



HONG KONG TRUE LIGHT COLLEGE

DEEP THINKING PROJECT BOOKLET (2023/24)

Optimize Deep Thinking Shine with Inquiry Spirit
Broaden Learning Horizons Live by Positive Values

BIOLOGY DEPARTMENT

MEMBERS: Miss CHAN Lai Shuen

Mr. CHU Wai Lun

Mr. LIANG Weijie



Programme Content (Sep 2023 – Apr 2024)



Programme 01.

[26 Sep 2023] Experiential Learning in Biotechnology

Curriculum Connection: Biotechnology

Target Level: S.6 Biology students

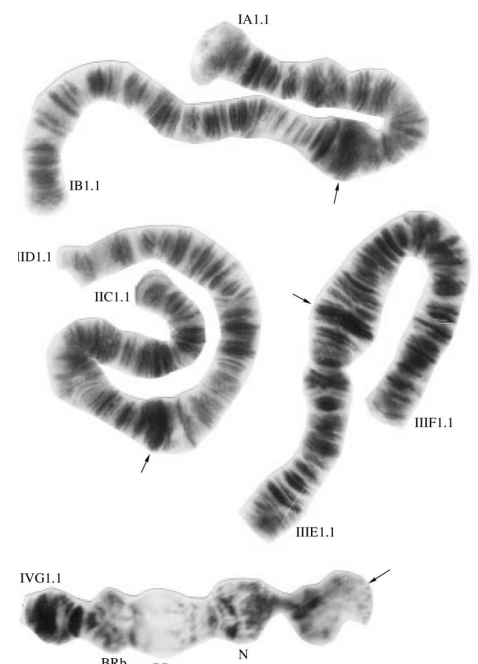
Learning Objectives:

- ★ Recognize the applications of DNA fingerprinting and related modern biotechnology techniques.
- ★ Use appropriate instruments and proper techniques for carrying out practical work (e.g., separation of DNA fragments by gel-electrophoresis)

Activity Highlight:

Our Biology Department orchestrated a site visit to Caritas Chan Chun Ha Field Studies Centre, a unique opportunity for our S.6 Biology students to actively apply their knowledge in molecular biology and biotechnology.

During this visit, our students acquired practical skills in using advanced equipment such as micropipettes and stereomicroscopes, a testament to their understanding of the work of molecular biologists in real-world research. Students were immersed in unique experiences, observing the polytene chromosomes in the larva of *Chironomidae* and conducting practical work to extract DNA from living tissues and separate DNA fragments by gel electrophoresis.



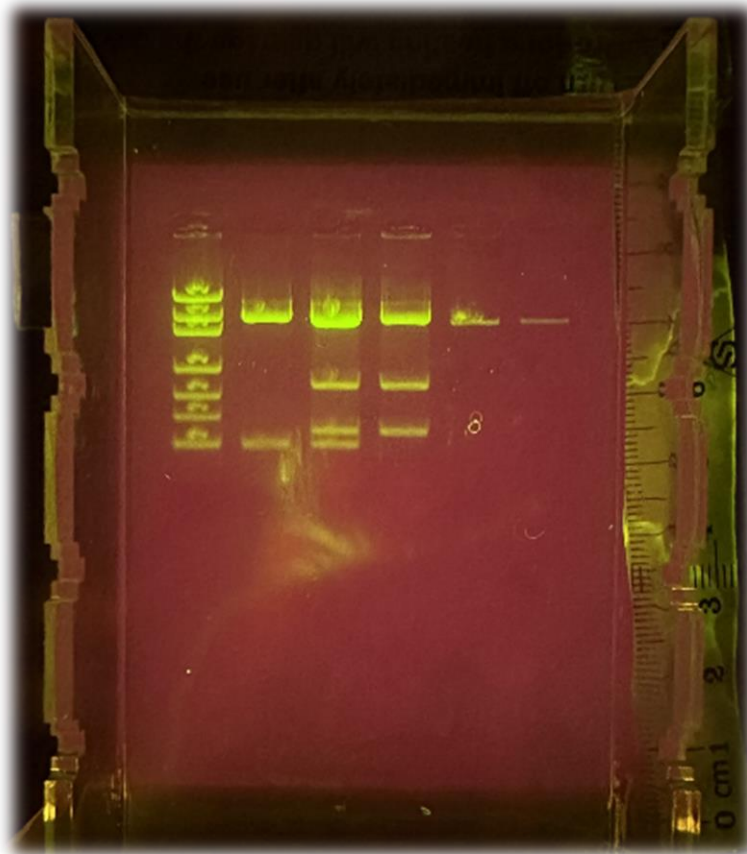
Polytene chromosomes in the larva of *Chironomidae*

Students' Feedback:

6A09 Kwok Hau Ling

The biotechnology workshop provided an opportunity for us to do advanced experiments. Although it was difficult to separate the larva's head under the microscope, this could let us experience how scientists conduct an experiment and it can also train our persistence. Moreover, I acquired more biological knowledge such as the function of different chemicals and how to prepare extraction buffers. This encourages me to think more and put theory into practice.

