Summer & Winter Workshops

Centre for Curriculum Leadership in Math and Science

Workshops *for* Students

NUS HIGH SCHOOL of Math & Science

NOBEL Summer Workshops

28 to 30 May 2019

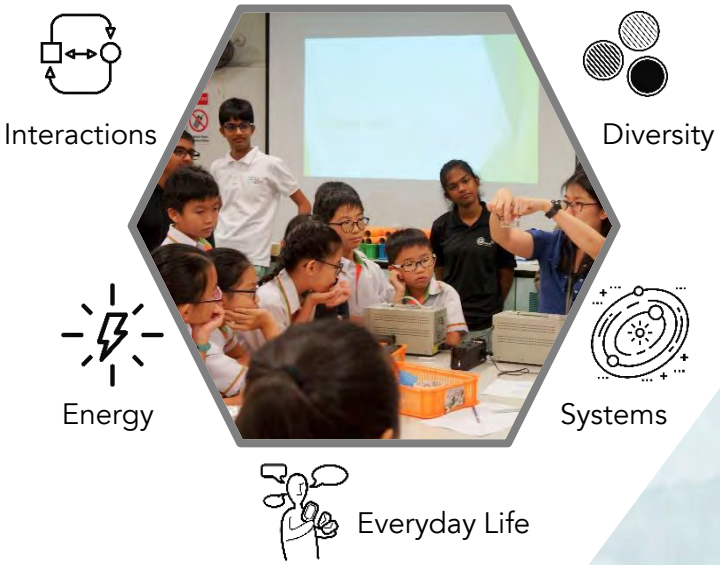
NOBEL Winter Workshops

12 and 15 November 2019

The Nobel workshops are run during two seasons in the year. These hands-on workshops are carefully crafted to allow students to use inquiry and critical thinking skills to understand the science behind daily applications which are essential to the progress of humankind.

The workshops aim to imbue in students a sense of wonder and a pioneering spirit, and show how their passion in science can benefit the world and improve the quality of lives around them.

So, come join the Nobel Summer and Winter workshops!



The workshops are grouped under categories with particular relevance to both the primary science syllabus (Diversity, Interactions, Systems, Energy), and Everyday Life.

There is something for the budding biologist, engineer, physicist, or simply, the curious mind..

NUS HIGH SCHOOL of Math & Science

NOBEL Summer Workshops

28 to 30 May 2019

Systems
Everyday Life
Interactions
Diversity
Energy

28TH MAY

Time	Workshop Title	Discipline	Nature
0900 – 1200	*Science of slime*	Chemistry	
	Unleash your inner master-baker	Biology	
	Everlasting Energy	Physics	
1300 – 1600	*Ice-cream making*	Chemistry	
	You are what you eat	Biology	
	Vision for the future	Physics	

NUS HIGH SCHOOL of Math & Science

Interactions Energy Diversity Systems Everyday Life

NOBEL Summer Workshops

28 to 30 May 2019

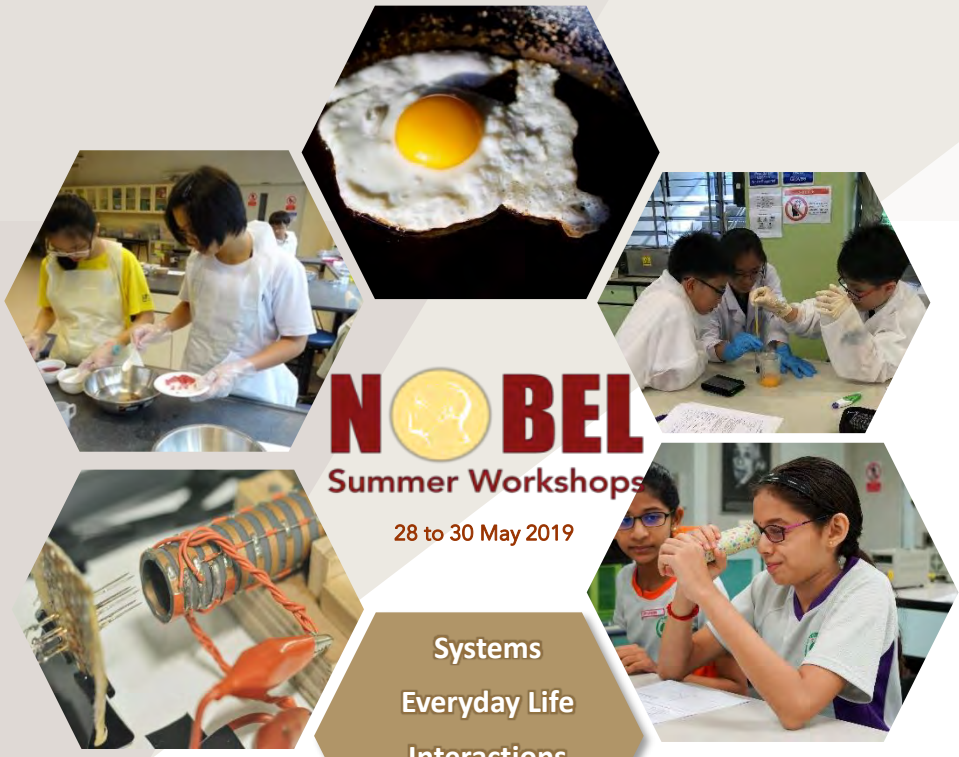
Systems
Everyday Life
Interactions
Diversity
Energy

29TH MAY

Time	Workshop Title	Discipline	Nature
0900 – 1200	*Song of ice and fire*	Chemistry	
	Wonderful world of Insects	Biology	
	Waves and their functions	Physics	
1300 – 1600	*Colours of electricity*	Chemistry	
	Biodiversity of sea creatures	Biology	
	Aerodynamics	Physics	

