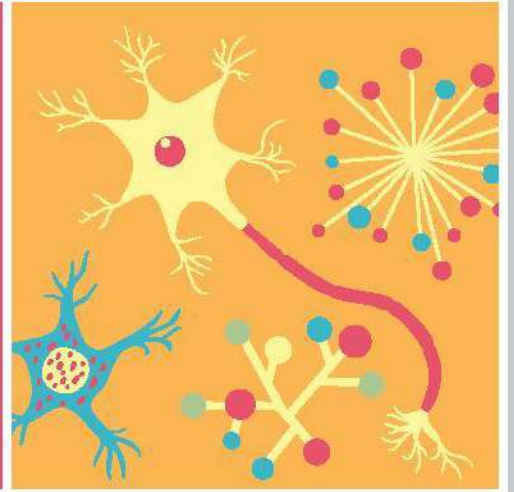
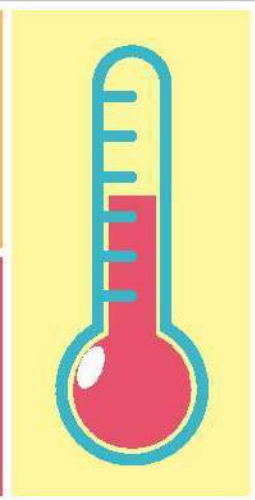
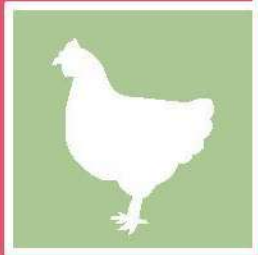


# ENRICHMENT PROGRAMMES

## 2018 SCIENCE CENTRE SINGAPORE



### PRIMARY SCHOOL



Singapore Government  
Integrity • Service • Excellence



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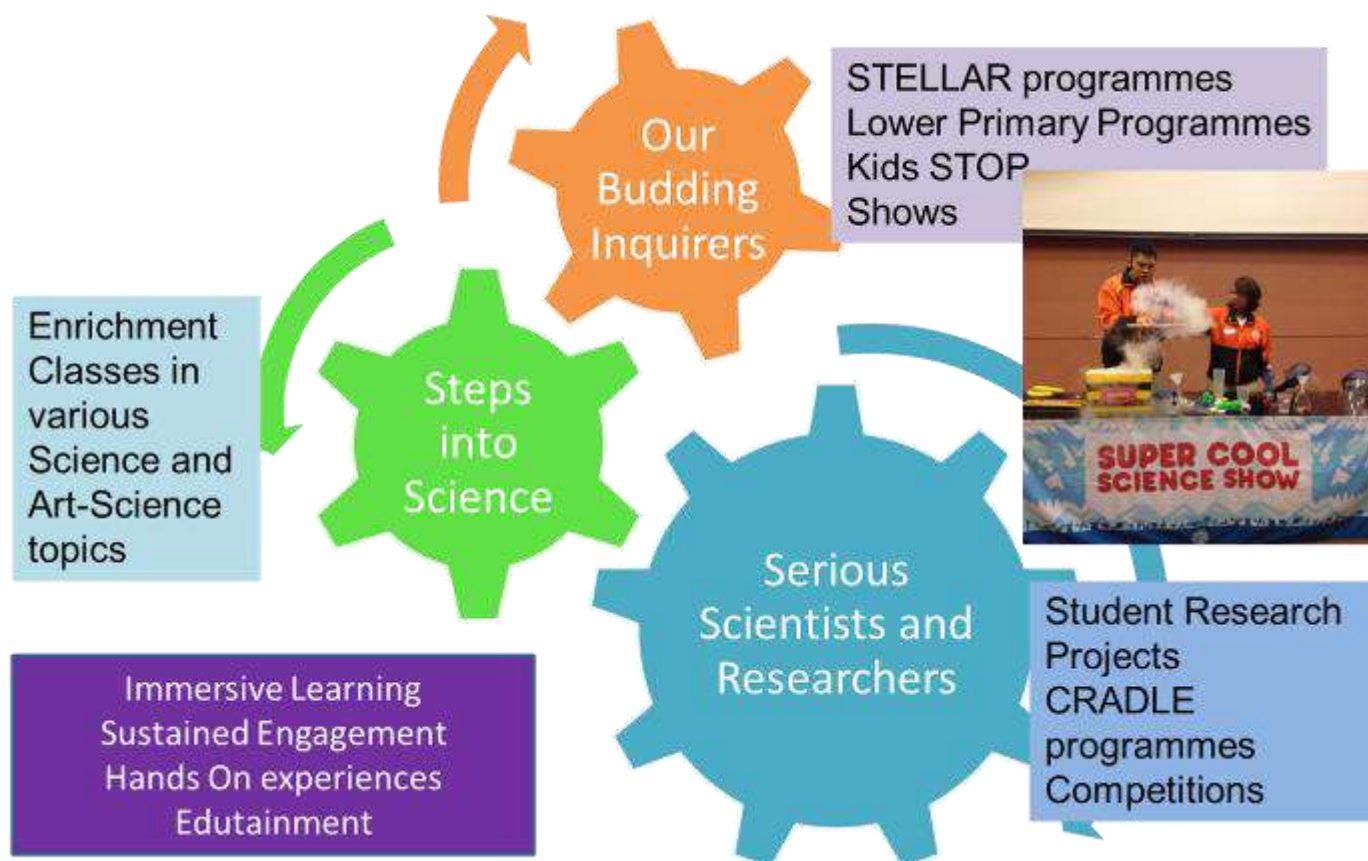
All information is correct at time of printing.

# WELCOME TO SCIENCE CENTRE SINGAPORE

Partnering schools over 40 years, Science Centre provides an extensive catalogue of enrichment experiences for students of all ages and stages.

Book now!! <https://obs.science.edu.sg/login>

## HOW CAN STUDENTS LEARN AT SCIENCE CENTRE SINGAPORE?



Gallery Pathways and exhibitions

Lectures and Lab Lessons

Volunteer Programmes

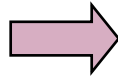
Student Research Projects

Competitions

# PLAN YOUR VISIT

At least 10 working days before your visit

- a. Choose your programme
- b. Book Online at <https://obs.science.edu.sg>
- c. Contact us if you want to enhance your visit with additional programmes or organise a Science Day

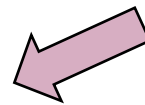


Before your visit, remind students to

- a. Bring a sweater or jacket
- b. Have your meal before the lesson
- c. Bring along extra clothing if visiting the waterworks exhibition
- d. Bring their water bottles and stationery

On the day of your visit

- a. Be at Science Centre Singapore at least 15 minutes prior to schedule
- b. Approach the ticketing counter with the confirmation email
- c. Our staff will show you to the labs/auditoriums



## CONTACT US

**General information:**

Tel: 6425 2500

[www.science.edu.sg](http://www.science.edu.sg)

**Science Centre Singapore opening hours: Daily 10.00am to 6.00pm**

**Science Enrichment Programmes, Science Days and Omni-Theatre Programmes**

**Tel** : 6425 2525/ 26  
**Fax** : 6561 6361  
**Email** : [schools@science.edu.sg](mailto:schools@science.edu.sg)  
**Online Booking** : <https://obs.science.edu.sg/login>

### **Snow City Programmes**

**Tel** : 6560 2306  
**Fax** : 6560 1297  
**Email** : [contact@snowcity.com.sg](mailto:contact@snowcity.com.sg)

### **Science Resource - StaR Kits**

**Email** : [star@science.edu.sg](mailto:star@science.edu.sg)

# ADMISSION CHARGES AND OPENING HOURS

## Opening Hours:

Daily 10.00am to 6.00pm. NOTE: CLOSED ON ALL MONDAYS FOR EXHIBITIONS.

- The Science Enrichment Programmes at Science Centre Singapore are available to schools from Monday to Friday and Saturdays (selected classes only), except when it is a public holiday.

Science Centre Singapore (SCS) open dates for Monday as follows:

1<sup>st</sup> January, 19<sup>th</sup> February, 12<sup>th</sup> March, 28<sup>th</sup> May, 4<sup>th</sup> June, 11<sup>th</sup> June, 18<sup>th</sup> June, 2<sup>nd</sup> July, 3<sup>rd</sup> September, 19<sup>th</sup> November, 26<sup>th</sup> November and whole of December 2018.

SINGLE VENUE	RATE	ADULT	CHILD
Science Centre Singapore (SCS)	Local School groups in uniform (MOE schools/poly/tertiary, excluding international schools)	Free	Free
	International school groups in uniform (Minimum 20 students)	\$5.00 per additional teacher	\$2 Free admission for 2 teachers per group of 20 students.
	Singaporean/PR Rate Off-Peak Period	Free	Free
	Singaporean/PR Rate Peak Period	\$6.00	\$4.00
	Standard Rate	\$12.00	\$8.00 (3-12 years)
Butterflies Up-Close	Local School group (Primary and above)	\$6.00 per additional teacher (includes SCS admission)	\$6.00
	Standard Rate	\$10.00	\$10.00 (3-12 years) (SCS admission charges apply.)
Omni-Theatre (Digital Movie OR Live Planetarium Show)	Standard Rate	\$14.00	\$14.00
	School Group (min 20 students)	\$10.00 per additional teacher	\$8.00 Free admission for 2 teachers per group of 20 students.
Snow City (1 hour rate)	Singaporean/PR Rate	\$15.00	\$12.00
	Standard Rate	\$18.00	\$18.00

For a complete list of admission charges, please refer to our website at <http://www.science.edu.sg>.



# TERMS AND CONDITIONS

## FOR LOCAL MOE SCHOOL BOOKINGS TO SCIENCE CENTRE SINGAPORE:

For overseas visitors and groups, please contact our marketing department.

Any bookings received implies that you are agreeing to our terms and conditions and the cancellation policy.

### 1. Admission and Science Centre Singapore Admission Fee\*

- i) Free Science Centre Singapore Admission applies to local MOE primary to tertiary schools in Singapore including ITEs, polytechnics and universities. Admission to Science Centre Singapore fee applies to International Schools (locally based) who are not Associate members.
- ii) Admission fee for International school groups in uniform is \$2 per student for group of 20 students and above. Free admission for 2 teachers per group of 20 students. Additional teacher fee is \$5.
- iii) Upon arrival, please approach the ticketing counter. Please present your confirmation letter and your Associate Member card (if applicable).
- iv) Admission for gated attractions are charged separately.

### 2. Cancellation and Amendments

- i) All cancellation & any booking amendments have to be sent to us at least **10 working days** before your arrival dates to avoid any penalty charges.
- ii) A penalty charge will apply for any cancellation within 10 working dates of scheduled booked date, no show, or if the class is late for > 30 mins without notification or if the number of students in the class falls below the minimum number stipulated for the class.
- iii) Penalty charges: the course fee for number of people booked (for paid programmes) or \$50 (for free programmes).
- iv) All bookings received will indicate that participants have agreed to the cancellation policy.
- v) Within 10 working days of the scheduled booking date:
  - No more amendments to the date or number of students will be allowed.
  - The course fee charged will be for the booked number, even if there are fewer students on that day.
  - If there are more students on that day, an additional invoice will be issued for the course fee and admission fee (if applicable).
  - Cancellations will be treated as a no-show and charged accordingly.

Example: If a class is scheduled for Wednesday 16 February, any cancellation or amendment requests received before Wednesday 2 February will not incur an extra charge. No amendments will be entertained after this time, and cancellation requests received after this time will be treated as no-shows.

### 3. No-shows and Punctuality

- i) If a class does not show up during their scheduled booking, it will be treated as a no-show. There will be a penalty charge of the course fee for a paid programme, or \$50 for a free programme, as resources will already have been mobilised for the programme.
- ii) If the number of students in the class falls below the minimum required number, a penalty charge of \$50 (for a free programme) will be imposed.
- iii) If a class is late for > 30 minutes without notification, the class will be automatically cancelled and treated as a no-show.
- iv) Should a class arrive late for a programme, the Science Centre Singapore may, at its discretion, grant an extension of time for the completion of the programme, or modify/omit programme segments to ensure that the programme finishes within the allocated time slot.
- v) Should unforeseen circumstances result in the Science Centre Singapore starting the programme late, the entirety of the programme will be delivered.

### 4. Class Size

- i) The minimum number of students per class is 20 for hands-on programs and 80 for lectures unless otherwise stated.
- ii) The maximum number of students per class is 40 for hands-on workshops, unless otherwise stated.

### 5. Etiquette and Lab Safety

- i) The teacher is strongly recommended to stay in the class during the lesson and assist in classroom management.
- ii) Teachers should ensure that students follow lab safety rules. In the event that the students are too rowdy or if there is a breach in safety rules, we reserve the right to stop the class.
- iii) To ensure a fulfilling and enriching experience, interruptions during lesson time is strongly discouraged. To minimise interruption, there will not be a toilet break for the students while the programme is in progress. Please ensure that the students visit the restroom prior to the start of the lesson.

All Science Centre Singapore trainers are registered with MOE.