I performed the following gel-running:



L1 L2 L3 L4 L5

- | | |
|------------------------------|-----------------------------|
| L1: DNA standard marker | L2: Child's DNA fingerprint |
| L3: Mother's DNA fingerprint | L4: Male 1 DNA fingerprint |
| L5: Male 2 DNA fingerprint | |

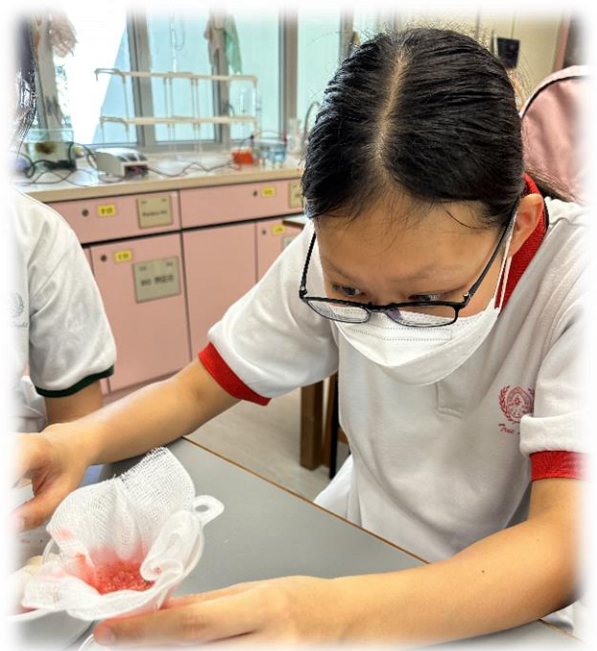
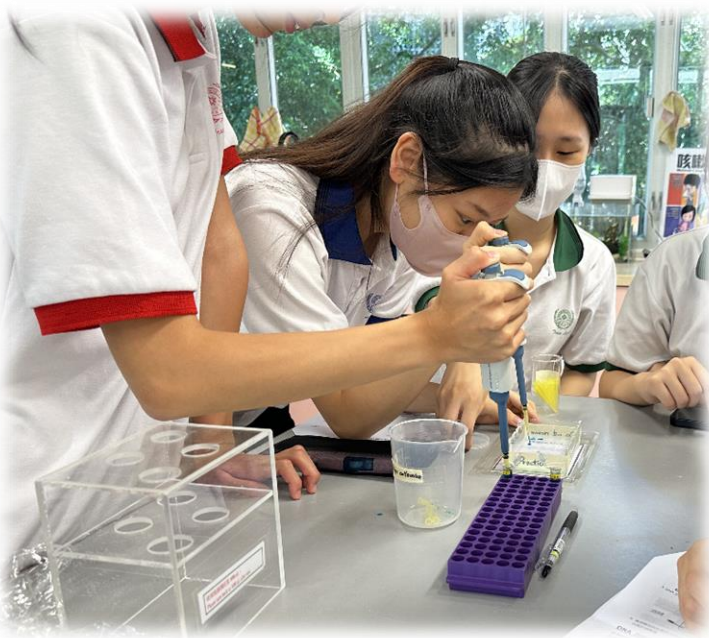
6C12 Ng Wing Ki

It was a hands-on experience that enhanced my understanding of these techniques and their relevance to Biology. I enjoyed the workshop and learned a lot from it.

Our capacity to comprehend and evaluate scientific literature and experiments in the field of biotechnology were improved by this practical understanding. Additionally, by looking at polytene chromosomes, we were able to see genetic material in a more organized way, which gave us significant fresh data on gene expression. Overall, the workshop has helped us to excel in our studies.

6D09 古嘉渝

透過進行從水果中提取脫氧核糖核酸及凝膠電泳等實驗，獲得了不少新知識。於提取 DNA 的過程中，我學到了氯化鈉 NaCl 令磷酸鹽與水之間的吸引力消失，而且乙醇使 DNA 與 Na^+ 的作用力上升，令兩者更易接觸。此外，使用冷凍後的水果做實驗是為了讓水果中酶活性下降，令我們較容易提取 DNA。另外，DNA 提取量是根據水果的倍體數量而改變。於凝膠電泳的過程中，我學到了聚合酶鏈反應包含溶解、接合、延長等過程以及 TaqDNA 聚合酶是耐熱的。



Programme 02.

