

The BRAINWAVES Club

Term 2 2021: Neutrinos – Years 5 and 6

Venue: North Curl Curl Public School

Term Fee: \$285.00

YOUR SPHERICAL NATURE

The world is ours, so we should learn how to take care of it right? Despite what some people might try to tell you, the Earth is a sphere, and like Shrek (and onions), it has many layers. Join the Neutrinos as they peel back the layers and learn what lurks beneath them. What lurks beneath our feet? Why are there so many kinds of rock and how do they get made? Where does water come from and can it run out? What keeps the atmosphere from just floating off into space? How does skydiving and hot air ballooning work? If the Earth is a sphere, how do we make flat maps? During this program the Neutrinos will develop an understanding of the large and complex structures and processes that take place in each sphere, and how these layers interact.

1 May

Meeting 5: Can You Survive the Biosphere?

Focus: Biology

"It is not the strongest of the species that survives, not the most intelligent that survives. It is the one that is the most adaptable to change." — Charles Darwin

We explore the sphere that we ourselves make up - the biosphere. Neutrinos will learn all about adaptations, how they help organisms survive and reproduce in their habitats and the role this plays in natural selection and evolution. Neutrinos will conduct an observational study of the common garden snail - *Helix aspersa*, analysing its adaptations and hypothesising how they impact on the snails' survival. Finally, the mutagenic roots of adaptations will be explored.

15 May

Meeting 6: Natural Patterns

Focus: Mathematics

Humans are pattern-seeking story-telling animals, and we are quite adept at telling stories about patterns, whether they exist or not." — Michael Shermer

Ever noticed a pattern? These sequences are found everywhere around us, not only do they already exist in the natural world, but their influence on us is clearly evident in the built environment. Club members will examine patterns in the environment, art and science. They will construct arrays and rules to describe simple geometric patterns and angles. Then they will deep dive into chaotic patterns that govern fractals such as the Mandelbrot and Juliet sets.

29 May

Meeting 7: SOS (Save Our Spheres)

Focus: Chemistry

Neutrinos return to the atmosphere, this time to try and understand how human activity has impacted the air that we share and breathe. Neutrinos will study and experiment with carbon dioxide. By studying the global carbon cycle, a new appreciation of its critical importance to life as a product of cellular respiration and critical ingredient for photosynthesis will be gained. The paradox of the negative impacts of carbon emissions on the Earth's oceans and climate will be examined.

19 June

Meeting 8: On the Revolutions of the Heavenly Spheres

Focus: Astronomy

Now that Neutrinos have explored all of the Earth's spheres, they are ready to expand their horizons and explore the final frontier...SPACE! Club members will seek to understand the difference between planets and stars and then work as a team to construct a scale model of the solar system. They will practise the chiaroscuro shading technique used by Galileo Galilei himself, in order to draw his observations of the moon's textured surface.

What to bring: Writing materials

Each week please bring an A4 notebook and a well-stocked pencil case containing (at least) pens, pencils, a calculator and a ruler. Please also bring a hat, drink and snack for the break (no nuts please).

About the Club Leader: Jeremiah Galea

Jeremiah is a science and mathematics teacher with ten years of experience engaging students in standard and extension mathematics. He is fascinated by the ways that maths, science and art overlap in nature and society, which is often a theme in his presentations and units of learning. Jeremiah has expressed this fascination creatively with screen writing, film making, and poetry. In 2016 he co-wrote and co-produced an award-winning science fiction short film which was selected in film festivals in Sydney, Montreal and Brussels. Jeremiah has been fortunate to collaborate with a diverse range of students, including gifted and talented students over the past decade. He believes that children growing up in the age of information, with an increasingly automated future where technology is ubiquitous and omnipresent, need critical and creative thinking skills. This is more important for young people than ever before.