For more details, refer to [http://intranet.moe.gov.sg/sdcd/cca0/Pages/cca\\_notifications.aspx](http://intranet.moe.gov.sg/sdcd/cca0/Pages/cca_notifications.aspx)

Thank you for your cooperation!  
Science Centre Singapore

# SCIENCE ON THE GO

## Can't come to the Science Centre Singapore?

Then let the Science Centre Singapore come to you! Our outreach programmes offer convenient, affordable, and unique science learning experiences.

## Hands-on Activities at your school

### Moving Machines

Using everyday materials, students are challenged to make a moving machine. Students will explore and experiment with different materials and variables, investigating concepts at the intersection of art, science and technology.

#### Objectives:

1. Understand what is innovation.
2. Gain an insight into Maker Education.
3. Understand Movement and how it can be caused.
4. Learn to work with motors and functional circuits.
5. Learn to use basic tools such as scissors, cutters, glue guns etc



**\$8 per person**



**1.5hr**



**P4 to P6**



**80 to 140**



**9.30am, 2.30pm**



# SCIENCE ON THE GO

## Science Shows at Your School

Extraordinary encounters and distinctive demonstrations are available for school bookings.



### \*Energy, What's That?

Energy is all around us and they exist in different forms. Learn more about energy through various exciting science demonstrations brought to you by our Science Educators. Be prepared to leave the show feeling energized and ready to learn more!

### \*Magic Science Show

Science can be full of mysteries too! Be a wizard yourself and partake in our "Magic Science" show. Waltz through a magical world with loads of magic science tricks that play with colour changes, fire and smoke, and seem to defy natural laws of nature. Our chief wizards can even read your mind! So what are you waiting for?

### Air-mazing Science Show

It's a bird, it's plane! No, it is just air! Air keeps us alive and helps us in many ways. However, what is air? Is air matter? What happens if air gets hot or cold? This special air show will answer all these questions with quirky and fascinating science demonstrations for everyone to enjoy! Learn about the properties of air and how air pollution can affect us!

*\*Fire demonstrations are conducted during shows. High ceiling for performance area recommended.*



1st session: \$530 + GST  
Add session: \$350+ GST



0.5hr approx.



100 to 300



Not available in Oct & Nov 2018;  
weekend and school holidays.

## Take Flight (Paper Airplane Demo)



See incredible and exciting paper airplanes in action – airplanes that zoom across the room, flap their wings, or return like boomerangs! This exciting performance showcases the 'Wright' stuff, from paper airplanes that are functional yet expressive to aesthetically appealing yet playable ones. This 30-minute performance gives students an introduction to some fantastic flyers in the world of paper airplanes and some insights into how flight performance of paper planes can be enhanced.



\$154.21 + GST  
per session



0.5hr approx.



100 to 300



Not available in Oct & Nov 2018;  
weekend and school holidays.

All cost includes a two-way transport charged between Science Centre Singapore and the school.

A 7% GST charge will be levied. For more information, please refer to our website: <http://www.science.edu.sg>, click "School Programmes (Science Resources, Science on the Go)".

For booking of the programmes, please download the booking form from the website and fax the completed form back to 6561 6361.



## STARLAB - A Portable Planetarium (with instructors)

### "Starry Night" Outreach Programme

Using a projector and an inflatable dome, STARLAB planetarium, simulates the experience of a starry night sky containing thousands of stars. During the programme students will be taken on a tour of the night sky, identifying the key constellations and highlighting some of the ancient stories about how the stars are named. Other concepts such as seasons and the Earth's rotation will be introduced as we explore the changes that occur in the sky at different times of year.

This Starry Night Outreach Programme includes half day or full day rental and delivery of the STARLAB Planetarium together with two instructors.

Each session lasts 45 min (inclusive of entry and exit time).

### Prices are as follows:

#### Rental Rates (Per Day)\*

	Half-Day Rental (Max. 4 sessions)	Full Day Rental (Max. 8 sessions with 1 hr lunch break)
*Rates/Charges (inclusive of 7% GST)	S\$1,123.50	S\$1,872.50

Venue requirements for the portable planetarium

Minimum Floor Area 7m x 7m

Minimum Ceiling Height 3.5m

Air-conditioning Compulsory

Suitable Venues Gymnasium, assembly hall, auditorium stage, large classroom, function room. Please note: Outdoor areas such as playgrounds, sheltered basketball courts and balconies are not suitable for the planetarium.

## STARLAB - A Portable Planetarium (without instructor)

If you would like to choose to conduct the shows yourself but do not have a planetarium, you may rent it from us and operate it using your PC.

You may choose to rent the system for 1 – 3 days. Please allow 1 hour for briefing on the proper use of the portable planetarium when you arrange to pick up the equipment.

### Prices are as follows:

	1-Day Rental	2-Day Rental	3-Day Rental
Rates/Charges (inclusive of 7% GST)	S\$454.75	\$775.75	\$1,032.55

Venue requirements for the portable planetarium

Minimum Floor Area 7m x 7m

Minimum Ceiling Height 3.5m

Air-conditioning Compulsory

Suitable Venues Gymnasium, assembly hall, auditorium stage, large classroom, function room. Please note: Outdoor areas such as playgrounds, sheltered basketball courts and balconies are not suitable for the planetarium.

For more information on planetarium programmes and additional/optional hands-on activities, contact [Charlene\\_yeo@science.edu.sg](mailto:Charlene_yeo@science.edu.sg).

# DNA LEARNING LAB

## Hands-on Workshops

<b>OBJECTIVES</b>          <b>TITLE</b>	Characteristics of cells and function of cell parts	DNA structure and function	Inheritance of traits	Forensic techniques	Micropipetting techniques
Bacteria Outbreak					<b>P5 to P6</b>
Diversity of Cells	<b>P5 to P6</b>				
DNA Basics		<b>P5</b>			
DNA Detectives		<b>P5 to P6</b>		<b>P5 to P6</b>	<b>P5 to P6</b>
Genes and our Traits		<b>P5 to P6</b>	<b>P5 to P6</b>		

### LEGEND



Cost per student



Duration



Target Group



Number of Students



Time



## Bacteria Outbreak

An outbreak has occurred and patients have been sent to the hospital with common symptoms. Join us as we take on the role of an epidemiologist to identify the cause of the outbreak and the source. Can we stop the spread of the outbreak?

### Objectives:

1. Understand what outbreaks are.
2. Learn the basic steps taken to investigate a case of food poisoning outbreak.
3. Understand the possible causes of food poisoning outbreaks and how to prevent them through proper hygiene.
4. Learn micropipetting techniques.
5. Learn the basic technique of growing bacteria.
6. Identify the basic shapes of bacteria.



\$7



2hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Diversity of Cells

Earth is an amazing place with a whole variety of life forms and cells are the building blocks of these living things. Do you know that while a bacterium is made up of only one cell, a human being is made up of trillions of cells! Cells are so tiny that about 5000 of them can fit onto the head of a pin and each cell cannot be seen with the naked eye. However, in this lesson we will explore and observe these amazing cells through a microscope and appreciate their significance.

### Objectives:

1. Understand what cells are and that there is a diversity of cells on earth.
2. Learn about classification of living things.
3. Identify different parts of the compound microscope and know their functions.
4. Prepare sample slides using simple staining methods and view them under the microscope.
5. Understand the application of using microscope to identify microorganisms or cells.



\$7



2hr



P5 to P6



20 to 40



9.30am, 2.30pm

## DNA Detectives

A crime has occurred and they have narrowed it down to a suspect. With the suspect behind bars, the community believed that all was now peaceful in their town. However, a similar crime has occurred again leaving behind a similar type of evidence. Could the crime have been done by a syndicate or did the police arrest the wrong person? Based on a true story, join us as we take on the role of forensic investigators to solve the case using various forensic tools.

### Objectives:

1. Learn about different types of forensic techniques used.
2. Learn about the structure of DNA and its importance.
3. Learn micropipetting techniques.
4. Understand how DNA is analysed through a technique known as agarose gel electrophoresis.
5. Learn how to interpret DNA analysis results and identify the possible criminal.



\$7



2hr



P5 to P6



20 to 40



9.30am, 2.30pm



## Genes and our Traits

Have you ever wondered why you look like your parents? Eye colour, gender and free or attached earlobes are examples of physical traits that are determined by our genes. How is it possible that one sibling has brown eyes, while the other sibling has blue eyes? To find out about this and more, join us as we observe our physical traits and learn how we inherit them from our parents!

### Objectives:

1. Understand what physical traits are and how to identify them.
2. Understand the diversity of genetic traits and that every individual has different genetic makeup.
3. Conduct a simple DNA extraction from wheat germ independently.
4. Learn about the sex chromosomes and how it determines the gender of a baby.
5. Understand that some traits are determined by a pair of genes.



\$7



2hr



P5 to P6



20 to 40



9.30am, 2.30pm

## DNA Basics

Ever seen how DNA looks like? Why is DNA so important? Be a DNA scientist for the day and join us in this introductory lesson to learn the basics of DNA. See what DNA looks like in real life and make a 3D DNA model to bring home!

### Objectives:

1. Understand the role of DNA in our lives.
2. Learn about the DNA structure and make a DNA model.
3. Conduct a simple DNA extraction from bacteria cells independently.



\$7



2hr



P5 to P6



20 to 40



9.30am, 2.30pm

# KITCHEN SCIENCE

## Hands-on Workshops

TITLE	TOPICS							
	Fermentation	Chemistry	Nutrients	Emulsifiers	Stabilisers	Flowering plants	Fruit groups	Balanced diet
A Jam Session (Making Strawberry Jam)						P5 to P6	P5 to P6	
I Scream for Ice-cream!		P5 to P6	P5 to P6	P5 to P6	P5 to P6			
Sugar Explorer <b>(REVAMPED)</b>			P5 to P6					P5 to P6
Pizza Pizzazz	P5 to P6	P5 to P6						
The Science of Making Candy			P5 to P6					

### LEGEND



Cost per student



Duration



Target Group



Number of Students



Time

To book, please login to <https://obs.science.edu.sg> Email us at: [schools@science.edu.sg](mailto:schools@science.edu.sg)



## A Jam Session (Making Strawberry Jam)

Almost everyone loves to eat strawberries but many do not know enough about this fruit and plant. Students will learn about the different parts of a flower, how fertilisation takes place and to compare the three main groups of fruits. At the end, they will get their hands dirty in the process of making strawberry jam that is soft, easy to spread and delicious.

### Objectives:

1. Identify the different parts of a flower.
2. Observe the reproductive parts of a flower and view pollen under a microscope.
3. Classify fruits into different groups.
4. Learn the importance of jam making as a way of food preservation.



\$7



2hr



P5 to P6



20 to 40



9.30am, 2.30pm

## I Scream for Ice-Cream!

Participants will learn the processes involved in ice-cream making. They will discover how using different types of ingredients affects the final product. Learn what terms such as Emulsifiers and Stabilisers mean and most importantly participants will get to taste the ice-cream that they make.

### Objectives:

1. Describe the effects of different ingredients in ice-cream.
2. Investigate the function of emulsifiers in ice cream making.
3. Investigate the effect of impurities during the process of freezing



\$7



2hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Sugar Explorers (REVAMPED)

*[Outdoor Ecogarden Session (weather permitting)]*

Did you know that sugar can also be used in different ways, even in areas which are unrelated to the food industry? In this session, students will get to explore the properties and the importance of sugar through different science experiments. At the end, students can attempt to make their own rainbow drink!

### Objectives:

1. Identify the types of sugar found in different food products.
2. Show an understanding of the uses of sugar.
3. Investigate the effect of sugar on ice.
4. Applying the concept of density to create a layered drink.



\$5



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm



## Pizza Pizzazz

Learn to make the popular flat bread with exactly the toppings you want. Pupils learn all about proofing, punching, shaping, baking and enjoying their own creation a tasty introduction to the science of bread making!

### Objectives:

1. Describe and explain the uses of different ingredients in pizza making.
2. Discuss the process of fermentation which helps in pizza making.
3. Identify the structure of yeast under the microscope.



\$7



2hr



P5 to P6



20 to 40



9.30am, 2.30pm

## The Science of Making Candy

Mixing sugar syrup at the right concentration and heating it to the right temperature are crucial to making candy. This process is a delicious art! But it is also a fascinating and precise science. When you are making candy, whether you realise it or not, you are a chemist transforming matter from one state to another.

### Objectives:

1. Identify different types of sugar.
2. Highlight the effect of interfering agents in candy making.
3. Create different types of candy (lollipops and cotton candy).



