The WONDER WEEKLY

NOW MONTHLY

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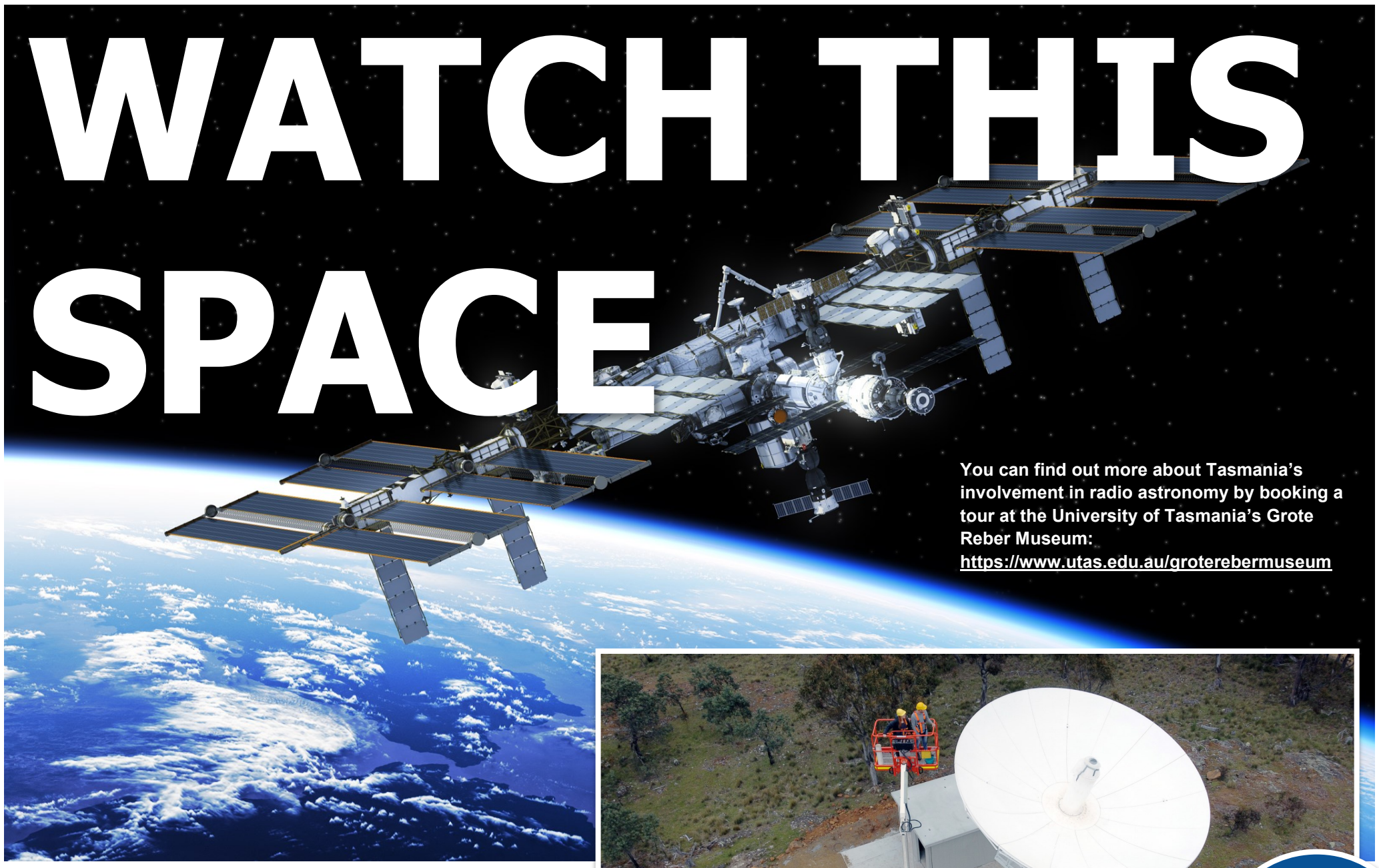
WATCH THIS SPACE



You can find out more about Tasmania's involvement in radio astronomy by booking a tour at the University of Tasmania's Grote Reber Museum: https://www.utas.edu.au/groterebermuseum

In what year was Australia's first satellite launched?

IMPORTANT ROLE: The new 7.3 metre antenna at the University of Tasmania's Greenhill Observatory in Tasmania's Southern Midlands, right, has been developed in partnership with the Australian Space Agency.

Tracking satellites from Tasmania

HAVE you heard about the new communications antenna in Tasmania, which will provide ground support to space missions and reduce the chance of spacecraft colliding?

The new $2 million tracking antenna at the University of Tasmania's Greenhill Observatory at Bisdee Tier, near Spring Hill, in the Southern Midlands, will be operated by a highly-skilled team.

Professor Simon Ellingsen, Dean of School of Natural Sciences, at the University of Tasmania, said the new antenna will provide space-to-earth communications for low-earth-orbit satellites.