NUS HIGH SCHOOL of Math & Science

Interactions Energy Diversity Systems Everyday Life



NOBEL

Summer Workshops

28 to 30 May 2019

Systems
Everyday Life
Interactions
Diversity

30TH MAY

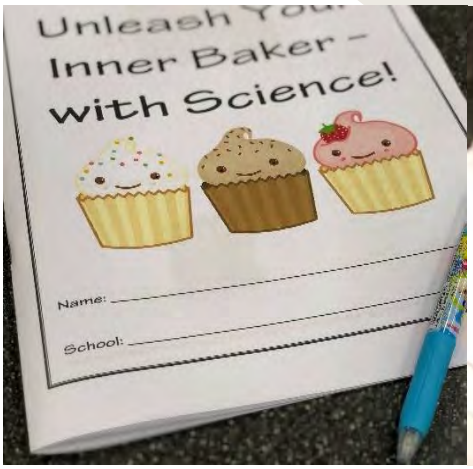
Time	Workshop Title	Discipline	Nature
0900 – 1200	*Spherification*	Chemistry	
	You are what you eat	Biology	
	Circuits and Electronics	Physics	
1300 – 1600	*Ice-cream making*	Chemistry	
	Enzyme universe	Biology	
	Optics and Astronomy	Physics	

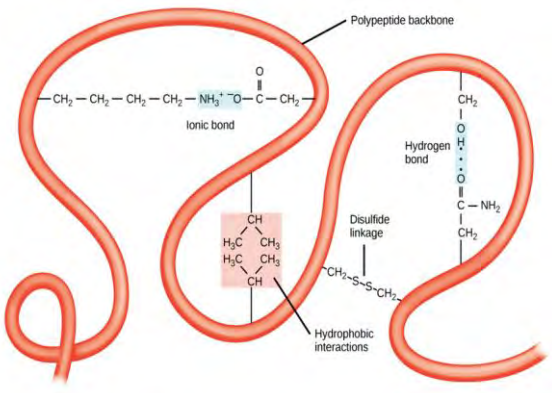
Interactions Energy Diversity Systems Everyday Life

NUS HIGH SCHOOL of Math & Science

Unleash your inner master-baker B1

Biology – Everyday Life/ Interactions





Some say baking is an art.

To us, baking surely is a science too.

In this workshop, you will get to explore how different compositions of ingredients (eggs, sugar, almond flour amongst others) affect the consistency and taste of macarons which you will bake with your own hands, and, of course, eat them.

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 28 May, 0900 – 1200 hrs
Target Level: Primary 5 – 6
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
Registration: Please email davinci@highsch.nus.edu.sg to register by 30 Apr.
Cost: Free of charge

P.S. We scientists take our food as seriously as our work

back

NUS HIGH SCHOOL of Math & Science

You are what you eat

B2 & B5

Biology – Systems/ Interactions

Solar Energy → Chemical Energy

The food that we eat consists mainly of the elements carbon, hydrogen and oxygen. Students will be introduced to the basic components of food and the concept of how molecules get digested and absorbed in our bodies, eventually becoming a part of our cells.

This workshop will seek to complement the existing curriculum on the digestive system, with a more expansive look at the interaction of different food classes with/in the body, and the processes which allows their utilisation for maintenance, growth and repair. Students will also get to explore how the food get digested through hands-on experiments designed to investigate different factors affecting digestion.

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 28th May 1300 – 1600 hrs & 30th May 0900 – 1200 hrs
Target Level: Primary 5 and 6
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
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Cost: Free of charge

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The wonderful world of insects B3

Biology – Interactions/ Diversity

This workshop introduces students to various biological concepts using the world of insects. Students will learn ecological sampling techniques as they practise sampling insect and butterfly diversity. Animal behaviour will also be explored with a simple experiment using *Drosophila Melanogaster* (or better known as fruit flies. Students will practise basic microscopy techniques as they examine their understanding of human physiology by comparing it with insect physiology. Throughout the workshop, higher-order thinking skills and the process of scientific inquiry will be emphasised.

Facilitator: Dr Low Kai Leng (Assistant Head, Biology) / Ms Fong Kit Ching (Senior Teacher/Biology)

Date and Time: 29th May, 0900 – 1200 hrs

Target Level: Primary 5 and 6

Class size: 20 students

Maximum sign up per school: 10 students

Venue: NUS High School, 20 Clementi Avenue 1, 129957

Registration: Please email davinci@highsch.nus.edu.sg to register by 30 Apr.

Cost: Free of charge

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The biodiversity of sea creatures B4

Biology – Systems, Interactions, Diversity

'The oceans cover 70% of the surface of our planet, and yet they are still the least explored,'

- Sir David Attenborough (opening sequence of BBC documentary series Blue Planet II)

According to the latest estimation by researchers, there are about two million species living in the world's ocean. But only about one-third of those species have been named and described. As scientists continue to make new discoveries about the marine species, come join us at this workshop to learn more about the wonders of marine life! Meet the corals, horseshoe crabs, starfishes, sharks and many other marine animals, and find out more about how these fascinating sea creatures are adapted to thrive in the seas.

Facilitator: : Dr Low Kai Leng (Assistant Head, Biology) / Ms Fong Kit Ching (Senior Teacher/Biology)
Date and Time: 29th May, 1300 – 1600 hrs
Target Level: Primary 5 and 6
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Cost: Free of charge

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Enzyme universe

B6

Biology – Everyday Life, Interactions

It is of the utmost importance to keep our body temperature within very narrow limits. Well, it is not so much to keep ourselves warm and fuzzy, but because of the need of our body processes, specifically enzymes. Imagine, as temperatures goes up, enzymes get 'fried' as like an egg does! And our body processes start shutting down too.

In the workshop, we will be studying different biological enzymes and investigate how their actions are affected at varying conditions. We will even be developing our own hypotheses and putting them to the test.

Bonus: *We will also work with enzymes that behaves differently from other enzymes, which will still function at extreme of conditions!*

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 30 May, 1300 - 1600
Target Level: Primary 5 and 6
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
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Cost: Free of charge

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Science of slime

C1

Chemistry - Interactions

Can a piece of slime be considered a solid or liquid? It has a fixed volume but yet, there is no fixed shape. And when a force is applied, the slime stretches, twists, and even flows.