\$7



2hr



P5 to P6



20 to 40



9.30am, 2.30pm



# LOWER PRIMARY PROGRAMME

## Hands-on Workshops

TITLE \ TOPICS	Animals and Insects	Characteristics	Simple Machines	Life cycle	Sounds	Type of Plants	Forces	Alternative sources of Energy	Engineering
A Butterfly is Born	P1 to P2	P1 to P2		P1 to P2					
Blast Off!							P1 to P2		P1 to P2
In the Garden	P1 to P2					P1 to P2			
Life in a Shell	P1 to P2	P1 to P2							
My River	P1 to P2	P1 to P2		P1 to P2		P1 to P2			
Poggy Frog and the Cows		P1 to P2		P1 to P2					
Power Forever								P1 to P6	
The Enormous Watermelon		P1 to P2				P1 to P2			
The Grasshopper and the Ant	P1 to P2	P1 to P2							
Slither and Slide		P1 to P2							
World of Tools			P1 to P2						

### LEGEND



Cost per student



Duration



Target Group



Number of Students



Time

To book, please login to <https://obs.science.edu.sg> Email us at: [schools@science.edu.sg](mailto:schools@science.edu.sg)

## A Butterfly is Born

*(Programme offered in Term 1 and 2)*

In conjunction with the book, A Butterfly is born, pupils will learn about different types of insects and their characteristics. They will be able to observe various live specimens of insects, in particular the butterfly. Pupils will also learn about the life cycle of a butterfly. At the end of the class, pupils will bring home their very own craft activity of a butterfly life cycle.

### Objectives:

1. State the characteristics of an insect.
2. Observe and label the parts of a butterfly.
3. Complete metamorphosis and incomplete metamorphosis.
4. Outline and explain the typical life cycles of a butterfly and dragonfly.
5. Create a butterfly life cycle craft..



Free



1.5hr



P1 to P2



20 to 60



9.30am, 2.30pm

## Blast Off!

Do you want to learn how to build an air rocket? Join us in this hands-on workshop and learn how to build your own rockets, using only commonly available materials! Learn about the physics behind rocket science and the engineering principles for a good rocket design. The exciting world of air rockets awaits you!

### Objectives:

1. Identify a force as a push or a pull.
2. Show an understanding of the effects of a force.
3. Recognise that different shapes of objects have different effects on forces acting on the object.
4. Investigate the effect of design and forces on the motion of objects and communicate findings.



Free



1.5hr



P1 to P6



20 to 40



9.30am, 2.30pm



## In the Garden

*[Outdoor session in the Ecogarden with hands-on activities and worksheets (weather permitting).  
Instructor/guide provided.]*

This lesson has been developed to be utilised as part of the SEED programme. Be amazed by the many plants found in our tropical climate. Meet some of the animals that call the Ecogarden home and learn about the plants that provide them with shelter, food and a place to lay their eggs. Visit the Treehouse and even dig around in the leaf litter to find your own earthworm!

### Objectives:

1. Classify plants into various groups based on their functions.
2. Identify common garden animals.
3. Highlight the interdependent relationship between organisms in a garden community.



Free



1hr



P1 to P2



20 to 60



9.30am, 2.30pm

## Life in a Shell

*(Programme offered in Term 1 and 2)*

In conjunction with the book, Life in a Shell, pupils will learn about animals that have shells. Pupils will get to experience touching sea shells and interacting with garden snails and hermit crabs, learning about the interesting characteristics of these amazing animals at the same time. At the end of the class, pupils will bring home their very own craft activity of a snail.

### Objectives:

1. Observe and label the parts of a land snail and a hermit crab.
2. Compare the similarities and differences between a land snail and a hermit crab.
3. Appreciate different types of shells.
4. Create a snail craft.



Free



1.5hr



P1 to P2



20 to 60



9.30am, 2.30pm

## My River

*(Programme offered in Term 1 and 2)*

In conjunction with the book, My River, pupils will be exposed to different types of pond plants and animals. They will be able to touch different types of pond plants and observe different types of pond animals. Pupils will also learn about the characteristics of insects and the life cycle of a dragonfly. At the end of the class, pupils will bring home their very own craft activity of a dragonfly.

### Objectives:

1. Compare and contrast the characteristics of a river and a pond.
2. Observe and identify some plants and animals that make up a pond community.
3. Identify different parts of a dragonfly.
4. Outline and explain the life cycle of a dragonfly.
5. Create a dragonfly craft



Free



1.5hr



P1 to P2



20 to 60



9.30am, 2.30pm



## Poggy Frog and the Cows

*(Programme offered in Term 3 and 4)*

In conjunction with the book, Poggy Frog and the Cows, pupils will learn about frogs and toads in a fun and interactive manner. They will be thrilled by live specimens of frogs and tadpoles, while finding out various interesting facts about frogs and toads such as the different places they live and the different ways they move. At the end of the class, pupils will bring home their very own craft activity of a tadpole.

### Objectives:

1. Observe and label the parts of a frog.
2. Compare the similarities and differences between a frog and a toad.
3. Outline the stages of the frog's life cycle .
4. Create a tadpole paper craft.



Free



1.5hr



P1 to P2



20 to 60



9.30am, 2.30pm

## Power Forever

For generations, we have depended upon petroleum for our energy needs, but as our oil wells run dry and our consumption of it pollutes our lands, we must look to other sources to fuel our power-hungry devices. In this workshop, we will learn to make use of energy from the sun and wind to empower us; do you want to be free of our oil dependency? Do you want to learn how to become more environmentally friendly? Join us!

### Objectives:

1. Recognise various types and sources of energy.
2. Recognise various types of renewable energy sources.
3. Investigate the effects of solar and wind energy conversions on the electrical output.



Free



1.5hr



P1 to P6



20 to 40



9.30am, 2.30pm

## Slither and Slide

*(Programme offered in Term 3 and 4)*

In conjunction with the book, Slither and Slide, pupils will learn about earthworm and mealworms in a fun and interactive manner. They will have firsthand experience handling live specimens of earthworms and mealworms, while conducting simple experiments on them to infer their environmental preferences. At the end of the class, pupils will bring home their very own craft activity of a worm.

### Objectives:

1. Compare the similarities and differences between an earthworm and a mealworm.
2. Conduct a simple experiment to infer the environmental preference of an earthworm and a mealworm.
3. Observe, label and describe the features and habits of an earthworm.
4. Experience authentic handling of earthworms and mealworms.
5. Create a bookworm bookmark craft.



Free



1hr



P1 to P2



20 to 60



9.30am, 2.30pm

## The Enormous Watermelon

*(Programme offered in Term 3 and 4)*

In conjunction with the book, *The Enormous Watermelon*, pupils will learn about plants in an exciting way. Through fun and engaging hands-on activities, pupils will get a chance to learn the function of various plant parts. After learning more about the life cycle of a plant, students will get a chance to bring home their own craft activity of a plant.

### Objectives:

1. Identify the functions of different parts of the plants.
2. Recognise the various shapes of leaves.
3. Outline the life cycle of a plant.
4. Create a plant craft.



Free



1.5hr



P1 to P2



20 to 60



9.30am, 2.30pm

## The Grasshopper and the Ant

*(Programme offered in Term 3 and 4)*

In conjunction with the book, *Grasshopper and the Ant*, pupils will explore the wonderful world of insects. Pupils will learn more about one of the insect characters from the book the honeybee. The honeybee is a fun insect to learn about through hands-on activities, dance and even making of a simple craft!

### Objectives:

1. Identify and label the parts of an insect.
2. Describe and explain the role of bees.
3. Recognise the uses of various products made from bees.
4. Create a bee craft.



Free



1.5hr



P1 to P2



20 to 60



9.30am, 2.30pm

## World of Tools

*(Programme offered in all Terms)*

In conjunction with the book, *World of Tools*, pupils will learn about tools in a fun and interactive manner. They will be intrigued by the amazing world of tools, how it works and how it helps us in our daily life. Pupils will also take a walk at the Kinetic Garden to see examples of simple machines. At the end of the class, pupils will make and bring home their own craft activity of a simple machine.

### Objectives:

1. Show an understanding of the various tools.
2. Recognise and give examples of the different types of tools.
3. Investigate the functions of various tools.



Free



1.5hr



P1 to P2



20 to 40



9.30am, 2.30pm

# MATHEMATICS

## Hands-on Workshops

<div style="text-align: center;"> <b>TOPICS</b>  <hr/> <b>TITLE</b> </div>	Fractions	Geometry	Problem in Real-world Contexts
Maths Games and Problem Solving			<b>P5 to P6</b>
Maths Model Making		<b>P5 to P6</b>	<b>P5 to P6</b>
Winning Strategies 1	<b>P5 to P6</b>		<b>P5 to P6</b>
Winning Strategies 3			<b>P5 to P6</b>

### LEGEND



Cost per student



Duration



Target Group



Number of Students



Time

## Maths Games and Problem Solving

In this fun workshop, exercise your critical thinking and creativity skills through a series of fun and challenging mathematical games, which includes constructing shapes and polygons, cracking codes, arranging objects and numbers into the correct sequences or simply finding the missing piece to the puzzle.

### Objectives:

1. Relate problem solving in mathematics to puzzles and games.
2. Apply logical thinking to create a plan, test the method, evaluate the outcome and reflect on the method to problem solving.
3. Create alternative solutions to solve a problem.



Free



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Maths Model Making

Triangles, rectangles, pentagons, hexagons, octagons and decagons! Oh, why are we learning these shapes? This is because geometry is an essential part of our lives. In this activity-based lesson, you will be provided with templates and materials to assemble colourful and amazing 3D mathematical shapes such as rotating hexagonal ring and the rotating octagonal ring. Be amazed as they transform from one shape to another!

### Objectives:

1. Identifying, naming, describing and classifying 3D shapes.
2. Determine polygon by looking at number of sides/faces.



Free



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Winning Strategies 1

Do you think winning a game is all just luck, or skill and strategy? In this lesson, play a game with your fellow students, and explore, strategize and learn the many optimal ways to winning a game.

### Objectives:

1. Use Mathematics to strategise how to win a game.
2. Calculate simple probability and ratio.
3. Recognise the importance of cooperation and good sportsmanship.



Free



2hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Winning Strategies 3

Computers solve problems by following algorithms—a set of step-by-step instructions on how to manipulate data. In order for computers to work efficiently, mathematical methods must be employed. This workshop is filled with challenging yet fun activities to explore algorithms that are vital for computing devices to run fun games and business applications.

### Objectives:

1. Apply logical thinking to solve a problem.
2. Apply logical thinking to create computer algorithm.
3. Create algorithms to apply in games.



Free



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm

# NATURE SCIENCE

## Lecture Demonstrations

TITLE \ TOPICS	Plant systems	Characteristics of plants	Life cycle of a plant	Five senses	Human body systems	Global warming	Ocean acidification	Conservation
My Body				P3 to P6	P3 to P6			
Our Environment and Us <b>(REVAMPED)</b>						P5 to P6	P5 to P6	P5 to P6
The Magnificent World of Plants	P3 to P6	P3 to P6	P3 to P6					

### LEGEND



Cost per student



Duration



Target Group



Number of Students



Time

## My Body

This lecture demonstration allows students to explore their body parts and functions. A unique introduction to the five senses as well as muscular, circulatory, respiratory, digestive and the skeletal systems will get the students excited. In addition, student volunteers will get a rare opportunity to assist in some of the fun science demonstrations conducted by the lecturer.

### Objectives:

1. Describe the five sense organs and their functions.
2. Describe the various systems in the body.
3. Observe and participate in various demonstrations and experiments.



Free



1.5hr



P3 to P6



80 to 120



9.30am, 2.30pm

## The Magnificent World of Plants

*[Includes outdoor tour of Ecogarden (weather permitting)]*

The world we live in has many plants with unique characteristics and uses. Besides learning how to differentiate between different types of plants (flowering and non-flowering), pupils will also explore the various parts of a plant and their functions.

### Objectives:

1. Recognise some broad groups of plants.
2. Identify the different parts of a plant and state their functions.
3. Outline the various ways in which plants reproduce.
4. Identify some trees in the Ecogarden and explore their characteristics.



Free



1.5hr



P3 to P6



80 to 120



9.30am, 2.30pm

## Our Environment and Us (REVAMPED)

*(Includes Self-guided tour of the Climate Challenge/Change Exhibition )*

Have you ever wondered how Earth has changed, compared to 50 years ago? We depend on Earth for our survival, but do we really know how our actions affect this beautiful planet? Come take a closer look at the different problems that the Earth is facing, and how they affect our lives. Through exciting demonstrations and a participative lecture, see first-hand what is happening to Earth, and discover what we can do to protect Mother Earth! You will also explore how Singapore is contributing to help to tackle climate change issues.

### Objectives:

1. Discuss the effects of global warming on climate change.
2. Outline the factors contributing to ocean acidification.
3. Describe and explain ways of conserving our environment.
4. Explore various exhibits on climate change.



