TEACHING NOTES

COMET CATCHER

A Hands-On STEM lesson from Nanogirl's Lab

This worksheet is to help you to support your teaching after your students have watched the 'Comet Catcher' video. It contains a summary of the science knowledge, experiment instructions, topics for further inquiry, and links to the curriculum.

If you do not have access to our teacher resources, they are available at no charge - please visit nanogirlslab.com, click 'Teachers' and sign up to receive access to three hands-on STEM lessons, each with accompanying teaching notes. Our team are always happy to help, so please don't hesitate to reach out with any questions.

For this session, your class will each need:

- **Plain paper**
- **String**
- **Scissors**
- **Strip of kitchen foil**

NZ CURRICULUM STRAND: PHYSICAL WORLD

Achievement Aims	Learning Outcomes
Curriculum Strand: Planet Earth & Beyond Astronomical Systems: Investigate the components of the solar system **Curriculum Strand: Nature of Science** Understanding about Science: Identify ways in which scientists work together and provide evidence to support their ideas Communicating in science: begin to use a range of scientific symbols, conventions and vocabulary	• Understand what comets and asteroids are, where they come from and their physical makeup • Understand that scientists can learn about the early universe by studying comets and asteroids

Comets & Asteroids

Comets and asteroids are small, irregular pieces of the solar system formed during the earliest period in the history of the universe, about 4.5 billion years ago. Just like planets, comets and asteroids orbit the Sun. The main differences between a comet and an asteroid is their composition. Comets are made of dust and rocks held together with ice. When comets approach the sun, the ice vaporizes to form a trail. Asteroids are usually made of pieces of rock, minerals including gold, platinum and palladium, held together loosely by weak gravity, but generally without any ice.

Because comets and asteroids were formed so long ago, their composition may reflect the conditions in the early solar system. This makes them attractive areas of study for physicists and astronomers.

The Rosetta spacecraft was designed to reach a distant comet, and after chasing it for several years was eventually able to land a module onto its surface. While catching a comet may sound challenging, the ability to do so for both comets and asteroids would help scientists to understand more about the composition of the solar system when it was first created. Businesses are also looking to asteroids as they are rich in valuable raw materials which if mined and brought back to earth could help with future shortages in our planet.

ACTIVITY— Comet Catcher

1. Start with a square piece of paper

2. Fold in half to make a triangle with the open end at the top.

3. Take the left side bottom corner and fold across the triangle so the point sits about one third of the way from the top of the triangle on the opposite side.

4. Do the same with the bottom right corner, to make a pentagon. The points you folded across the middle should lie over one another, like a set of folded arms.

5. Turn the whole shape over. Fold the top point of the sheet closest to you down.

6. Turn the shape over again and fold the top point down, tucking into the pocket made by the folded arms.

7. Open up the middle to make a cup.

8. Snip a small hole into thel base of the cup using scissors.

9. Cut 40 cm of string, and thread one end through the little hole.

10. Tie a large knot in the end of the string that's inside the cup.

11. Lay the un-knotted end of the string in the centre of the foil strip.

12. Scrunch up the foil around the string. This will be your comet!

13. See how many times you can flick your creation upwards to launch the foil comet then catch in the cup!

EXPLORE FURTHER

(Use these prompts to start a discussion or further inquiry on the topic of Space)

- How many times in 30 seconds can you catch the comet?
- How many comets and asteroids are there in the solar system?
- Which comet is nearest to Earth at the moment?
- Can you see any comets in the sky this year?
- How big are comets?
- Where did the Rosetta space mission launch from?
- What happens to a spacecraft after it completes its mission?
- How long did it take the Rosetta mission to reach a comet?
- What colour are comets?
- How fast do comets travel?

If you have any questions, please contact info@nanogirllabs.com or check out Nanogirl's Lab at www.nanogirlslab.com