Have you wonder how this soft and squishy texture comes about, and the various factors that affects the properties of slime, which exhibits non-Newtonian property (w*hat is Newtonian in the first place?!*)

To answer all these questions, come join us at this always-popular workshop where you do not just make your own slime, but are given various ingredients to make more stretchy and fluffy slime as you investigate their properties. You will also get to understand the (literal) flexibility chemistry brings to the vast variety of materials around us.

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 28 May, 0900 – 1200 hrs
Target Level: Primary 5
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
Registration: Please email davinci@highsch.nus.edu.sg to register by 30 Apr.
Cost: Free of charge

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Ice-cream making

C2 & C6

Chemistry – Everyday Life / Interactions

Ever wonder why are some ice cream so soft and fine, and tastes so nice, while others are not?

The secret to the yummy ice cream is all about providing the right condition for the ingredients to interact and mix. And usually, the freezing of the ingredients is made possible by liquid nitrogen

(*Fun fact: Nitrogen has a boiling point of – 196 ^{0}C..*
so how does liquid nitrogen look like, and how do we handle it?).

If you have an appetite for exploring the science of food and love for ice cream, join this workshop to create your own ice cream of different flavours with liquid nitrogen.

Just like delicious ice cream, this most-popular of workshops will be snatched up in a jiffy!

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 28 May (C2) & 30 May (C6), 1300 – 1600 hrs
Target Level: Primary 5 – 6
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
Registration: Please email davinci@highsch.nus.edu.sg to register by 30 Apr.
Cost: Free of charge

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Song of ice and fire

C3

Chemistry – Everyday life / Interactions

Water Oil

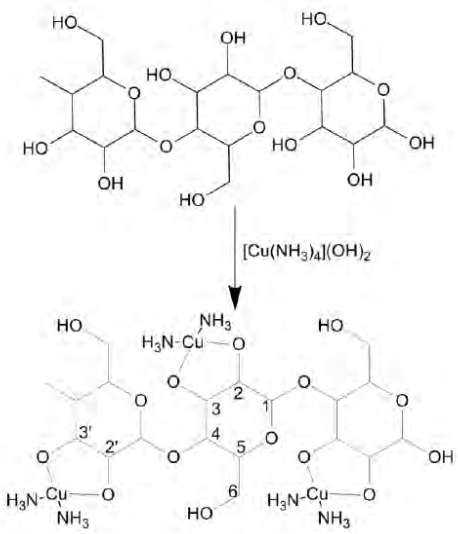
Acids Bases

Making Dissolving cotton

Solutes Solvent

Schweizer reagent

Ice and fire do not mix, and this is not just in *The Game of Thrones*. There are many pairs of seemingly mutually exclusive substances around us, like water and oil, for example. But this are not random occurrences, but governed by a set of rules and based on their unique characters.



Ever wondered what would happen if cotton (your clothes!) can dissolve in water? In this workshop, we will learn to make, and use, a special 'water' that dissolves cotton, and you will get to try to use it. You will also learn what affects the ability of things to dissolve in a solution, and the science behind it - Is it the forming of something unexplainable to us humans (complexes), how hot the solution is (temperature), or how long the hydrocarbon chains are (what are hydrocarbons?!)?

Well, these are all for you to find out when you attend this workshop! So bring along your friendly selves, after all, the secret of everything lies in our interactions!

Facilitator: Dr Seow Nian Jia and NUS High CaTAlYZr Interest Group
Date and Time: 29 May, 0900 – 1200 hrs
Target Level: Primary 5 – 6
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
Registration: Please email davinci@highsch.nus.edu.sg to register by 30th April.
Cost: Free of charge

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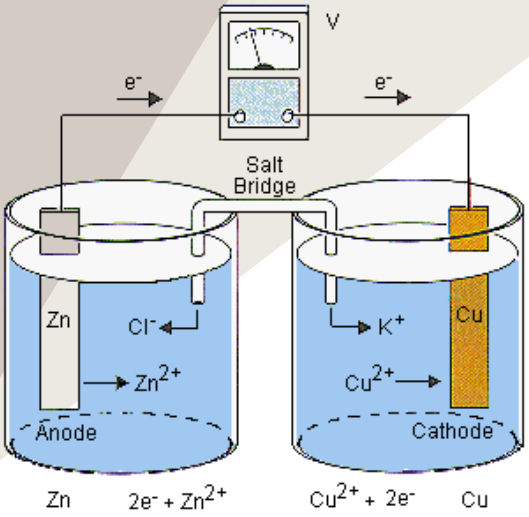
Colours of electricity C4

Chemistry – Systems / Interactions



You might have encountered how the chemical potential energies of batteries are converted to kinetic energy, heat and light.

But what about electricity causing chemical reactions?

The term 'electrolysis' can be understood as the 'using electricity to break something up'. When electricity is passed through certain chemicals, the reactions that proceed can be visualized in a dazzling array of colours (*depending how inventive a scientist you are*). In this workshop, you will not only conduct electrolysis, but also have the opportunity to exercise your creativity and come up with different electro-chemical patterns, all done in a safe environment, of course.

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 29 May, 1300 – 1600 hrs
Target Level: Primary 5 – 6

Maximum sign up per school: 10 students
Class size: 20 students
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Spherification

C5

Chemistry –Interactions

Hands up if you have added black, white, or golden pearl to your bubble tea! OK, even if you do not take sugar drinks, you might have drank fruit juices with aloe vera in them. Or maybe, you have eaten caviar, a luxurious delicacy.

All these do not occur naturally, but rather are processed and manufactured through a process that generates the regular spheres that tastes so good. So put on your chef's hat and apron and you can look forward to make and taste beautiful spheres of your own creation. Come understand the amazing chemistry process behind spherification!

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 30 May, 0900 – 1200 hrs
Target Level: Primary 5
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
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Cost: Free of charge

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Everlasting Energy

P1

Physics – Energy

Have you sat on a roller coaster and wondered why it picks up speed when going downwards? Energy is all around us– from chemical energy in batteries, to elastic energy in springs and kinetic energy in moving objects!