"In the past, we have only been able to listen to transmissions from spacecraft but now we are able to transmit messages through radio frequency communications to spacecraft, sending commands as well as receiving data."

The other important function of the new antenna will be to track satellites and other debris.

There are more than 8,000 satellites alone orbiting the Earth.

We therefore need to track them really carefully to reduce the chance of spacecraft collisions.

More than half of these satellites are active and are being used for communications, Earth observation, navigation and positioning, Earth science and other purposes.

Regular readers of *The Wonder Weekly* will know Tasmania is one of the best places in the world for radio astronomy.

Radio astronomers use giant radio antennas, known as radio telescopes, to detect radio waves from the Sun, the Milky Way, planets and other objects in space.

Because radio waves coming from sources such as planets, stars and galaxies are very far away, they are very weak.

Radio telescopes therefore require very large antennas to collect enough radio energy to study them, as well as extremely sensitive equipment. Astronomers sometimes use several connected telescopes, or radio arrays, which work like one very large telescope.

The University of Tasmania is the only university in the world that operates a continent-wide array of telescopes, called the AuScope VLBI Array.

These six radio telescopes around Australia are operated remotely from the control room in Hobart.

An edition of *The Wonder Weekly* on July 20, 2020, talked about the Mt Pleasant observatory, near Hobart.

It has a 26-metre former-NASA telescope and a 12m AuScope telescope, which are linked to `dishes' at Katherine in the Northern Territory, Yarragadee in Western Australia, and Ceduna in South Australia.

Radio waves are a type of electromagnetic radiation.

Sunlight is also a form of electromagnetic radiation.

All electromagnetic radiation is light, but we can only see part of this radiation with our eyes - what is called visible light.

Most of the light in the universe is invisible to our eyes.

Objects in the universe radiate many other types of light through space in waves, like the waves of the ocean. Each wave has a peak and a trough, which is called a cycle.

The distance the wave moves during a cycle is called a wavelength.

Radio waves have wavelengths billions of times longer than those of visible light.

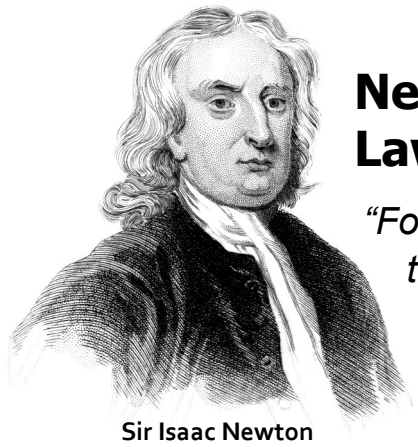
Radio waves can be generated artificially by transmitters and received by radio receivers, using antennas.

University of Tasmania radio telescopes have been used for a number of space projects to track, monitor and study the signals from spacecraft.

Examples include the landing of the Huygens probe on Saturn's largest moon Titan, and the launch and re-entry of rockets in Earth orbit.

CONTINUED PAGE 2

Rocket science challenge



Sir Isaac Newton

Newton's Third Law of Motion

"For every action, there is an equal and opposite reaction."

"IT'S not rocket science."

Have your ever heard this saying?

It basically means something is not difficult to understand, well not compared to rocket science anyway.

Yes rocket scientists are very clever people, but you can perform an experiment at home to show how a rocket works.

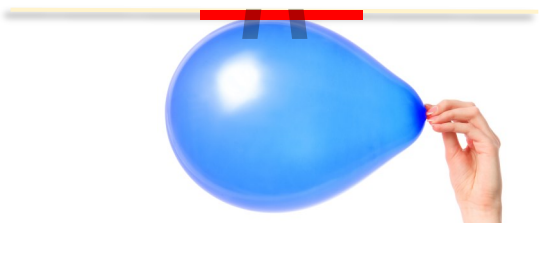
All you will need is string, a balloon, a straw, and some sticky tape.

1. **Thread the straw on the string.**

2. Tie a length of string (about three metres) between two objects at the same height (two chairs will work very well).

3. Blow up the balloon and twist the neck to keep the air in.

4. Tape the balloon to the straw, being careful no to let the air out of the balloon until you are ready for launch. You can use a clothes peg on the neck of balloon if you like.



5. What do you think will happen when you let go of the end of the balloon?

6. Write down your thoughts.

7. Then do your countdown and blast off.

8. If you like, you can construct a second balloon rocket course and have a rocket race.

9. What happened?

10. Write down what you think caused this reaction.

Children's University Tasmania members can earn a stamp in their passports for this challenge, at the discretion of school/ hub coordinators.

IMAGES: iStock/ 3DSculptor/ TonyBaggett

University keeping a close watch on space

FROM PAGE 1

The new antenna has been jointly developed by the University and the Australian Space Agency.