Free



1.5hr



P5 to P6



80 to 120



9.30am, 2.30pm



# NATURE SCIENCE

## Hands-on Workshops

TITLE \ TOPICS	Plant systems	Physical and chemical properties of materials	Biodiversity	Life cycle	Adaptations	Locomotion	Photosynthesis	Interactions	Food chain	Conservation	Habitat
All About Chickens			P3 to P4	P3 to P4							
Aquatic Plants and Animals			P5 to P6					P5 to P6	P5 to P6	P5 to P6	P5 to P6
Flying with Butterflies			P1 to P6	P1 to P6	P1 to P6				P1 to P6	P1 to P6	
Guided Tour of Butterflies Up-Close			P1 to P6	P1 to P6	P1 to P6						
Food from Plants	P3 to P4		P3 to P4		P3 to P4		P3 to P4				
Fun with Animals (REVAMPED)			P3 to P4	P3 to P4	P3 to P4	P3 to P4					
How Fruits and Seeds are Scattered	P5 to P6		P5 to P6		P5 to P6						
Insect Mysteries			P3 to P4	P3 to P4	P3 to P4	P3 to P4					
Rubber Story (REVAMPED)	P5 to P6	P5 to P6									
Sugar Explorers (REVAMPED)	P5 to P6						P5 to P6				
The Leaf Litter Community				P5 to P6				P5 to P6			P5 to P6

### LEGEND



Cost per student



Duration



Target Group



Number of Students



Time

To book, please login to <https://obs.science.edu.sg> Email us at: [schools@science.edu.sg](mailto:schools@science.edu.sg)



## All About Chickens

*(Includes a self-conducted tour of observing chicks at the Hall E of Science Centre Singapore)*

Find out what happens inside the egg during the 21 days of incubation and also how a chick is formed. Discover some features of the chick and observe live chicks hatching in our Hatchery.

### Objectives:

1. Observe and identify parts of a chick.
2. Outline the life cycle of a chick.
3. Observe and label parts of an egg.
4. Describe and explain the functions of the parts of an egg.



Free



1.5hr



P3 to P4



20 to 40



9.30am, 2.30pm

## Aquatic Plants and Animals

*[Outdoor Ecogarden Session (weather permitting)]*

The ponds in the Ecogarden are teeming with life forms, from microscopic algae to pond skaters and even the occasional water monitor lizard! Pupils will be taught field techniques to catch and observe a variety of aquatic organisms which make up the pond community. In the process they will learn about relationships between organisms (e.g. food web) in the pond ecosystem.

### Objectives:

1. Observe and Identify aquatic plants and animals in a freshwater pond.
2. Apply the basic techniques of using a microscope to observe organisms.
3. Classify various pond organisms based on their characteristics.
4. Identify various roles of various organisms in a food chain and a food web.



\$2



2hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Food from Plants

*[Includes a tour of Ecogarden to look at plants with edible parts (weather permitting)]*

Discover how plants make their own food and where they store them. Students will not only become little scientists and discover the different edible plant parts, but also chefs as they make a salad for themselves to enjoy!

### Objectives:

1. Briefly describe the process of photosynthesis and food storage in plants.
2. Recognize plants in their natural habitat.
3. Observe and identify various plant parts such as roots, stems, underground stem, leaves, flower and fruits.
4. Relate different parts of a plant to their respective functions.



Free



1.5hr



P3 to P4



20 to 40



9.30am, 2.30pm

## Flying with Butterflies

We have all learnt about how butterflies transition through the four different stages of their life cycle, but will all of them survive to adulthood? Marvel at the diversity of these seemingly simple looking creatures and follow them on their journey through life as they deal with all the challenges which Mother Nature has for them. Students may get a chance to have some first-hand experience with the butterflies, and will get to know some new fluttery friends by the end of this session. They will also get to view butterfly specimens under microscopes to learn more about special parts of the butterflies which help them to survive!

### Objectives:

1. Identify different types of butterflies.
2. Outline and explain the life cycles of butterfly.
3. Observe the difference between butterfly and moth.

*\*Programme fee includes course, guided tour and admission to Butterflies Up-Close Exhibition and Science Centre Singapore. Please pay Science Centre Singapore admission fee onsite separately.*



**\$10**



**1.25hr**



**P1 to P6**



**20 to 40**



**9.30am, 2.30pm**

## Guided Tour of Butterflies Up-Close

Learn about the life cycle of butterflies. Enjoy a guided tour of our exhibits and have a close up look at live butterflies and seasonal insects.

**Topics:** Life cycle of a butterfly, differences between butterfly and moth, distinctive features of seasonal insects

*\*Programme fees includes guided tour and admission to Butterflies Up-Close Exhibition and Science Centre Singapore. For international schools, please pay the Science Centre Singapore admission fee onsite separately.*

*# Each time slot can take about 3 groups of students.*



**\$6\***



**0.45 to 1hr**



**P1 to P6**



**20 to 40**



**9.30am, 11.00am, 2.30pm #**

## Fun with Animals (REVAMPED)

*(Includes a self-conducted tour of observing animals at the Hall E of Science Centre Singapore)*

Classify animals into different groups (amphibians, birds, fish, insects, mammals and reptiles). Find out about their physical features for example, their outer coverings, the way they move and the way they reproduce. Student will also get an opportunity to look at live animal specimens.

### Objectives:

1. Recognize some broad groups of animals.
2. Classify animals into broad groups based on their physical characteristics.
3. Observe various animals in their respective habitats.



Free



1.5hr



P3 to P4



20 to 40



9.30am, 2.30pm

## Insect Mysteries

Insects are the most diverse group of organisms on Earth and are vital to the health of our environment. Discover the many unique and different characteristics and adaptations of insects and learn about their life cycles. Not forgetting to get close and personal with some creepy crawlies and even observe them under the microscope!

### Objectives:

1. Observe and label the parts of an insect.
2. Observe a variety of insect specimens under the microscope.
3. Outline and explain the typical life cycles of an insect.
4. Identify and link the various adaptations of insects to their environment.



Free



1.5hr



P3 to P4



20 to 40



9.30am, 2.30pm

## How Fruits and Seeds are Scattered

*[Includes a tour of Ecogarden (weather permitting)]*

Through observing various fruit and seed specimens, find out how they are adapted for dispersal. In the process, pupils will be taught how to classify them into various methods of dispersal, such as by water, wind, explosive action and animals.

### Objectives:

1. Recognise that living things reproduce to ensure continuity of their kind.
2. Identify seed dispersal as one of the processes in the life cycle of flowering plants.
3. Recognise the four different modes of seed dispersal.
4. Observe and identify the physical characteristics of different fruits and seeds and classify them into the four modes of seed dispersal.
5. Apply the concepts learned to identify and group plants in the ecogarden.



\$2



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Rubber Story (REVAMPED)

*[Includes a guided tour to our Mini Rubber Plantation (weather permitting)]*

The story starts as we travel back in time, walking through a real rubber plantation and living the lives of rubber tappers in 19th Century Singapore. Rubber tapping is an art by itself. Learn the different techniques, tools and skills that are needed to obtain the highest latex yield. The story does not stop here. Discover its wondrous and unique set of properties from different experiments conducted in laboratory!

### Objectives:

1. Describe the parts of a plant.
2. Identify the importance of economical crops such as rubber.
3. Recognize the physical and chemical properties of rubber.
4. Create a fake wound craft using latex.



\$6



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Sugar Explorers (REVAMPED)

*[Outdoor Ecogarden Session (weather permitting)]*

Did you know that sugar can also be used in different ways, even in areas which are unrelated to the food industry? In this session, students will get to explore the properties and the importance of sugar through different science experiments. At the end, students can attempt to make their own rainbow drink!

### Objectives:

1. Identify the types of sugar found in different food products.
2. Show an understanding of the uses of sugar.
3. Investigate the effect of sugar on ice.
4. Applying the concept of density to create a layered drink.



\$5



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm

## The Leaf Litter Community

*[Outdoor Ecogarden Session (weather permitting)]*

Investigate the organisms responsible for the decay and breakdown of plant and animal matter in the leaf litter community. This hands-on session will provide an opportunity for pupils to sharpen their skills in finding and observing the animals they catch; from centipedes, earthworms, earwigs to toads. They will be introduced to the recycling of nutrients in nature.

### Objectives:

1. Observe and identify organisms in a leaf litter community.
2. Recognise the importance of decomposers in the environment.
3. Describe the physical conditions in a leaf litter community.
4. Classify various organisms in a leaf litter habitat based on their characteristics.



\$2



2hr



P5 to P6



20 to 40



9.30am, 2.30pm



# PHYSICS

## Lecture Demonstrations

<b>TITLE</b> / <b>TOPICS</b>	Cycles in Matter and Water	Diversity of Materials	Electrical System	Interactions of Forces	Energy Forms and Uses	Energy Conversion
Fascinating Light					P4 to P6	P4 to P6
Properties of Forces				P5 to P6		
States of Matter	P3 to P6			P3 to P6		

### LEGEND



Cost per student



Duration



Target Group



Number of Students



Time

## Fascinating Light

This exciting lecture demo explores the concept of light as a form of energy, through colourful demonstrations of its various properties. Highlights include the ultraviolet light, lasers, stroboscopes and their various fascinating applications.

### Objectives:

1. Recognise that an object can be seen when it reflects light or when it is a source of light.
2. Recognise various properties of light such as reflection and refraction.
3. Recognise that light is made up of a spectrum of different colours.
4. Investigate the various sources of light and their applications.



Free



1.5hr



P4 to P6



80 to 200



9.30am, 2.30pm

## Properties of Forces

What is a force? What can forces do? Join us in learning about the effects of forces and the various types of forces observed in our daily lives. Expect to bring home some interesting facts about gravity, magnetism and friction through a series of fun demonstrations. May the force be with you!

### Objectives:

1. Show an understanding of the effects of a force.
2. Recognise and give examples of the different types of forces.
3. Recognise that objects have weight because of the gravitational force acting on the object.
4. Investigate the effect of friction on the motion of objects and communicate findings.



Free



1.5hr



P5 to P6



80 to 200



9.30am, 2.30pm

## States of Matter

Beyond solids, liquids and gases are many more exciting and intriguing states of matter to be explored! Learn how materials change from one state to another when energy is added or removed. Be amazed by the state of plasma and learn how plasma is produced. Finally we are breaking out some of our coldest material on hand for a chilling look at what happens when matter becomes superfrozen!

### Objectives:

1. State that matter is anything that has mass and occupies space.
2. Differentiate between the three states of matter (solid, liquid, gas) in terms of shape and volume.
3. Recognise behaviour of particles in different states.
4. Recognise the effects of heat and pressure on various states of matter.



Free



1hr



P3 to P6



80 to 200



9.30am, 2.30pm

# PHYSICS

## Hands-on Workshops

TITLE	TOPICS				
	Diversity of materials	Electrical System	Interactions of Forces	Energy Forms and Uses	Energy Conversion
Blast Off!			P1 to P6		
Electric Carnival		P5 to P6		P5 to P6	
Electronics Fun-damentals		P4 to P6		P4 to P6	
Energy Lab				P5 to P6	P5 to P6
Heat and Temperature				P4 to P6	
Impact	P5 to P6		P5 to P6		
Learning Science with Minecraft	P4 to P6				
Light				P3 to P4	
Magnets	P3 to P4				
Power Forever				P1 to P6	P1 to P6
Science of Flight featuring SimplePlanes			P4 to P6		
Shake, Rattle and Roll			P4 to P6		
Water Rockets			P4 to P6		

### LEGEND



Cost per student



Duration



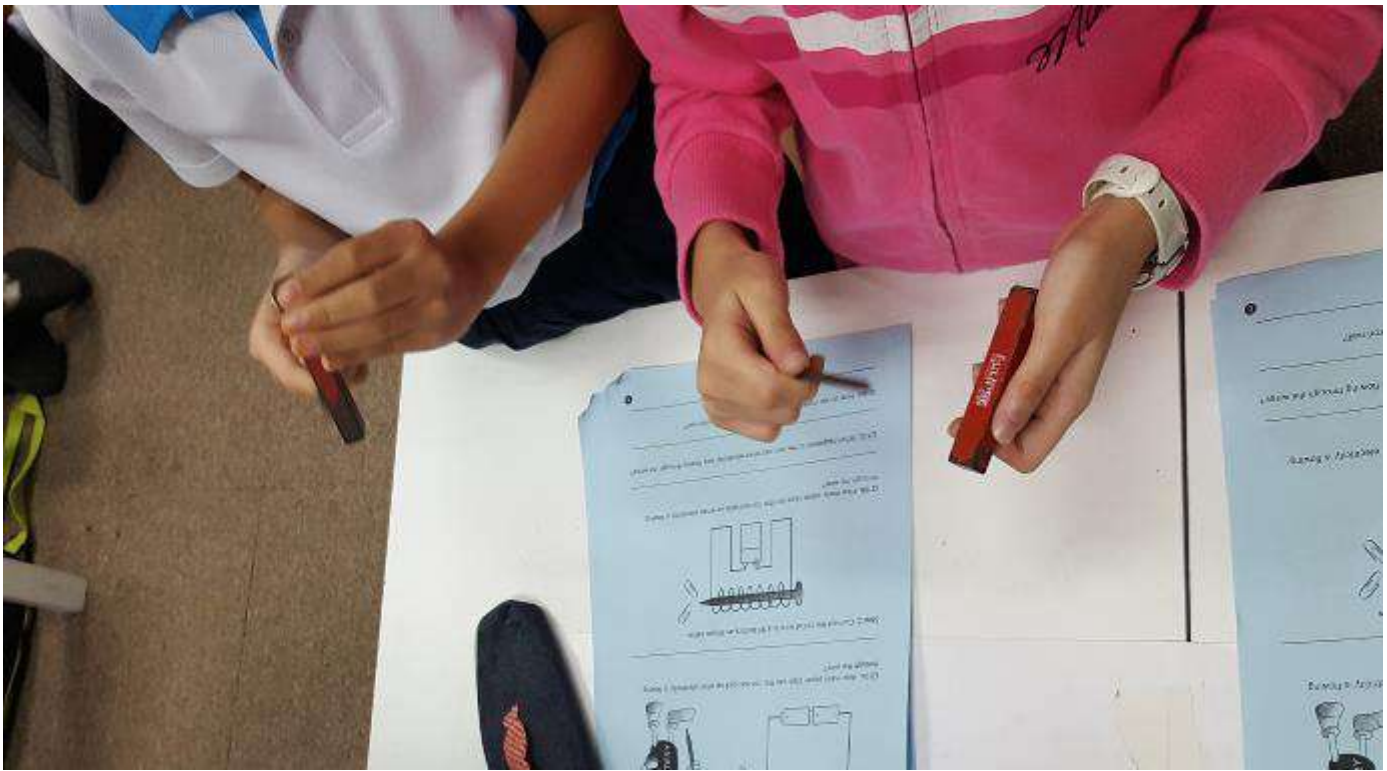
Target Group



Number of Students



Time



## Blast Off!

Do you want to learn how to build an air rocket? Join us in this hands-on workshop and learn how to build your own rockets, using only commonly available materials! Learn about the physics behind rocket science, and about the engineering principles for a good rocket design. The exciting world of air rockets awaits you!