In this workshop, students will learn about the various forms of energy and explore the energy conversion between different forms.

Facilitator: Ms Lim Jia Hui (Assistant Head, Physics) and Raine Low (Alumni)
Date and Time: 28th May, 0900 – 1200 hrs
Target Level: Primary 5 and 6
Class size: 24 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
Registration: Please email davinci@highsch.nus.edu.sg to register by 30 Apr.
Cost: Free of charge

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Optics: Vision for the Future

Physics – Interactions

"Everything we hear is an opinion, not a fact. Everything we see is a perspective, not the truth." - Marcus Aurelius, Philosopher, Roman Emperor (121 - 180)

Ever wondered how we see objects or even how rainbows form? Since the ancient Egyptian period, the study of optics has led to many new discoveries and inventions, such as spectacles– something most of us can't live without.

Students will explore the reflection and refraction of light through cool demonstrations and hands-on activities!

Facilitator: Ms Lim Jia Hui (Assistant Head, Physics) and Ms Raine Low (Alumni)
Date and Time: 28th May, 1300 – 1600 hrs
Target Level: Primary 5 and 6
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Venue: NUS High School, 20 Clementi Avenue 1, 129957
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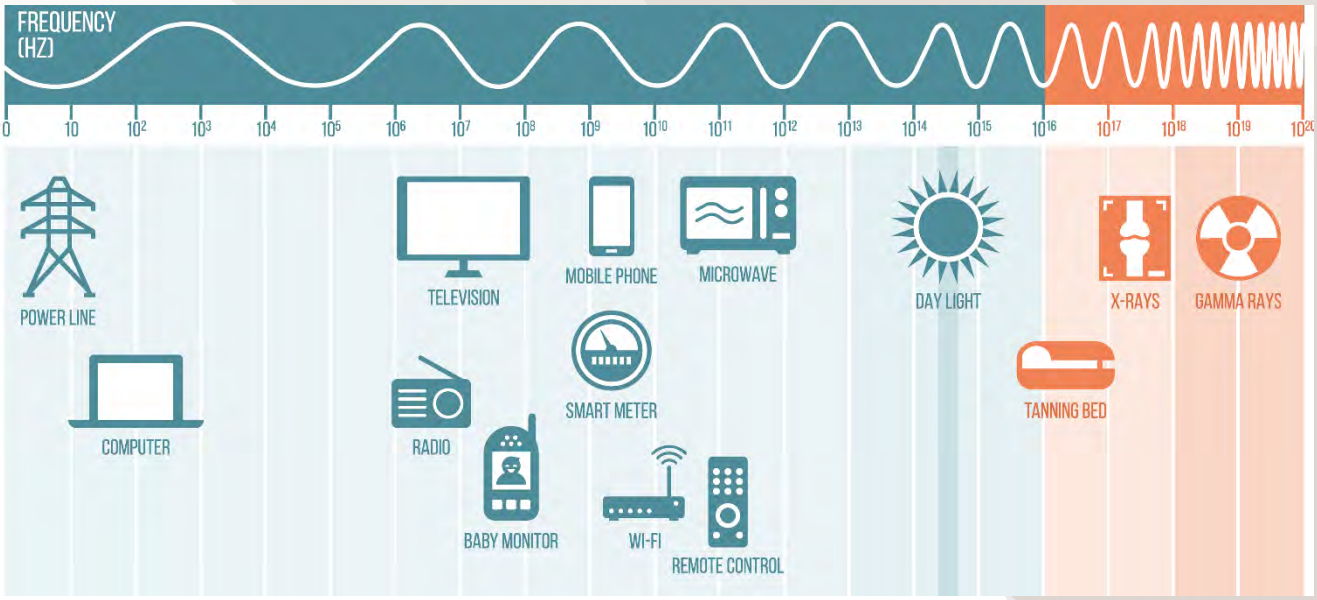
Waves and their Functions

P3

Physics – Energy and Interactions



Can you imagine a pitch black and totally silent world? That is what the world would be like without waves. Since the discovery of the electromagnetic spectrum in the 19th century, waves have been an integral part of our lives– not only to see and hear, but also in the use of broadcasting, cooking and even in medical fields!

Join this workshop to learn about the electromagnetic spectrum, sound and their various uses in our daily lives!

Facilitator: Ms Lim Jia Hui (Assistant Head, Physics) and Ms Raine Low (Alumni)
Date and Time: 29th May, 0900 – 1200 hrs
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Cost: Free of charge

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Aerodynamics

P4

Physics – Interactions

After the fixed-wing model of an airplane was proposed by George Cayley in 1799, it took approximately another hundred years for that machine to be lifted off the ground. Lives of brilliant minds such as Otto Lilienthal and Percy Pilcher were sacrificed during the process of understanding aerodynamics.

What are the different forces acting on a plane while it is in the air? How does the structure of an object affect its flight? In this workshop, we will be looking into the basics of aerodynamics through fun hands-on and simple explanations. Solve mysteries on the flight of planes and learn the physics of flight today!

Facilitator: Ms Lim Jia Hui (Assistant Head, Physics) and Ms Raine Low (Alumni)
Date and Time: 29th May, 1300 – 1600 hrs
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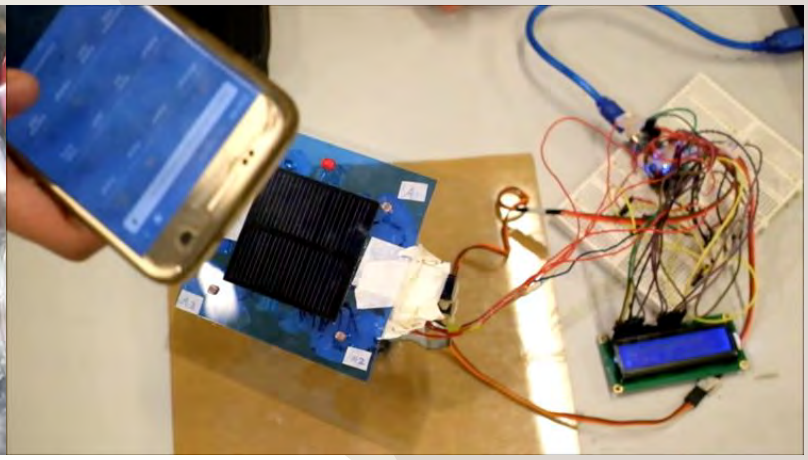
Circuits and Electronics

P5

Physics – Systems



What would life be like without electricity? Do we rely on electricity like we do on food and water? Answers to these questions we don't dare dream and admit, but we know that since the first invention of a lamp powered by electricity in the 1800s, the use of electricity has become deeply entrenched in our daily lives, evolving as technology progresses.