[28 Sep 2023] Site Visit to the Hong Kong Biodiversity Museum (HKBM)

Curriculum Connection:

Biodiversity

Evolution

Target Level: S.6 Biology students

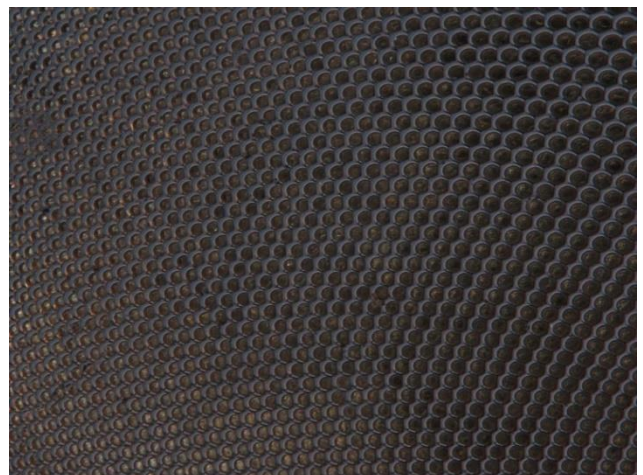
Learning Objectives:

- ✧ Appreciate the existence of various life forms in the world.
- ✧ Be aware that modern classification is based on the phylogenetic relationships of organisms.

Activity Highlight:

Our school's Biology Department recently sent students to visit the Hong Kong Biodiversity Museum at the University of Hong Kong. This is the first museum in Hong Kong to focus on biodiversity.

Students were exposed to over 15,000 valuable specimen collections and were introduced to the different methods of specimen preservation. Students also experienced examining insect biodiversity from an unprecedented angle through the lens of a microscope.



A compound eye of *Milesia balteata* under a light microscope



With the professional dialogue between students and professionals in the University, students not only expanded their understanding of systematics, but also learnt the importance of local and regional biodiversity conservation. Students are generally amazed and thrilled to have such an opportunity to learn from HKU's professors.



Students' Feedback:

6D13 李巧晴

透過這次活動，我看到了很多不同種類的動物標本。博物館內的標本應有盡有，從古老的無脊椎生物到靈長類也有，實在讓我大開眼界。其中，最讓我深刻的便是老師的講解，老師用顯微鏡向我們展示了不同昆蟲的構造，還向我們講解了牠們的習性，十分生動有趣。在這次活動中我留意到原來香港的生物多樣性很高，有很多種類的動物也能在香港找到，令我非常驚訝。這次活動大大提升了我對動物學的興趣。

6A14 Lo Sum Yau

I was amazed visiting the Hong Kong Biodiversity Museum. The Museum's collection showcased the incredible diversity of different phyla of animals from various habitats. Some of them can be found in Hong Kong, while some of them cannot.

The display of specimens made the visit engaging and educational. Also, with the detailed descriptions from the guides, we had a comprehensive understanding of the biodiversity, which left us with a deep appreciation of the ecosystem.



Programme 03.

[21 Oct 2023] ASM Agar Plate Contest 2023 (HK Region)

Curriculum Connection:

Microbiology

Biotechnology

Target Level: S.4-5 Biology students

Activity Highlight:



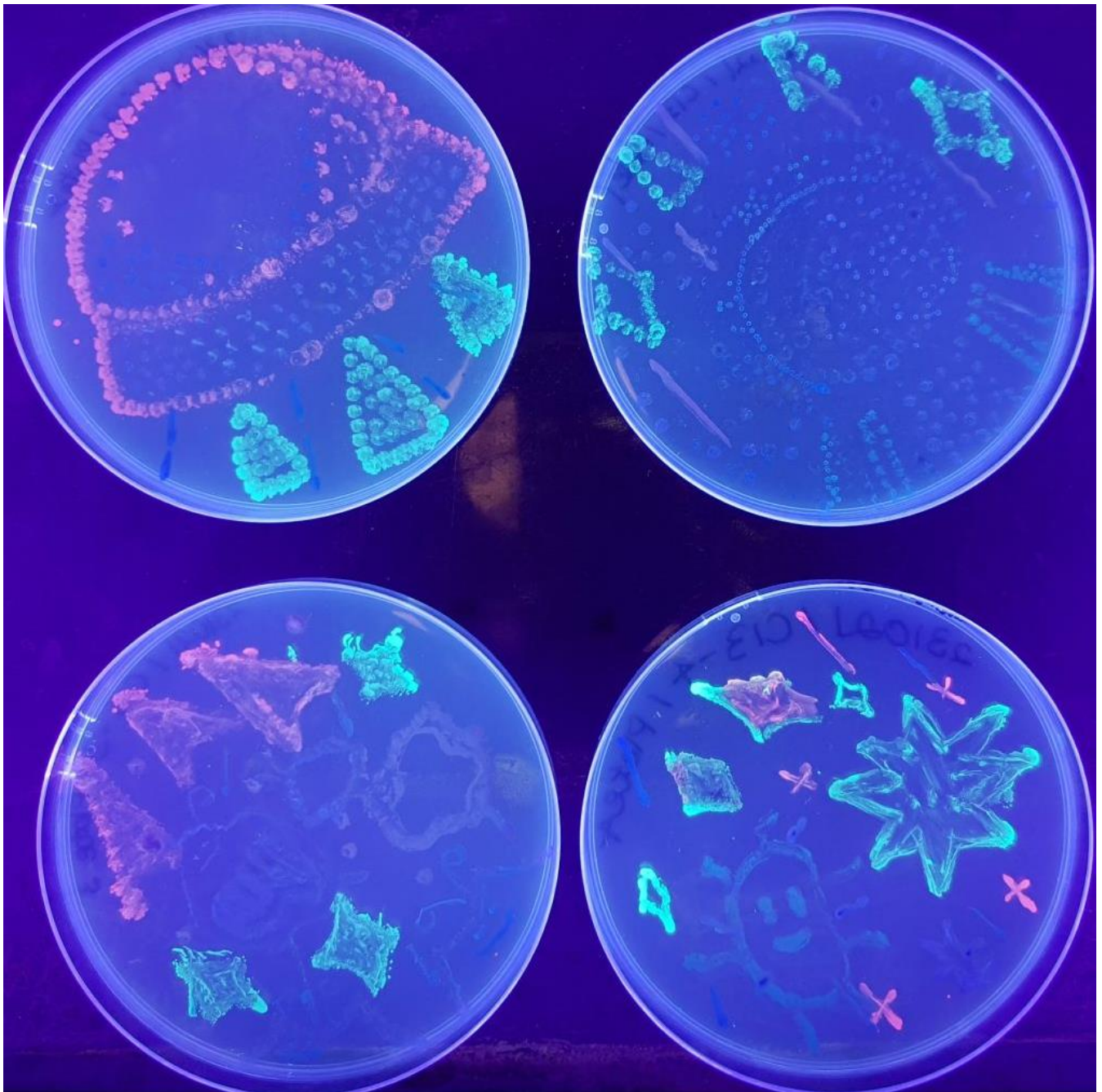
我校共 8 位同學於十月下旬代表學校參加了『國際瓊脂藝術大賽 2023』香港區賽，以『微生物在太空』為主題創作瓊脂藝術畫作，參賽隊伍展示了無比的創意及藝術天分，把科學概念透過科技的應用展示於瓊脂畫作上。我校代表 C13 組成功在『國際瓊脂藝術大賽 2023』香港區賽中得到了亞軍的成績，為我校爭取了一座獎盃、四副手提顯微鏡和兩副 DNA 模型！



Students' Output:

C13 組：4E01 區嘉怡 4A13 盧蕙蕙 4A15 王小雪 4A01 鄭凱瑤

"Our design used the star of Bethlehem as the guide of those true light girls, who role as the astronauts. Those astronauts were invited by Sik Sik Yuen, the organizer of this event. When the true light astronauts travelled to the universe by spaceship, they found a variety of microorganisms, including viruses, protozoa, and algae as the diagram is created by the bacteria growth. They discovered that those microorganisms were interesting and had different shapes and characteristics which inspired them to devote more time to science."



C35 組： 4B02 陳卓遙 4A10 郭菲 4A05 張晞苗 5C14 盧凱祺

"Microorganisms are living all around the world, no matter in the Earth or even space. Our design used *Salmonella* as an example to demonstrate what if bacteria can travel from Earth to outer space. It is equipped with a spacesuit with professionally designed equipment to travel in space. Another plate used *Amoeba* as the main character and dance with other virus, advocating the idea of inclusion and live peaceful with no discrimination. We would like to use this art piece to encourage people to think about love, care, and peace, and treasure what we have now."



Activity Photos:



Please scan the QR code for more information about our students' reflection!



Programme 04.

[28 Nov 2023] Exploring Enzymes: A Dynamic Four-phase Journey of Inquiry and Culinary Exploration

Curriculum Connection:

Enzyme and Metabolism

Target Level: S.4-5 Biology students

Learning Objectives:

- ✧ Recognize the properties of enzyme and its roles in metabolism.
- ✧ Interpret and analyze data relating to actions of catabolic enzymes.
- ✧ Connect Biology concepts to culinary experiences.