### Objectives:

1. Identify a force as a push or a pull.
2. Show an understanding of the effects of a force.
3. Recognise that different shapes of objects have different effects on forces acting on the object.
4. Investigate the effect of design and forces on the motion of objects and communicate findings.



Free



1.5hr



P1 to P6



20 to 40



9.30am, 2.30pm

## Electric Carnival

We know that electricity is important, but how much do we really know about it? Through experimentation and hands-on activities, explore concepts such as parallel and series circuits, electrical connections, conductors and insulators. Find out how common electrical components like fuses and LEDs work, and how these are important in our daily lives.

### Objectives:

1. Recognise that an electric circuit consisting of an energy source (battery) and other circuit components (wire, bulb, switch) forms an electrical system.
2. Show an understanding that a current can only flow in a closed circuit.
3. Identify electrical conductors and insulators.
4. Construct simple circuits from circuit diagrams.
5. Investigate the effect of some variables on the current in a circuit and communicate findings.



Free



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Electronics Fun-damentals

Have you ever wanted to learn the essentials of electronics in a fun, hands-on way? In this workshop, you will start building circuits and understand more about what's happening and why. Learn about Light Emitting Diodes and other key electronic components and their functions in a circuit. Make things more interesting by creating your own electronic art! This workshop is suitable for learners with little to no technical training but a lot of interest.

### Objectives:

1. Recognise that an electric circuit consisting of an energy source (battery) and other circuit components (wire, bulb, switch, LEDs) forms an electrical system.
2. Construct a table lamp using LEDs and fibre optics.



Free



1.5hr



P4 to P6



20 to 40



9.30am, 2.30pm

## Energy Lab

Explore the various forms of energy with this engaging hands-on workshop, packed with activities that demonstrate how energy is transferred and converted from one form to another. Use these concepts to build a thrilling marble machine!

### Objectives:

1. Recognise that energy from most of our energy resources is derived in some ways from the Sun.
2. Recognise and give examples of the various forms of energy.
3. Recognise that objects have weight because of the gravitational force acting on the object.
4. Investigate energy conversion from one form to another and communicate findings.



Free



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm

## Heat and Temperature

We rub our hands to keep ourselves warm and turn on air conditioners to cool our room. All of these activities deal with the concepts of heat and temperature. In this workshop, observe what happens to objects when they are heated up or cooled down. Learn about the different methods of heat transfer and how to measure temperature. Finally, compare how different objects conduct heat at different rates. Excite yourself with this hot lesson!

### Objectives:

1. Differentiate between heat and temperature.
2. Show an understanding that heat flows from a hotter to a colder object/region/place until both reach the same temperature.
3. Measure temperature using a thermometer.
4. Recognise some effects of heat gain/loss in our everyday life.



Free



1.5hr



P4 to P6



20 to 40



9.30am, 2.30pm

## Impact

How do you protect a falling raw egg from cracking upon impact when it hits the ground? When NASA needs to land their million-dollar Mars Rover, they use, of all things, a nifty parachute! In this lesson, learn about the concepts of free fall, gravity, air resistance and impact. In the process of building and experimentation, aspects of engineering and material science will be incorporated. A fun lesson that will engage you to learn through play and encourage you to think out of the box!

### Objectives:

1. State that the acceleration of a free falling rover is constant and is approximately  $10 \text{ m/s}^2$ .
2. Describe the motion of rover with constant weight falling with air resistance.
3. Explain the effects of friction (air resistance) to the motion of a falling rover.
4. Design a rover protection system (parachute and airbags).
5. Build and test a rover protection system.



Free



1.5hr



P5 to P6



20 to 40



9.30am, 2.30pm



## Light

Explore the nature of light with a series of hands-on activities in this fun-filled workshop, where you investigate how different mirrors, lenses and materials affect how light travels. The workshop will also cover aspects of colours, shadows and light as a form of energy.

### Objectives:

1. Recognise that an object can be seen when it reflects light or when it is a source of light.
2. Recognise that a shadow is formed when light is completely or partially blocked by an object.
3. Investigate the variables that affect shadows formed and communicate findings.
4. Recognise various properties of light such as reflection and refraction.
5. Investigate the how materials interact with light and their applications.



Free



1.5hr



P3 to P4



20 to 40



9.30am, 2.30pm

## Magnets

Explore the exciting phenomena of magnetism through different types and shapes of magnets. You can investigate the magnetic properties of materials, make your own magnets, find out about the properties and uses of different magnets, and even see the patterns of a magnetic field!

### Objectives:

1. Recognise that a magnet can exert a push or a pull.
2. Identify the characteristics of magnets.
3. List some uses of magnets in everyday objects.
4. Compare magnets, non-magnets and magnetic materials.
5. Make a magnet by the 'Stroke' method and the electrical method.



Free



1.5hr



P3 to P4



20 to 40



9.30am, 2.30pm

## Learning Science with Minecraft

Minecraft is a videogame that allows the players to build structures and models with blocks in a 3D world. Grounded in real-life materials science, Minecraft provides a compelling and fun way to learn how materials are extracted, refined and used in different ways. In this workshop, work collaboratively with your fellow players to solve a Minecraft challenge, using science!

### Objectives:

1. Learn how different materials can be classified based on their physical properties.
2. Compare physical property of materials (hardness).
3. Relate the use of various types of materials to their physical properties.
4. Complete a survival challenge as a class.



Free



2hr



P4 to P6



20 to 40



9.30am, 2.30pm

## Power Forever

For generations, we have depended upon petroleum for our energy needs, but as our oil wells run dry and our consumption of it pollutes our lands, we must look to other sources to fuel our power-hungry devices. In this workshop, we will learn to make use of energy from the sun and wind to empower us; do you want to be free of our oil dependency? Do you want to learn how to become more environmentally friendly? Join us!

### Objectives:

1. Recognise various types and sources of energy.
2. Recognise various types of renewable energy sources.
3. Investigate the effects of solar and wind energy conversions on the electrical output.



Free



1.5hr



P1 to P6



20 to 40



9.30am, 2.30pm

## Science of Flight featuring SimplePlanes

Ever wonder how planes fly? Learn about the science of flight through exciting experiments using simple materials. Put your knowledge to the test: design your own aircraft from scratch, in whichever way you want it, using a computer game called SimplePlanes, then test to see if it really flies!

### Objectives:

1. Describe the ways in which forces may change the motion of an aircraft (thrust, lift, drag, weight).
2. Describe how lift is produced in terms of action-reaction force pairs.
3. Show understanding that the weight of an airplane may be taken as acting at a single point known as its centre of gravity.
4. Explain the effects of friction (air resistance) to the motion of an aircraft.
5. Design, build and safely land an aircraft.



Free



1.5hr



P4 to P6



20 to 40



9.30am, 2.30pm

## Shake, Rattle and Roll

Build a structure and subject it to various forces to test its stability! This fun, hands-on investigation requires you to think about friction, forces and balance, and how to use these concepts to make stable structures. Comparison with real-time structures will be highlighted, in particular those able to withstand extreme forces such as earthquakes.

### Objectives:

1. Understand the effects of forces and list the types of forces that act on a building.
2. Apply the understanding of forces to build a stable structure.



Free



1.5hr



P4 to P6



20 to 40



9.30am, 2.30pm

## Water Rockets

Looks like water, feels like water, but it is rocket fuel! Turn an ordinary PET bottle into an amazing rocket using everyday materials. Just like real rockets, your PET bottle rocket makes use of Newton's Laws to propel itself fast and far. In this exciting workshop, explore the various scientific concepts behind water rockets through, and launch your rocket safely under the guidance of our rocket instructors!

### Objectives:

1. Identify a force as a push or a pull.
2. Show an understanding of the effects of a force.
3. Recognise that different shapes of objects have different effects on forces acting on the object.
4. Investigate the effect of design and forces on the motion of objects and communicate findings.



Free



1.5hr



P4 to P6



20 to 40



9.30am, 2.30pm

# SPORTS SCIENCE

## Hands-on Workshops

TITLE \ TOPICS	Diversity	Human body skeletal and muscular systems	Interaction within Ecosystem	Microscope viewing
Dare to Climb (The Cliff)	P5 to P6	P5 to P6		
K-2 Adventure @ Jurong Lake (NEW)	P5 to P6		P5 to P6	P5 to P6
Urban Water	P5 to P6		P5 to P6	P5 to P6

### LEGEND



Cost per student



Duration



Target Group



Number of Students



Time



## Dare to Climb (The Cliff)

Dream of scaling great heights? Then this session is for you! Fun and interesting hands-on activities will be held in the classroom to assist your learning of the major muscle groups of the human body, the biomechanics of climbing, and the climbing equipment that keeps your life hanging on a rope. When you are all set and ready, you will get to pit your skills against The Cliff, our 15 metres climbing wall in a climbing teaser. Afraid of heights? Do not worry, our trained and friendly instructors will be there to show you the ropes.

### Objectives:

1. Identify major muscle groups.
2. Introduction to the different climbing's and equipment.
3. Participate in different levels of rock climbing.

*\*(1 hour workshop at Science Centre Singapore; 2 hours activity at the Cliff)*



3hr



\$48



P5 to P6



20 to 40



9.30am, 2.30pm

## Urban Waters

Get on a learning journey to know more about our waterways! Learn about Singapore's different national taps, and what flora and fauna are found in the waterways located in the heart of our Lion City. This fun-filled workshop will end with an exciting kayaking journey around Marina Channel and Kallang Basin. The workshop will be held by PAssion WaVe @ Marina Bay.

### Objectives:

1. Identify the national taps of Singapore.
2. Identify freshwater organisms under microscope.
3. Explore and learn how to kayak from PA Water Venture staff.

(Available during school holidays, content will be adjusted according to the level of students)

*\*(1 hour workshop at Marina Bay; 1.5 hours kayaking)*



3hr



\$20



P5 to P6



20 to 40



9.30am, 2.30pm

## K-2 Adventure @ Jurong Lake

(In collaboration with People's Association Water Venture)

**(New) (Only available after May 2018)**

Get on a kayak and have an unforgettable adventure down Jurong Lake. Do not forget to look out for the vast diversity of flora and fauna as our muscles work hard to complete the journey! Do not worry if you cannot identify them as a fun-filled workshop is provided before you start.

### Objectives:

1. Identify the different stages of water cycle .
2. Recognise the flora and fauna of Jurong lake using binoculars.
3. Participate in basic kayaking experience at Jurong lake.



3hr



\$32



P5 to P6



20 to 40



9.30am, 2.30pm

# OMNI-THEATRE PROGRAMMES



The Omni-Theatre uses state-of-the-art digital projectors and powerful digital planetarium software to present full-dome shows of unrivalled digital resolution and brightness.



Credit: ICUB learning language in "Robots"

## Singapore's Only Dome Theatre | SE Asia's First 8K 3D Dome Theatre

A key highlight is our Live Planetarium Show which is a digital presentation that is projected on the dome screen using our digital planetarium system and delivered live by our very own Science Educator.

With Asia's largest seamless dome screen (23m), specially designed seating configuration and surround-sound effects, your students will be enthralled by an experiential learning journey like no other!



**\$8 each show**



**30mins**



**P1 to P6**



**60 to 200**



**10am, 11am, 12pm, 1pm, 2pm, 3pm, 4pm, 5pm (on request)**

### **Live Planetarium Show (by a Science Educator): Exploring the Planets**

From the Earth, most planets look simply like bright stars moving across the night sky. But as you get up close, they are all as different as you and me! What lies below the clouds of Venus? What does it look like to stand on Mars? What makes up the beautiful rings of Saturn? Go on an interplanetary journey through our Solar System!