In this workshop, students will learn about current electricity and their applications in fun and exciting games!

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Optics and Astronomy

P6

Physics – Energy and Interactions

In the 16th Century, Galileo Galilei invented the first telescope and used it to gaze at the countless stars. Since then, people all around the world have gained insight on how manipulating the path of electromagnetic waves like visible light has enabled us to look beyond the horizon, and discover new frontiers in Physics.

In this workshop, students will learn more about the properties of light and how it travels. They will explore concepts of reflection and refraction, and applying that in building their own handphone projector! After learning about lenses and their applications, they will build telescope and test for themselves how optics is applied in the real world.

Facilitator: Ms Lim Jia Hui (Assistant Head, Physics) and Ms Raine Low (Alumni)
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NOBEL Winter Workshops

12 & 15 November 2019

Nobel winter workshops takes place on 12 & 15 November. We will be bringing back some of the most popular workshops, as well as offerings such as new workshops on Primates – Speech and Behaviour and Cyanotyping. So watch this space!

NUS HIGH SCHOOL of Math & Science

Come!

Experiment | Explore | Excel

"Scientists have become the bearers of the torch of discovery in our quest for knowledge."

— Stephen Hawking

NUS High School of Mathematics and Science
20 Clementi Avenue 1 | Singapore 129957 | davinci@highsch.nus.edu.sg

NOBEL

Summer & Winter Workshops

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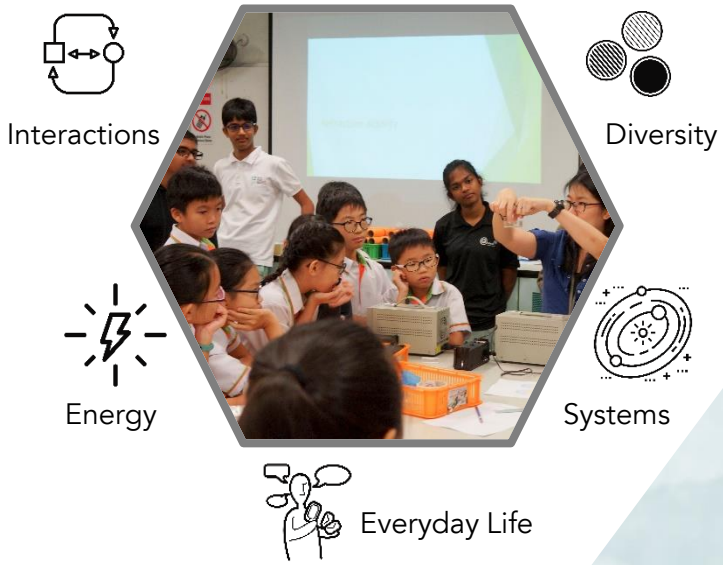

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There is something for the budding biologist, engineer, physicist, or simply, the curious mind..

NUS HIGH SCHOOL of Math & Science

NOBEL Winter Workshops

12& 15 November 2019

Systems
Everyday Life
Interactions
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Energy

12TH November

Time	Workshop Title	Discipline	Nature
0900 – 1200	*Ice-cream making*	Chemistry	
	Enzyme Universe	Biology	
	Simple Harmonic Motion	Physics	
	*Building the Bionic robot *NEW**	Engineering	
1300 – 1600	*Soap making *NEW**	Chemistry	
	Song of ice and fire	Chemistry	
	You are what you eat	Biology	
	Quantum Physics: The History of Light	Physics	

NUS HIGH SCHOOL of Math & Science

Interactions Energy Diversity Systems Everyday Life

NOBEL Winter Workshops

12& 15 November 2019

Systems
Everyday Life
Interactions
Diversity
Energy

15TH November

Time	Workshop Title	Discipline	Nature
0900 – 1200	*Basically, Acids! *NEW**	Chemistry	
	Biodiversity of sea creatures	Biology	
	Street Luge	Physics	
1300 – 1600	*Science of Spherification*	Chemistry	
	*DNA and Evolution *NEW**	Biology	
	Electromagnetism	Physics	

NUS HIGH SCHOOL of Math & Science

Interactions Energy Diversity Systems Everyday Life

Ice-cream making

Need we say more?

Chemistry

Ever wonder why are some ice cream so soft and fine, and tastes so nice, while others are not?

The secret to the yummy ice cream is all about providing the right condition for the ingredients to interact and mix. And usually, the freezing of the ingredients is made possible by liquid nitrogen

(*Fun fact: Nitrogen has a boiling point of – 196 ^{0}C..*
so how does liquid nitrogen look like, and how do we handle it?).

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Just like delicious ice cream, this most-popular of workshops will be snatched up in a jiffy!

