

# Celebrating Astronomy

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## WHAT IS THE IYA?

The International Year of Astronomy was a year-long, world-wide public celebration of astronomy, marking the 400th anniversary of Galileo pointing a telescope to the sky. New Zealand is one of 63 countries signed up to participate.

Astronomy is the scientific study of celestial objects such as stars, planets, comets and galaxies. It is one of the world's oldest sciences. The word astronomy means 'law of the stars'.

In 1609, Galileo first turned one of his telescopes to the night sky and made astounding discoveries that changed humankind's understanding of our position in the universe. He found mountains and craters on the Moon, the stars invisible to the naked eye, and the moons around Jupiter. In the same year, Johannes Kepler published his work *Astronomia nova* in which he described the fundamental laws of planetary motions.

## SUITABLE STARTER RESEARCH QUESTIONS

Use these questions as a guide for discussion and research.

1. What is a planet?
2. What are the names of the planets in our solar system?
3. Is Pluto a planet? Why or why not?
4. What are meteorites, asteroids and comets?
5. How far is a 'light year'?
6. What is the difference between astronomy and astrology?
7. Who was the first man to step on the surface of the Moon?
8. Which planet in our solar system orbits the Sun in the least time? Which planet takes the longest time to orbit the Sun?
9. How many planets have moons? How many moons does each of them have?
10. What do you think is the future of astronomy – where do we go from here?

## ACTIVITIES

### Our Solar System

Encourage the students to use books and the internet to research the planets in our solar system. Ask the students to find out how many days it takes each planet to go around the sun. Invite them to construct a small model or mobile of the planets using recyclable materials. Have the students choose a planet to complete more detailed research of their choice.

### Star Gaze

Encourage the students to look at the night sky, either as a class from the playground or with their family at home. Ask them to record different constellations or formations of stars. Display charts of stars and constellations, and locate those you may have found in the night sky. Discuss how the constellations were named and by whom.

Encourage the students to look out for satellites and shooting stars.

## GETTING INTO STAR GAZING

Once it gets dark go outside and face North (if you are not sure where North is, stand with your right shoulder to where the sun rises and your left shoulder to sun set – you are facing a northerly position). Look carefully and you will see a bright object that does not twinkle. This is the planet Saturn.

Saturn is the planet that has rings visible in binoculars or a telescope but as the earth and Saturn orbits the sun twice every 30 years, the rings are on edge and they disappear. It is called the ring plane crossing. The rings are so thin they will seem to vanish on September 4... only to reappear three months later. You may also see its brightest moon Titan.

Look to the left (or west) of Saturn and you will find a group of stars shaped like a hook and a triangle. This is the constellation of Leo, the Lion. Leo is one of the birthday signs or signs of the Zodiac. The 12 Zodiac signs is the path that the sun takes across the sky and where you find the moon and the 7 planets. The curve of the hook is Leo's head and the shaft of the hook is his neck (in the Southern Hemisphere Leo is upside down). The triangle is the end of Leo's body and tail.

Towards the western horizon is the constellation of Orion the hunter. Most people know the "pot". This is the belt and sword of Orion. If you have binoculars, look at the middle star of the handle or Orion's sword and you will see a misty hazy object. This is the Great Nebula in Orion or M 42. The nebula is a star factory where over billions of years new stars are being made. You are seeing this as if was 1600 years ago as that is how long the light has taken to travel from the nebula to you (1600 light years).

Now let's go back to Saturn and turn our back on it (we are now facing a southerly direction). At about 45 degrees you should see a small kite shaped group of stars. This is the Southern Cross or Crux – the shape of the stars on the New Zealand flag. There are two bright stars close to Crux, between it and the horizon. These are the "pointers" that point to Crux. The furthestmost pointer is the closest star to our sun, at a distance of 4.5 light years. A pair of good binoculars or a telescope will show this to be two stars. These two stars orbit each other every 80 years. There is a faint third star in this system which takes about 500,000 years to orbit the other two stars that is currently the closest star to Earth. This is a "star system", one of many in the sky.

If you are still having trouble finding the Crux again face a southerly direction, join your thumbs and fore fingers together to make a circle. Place your thumbs under your nose level with the horizon and look through it. Crux should be within that circle. In summer it is where your thumbs meet and in winter, where your fingers meet. The furthestmost pointer should be just on the outer edge of the circle made by your fingers.



