

The BRAINWAVES Club

Semester 1 2019: Einsteins Years 4 and 5

Venue: North Curl Curl

The Scientific Wonders of Europe

From London to Paris, Amsterdam to Rome...the cities of Europe are bursting with scientific wonders, just waiting to be discovered. What is the mystery behind the historic counterfeit coins of London? How do windmills really work? What is the chemistry behind glaciers in Switzerland and gelato in Italy? These are just some of the questions we will be answering as we explore each city. We might even meet some creepy ghosts and ghouls along the way! What are you waiting for? Let's put on our backpacks and hit the road!

23 February

Meeting 1 – The Royal Mint of London

Focus: Chemistry

We start our journey in London, England, with a trip to Royal Mint. We go back in time, looking at the early English coins and the elements used to make them, while also discovering some interesting facts about Isaac Newton! We then compare the chemical properties of coins from various countries. And make some links with the elements on the Periodic table. We might even get to turn our copper coins into gold as we explore the science of alloys!

9 March

Meeting 2 – Crossing the English Channel

Focus: Physics

Travelling from England to France involves crossing the English Channel and hovercrafts were once a popular method of travel. How complex can a hovercraft be? We might find out as we design and build our own hovercrafts. We will experiment with our designs and examine the forces and friction at play as we race our hovercrafts to the finish line. We will also compare the various energy sources used to power hovercrafts. Today, modern hovercrafts are used in many ways from wildlife conservation to rescue operations.... the possibilities are endless. Where do you see the hovercrafts of the future being used?

23 March

Meeting 3 – Disneyland Paris

Focus: Chemistry

Come on a tour through the frightening Phantom Manor, where ghost and ghouls are waiting in every shadow. What's the secret behind the glow-in-the-dark skeleton? And what's the chemistry behind the spooky smoke-filled bubbles? Could atomic structure hold the key? As we delve deep inside the atom, we look at the behaviour of the various subatomic particles and build models that will help us answer these questions. This session is sure to send chills down your spine!

6 April

Meeting 4 – The Giant Belgian Omelette

Focus: Food science, physics

Imagine using 10 000 eggs to make a giant omelette. Well this is a tradition that occurs every year at the Giant Omelette Festival in Belgium. But how could we ensure that the eggs used for this omelette are safely transported? We will construct our own devices that are able to protect an egg when it is dropped, using mechanical deformation. We will also look at the chemical changes involved as this giant omelette cooks. This session might even end with us walking on eggs!

11 May

Meeting 5 – Windmills of Amsterdam

Focus: Physics, environment

Let's get the wheel spinning as we hop on our bikes and cycle through the famous village of windmills. Building an Archimedes screw might give us a good idea as to how these amazing structures work. And how are the wind turbines we see today different? Could an Archimedes screw design be the answer to whisper quiet wind turbines? Come ready to design, build and test as this session will put your engineering skills to work.

25 May

Meeting 6 – Glaciers in Switzerland

Focus: Earth and environment

A day of hiking in the Swiss Alps brings us face to face with the giant Eiger Glacier, an 1800-metre-high face of rock and ice. What are the scientific principles at work during glacial formation and movement? Einsteins, we will find out as we build models that simulate this movement. Some data analysis will also help us discover the relationship between glaciers and climate change. What's bigger, the impact these glaciers have on us or the impact we have on them?

15 June

Meeting 7 – Kitzbuhel Ski Resort in Austria

Focus: Chemistry, biology

Skiing the slopes of Austria in winter can be an exhilarating experience but not if you don't have the right gear. Homeostasis refers to the ability of the cells in our body to maintain stability in spite of changes but how cold does it have to get before we start suffering frost bite? What can we use to keep warm? Do we only rely on ski jackets, scarves and gloves or could we try some of the hand warmers available? Einsteins, hold on to your beanies as we discover some interesting exothermic and endothermic reactions in this session!

29 June

Meeting 8 – Gelato in Rome

Focus: Food science, Chemistry

Did you know gelato is the Italian word for ice cream? And there is a whole world of science behind making the most delicious Italian gelato. Gelato even has its own unique chemical structure. Are you ready to step inside the famous Giolitti Gelateria to learn the tricks of the trade? We'll carry out investigations to learn about the selection of the best ingredients, emulsification, homogenisation, the intricate chemistry of flavours and other secrets that are used to develop the fluffy, creamy treat that we all love. This is sure to be a mouth-watering session!

What to bring:

Please bring a notebook and a well-stocked pencil case to each meeting as well as a hat, drink and snack for the break (no nuts please).

About the Club Leader: Debbie McKenna

Debbie has a Bachelor of Science degree, majoring in Chemistry and Applied Chemistry, and a Postgraduate Diploma in Education. She is passionate about instilling a love of Science in children and

strives to do this through fun, interactive activities that allow children to develop an understanding of scientific principles. She has worked in various industries and loves to incorporate her experience into her workshops.