Topics: The Solar System, planets (terrestrial & gas giants), Moons.

### **Live Planetarium Show (by a Science Educator): Phases of the Moon**

Does the Moon give out its own light? Why does the moon appear different on different nights? Learn how different cultures perceive the Moon, and discover the stories behind them. Find out how the Moon orbits around our Earth, and what happens during eclipses.

Topic: Astronomy, Phases of the Moon, Calendars.

### **Live Planetarium Show (by a Science Educator): What's Up There?**

**Note: show content will vary depending on time of the year**

What stars, planets and constellations are in the skies tonight? As the Earth spins around the Sun, we will see different portions of the night sky. Every season brings a slightly different visual spectacle to the skies overhead. Our Science Educator will bring your students on a tour of the current night sky and point out the beautiful sights and share fascinating stories about the stars.

Topics: Astronomy, constellations, mythology of the constellations.



# OMNI-THEATRE PROGRAMMES



\$8



40mins



P1 to P6



60 to 200



10am, 11am, 12pm, 1pm, 2pm, 3pm, 4pm, 5pm (on request)



## Digital Movie: Earth, Moon & Sun

This movie explores the relationship between the Earth, Moon and Sun with the help of Coyote, an amusing character adapted from Native American oral traditions who has many misconceptions about our home planet and its most familiar neighbors. His confusion about the universe make students think about how the Earth, Moon and Sun work together as a system. Native American stories are used throughout the show to help distinguish between myths and science.



\$8



30mins



P1 to P6



60 to 200



10am, 11am, 12pm, 1pm, 2pm, 3pm, 4pm, 5pm (on request)



## Digital Movie: Back to the Moon for Good

Immerse your students in a race to return to the Moon 40 years after the historic Apollo landings. See how a competition among privately funded international teams is ushering in a new era of lunar exploration. Learn about the Moon's resources and discover what humanity's future on the Moon might hold.



\$8



40mins



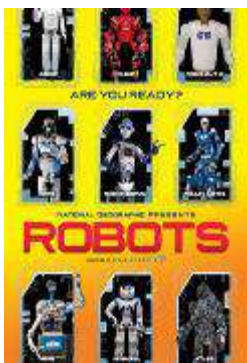
P1 to P6



60 to 165



10am, 11am, 12pm, 1pm, 2pm, 3pm, 4pm, 5pm (on request)



## Digital Movie: Robots

Today's robots are nothing short of astonishing! What does it take to make a humanoid robot - a robot that can do anything we can do without the benefit of a human brain? Let your students peek into the future, at what might be possible as scientists use innovative engineering and design to make cyber characters less "humanoid" and more just plain human. Robot "actor" RoboThespian will introduce your students to CHIMP, ATLAS, PR-2, Herb the Butler, ICUB, and others as he takes you on an amazing tour of what's going on in robotics labs around the world.

The Omni-Theatre uses state-of-the-art digital projectors and powerful digital planetarium software to present digital dome shows or movies of unrivalled digital resolution and brightness.

A key highlight is our “Live Planetarium Show” which is a digital presentation that is projected on the dome screen using our digital planetarium system and delivered live by our very own Science Educator.

With Asia’s largest seamless dome screen (23m), specially designed seating configuration and surround-sound effects, your students will be enthralled by an experiential learning journey like no other!

### Admission Charges (Digital Movie/Live Planetarium Show)

<b>School Group (min 20 students)</b>	\$8/student Free admission for 2 teachers per group of 20 students Additional Teacher: \$10
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### How to Book:

- Our library of titles are available on demand with a minimum of 60 students. You can book any of the titles above for any time slot on the hour from 10am to 5pm (weekday). Subject to availability.
- For groups with less than 60 students, you can book any of the scheduled movies as per our Showtime Schedule for public visitors ([www.omnitheatre.com.sg](http://www.omnitheatre.com.sg))
- For movie trailers, updates and Booking Form, please refer to the School Programme section at [www.omnitheatre.com.sg](http://www.omnitheatre.com.sg)
- Email: [schools@science.edu.sg](mailto:schools@science.edu.sg)

### Please note:

1. The theatre, with a capacity of 201, operates on a free-seating basis.
2. All shows begin promptly at the showtime stated. Please arrive at the theatre at least 15 minutes before showtime.
3. Payment procedure will be advised upon booking confirmation. Groups, which fail to turn up without prior cancellation, will be billed as registered.
4. Programmes, schedules and admission charges are subject to change.

# TINKERING PROGRAMMES

## Hands-on Workshops



### LEGEND



Cost per student



Duration



Target Group



Number of Students



Time

To book, please login to <https://obs.science.edu.sg> Email us at: [schools@science.edu.sg](mailto:schools@science.edu.sg)

## Light Play

Light Play lets the students explore light, shadow, and motion using a variety of simple materials and light sources. Beginning with gently guided explorations of shadows, single and multiple light sources, three-dimensional objects and translucency, students will work toward building kinetic light and shadow installations.

### Objectives:

1. Explore light properties like reflection and refraction .
2. Create their own light play story.



\$7



1.5hr



P4 to P6



10 to 25



9.30am, 2.30pm

## Marble Machine

Marble Machine is a creative ball-run contraption, made from familiar materials, designed to send a rolling marble through tubes and funnels, across tracks and bumpers, and into a catch at the end. Beside the basic materials like tubes and tracks, students will also be provided with random items like bells and kitchen utensils to bring out the creativity in them.

### Objectives:

1. Students will create and innovate their own mechanism.
2. Explore forms of energy and transfer of energy.



\$7



1.5hr



P4 to P6



10 to 25



9.30am, 2.30pm

## Light Up Story

This activity allows students to create their own storyboard by cutting out the silhouettes of plants, animals and things and pasting them on a screen. They will learn how to use LED lights to bring out the story and create a mood on screen. They will also learn how to convert it into a display box or one that can be carried around.

### Objectives:

1. Create circuits using LEDs.
2. Understand Light, shadows and Silhouettes.
3. Learn to use basic tools such as scissors, cutters and hot glue guns to make a prototype.
4. Gain exposure to creative thinking and story telling.



\$5



1.5hr



P4 to P6



80 to 140



9.30am, 2.30pm

## Moving Machine

Using everyday materials, students are challenged to make a moving machine. Students will explore and experiment with different materials and variables, investigating concepts at the intersection of art, science and technology.

### Objectives:

1. Understand what is innovation.
2. Gain an insight into Maker Education.
3. Understand Movement and how it can be caused.
4. Learn to work with motors and functional circuits.
5. Learn to use basic tools such as scissors, cutters, glue guns etc.



\$6



1.5hr



P4 to P6



80 to 140



9.30am, 2.30pm

# TEACHERS' PROFESSIONAL DEVELOPMENT



## LEGEND



Cost per student



Duration



Target Group



Number of Students



Time

To book, please login to <https://obs.science.edu.sg> Email us at: [schools@science.edu.sg](mailto:schools@science.edu.sg)

Science Centre Singapore conducts interdisciplinary workshops that enable teachers to experiment with a variety of concepts. The hands-on workshops allow teachers to explore applicable sciences ideas and create memorable team bonding experience. **For enquiries and to book, please contact [teachers@science.edu.sg](mailto:teachers@science.edu.sg).**

## Coffee CheMystery

Brewing coffee is a never-ending science project. To achieve the perfect cup of coffee, one requires proper technique, precision and knowledge on the factors that affect chemical reaction from coffee beans. In this workshop, participants will perform observations and experiments while carrying out coffee brewing techniques such as:

- 1) Coffee cupping
- 2) Pour-over
- 3) Aeropress
- 4) Vacuum siphon
- 5) French press

Sign up and be a coffee scientist for a day!



**\$45**



**3hr**



**15 to 40**



**9.00am, 2.00pm**

## Chemistry of Cosmetics

Is it true that only woman use cosmetics? It is a common misconception to agree with this. Both men and woman use them one way or another. In this workshop, participants will learn how to make various cosmetics such as:

- 1) Shower gel
- 2) Lip balm
- 3) Sunblock

Participant will also investigate and experiment with the products made!



**\$45**



**3hr**



**15 to 40**



**9.00am, 2.00pm**



## Forensic Science: Every Contact Leaves a Trace

Forensic science involves many interdisciplinary sciences, all focused toward the solving of a crime. Many TV shows have popularised forensic science through the dramas involving crime scene investigation. How much of reality is reflected in these shows? Participants will make useful observations and deductions while carrying out forensic techniques such as:

- 1) Fingerprinting
- 2) DNA Profiling
- 3) Ink chromatography
- 4) Forensic entomology
- 5) Identification of blood

Sign up to have an enriching session as you walk in the shoes of a forensic analyst.



\$45



3hr



15 to 40



9.00am, 2.00pm

## Science of Ice Cream

Everyone loves eating ice-cream. But have you ever wondered about the ingredients that go into making the perfect ice-cream? In this workshop, participants will understand the significance of:

- 1) Emulsification
- 2) Hydrophobic and hydrophilic interactions

You will also be allowed to experiment with the ingredients provided to make ice-cream to your liking. Join us to have an excuse to “play” with your food!



\$45



3hr



15 to 40



9.00am, 2.00pm

## Learning by Making

In this 3 hour workshop, teachers will be introduced to the principles of constructionism-learning by doing-and go through two activities. The first activity-toy take apart-explores the predict, observe, explain cycle while participants understand the workings of a toy by taking it apart. The workshop will then explore how a tinkering space can be setup to encourage collaborative learning. This will be followed by a short collaborative project where participants build a structure together and learn to fail often, fail fast and learn quickly. This is a great programme for team building.



\$95/ teacher (@ Science Centre)  
\$110/ teacher (in school)



3hr



10 to 70



Please contact  
Kiruthika\_ramanathan@science.edu.sg

# EXHIBITION LEARNING RESOURCES

## Defending Science (Hall A)

Enter the mysterious world of defence scientists and engineers, and discover how science changes the rules of the game on the battlefield! A collaboration between DSO National Laboratories and Science Centre Singapore, the Defending Science exhibition is a mind-blowing experience filled with multimedia exhibits, interactive games and adrenaline-packed workshops. So get ready to be wowed in four exciting zones of Armour and Protection, Stealth and Surveillance, Flight and Radar!

## Revamped Kinetic Garden (The Entrance)



Serving as a frontage to welcome you to the Science Centre Singapore experience, the Kinetic Garden is a unique outdoor exhibition which demonstrates certain scientific principles and phenomena that would be difficult to create in an indoor setting.

Come and discover the inter-relationships between the different forms of energy and much more through interactive and interesting exhibits like the Magic Swing, a Sundial and a Lithophone.

## Waterworks (The Entrance)

Water is a precious resource to all living things. A person can live about a month without food, but only about a week without water. Discover some intriguing facts about water and find out about the importance of water in our lives. Be prepared to get wet as you explore Waterworks and its hands-on exhibits.

## Scientist For A Day – DIY Lab Class (Hall A)



**Scientist For A Day (SFAD)** is an exhibition which introduces the “scientific method” to our visitors. The scientific method is especially important in problem-solving and science learning. Hence, its implicit introduction in science classes in upper primary and its explicit exposition in the lower secondary. SFAD thus conducts various **Discover-It-Yourself (DIY)** Lab workshops/classes aimed at re-enforcing the learning of the scientific method. Each workshop runs for 90-120 minutes for a group of 25-30 students. Bigger groups are divided to rotate through consecutive sessions. Please book your DIY Lab session on OBS

(<https://obs.science.edu.sg/>) by selecting one of the following experiments.

1. SFAD DIY Lab: Centre of Gravity Balancing Act
2. SFAD DIY Lab: Follow the Bouncing Ball
3. SFAD DIY Lab: Hooke’s Law on Bungee Jumping
4. SFAD DIY Lab: Parallel & Series Circuits
5. SFAD DIY Lab: Timing with a Pendulum

For more information, please view <http://www.science.edu.sg/exhibitions/Pages/ScientistForADay.aspx#schinfo>.

# EXHIBITION LEARNING RESOURCES

## The Mind's Eye (The Entrance)



The Mind's Eye is a new exhibition on Illusions and Human Perception which includes some of our old time goodie exhibits specially curated to inspire you with a fresh perspective.

Do you always believe in what you see? Think again. Visit The Mind's Eye for a brand new experience.

## Digital Food (Hall A)



Digital Food is an exhibition that focuses on the futuristic idea of how taste or flavour have been evolving, i.e. from natural, to artificial or synthetic flavours.

The exhibition also explores how senses can be manipulated using digital technology in future. It challenges us to think about how digital food is going to enhance living quality and improve our health. This exhibition is only available for a limited period so do catch it while it last! It is jointly developed by Science Centre Singapore and Imagineering Institute.

## Professor Crackitts Light Fantastic Mirror Maze (Hall A)



Welcome to Professor Crackitt's laboratory – a life-size labyrinth of mirrors, filled with infinite reflections and endless hallways! Help Professor Crackitt to find his pet parrot - Wattnot, who has gotten lost in the vast laboratory.

Will you be able find your way through the identical corridors that seem to loop back confusingly on themselves? As you stop to re-orientate yourself on your journey, be sure to check out the Prof's numerous whimsical inventions that presents various phenomena of Light and Mirrors.