Activity Highlight:

To optimize students' deep thinking and broaden their learning horizons, the Biology Department has launched a four-phase learning project on the topic 'Enzyme'. Enzymes, being biological catalysts, play a vital role in speeding up metabolic reactions and possess numerous practical applications in our daily lives.

In this project, students were first encouraged to delve into articles exploring proteases, including their natural sources, their significance in our body, and their use in tenderizing meat.

proteins in connective tissues of meat $\xrightarrow{\text{protease}}$ peptides

Armed with knowledge about the natural sources from which they could extract protease, students then tested the protease activity in natural extracts using milk agar plates, aiming to determine the most effective protease for tenderizing meat.



As the project progressed to its third phase, students were allowed to utilize our facilities in the renovated Home Economics laboratory, gaining hands-on experience in cooking chicken fillets using natural juice extracts through baking or frying. This hands-on experimentation aimed to validate the experimental findings against practical cooking results. Notably, students not only gained valuable experience but also thoroughly enjoyed the culinary aspect of the project.



Finally, in the concluding phase, students were tasked with writing a comprehensive laboratory report to document their scientific investigation journey and capture the essence of their learning. Our students derived immense benefits from this enriching learning experience, with culinary as a particular highlight for them.



Please scan the QR code for more information about our renovated Home Economics Lab!



Lab Reports:

Hong Kong True Light College

S.4 Biology Scientific Investigation

Which natural juice extraction has the best meat tenderizing ability?



Name: _____

Class: S4 _____ ()

Teacher: CWL / LWJ

Submission Date: ____ / 12 / 2023

| Grade | |
|--------------|-------------|
| B1 | / 27 |
| B2 | / 13 |
| Total | / 40 |



Instruction:

Enzymes are commonly found in different natural extracts. These enzymes may include proteases, the type of enzyme that helps speed up the breakdown of proteins.

Billy is reading a recipe for cooking chicken fillet. The recipe suggests adding some natural extracts to the chicken before cooking, which may help soften the chicken. Vicky told him that he could measure the activity of proteases in different natural extracts using skimmed milk agar plates. The white colour of skimmed milk-agar is caused by a protein called casein. When casein is digested by protease, a clear zone will be formed in the skimmed milk-agar plate.

Billy wanted to compare the activity of protease in different natural extracts. He would like to find out which natural juice extraction has the best meat tenderizing ability.

Experimental Design (B1):

Answer the following questions to help Billy design an investigation to achieve his goal:

1. State the independent variable of this investigation. (1 mark)

Independent variable: _____

2. What is the dependent variable in the investigation? Hence, how can the dependent variable be measured **accurately** and **reliably**? (3 marks)

Dependent variable: _____

How can it be measured accurately:

How can it be measured reliably:

Students are encouraged to think about the experimental designs (e.g., independent variable, dependent variable, how to enhance accuracy and reliability) before the actual hands-on experience.

Programme 05.

[4 Dec 2023] Reading in Science

Curriculum Connection:

Gas pressure (in lungs)

Density

Target Level: S.1 Science students & S.5 Biology students

Learning Objectives:

- ✧ Promote science learning through reading by demonstrating innovative experiments correlated with the junior Integrated Science curriculum.
- ✧ Enhance understanding of scientific concepts and spark a genuine interest in science among the junior form students.

Activity Highlight:

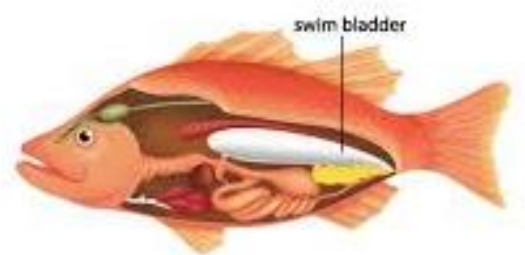
This December, our Biology students took the initiative to become "little instructors" as they demonstrated innovative experiments to our junior form students, promoting the learning of science through reading. By extensively researching and engaging in book studies, our Biology students meticulously planned various experiments that correlated with the concepts taught in junior Integrated Science, such as gas pressure and density. These experiments were carefully designed to align with the Science curriculum.

Experiment 1: The growing and shrinking marshmallow

- ✧ related to gas pressure

Experiment 2: The floating and sinking fish

- ✧ related to density



The junior form students thoroughly enjoyed the experiments, finding them both educational and entertaining. By immersing themselves in the hands-on activities, the students could grasp scientific concepts more effectively and develop a genuine interest in science. This workshop served as a testament to the dedication and passion of our Biology students, highlighting their commitment to nurturing a love for science among their peers. By sharing the knowledge they had learnt through reading and serving as role models, they successfully sparked curiosity and enthusiasm in their fellow students.