Head of the Australian Space Agency,

Enrico Palermo, said:

"Space technology, like satellites, is critical in supporting our everyday life and national wellbeing, and the new antenna will track and protect vital technology in space that we rely on here on Earth."

Space technologies support things like weather forecasting, internet access and the Global Positioning System (GPS).

It helps farmers monitor the health of their crops, firefighters to track bushfires and much, much more.

You can learn more about Australia's involvement in space on the Australian Space Agency website: https://www.industry.gov.au/australian-space-agency

Based in Adelaide, the Australian Space Centre is home to the Australian Space Discovery Centre: https://www.industry.gov.au/australian-space-discovery-centre

If you are ever in Adelaide it would be well worth a visit, but you can learn more from home as well, through the Australian Space Discovery Centre's digital sessions.

Schools or individuals can book into any of these sessions, including Q&As with a space expert, or catch up on past sessions on YouTube: https://www.youtube.com/c/AustralianSpaceAgency

There are also a number of other resources for learning more about space on the website.

Subjects include Australian space milestones.

Did you know Australia played a vital role in the coverage of the moon landing, and the rescue of Apollo 13?

We have included a fun activity from the Discovery Centre's website on pages 3-4 of today's edition of *The Wonder Weekly.*

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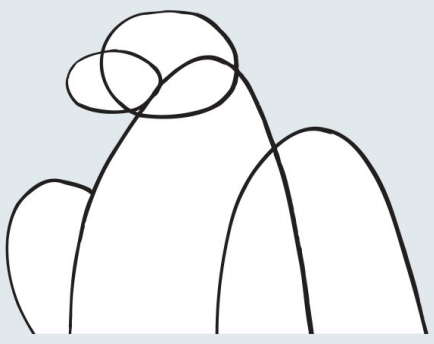
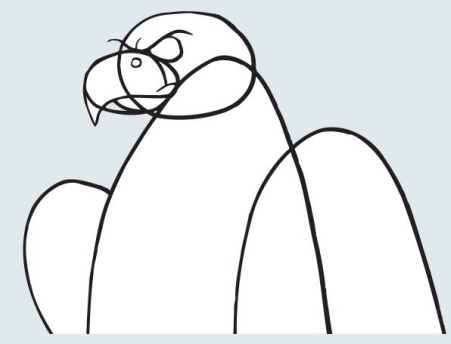
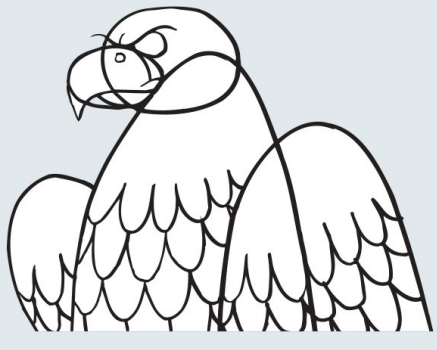
How to draw a BALD EAGLE



Using a pencil draw a circle for your eagle's head and an oval for his beak. Draw a large upside down 'u' shape for his body and another slightly smaller one for his right wing. Add a curved line on the left of his body for his left wing. These will be your guides.



Inside the oval draw the shape of your eagle's beak. A small triangle on the tip gives it a sharp hook. Draw a circle for his eye and add some eyebrows.



Inside the shapes you have drawn for the body and wings draw some rows of 'u' shapes for feathers.

Finish his eye and rub out all the lines you don't want. Ink him in with a fine tipped pen or texta. To finish, just add some colour.

Artwork: www.johnpollyfarmer.com.au/

Make your own solar system

Materials

- Scissors
- String
- Sharp pencil
- Coat hanger
- Glue stick

Follow these simple instructions to build a model of our solar system:

1. Fold the paper down the line so the planets are facing outwards.
2. With the paper folded, hold it up in front of the light. If you can see any planets outside the lines, try folding the paper again.
3. Unfold the paper so it looks like an open book.
4. Run a glue stick all over the inside page and close it shut. Lay the folded paper flat on a table and rest a heavy book on top for about 10 mins.
5. Remove the book and make sure the glue is dry and the page has stuck together.
6. Cut out the planets. You should be able to flip them over like a coin and see the same planet on the other side.
7. Get an adult to poke a hole through the grey dot near the top for each planet.
8. Cut a piece of string into five 15 cm pieces and four 20cm pieces.
9. Tie one 15 cm piece of string to Mercury, through the hole you created. Do the same for Earth, Jupiter and Uranus.
10. Attach the other end of each piece of string to the bottom of the coat hanger in this order: Sun, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

Australian Space Agency


SATURN
SUN
VENUS
NEPTUNE
URANUS
MERCURY
JUPITER
MARS
EARTH
Fold along dotted line
Fold along dotted line
JUPITER
MARS
EARTH
NEPTUNE
URANUS
MERCURY
SATURN
SUN
VENUS