Back by popular demand, this new mirror maze experience promises countless opportunities to get lost! Just be careful not to run into yourself on your way out!

## Dialogue with Time® - Embrace Ageing (Hall B)



Dialogue with Time is an exhibition exclusively on the topic of ageing. It. This fully-guided experience is facilitated by retirees who will lead a group of visitors through various zones in the exhibition.

The key highlight of the tour are two discussion zones where the senior guides will facilitate dialogues with visitors to overcome stereotypes or misguided assumptions associated with old age. Other interactive exhibits within the exhibition also allow you to experience and understand more about the ageing process and reconsider your perception of age.

# EXHIBITION LEARNING RESOURCES

## Climate Change-Climate Challenge (Hall B)



What will Singapore life be like with climate change and global warming? Or anywhere else in the world? This exhibition aims to bring this 21<sup>st</sup> Century planet-wide challenge to our visitors by relating the science and the experts' projections of possible local effects.

There are 8 sections: the introductory CLIMATE CHALLENGE zone, the IMPACTS OF CLIMATE CHANGE zone, CLIMATE SCIENCE zone, WEATHER & THE MET OFFICE zone, CLIMATE CAUSES zone, the CLIMATE CHANGE SHOW object theatre, the ECO-HOME/LAB zone, and lastly, our CLIMATE ACTION PLAN zone. The entry zone centres around the "Climate Machine" which represents the natural and human-added carbon cycle. Red balls representing carbon dioxide, are raised from a reservoir, up into a transparent sphere with a globe within – the space between representing our atmosphere.

Play the games surrounding the machine to learn what you can do to reduce your carbon footprint.

<http://www.science.edu.sg/exhibitions/Pages/climatechange.aspx>.

## Phobia<sup>2</sup>: The Science of Fear (Hall B)



What is there to fear? Embark on a journey of self-discovery and find out what phobia really is. Phobia<sup>2</sup>: The Science of Fear is designed to generate a low level anxiety throughout, this exhibition explores the topic of fear, from its historical and cultural significance, to the psychology and physiology of fear and how it affects our daily lives.

It focuses on capturing the interest and imagination of our guests, with the use of original pop-art design and bespoke concepts. Its approach will delight and impress guests of all ages.

Come on over now and join in this educational and entertaining journey that will not only excite but also inform you. Be prepared for something different!!! And perhaps, better manage your own fears? Be fearless at this exhibition.

## Butterfly Up-Close (Hall D)



Bring your students to a safe, cosy and air-conditioned butterfly sanctuary! They will be transported into a "jungle" setting to learn about the life cycle of a butterfly, observe their unique characteristics, study butterfly body parts through a microscope, view real pupae and marvel at the specimens and live butterflies. They will also enjoy looking at seasonal live insects such as stick insects and beetles.

We suggest you complement your visit experience by continuing your adventure at the nearby Animal Zone with highlights such as chicks and gerbils; as well as the Ecogarden.

Note: Separate admission fee applies for Butterflies Up-Close exhibition (on top of usual the Science Centre Singapore admission fee).

# GALLERY PATHWAYS

Gallery Pathways have been designed to enhance students' understanding and application of science concepts taught in the primary, secondary and junior college school science curriculum.

These pathways also complement the exhibits in the exhibitions and are designed to guide students as they learn how to better visualise abstract ideas such as force, infection and transmission of infections, genetics, nanotechnology, environmental impact etc.

Title	Topics	Level
<b>Ecogarden Trail</b>	<b>Diversity of Living Things:</b> Plants and Insects <b>Plants and their Uses:</b> Plant Varieties, Culinary Garden, Economic Crops <b>Interactions within the Environment:</b> Pond, Garden, Tree Communities	<b>P3, P4, P5, P6</b>
<b>Earth – Our Untamed Planet</b>	History of Earth, Forces of Nature, Geological Samples, Technological Advancements in Earth Research	<b>P5, P6</b>
<b>Mathematics Explorer</b>	<b>Numbers and the Four Operations:</b> Tens, Hundreds, Thousands <b>Measurement:</b> Length, Area, Volume, Weight (Conversion of Units)	<b>P5, P6</b>
<b>Climate Change Climate Challenge</b>	<b>Interactions within the Environment:</b> Water cycle, Man's Carbon Footprint, Climate Change and its Impact on the Environment, Smart Energy	<b>P5, P6</b>
<b>FunFair Maths</b>	Algebraic Manipulation, Graphs, Symmetry, Tessellations, Polygons	<b>P5, P6</b>
<b>Energy Trail @ Kinetic Garden</b>	<b>Energy Forms and Uses:</b> sound energy, thermal energy, light energy, kinetic energy, potential energy, gravitational potential energy, elastic potential energy <b>Energy Conversion:</b> Energy conversion from one form to another	<b>P4, P5, P6</b>
<b>Open your Eyes</b>	<b>Optical Illusions:</b> Perception, Persistence of Vision <b>Energy Forms and Uses:</b> Light, Colours & Shadows	<b>P3, P4, P5, P6</b>
<b>Fact or Fiction</b>	<b>Living with tectonic hazards:</b> Earthquakes <b>Wonders of my body:</b> Key regions of brain <b>Variable weather and changing climate:</b> 4 R's <b>Energy Forms and its uses:</b> Light, heat and infrared radiation	<b>P4, P5, P6</b>
<b>DNA Trail</b>	<b>Cell System:</b> Plant and Animal Cells <b>Cycles in plants and animals:</b> DNA traits	<b>P5, P6</b>



# SNOW CITY: THE SUB ZERO LEARNING EXPERIENCE



Snow City offers educational programmes that are all conceptualized in the context of low temperatures (from  $-196^{\circ}\text{C}$  to  $0^{\circ}\text{C}$ ). The main goal of the programmes is to foster interest in science through the novel experiences offered by exciting lecture demonstrations and hands-on activities. The programmes provide the students a unique experience that cannot be duplicated in ordinary classrooms. The programmes cater to a wide range of audiences. The Education Officers, who conduct the programmes, can vary the level of the discussion/explanation for each lesson.

Now, you have more variety to choose from with our exciting team-building 'Winter Olympics' and enrichment programmes.

All our packages come with a snow play experience and Snow City has undergone a major renovation and reopened last November 2015. With the new look and offerings, Snow City will be the perfect environment for students to come and learn and have fun. Here is the list of carefully planned programmes that focus on learning, fun, and team building.

## EDUCATION PACKAGE A

### Do-It-Yourself Ice Cream Making Workshop



**\$15 per student, free admission to 1 teacher for every group of 10 students, \$10 for every additional teacher**



**2.5hr**



**30 to 100**

The programme opens with a brief history of ice cream. Different techniques in making ice cream will be discussed with emphasis on the use of liquid nitrogen. Students will be asked to form small groups, and together they will prepare their group's ice cream using liquid nitrogen. On top of that, students will get the chance to savour the ice cream that they have prepared.

**Topics:** The experience is expected to be memorable for the students. They get to learn science concepts such as transmission of heat energy by conduction, effects of heat exchange, and thermal properties of matter. The multi-sensory experience provided by this programme helps to cement the students' understanding of various science concepts further.

**Duration includes:** 1 hour snow play, 1 hour ice cream making, 30 minutes changing of winter apparel.

## EDUCATION PACKAGE B

### Fun with Liquid Nitrogen Workshop



**\$15 per student, free admission to 1 teacher for every group of 10 students, \$10 for every additional teacher**



**2.5hr**



**30 to 100**

This programme is recommended for those who attend low-temperature science programs for the first time. The program involves several demonstrations that showcase the properties of liquid nitrogen. Students will be awed by liquid nitrogen as it smokes, expands, and evaporates. The ability of liquid nitrogen to readily freeze objects and make a banana assume hammer-like properties will definitely amaze students.

**Topics:** This fun-filled program also touches on concepts of force, pressure, effects of cooling, properties of materials, and change of state from a temperature of  $-196^{\circ}\text{C}$  to room temperature.

**Duration includes:** 1 hour snow play, 1 hour ice cream making, 30 minutes changing of winter apparel.



# SNOW CITY: THE SUB ZERO LEARNING EXPERIENCE

## EDUCATION PACKAGE C

### Winter Olympics



\$16 per student, free admission to 1 teacher for every group of 10 students, \$10 for every additional teacher



2hr



30 to 60

This is a compulsively enjoyable programme fit for anyone that just wants to have a roaring good time! Conducted in our very own snow chamber, Winter Olympics is a culmination of carefully tailored activities that challenges the mind while testing your physical agility. It is a program catered to the young and the young at heart. After all, having fun has absolutely no age limit!

**Topics:** Winter Olympics is a specially designed programme that effectively incorporates team building into its host of activities with light-heartedness and exhilaration. For any game planner, it is an extremely versatile programme, as it allows the planner to mix and match from its pool of activities based solely on his/ her objective. So why choose convention when convention is boring? At Snow City, we provide you with the perfect alternative to convention, the cool way.

**Duration includes:** 1 hour snow play, 30 minutes Winter Olympics, 30 minutes changing of winter apparel.

**Note: Choose any 3 of the total 10 activities to fit your gaming objective. Children must be 8 years old and above to participate.**

ACTIVITY	SYNOPSIS
Speedo	Each player from each team will slide down the slope one by one. Every team will be timed. Timing starts at the point when the first player slides down and ends when the last player of the group completes the slide. The team with the fastest time recorded will be the winner
Breakage	Everyone in a team will log his or her arm to form a chain, with different formation, and slide down the slope together. The chain should not break. The team with no breakage will win the game.
The Mad Ball	Each player from each team will use his or her mouth to hold a plastic cup, containing a ping pong ball. They will slide down the slope one by one. Once he or she reaches the bottom of the slope, he or she will place the ping pong ball into a big container. Whichever team has the most number of ping pong balls in the big container wins the game.
Balloon Hurray	2 players from each team will hold each other's hands with a balloon in between them. They will slide down the slope together. Upon reaching the bottom of the slope, they will place the balloon into the big container. Whichever team with the most balloons in the big container wins the game.
Musical Chairs	Rubber tubes will be arranged in a circular form. The children have to walk round the rubber tubes once the music starts. Once the music stops, they have to quickly sit down on a rubber tube. The one who is unable to find a rubber tube to sit down will be penalized once. He or she is given up to 3 chances. If he or she is penalized thrice, he or she will have to perform for the rest of the children.
Bursting Balloons	Each player from each team will slide down one by one. Once he or she reaches the bottom of the slope, he or she will have to burst a balloon with both hands. Only when he or she has burst the balloon, will the next player able to slide down and repeat the process. There is a time limit of 10 mins. The team, which is able to burst the most balloons within the time limit, wins the game.
Dress Me Up	One player from each team will be dressed to the minimum, for example, in only T-shirts and jeans, and stands at the bottom of the slope. Several items will be given to the other team players, which are the hat, jacket, waterproof pants, ski boots, ski and poles. They will then slide down one by one, carrying one item at a time, and dress up the player standing at the bottom of the slope. The objective is to dress him or her up as a skier. The team, which finishes first, wins the game.

# SNOW CITY: THE SUB ZERO LEARNING EXPERIENCE

## EDUCATION PACKAGE D

### Snow Science Workshop



**\$15 per student, free admission to 1 teacher for every group of 10 students, \$10 for every additional teacher**



**2hr**



**30 to 60**

An interactive and hands-on programme, Snow Science dwell deeper into the science behind ice and water. The programmes offers an hour's fun snow play on the slope and a choice to participate in 4 of out of 8 experiments.

**Topics:** Discussion points includes density, friction, pressure and freezing points, and properties of ice, water, salt and other related substances.

**Duration includes:** 1 hour snow play, 1 hour Snow Science Workshop, 30 minutes changing of winter apparel.

**Note: Choose any 4 from the total 8 activities to fit your lesson objective. Children must be 7 years old and above to participate.**

ACTIVITY	SYPNOSIS
Rolling Ice Cubes	Discover how the different melting rates of ice above and below water caused the ice to roll.
The Exploding Bottle	Find out why water expands when it freezes.
Ice Pops Without a Freezer	Find out how different substances affect the freezing point of water and make an ice pop without using a freezer.
Lifting an Ice Cube With String	Learn how the concentration of solute affects the extent of melting ice.
Ice and Oil	Observe a demonstration that illustrates the different densities of oil, water, and ice.
Wired Ice	Learn how different pressures affect the melting point of ice.
Slippery Ice	See how friction affects the movement of ice across different surfaces.
The Melting Ice Race	Figure out how the different substances have different effects on the melting point of ice.

## EDUCATION PACKAGE E

### Cool Magic Workshop



**\$15 per student, free admission to 1 teacher for every group of 10 students, \$10 for every additional teacher**



**2.5hr**



**30 to 80**

How do you spin a ping pong ball without holding it? How do you instantly freeze water in just seconds? Know the answers to these questions in this workshop.

**Topics:** These experiments are fun yet simple enough to be replicated at home and for participants to show off their 'magic' skill to their friends. Some of the concepts that will be discussed are about force, states of matter, heat transfer, crystalization, and condensation.

