurriculum.edu.au/curriculum/contentdescription/ACSIS208)

## Stage 6 Physics

#### Unit 2: Linear Motion and Waves

*Science Inquiry Skills*

* Science is a global enterprise that relies on clear communication, international conventions, peer review and reproducibility (ACSPH053)
* Select, use and interpret appropriate mathematical representations, including linear and non-linear graphs and algebraic relationships representing physical systems, to solve problems and make predictions (ACSPH051)

*Science as a Human Endeavour*

* Science is a global enterprise that relies on clear communication, international conventions, peer review and reproducibility (ACSPH053)
* Development of complex models and/or theories often requires a wide range of evidence from multiple individuals and across disciplines (ACSPH054)
* Advances in science understanding in one field can influence other areas of science, technology and engineering (ACSPH055)

*Science Understanding*

* predictions, except when considering objects travelling at or near the speed of light, or very small objects like atoms or subatomic particles, or when very strong gravitational fields are involved (ACSPH058).
* Later, in the 1860s, James Clerk Maxwell developed a theory of electromagnetism and showed that electromagnetic waves would travel through space at the speed of light, implying light was an electromagnetic wave (ACSPH054).
* Light exhibits many wave properties; however, it cannot be modelled as a mechanical wave because it can travel through a vacuum (ACSPH074)
* A ray model of light may be used to describe reflection, refraction and image formation from lenses and mirrors (ACSPH075)
* A wave model explains a wide range of light-related phenomena including reflection, refraction, total internal reflection, dispersion, diffraction and interference; a transverse wave model is required to explain polarisation (ACSPH076)
* The speed of light is finite and many orders of magnitude greater than the speed of mechanical waves (for example, sound and water waves); its intensity decreases in an inverse square relationship with distance from a point source (ACSPH077)

#### Unit 3: Gravity and electromagnetism

*Science Inquiry Skills*

* Represent data in meaningful and useful ways, including using appropriate SI units, symbols and significant figures; organise and analyse data to identify trends, patterns and relationships; identify sources of uncertainty and techniques to minimise these uncertainties; utilise uncertainty and percentage uncertainty to determine the uncertainty in the result of calculations, and evaluate the impact of measurement uncertainty on experimental results; and select, synthesise and use evidence to make and justify conclusions (ACSPH081)
* Select, use and interpret appropriate mathematical representations, including linear and non-linear graphs and algebraic relationships representing physical systems, to solve problems and make predictions (ACSPH084)

*Science as a Human Endeavour*

* ICT and other technologies have dramatically increased the size, accuracy and geographic and temporal scope of datasets with which scientists work (ACSPH086)
* Models and theories are contested and refined or replaced when new evidence challenges them, or when a new model or theory has greater explanatory power (ACSPH087)
* Science can be limited in its ability to provide definitive answers to public debate; there may be insufficient reliable data available, or interpretation of the data may be open to question (ACSPH090)
* International collaboration is often required when investing in large-scale science projects or addressing issues for the Asia-Pacific region (ACSPH091)

*Science Understanding*

**Gravity and Motion**

* All objects with mass attract one another with a gravitational force; the magnitude of this force can be calculated using Newton’s Law of Universal Gravitation (ACSPH094)
* Objects with mass produce a gravitational field in the space that surrounds them; field theory attributes the gravitational force on an object to the presence of a gravitational field (ACSPH095)

## Other subject possibilities

PULSE@Parkes lends itself to forming the core of a Depth Study as required in the NSW Stage 6 Physics syllabus, the Stage 6 Investigating Science syllabus, open-ended investigations in Stage 5 and the Extended Essay for the International Baccalaureate. Please contact our team if interested in exploring options.

**More details:**

<https://research.csiro.au/pulseatparkes/>

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