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| Space Science Primary Incursion for Stages 2 and 3 |
| Incursion Outline |
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| Your incursion  Offered to local primary schools in the St George and Sutherland Shire regions of Southern Sydney.  The Space Science Primary Incursion is delivered to your classroom by two experienced and passionate educators with science qualifications and specialised knowledge in space science and technology.  **Requirements for this incursion are as follows:**   * Students construct rockets and landers at desks * Students work in pairs * A pencil and paper for designing landers * A large outdoor open area/playground or school hall with high ceiling for launching rockets * Technology for PowerPoint presentation   For further enquiries or to book this incursion, contact the ANSTO Education Team:  Phone: 02 9717 3090 email: tours@ansto.gov.au |
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**Overview**

We start with a fun interactive space science quiz designed to capture young imaginations and provide an opportunity for students to share their knowledge and interest with our experienced STEM education staff. This is followed by a presentation that includes an explanation of the place of Earth in space and other key space phenomena.

A take-apart scale model of the mighty Saturn V rocket is used to demonstrate how man landed on the moon in the NASA Apollo missions. Students also learn about research conducted by ANSTO scientist Dr Helen Maynard-Casely into materials on other moons in our solar system.

In the first STEM activity students learn about rocket design and construct a paper rocket. They launch their rocket in the playground and evaluate which rocket travelled the farthest and why.

In the second STEM activity, students design a lunar lander and construct it from craft materials. They test the performance of their design and evaluate whether modifications to the design are needed. Students then retest their lander after making modifications. In this activity, students learn design and evaluation processes followed by aerospace engineers.

**Format Summary**

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| Component | Suggested timings (mins) |
| Interactive quiz with keypad devices | 20 |
| Presentation with demonstrations | 30 |
| Demonstration with model of Saturn V rocket used in moon landings | 10 |
| STEM Activity 1: Create and launch a rocket | 40 |
| Recess break | 20 |
| Scientist focus: Dr Helen Maynard-Casely and her planetary research | 10 |
| STEM Activity 2: Design and test a lunar lander | 40 |
| Wrap-up | 10 |

The incursion is approximately 3 hours in duration and has been successfully run from start of day to lunch, with a recess break.

**Group size:** Student numbers are limited to 30

**Content Summary:**

* Our place in space: our place in the solar system and in the Milky Way Galaxy
* The size of the universe
* How planets compare in size
* Why planets orbit the sun
* Space phenomena viewable by the human eye: day and night, phases of the moon, solar and lunar eclipses
* Other phenomena: red giants, planetary nebulae, supernovae, white dwarfs, black holes
* Rocket science: how rockets work and how they have been used to land man on the Moon
* Lunar landers: stability and design considerations
* Space science research conducted at ANSTO

**Links to NSW Science and Technology K-6 Syllabus 2017:**

**Stage 2 - Earth and Space**

Content:

Earth’s relationship with the Sun

* identify the Sun as a major source of energy
* investigate how the Earth’s rotation on its axis causes regular changes including night and day (ACSSU048) SciT SysT
* explore the relative sizes and movement of the Earth and the Sun DesT SysT

Skills:

Working scientifically: Communicating

* represent and communicate observations, ideas and findings, using formal and informal representations (ACSIS060, ACSIS071)

Design and Production: Researching and planning

* identify and define a design problem with consideration of practical and aesthetic needs
* consider sustainable use of resources and time constraints in planning design solutions
* develop, record and communicate design ideas and decisions using appropriate technical terms
* produce labelled and annotated drawings (ACTDEP015)
* plan a sequence of production steps when producing designed solutions individually and collaboratively (ACTDEP018)

**Stage 3 - Earth and Space**

Content:

Earth’s place in our solar system

* identify that Earth is part of a system of planets orbiting around a star (the Sun) (ACSSU078) SysT
* investigate the role of light energy in how we observe the Sun, Moon and planets SysT
* compare the key features of the planets of our solar system, for example:

− time it takes for the planets to revolve around the Sun

− size of the planets

− distance of the planets from the Sun

* examine and discuss current developments in astronomy, space and planetary science, particularly related to making observations and gathering data SciT

Skills:

Working scientifically: Communicating

* communicate ideas, explanations and processes, using scientific representations including multimodal forms (ACSIS093, ACSIS110)

Design and Production: Researching and planning

* consider functional and aesthetic needs in planning a design solution
* develop, record and communicate design ideas, decisions and processes using appropriate technical terms
* produce labelled and annotated drawings for an audience (ACTDEP025)
* consider sustainability of resources when planning design solutions
* manage projects within time constraints