Facilitator: Dr Seow Nianjia (Outreach Educator) & **NUS High CAtAlYZr Interest Group**
Date and Time: 12 November, 0900 – 1200 hrs
Target Level: Primary 5
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
Registration: Please email davinci@highsch.nus.edu.sg to register by **14 Oct 2019**.
Cost: Free of charge

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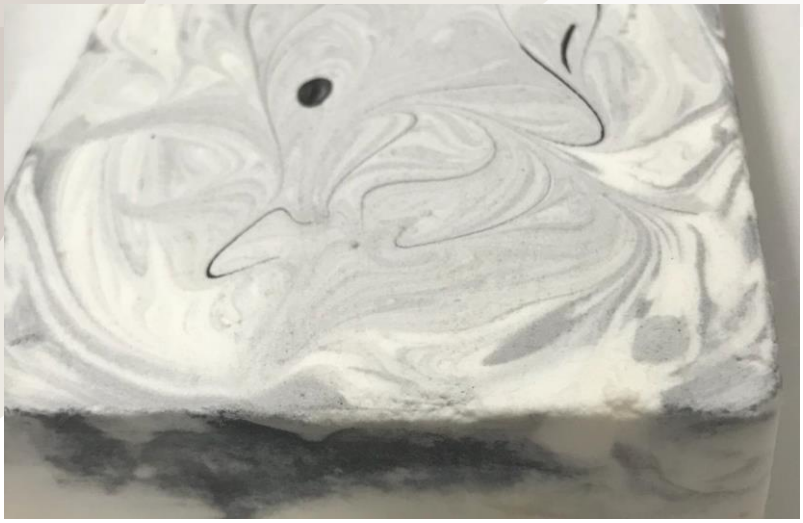
Soap-making

Chemistry



Ever been entranced by the scents and designs of beautifully crafted soaps, and wonder how they are made? Now comes the chance for you to experience the process of making your own specially-designed soap!

Soap making basically consists of a chemical reaction between fats/oils and lye (what is this, you ask? Come for the workshop and find out!). It can be a wonderfully simple process, enriched by ingredients of choice such as naturally skin-nourishing components and vitamins, minerals, and beneficial oils. They will be smooth to touch, nice to smell, and of course, do what soaps are supposed to do in terms of cleaning.

Looking forward to an engaging afternoon designing a soap that is uniquely yours. It makes for a wonderful gift too.

Facilitator: Mrs Tan-Soong Seck Cher (Senior Teacher)
Date and Time: 12 November, 1300 – 1600 hrs
Target Level: Primary 5
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Maximum sign up per school: 10 students
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Song of ice and fire

Chemistry

Water Oil

Making Dssolving cotton

Schweizer reagent

Solutes Solvent

Ice and fire do not mix, and this is not just in *The Game of Thrones*. There are many pairs of seemingly mutually exclusive substances around us, like water and oil, for example. These are not random occurrences, but governed by a set of rules and based on their unique characters.

Ever wondered what would happen if cotton (your clothes!) can dissolve in water? In this workshop, we will learn to make, and use, a special 'water' that dissolves cotton, and you will get to try to use it. You will also learn what affects the ability of things to dissolve in a solution, and the science behind it.

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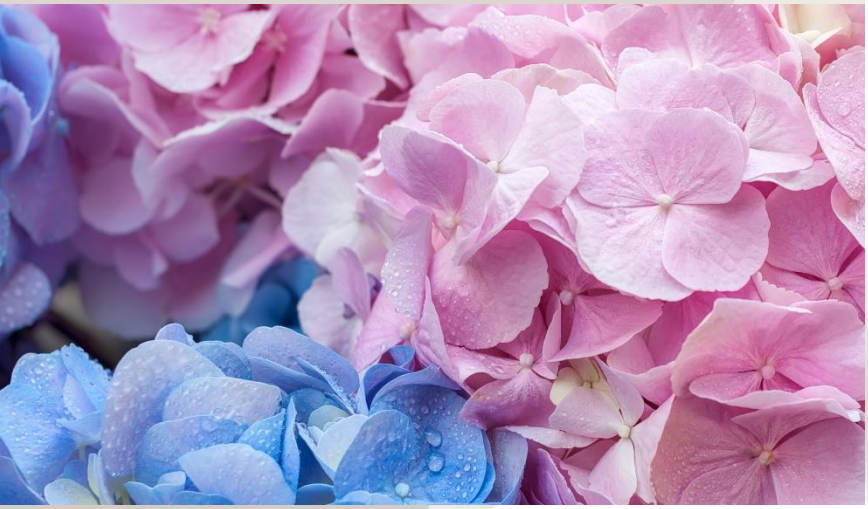
Basically, Acids!

Chemistry



The colours of hydrangea flowers depend on soil pH

Acids are a prominent feature of our daily life. We use it for cooking and preservative (ethanoic acid/ vinegar), while our stomach produce around 2 litres of hydrochloric acid, without which we will not be able to digest much of the food we eat. pH is a scale that provides an indication on the amount of acid that is present, and pH indicators can be made from many (often natural) sources all around us.

In this workshop, we will be

1. Exploring different reactions associated with acids
2. Preparing natural indicators and making our own pH wheel
3. Identifying the pH of unknown, 'mystery' solutions

Come join us for an afternoon filled with a explosion of COLOURS!

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 15 November, 0900 – 1200 hrs
Target Level: Primary 5
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
Registration: Please email davinci@highsch.nus.edu.sg to register by **14 Oct 2019**.
Cost: Free of charge

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The Science of Spherification

Chemistry



Hands up if you have added black, white, or golden pearl to your bubble tea! OK, even if you do not take sugar drinks, you might have drank fruit juices with aloe vera in them. Or maybe, you have eaten caviar, a luxurious delicacy.

All these do not occur naturally, but rather are processed and manufactured through a process that generates the regular spheres that taste so good, while showing remarkable consistency. If you are wondering how these pristine spheres are formed, and the science behind controlling their shape and size, texture and taste, this is the workshop you will want to hop on, and have a fun-filled and enriching afternoon of exploration.

Come understand the amazing chemistry processes behind spherification!

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 15 November, 1300 – 1600 hrs
Target Level: Primary 5
Class size: 20 students
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Enzyme Universe

Biology

It is of utmost importance to keep our body temperature within very narrow limits. Well, it is not so much to keep ourselves warm and fuzzy, but because of the needs of our body processes and functions, specifically enzymes. Imagine, as temperatures go up, enzymes get 'fried' like an egg! Then our body processes start shutting down too.

In the workshop, we will be studying different biological enzymes and investigate how their actions are affected at varying conditions. We will even be developing our own hypotheses and putting them to the test.