Overall, this workshop showcased the success of integrating reading and practical application in science education. It emphasized the importance of hands-on learning experiences and highlighted the positive impact that peer instruction can have on student engagement and comprehension.



Students' Feedback:

5A05 Ho Sheung Wai

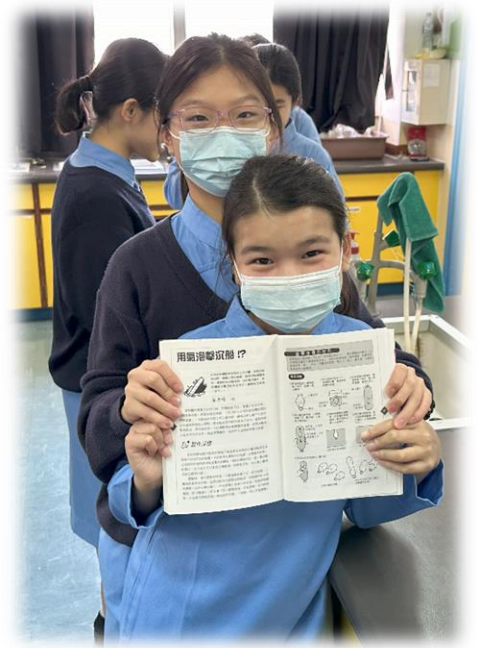
I found this workshop meaningful because it allowed me to apply the knowledge I gained from books and share it with the S1 students. It never occurred to me that I could teach others. Now I realize that reading not only enriches my knowledge but also has the power to impact others' learning. This experience has motivated me to share what I have learned through reading books with others in the future.



1D24 Wong Chiu Man

The science workshop about density and gas pressure was so cool! We did fun experiments and activities that made me excited.

I liked them a lot and now I want to learn even more about science through reading the book suggested.



Programme 06.

[13 Dec 2023] DIY Leaf Vein Bookmark Workshop

Curriculum Connection:

Plant Biology

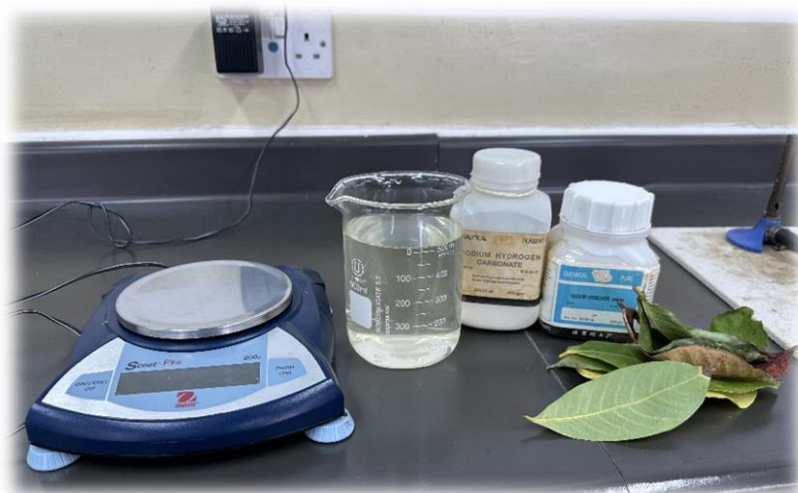
Target Level: S.1 Science students

Learning Objectives:

- ✧ Foster enthusiasm for life sciences and encourage regular reading habits through an interactive DIY leaf vein bookmark workshop.
- ✧ Empower students to explore the patterns and structures of leaf veins, and foster an appreciation for nature.

Activity Highlight:

To foster students' enthusiasm for life sciences while encouraging regular reading habits, the Science Club organized an interactive DIY leaf vein bookmark workshop, in which students had the opportunity to explore the patterns and structures of leaf veins, gaining insight into the wonders of plant biology.



Through a guided step-by-step tutorial, students were empowered to create their unique leaf vein bookmarks, fostering an appreciation for the beauty and complexity of nature. Gently brushing away the leaf cells not only intrigued students but also provided a sense of healing and tranquility. By combining creativity, scientific exploration, and the joy of reading, this workshop impacted students' interest in life sciences and their commitment to regular reading habits.

Students' Feedback:

1B13 Kwan Man Chi

I love Visual Art and Science very much, so when I noticed that the Science Society is going to hold an activity that mixes Science and Visual Art, I was very excited and wanted to join this activity. At first, I thought making a Leaf Vein Bookmark was an easy job but after this activity, I realized that making a Leaf Vein Bookmark is challenging.