**Duration includes:** 1 hour snow play, 1 hour Cool Magic workshop, 30 minutes changing of winter apparel.

# SNOW CITY: THE SUB ZERO LEARNING EXPERIENCE

## EDUCATION PACKAGE F

### Clouds of Fun Workshop



**\$15 per student, free admission to 1 teacher for every group of 10 students, \$10 for every additional teacher**



**2.5hr**



**30 to 80**

This workshop is composed of experiments using dry ice. When dry ice gets in contact with water and soap, it produces cloud-like formations and mists. Get ready to be awed by the science behind these simple demonstrations!

**Topics:** Concepts that will be discussed include sublimation, expansion, states of matter, and heat transfer.

**Duration includes:** 1 hour snow play, 1 hour Clouds of Fun workshop, 30 minutes changing of winter apparel.

## COMBO EDUCATION PACKAGE



**\$25 per student, free admission to 1 teacher for every group of 10 students, \$10 for every additional teacher**



**3hr**



**30 minimum**

This package comes with 30 minutes Winter Olympics, 1 hour snow play, and your choice of 1 workshop.

**Duration includes:** 1 hour snow play, 1 hour workshop of your choice, 30 minutes Winter Olympics, 30 minutes changing of winter apparel.

### REMINDERS

- Course fee includes gloves, jackets, and boots for the students. Only boots and jackets are provided for teachers. Adult gloves are optional for rent at \$2.10 per pair.
- It is compulsory to wear long pants to enter the snow chamber and socks when using our in-house boots.
- Cameras are not allowed inside the snow chamber to prevent damage caused by the subzero temperature. Photo services are available.
- Bookings are to be made at least 2 weeks in advance and are subject to availability.
- All prices are still subject to 7% GST. Fees are subject to change without prior notice.
- These programs are not valid with other discounts and promotions.

# SNOW CITY: THE SUB ZERO LEARNING EXPERIENCE



## Education Package Booking Form

Please fax this form to 6560 1297 or email to [sales@snowcity.com.sg](mailto:sales@snowcity.com.sg)

**Name of School** : \_\_\_\_\_

**Address** : \_\_\_\_\_  
\_\_\_\_\_ Postal Code: \_\_\_\_\_

**Contact Person** : \_\_\_\_\_

**Contact No** : \_\_\_\_\_ (Tel) \_\_\_\_\_ (HP)  
\_\_\_\_\_ (Fax)

**Email** : \_\_\_\_\_

**Education Package** : \_\_\_\_\_

**Total Pax** : \_\_\_\_\_ (Teacher)  
\_\_\_\_\_ (Student)

**Date of Visit** : \_\_\_\_\_

**Preferred Time Slot** : \_\_\_\_\_

\_\_\_\_\_  
**Signature of Principal**

\_\_\_\_\_  
**School Stamp**

\_\_\_\_\_  
**Date**

- *Terms and conditions subject to change without prior notice.*
- *Packages are not valid with other promotions.*
- *Booking is done on first-come, first-served basis and is subject to availability.*
- *50% Deposit payment is needed to reserve the booking.*
- *A successful booking will be confirmed by a reservation booking form via email.*

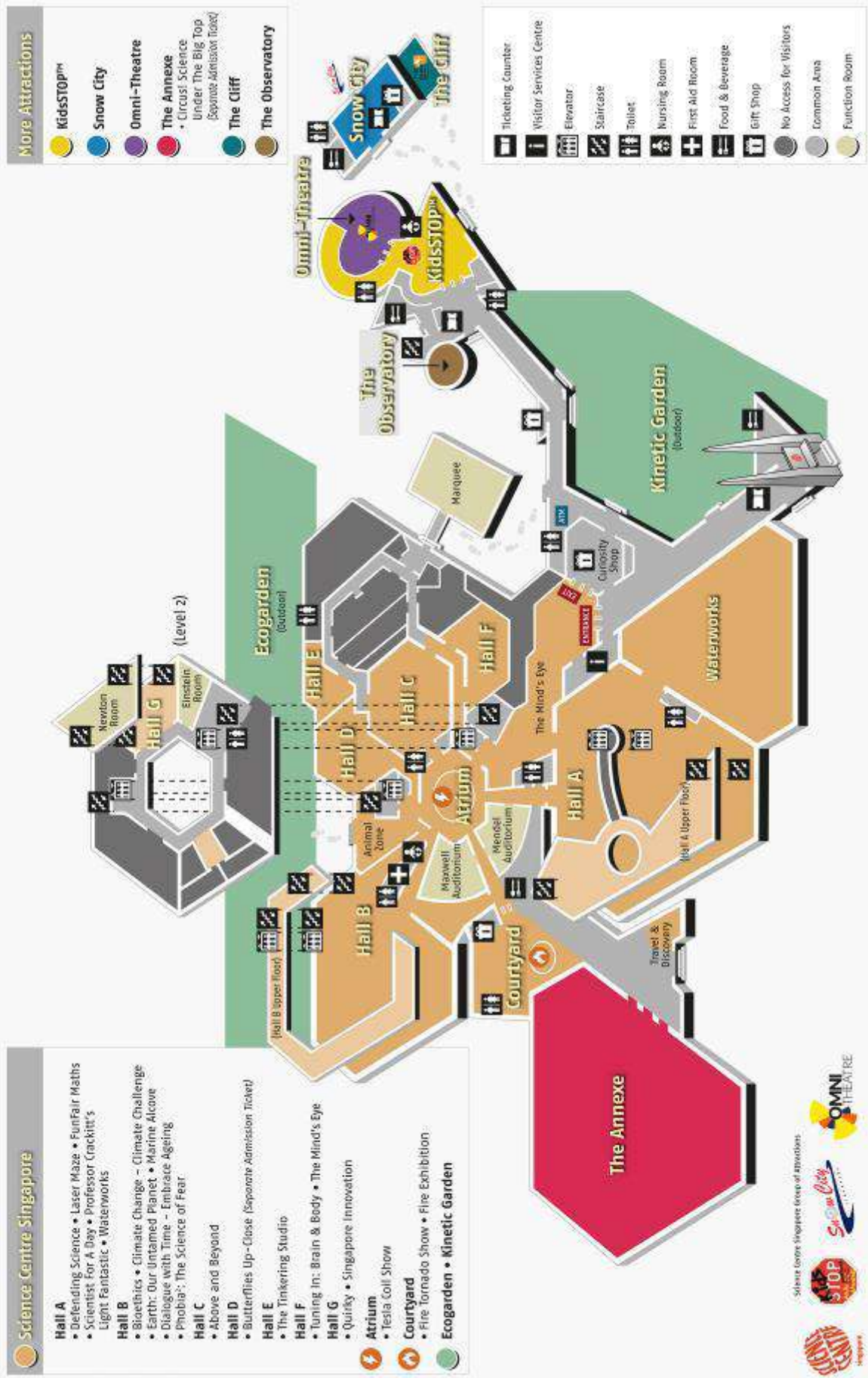
**SNOW VENTURE PTE LTD** 21 Jurong Town Hall Road, Snow City Building, Singapore 609433  
**Tel: 6560 2306 Fax: 6560 1297 Email: [sales@snowcity.com.sg](mailto:sales@snowcity.com.sg) Website: [www.snowcity.com.sg](http://www.snowcity.com.sg)**

# AREA MAPS AND FLOOR PLANS

This map was updated last in 08 December 2017.



## Science Centre Singapore Map





# THE ECOGARDEN



## ECOGARDEN

The Ecogarden, short for Ecology Garden is not an ordinary garden or public park. It is a place unadulterated by the urban environment and is packed with many of nature's secrets to discover. From insects like caterpillars and dragonflies to common fruits trees; from the vegetable farm to the ponds and leaf letter corners, it is action galore as you witness the dynamic "eat and be eaten" world that inhabits the Ecogarden. Visit the Treehouse, built around a Chinese Banyan and learn about the symbiotic relationship it has with a wasp. The Healing Plant section, featuring over sixty medicinal plants like "Tongkat Ali", Sweet Annie, "Noni" and Neem is also a stop not to be missed. Find out which plants cure your pimples and sore throat. To top it all, many of these medicinal plants can be easily planted in schools.

## TOUR OF ECOGARDEN

This is a self-conducted programme. Worksheets, depending on the level of students will be provided during your visit. The Ecogarden is open from 9.30am to 5.30pm. Student are encouraged to bring along a cap, water bottle and to wear appropriate shoes.



# SCIENCE

## EDUCATIONAL RESOURCES FOR TEACHING AND LEARNING



### Science Teaching and Resource Kits

Designed to support the teaching and learning of science through inquiry-based learning, these kits were developed for primary and secondary school teachers. Its activities are tailored to assist in the teaching of key science concepts in the classroom.



### Let's Explore Kits

Children learn better when they perform experiments themselves and witness the cause and effect first-hand. These specially designed kits are comprehensive with well-illustrated guides to facilitate teaching and learning.





## Professional Training for Teachers

Learn effective techniques of delivering science lessons in our specialist workshops for teachers. Discover the pedagogy of inquiry based learning and the benefits of teaching science process skills. Be an inspired educator to infuse fun and excitement in engaging children in the learning of science.

Workshops can be conducted for teachers at your respective schools at a special rate. To find out more, contact us at [star@science.edu.sg](mailto:star@science.edu.sg) or fax to 6565 7032.



## Young Scientist Card and QUESTA Club Card

These structured science activity cards for primary and secondary students engage them to learn and work independently, by carrying out activities related to a science topic. Students collect a certain number of "stars" and earn badges.



The newly revamped "I am a Young IT Whiz" card moves beyond fostering technical competence to include a mix of activities promoting media literacy skills and competencies among our young students. The activities are tailored to create awareness among the young on cyber security and cyber wellness in the form of social and personal responsibility online and

in social media spaces. The programme is a collaboration between MDA (Media Development Authority), MLC (Media Literacy Council), Singtel, CSA (Cyber Security Agency of Singapore), PDPC (Personal Data Protection Commission), NLB (National Library Board) and Science Centre Singapore. Primary schools who are keen to adopt the "I am a Young IT Whiz" card can now obtain it for free, whilst stock last. To find out more, contact us at [star@science.edu.sg](mailto:star@science.edu.sg) or fax to 6565 7032.



## Guidebooks

An extensive range of titles including local flora and fauna, insects and marine animals, etc. These compact, pocket-sized booklets are intended as field guides for a wide readership, ranging from science teachers and students to nature lovers.



For purchasing enquiry, email to [Star@science.edu.sg](mailto:Star@science.edu.sg)  
[www.science.edu.sg/resources](http://www.science.edu.sg/resources)



# BOOKING FORM

## 2018 SCIENCE ENRICHMENT PROGRAMMES

### Booking Form

Name of Teacher-in-Charge: (Ms/Mrs/Mdm/Mr) \_\_\_\_\_ Name of School: \_\_\_\_\_

E-mail: \_\_\_\_\_ Institutional / Associate Member: (Yes/No)

HP: \_\_\_\_\_ School Tel: \_\_\_\_\_ School Fax: \_\_\_\_\_

(Please tick) I would like to be included on the Science Centre Singapore Education Programmes mailing list to receive information regarding new and upcoming enrichment programmes, movie previews, talks or workshops for students/teachers.

Section B: To be completed by Teacher-in-Charge					Section C: For Official Use			Section D: To be acknowledged by Teacher-in-Charge			
Course Title:					Status of Booking			Acceptance of Dates Given			
<i>Please list each class individually</i>											
Level	Class Name	No of students	No of teachers	Term/Week	Date	Time	Successful	Unsuccessful	Alternate Date	Accepted (please tick)	Rejected (please tick)
Total No. of Classes (for entire booking):											
Total No. of Students:											
Date Submitted:											
Remarks: (If you have any preferred days or week period, please state below.)											
To Book:											

Please note that this form is only applicable to classes currently not on the online system. All other classes have to be booked online through <https://obs.science.edu.sg/login>

- Please complete Section A & B, using one form for each course title you would like to book for.
- Please return the completed form to: Education Programmes Division to our Fax: 6561 6361
- We will notify you of the status of your booking in Section C. If your preferred slot is unavailable, we will offer an alternative slot near the date you have requested.
- Kindly acknowledge your acceptance of the allocated slots in Section D within 7 working days upon receiving our reply. If you need to amend the dates, please email us at [schools@science.edu.sg](mailto:schools@science.edu.sg).
- Please proceed to ticketing counter on the day itself with your school member pass (if applicable) and this form as a confirmation letter.

**Privacy Policy**  
Information collected in this document is for Science Centre Singapore enrichment programme booking purposes only and will not be sent to third parties. We request for teachers' contact information in order to arrange alternative dates if slots are unavailable. Explicit consent is obtained to use the information in a manner different from the purposes for which it is collected.

*This form may be copied if necessary for booking purposes.*



**SCIENCE CENTRE SINGAPORE**

15 Science Centre Road Singapore 609081

Tel : 64252500 | Fax : 65659533

[www.science.edu.sg](http://www.science.edu.sg)