Bonus: *We will also work with enzymes that behaves differently from other enzymes, which may still function at extreme conditions!*

Facilitator: Dr Seow Nianjia (Outreach Educator) & **NUS High Biology Interest Group**
Date and Time: 12 November, 0900 - 1200
Target Level: Primary 5
Class size: 20 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
Registration: Please email davinci@highsch.nus.edu.sg to register by **14 Oct 2019**.
Cost: Free of charge

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You are what you eat

Biology

Solar Energy → Chemical Energy

The food that we eat consists mainly of the elements carbon, hydrogen and oxygen. Students will be introduced to the basic components of food and the concept of how molecules get digested and absorbed in our bodies, eventually becoming a part of our cells.

This workshop will seek to complement the existing curriculum on the digestive system, with a more expansive look at the interaction of different food classes with/in the body, and the processes which allows their utilisation for maintenance, growth and repair. Students will also get to explore how the food get digested through hands-on experiments designed to investigate different factors affecting digestion.

Facilitator: Dr Low Kai Leng (Assistant Head, Biology)
Date and Time: 12 November, 1300 – 1600 hrs
Target Level: Primary 5
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The biodiversity of sea creatures

Biology

'The oceans cover 70% of the surface of our planet,
and yet they are still the least explored,'

- Sir David Attenborough (opening sequence of BBC documentary series Blue Planet II)

According to the latest estimation by researchers, there are about two million species living in the world's ocean. But only about one-third of those species have been named and described. As scientists continue to make new discoveries about the marine species, come join us at this workshop to learn more about the wonders of marine life! Meet the corals, horseshoe crabs, starfishes, sharks and many other marine animals, and find out more about how these fascinating sea creatures are adapted to thrive in the seas.

Facilitator: Miss Fong Kit Ching (Senior Teacher)
Date and Time: 15 November, 0900 – 1200 hrs
Target Level: Primary 5
Class size: 20 students
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DNA and Evolution

Biology

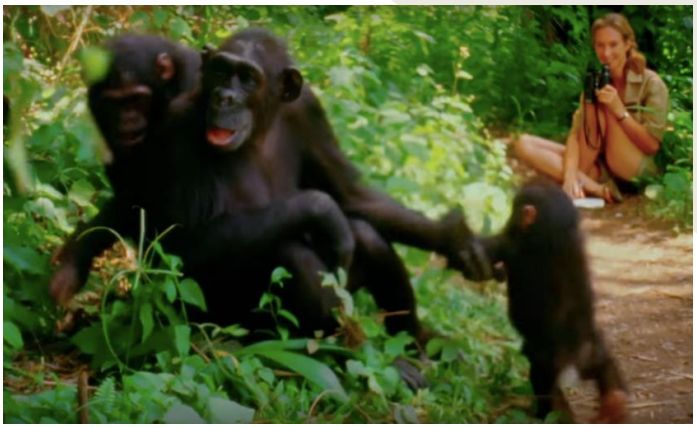

Image: The Jane Goodall Institute

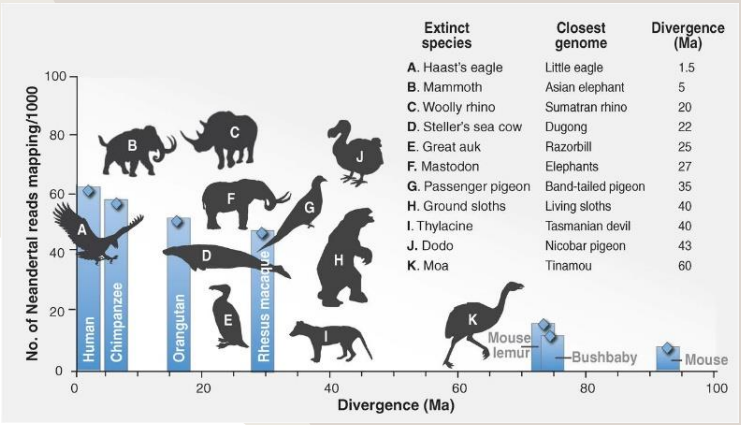

Image: Science Magazine

It is often said that we are who and what we are because of our DNA. And it is same DNA that cause us humans *(homo sapiens)* to have similar properties as some other mammals such as primates (arms, legs, eyes amongst others), while yet showing much differences.

So what is DNA exactly?

In this workshop we will looking at 2 very similar yet different topics. First, we will look at the genome, this DNA that we are all made of, and the influence of DNA on our proper functioning.

Then, we will also learn about the studies on primates done by Professor Jane Goodall, and we will see how remarkably similar the behaviour of humans and primates are.

(D)o (N)ecessarily (A)ttend!

Facilitator: Dr Seow Nianjia (Outreach Educator)
Date and Time: 15 November, 1300 - 1600
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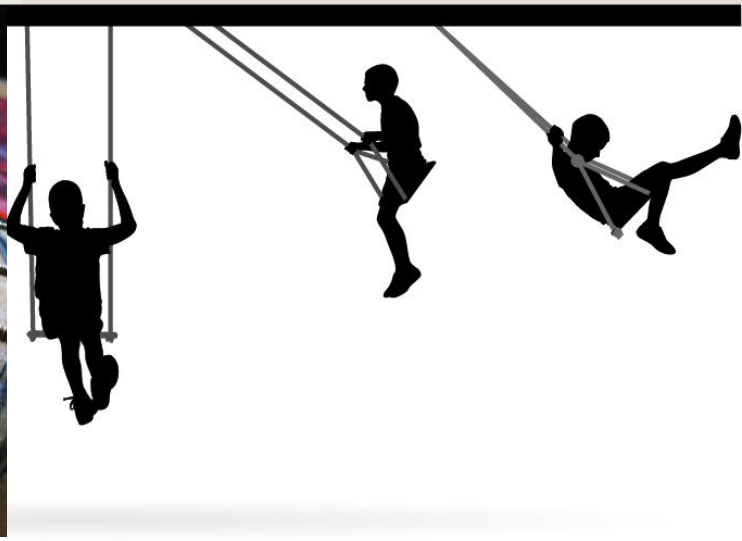
Simple Harmonic Motion

Physics – Systems and Interactions



Ever wondered why the swings you ride can change directions on its own? Or how you can enjoy those thrills in bungee jumping? Have you observed what happens when you pull a string on the guitar or the violin? This is not simply the "wave motion" you're thinking, but something more simple!