# Teaching and Learning Ideas

## FURTHER RESEARCH & CLASSROOM ACTIVITIES

### Invention of the telescope

Discuss with the class the impact of the invention of the telescope on the world. Use books and the internet to research Galileo Galilei. Invite the students to find the following information about Galileo:

- date and place of birth and death
- family background and education
- inventions
- telescopic discoveries
- impact on the world.

### Famous astronomers

Divide the students into groups of 2 or 3. Ask each group to select one of the following famous astronomers – or one of their own choice – to research, then create a poster or PowerPoint display of their findings:

- Nicolaus Copernicus
- Johannes Kepler
- Tycho Brahe
- Clyde Tombaugh
- Edmund Halley
- Maria Mitchell
- Claudius Ptolemy.

Useful Website:

[www.astronomy-for-kids-online.com/famous-astronomer.html](http://www.astronomy-for-kids-online.com/famous-astronomer.html)

In their research, students should include:

- background, including dates and places of birth and death
- where they came from
- ideas and/or inventions
- interesting facts.

### The Southern Cross

Display pictures and photos of the Southern Cross. Talk with the class about why it is such an important group of stars, and why it is part of the New Zealand flag. Invite the students to sketch the Southern Cross and label the different stars. They could then write an explanation of how the Southern Cross moves in the night sky.

### Life on Mars

Encourage the students to write a short narrative on the topic 'My Life on Mars'. Remind the students to include an introduction, main body of text, complication and conclusion. Invite them to read out their stories to the class. They may also like to write an acrostic or shape poem about life on Mars.

### Starry Night

Display a photo or picture of Vincent van Gogh's painting The Starry Night (1889). Encourage students to create their own painting or collage of the night sky, then display the artworks around the classroom.

### Dazzling Description

Encourage the students to write a description of the night sky. Imagine they are describing the sky to someone who is blind.

### Circle Meeting

Students sit in a circle. Provide them with the topic 'There is life on other planets'. Go around the circle and ask the students to say 'Yes' if they agree with the topic or 'No' if they disagree. Ask students to give a reason for their answer. Next time around, ask the students to add interesting facts or to give responses to other students' answers. Remind students there are no wrong answers and that they may pass at any time.

### Halley's Comet - Google Research Questions

1. How often can Halley's comet be seen?
2. When was Halley's comet first sighted?
3. Who is Halley's comet named after?
4. What is Halley's comet made of?
5. How long is Halley's comet?
6. What years has Halley's comet been seen?
7. When will Halley's comet be seen next?

### Invent an Alien Life Form

Students invent their own alien life form. Sketch their alien, labelling different parts. Provide the students with recyclable materials or modelling clay and encourage them to make a three-dimensional model of their alien life form.

### How to Make a Telescope

Allow the students to use one of the following websites then follow the instructions to make their own telescope:

[www.funsci.com/fun3\\_en/tele/tele.htm](http://www.funsci.com/fun3_en/tele/tele.htm)

[www.ehow.com/how\\_17057\\_make-simple-telescope.html](http://www.ehow.com/how_17057_make-simple-telescope.html)

## VERY USEFUL WEBSITES FOR RESEARCH

<http://www.starlab-astronomy.co.nz/>

Check out the Kids Questions section and star charts.

<http://brunelleschi.imss.fi.it/telescopiogalileo/index.html>

Galileo's Telescope - the instrument that changed the world

<http://christchurchcitylibraries.com/Kids/SpaceExplorer/>

<http://www.kidsastronomy.com/> (Great for younger students)

<http://amazing-space.stsci.edu/resources/explorations/>

<http://www.astronymnz.org.nz/>

starcharts, sun and moon, planets, meteors, comets **etc.**

<http://library.thinkquest.org/28327/> (Virtual universe journey)

<http://www.stardome.org.nz/>

<http://www.transitofvenus.co.nz/astronomy/index1.html>

<http://hubblesite.org/> (Hubble telescope website)

<http://soho.nascom.nasa.gov/>

<http://www.space.com/php/video/> (Space Videos)

[http://planetquest.jpl.nasa.gov/overview/overview\\_index.cfm](http://planetquest.jpl.nasa.gov/overview/overview_index.cfm)

Planetquest and searching in outer space.