Programme 07.

[4 Feb 2024] Tong Fuk Go Green Organic Farm Visit

Curriculum Connection:

Conservation

Target Level: S.1 Science students

Learning Objectives:

- ★ Learn eco-friendly farming practices and enhance environmental protection awareness among junior form students.
- ★ Encourage students to take sustainable environmental actions at both personal and community levels, inspired by the visit to the farm and their newfound knowledge of eco-friendly practices.

Activity Highlight:



To promote environmental protection in schools and raise sustainability awareness, four Form 1 students were invited by the Rotary Club to visit the Tong Fuk Go Green Organic Farm on Lantau Island in early February. Through this opportunity, students learned some eco-friendly farming practices. The activity raised the students' environmental protection awareness. It encouraged them to take sustainable environmental actions at both the personal and community levels.

Students' Feedback:

1B10 Kan Cheuk Yu

During this farming experience activity, we tried using different farming tools to plant plants. In the process of visiting, we also learned about different green planting methods. Many of the facilities were handcrafted by the local staff and they did not use materials that were harmful to the environment. For example, the floor of the farm is made of recycled fallen trees. It was a wonderful experience and we learnt a lot about environmental protection from it.



1B17 Leung Lok Tung Mia

I went to an organic farm on Lantau Island in February. The farmers showed us how to use farming tools like hoes and shovels. During the visit, the farmers told us about their farm and plants, and explained why it's important to protect the earth. Protecting the earth is very important as this is the place where we are living now. We should follow the 4Rs principle to avoid further destruction to the environment.



Programme 08.

[7 Feb 2024] Exploring Marine Biodiversity @SWIMS

Curriculum Connection:

Ecosystem

Biodiversity

Target Level: S.5 Biology students

Learning Objectives:

- ✧ Visit and explore the ecology of the world-class marine research center at the Swire Institute of Marine Science.
- ✧ Understand basic ecology of the rocky shore habitat and perform intertidal survey with SWIMS researchers.



Activity Highlight:

On February 7th, our S.5 Biology students participated in a field trip to the renowned Swire Institute of Marine Science (SWIMS) located in Cape D'Aguilar. The purpose of the trip was to provide students with valuable experiential learning opportunities related to marine research and ecology.

During the morning session, students had the privilege of collaborating with SWIMS researchers to conduct an intertidal survey. This hands-on activity allowed them to explore the unique ecology of the Marine Reserve in Hong Kong, specifically focusing on the rocky shore habitat. Through the utilization of transects, quadrats, and species identification techniques, students gained a comprehensive understanding of the fundamental principles of rocky shore ecology. By observing the interactions between organisms and their environment, students were able to deepen their knowledge of ecological dynamics.



In the afternoon, the students returned to the research center to analyze subtidal zone biodiversity. This analysis involved using Autonomous Reef Monitoring Structures (ARMS), which enabled students to classify diverse marine organisms collected in the sampler. Notably, our students successfully identified over 50 species during this immersive experience, which was truly remarkable.



Overall, the field trip to SWIMS gave our students a unique opportunity to apply theoretical knowledge gained in the classroom to real-world ecological settings. By actively participating in various research activities and interacting with experts in the field, our students fostered a deeper appreciation for marine science and its vital role in environmental conservation.

sea urchin

Students' Feedback:

5A02 Chan Tsz Ching Nicole

I have learnt that the biodiversity in Hong Kong is high and that the city contains a lot of marine organisms compared to larger cities, countries, or places in the world. I was amused that Hong Kong has more than 5900 kinds of sea creatures in just a small place after all. The creatures were really cute and fun to look at and play with, though the weather was cold. We looked at different species of a kind of Mollusca and I was shocked that there were so many kinds of similar things.



Epiactaea bullifera



Ciona intestinalis



Barbatia trapezina

Species Identification Key:

Annelida – Polychaeta

&

Platyhelminthes

Dorvilleidae



Four symmetrical palps around head
Distinct segments

Syllidae



Long, thin parapodia

Nereididae



Distinctive double, frontal rostra
Whisker-like palps aft of rostra



Phyllodocidae



Forward facing,
symmetrical palps
Often very long bodies



Notophyllum HK01

Programme 09.