In this workshop, you will get acquainted with Simple Harmonic Motion - the science of oscillations in pendulums and what happens when a spring is compressed. You would even get to make and conduct an experiment with your own pendulum!

Facilitator: Mr Kenneth Ho Jun Hao (Outreach Educator) & **NUS High Quanta Physics Interest Group**
Date and Time: 12th Nov, 0900 – 1200 hrs
Target Level: Primary 5 and 6
Class size: 24 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
Registration: Please email davinci@highsch.nus.edu.sg to register by **14 Oct 2019**.
Cost: Free of charge

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Building the Bionic robot

Engineering – Systems

Are you fascinated by how toys work on the inside? Do you love tinkering around and making things? Then this is the workshop for you!

We will be guiding you through step-by-step instructions on how build a walking bionic bear robot, using laser cut wood parts made right here in NUS High! You will also get to design anything you want the bear to hold!

Facilitator: Mr Kenneth Ho Jun Hao (Outreach Educator) & **NUS High Engineering Interest Group**
Date and Time: 12th Nov, 0900 – 1200 hrs
Target Level: Primary 5 and 6
Class size: 24 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
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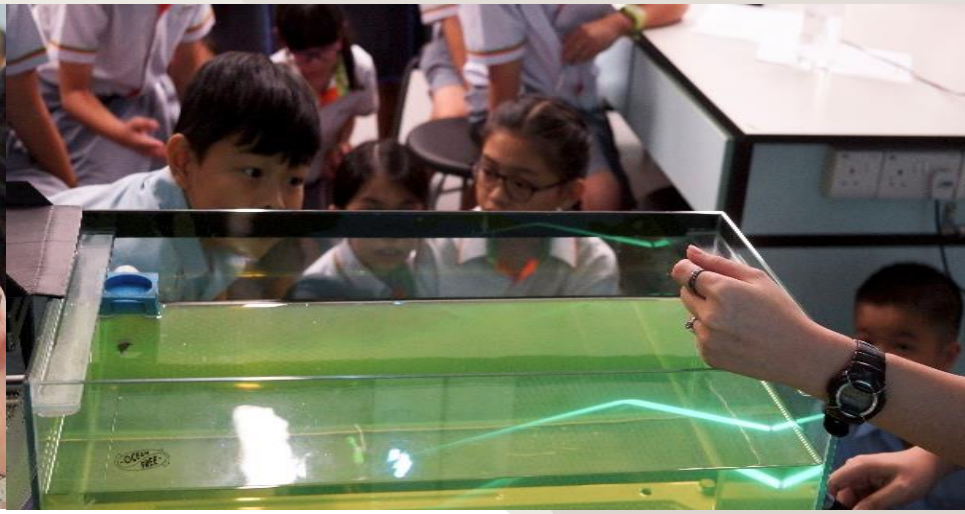
Quantum Physics: The History of Light

Physics – Systems and Interactions



What is the nature of light and how does it work? This is the very question that has been bothering major civilizations like the Greeks, Arabs and Egyptians for thousands of years. The behaviour of light has pitted great scientists like Isaac Newton, Einstein and Bohr against each other in their quests to understand the way our universe functions.

This workshop takes a trip down the history of Physics to understand how we have come to the current understanding of light, and the birth of Quantum Mechanics. We will also investigate one of the ways Quantum Technologies is shaping our present and the future – Quantum Communications and Cryptography.

Join us this Nobel Winter camp and bend the rules of human experience to understand the hidden and breathtaking realm of Quantum Mechanics!

Facilitator: Mr Kenneth Ho Jun Hao (Outreach Educator) & **NUS High Quanta Physics Interest Group**
Date and Time: 12th Nov, 1300 – 1600 hrs
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Street Luge

Physics – Energy and Interactions



Fastest car wins!
In this workshop, students will make a simple unpowered car that will race down a ramp.
Students will learn about:

- Friction & ways of reducing friction
- Energy Conversion
- Gravitational PE
- Kinetic Energy (translational & rotational)
- Speed

Facilitator: Mr Soh Kwan Seng Clifton (Senior Teacher)
Date and Time: 15th Nov, 0900 – 1200 hrs
Target Level: Primary 5 and 6
Class size: 24 students
Maximum sign up per school: 10 students
Venue: NUS High School, 20 Clementi Avenue 1, 129957
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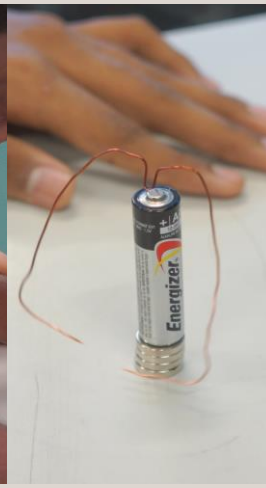
Electromagnetism

Physics – Systems & Energy



In 1821, Michael Faraday, built two devices to produce what he called "electromagnetic rotation". One of these devices, the homopolar motor, causes a continuous circular motion due to a circular magnetic force around a wire that extended into a pool of mercury in which a magnet was placed; the wire would then rotate around the magnet if supplied with current from a battery. These experiments and inventions formed the foundation of modern electromagnetic technology.

In this workshop, students will be exposed to experiments involving electromagnetism and learn about concepts such as static electricity and current electricity. They will also get to build their very own homopolar motor that they can bring home! So join us for a truly electrifying 3 hour workshop!

Facilitator: Mr Kenneth Ho Jun Hao (Outreach Educator) & **NUS High Quanta Physics Interest Group**
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NUS HIGH SCHOOL of Math & Science

Come!

Experiment | Explore | Excel

"Scientists have become the bearers of the torch of discovery in our quest for knowledge."

— Stephen Hawking

NUS High School of Mathematics and Science
20 Clementi Avenue 1 | Singapore 129957 | davinci@highsch.nus.edu.sg