[19 Feb 2024] 第二屆扶輪減碳短片創作比賽

課程連結:

環境保護

目標學生: 中一科學科學生

學習目標:

✦ 通過短片創作的形式，喚起大眾對於環境保護的關注。

活動亮點:

同學們熱情參與了「第二屆扶輪減碳短片創作比賽」，她們精心準備了一分鐘的短片，從頭到尾都是由她們自己規劃、執導和演出。

在準備過程中，同學們學習了許多關於拍攝技巧和剪接的知識。她們掌握了攝影構圖、聲音錄製等技術，並且學會了如何運用剪接軟體進行後期製作。這些技能的學習不僅提高了她們的創作能力，還為她們未來從事相關領域的工作打下了堅實的基礎。



這場比賽不僅僅是一個技術的挑戰，更是一個機會，讓同學們展現她們對於環境保護的關心。短片通過精心的故事，向觀眾呼籲保護環境的重要性。更重要的是，這此活動使她們意識到每個人都有責任為環境盡一份力。她們通過自己的創作，傳遞出了一個重要的信息：我們應該共同努力，採取行動減少碳排放，保護我們共同的家園。

參加同學名單：1B02 陳晞瞳 1B09 洪晞晴 1B10 簡卓好 1B17 梁樂童

請掃描二維碼觀看我們
學生製作的影片！



Programme 10.

[24 Feb 2024] 龍文化薈萃啟動禮

課程連結:

環境保護

目標學生: 中四至五生物科學生

學習目標:

✦ 拓寬學生學習視野，學習作為負責任的世界公民、珍惜地球資源和保育珊瑚。

活動亮點:



配合龍年，宏揚中華文化，南區學校聯會各中小學會籌辦「南區龍文化教育薈萃」，本校參與和海洋公園合辦的「海龍計劃」活動。

中四和中五生物科 DTP 學生參加由海洋公園教育部提供的海洋科研活動，然後把所學知識推展至區內其他中小學。

中五 DTP 生物科學生代表於 2024 年 2 月 24 日出席在海洋公園舉行的「南區龍文化教育薈萃」啟動禮將。當日除了有不同中華文化活動的表演外，亦有海洋公園介紹有關保育的資訊。

活動倩影:



Programme 11.

[4 Mar 2024] Site Visit to the "State Key Laboratory of Marine Pollution" at City University of Hong Kong

Curriculum Connection:

Ecosystem

Biodiversity

Target Level:

S.1-2 Science & S.3-5 Biology students



Learning Objectives:

- ✧ Enhance students' awareness of marine environmental issues and the importance of conservation efforts.
- ✧ Provide students with an opportunity to engage with renowned researchers and gain insights into multidisciplinary approaches in marine research.

Activity Highlight:

On March 4th, our outstanding Science students from grades S.1-2, as well as our top Biology students from grades S.3-5, embarked on a visit to the esteemed "State Key Laboratory of Marine Pollution" (SKLMP) at the City University of Hong Kong. SKLMP holds a prominent position as an international research center focused on advancing marine environmental research, with a dedicated mission to safeguard and manage the marine environment while making a positive societal impact.

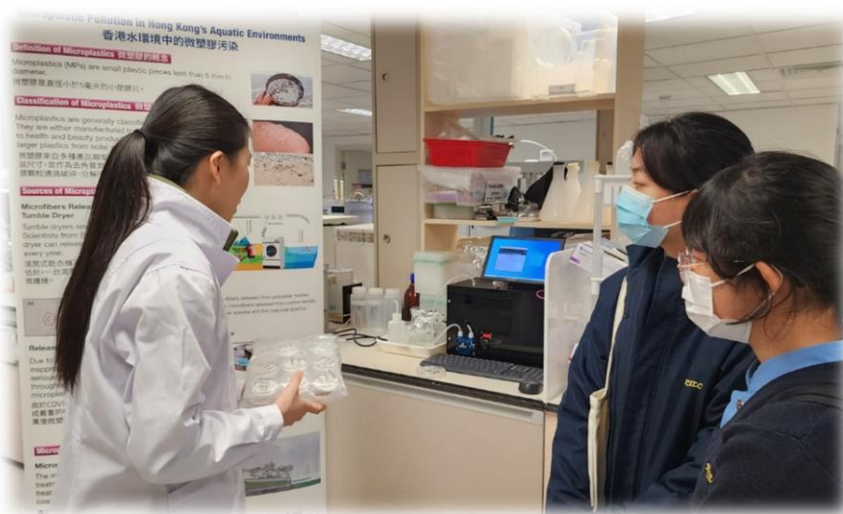


During this visit, our students were fortunate enough to engage in a professional dialogue with Professor Kenneth Mei Yee Leung, the director of SKLMP and chair of the Department of Chemistry. This gave them a unique opportunity to deepen their understanding of the human impact on the marine environment in Hong Kong, the South China region, and the wider Asia-Pacific region. They also gained insights into the conservation efforts undertaken by renowned researchers through multidisciplinary research and innovative approaches related to pollution monitoring and control, environmental risk assessment, ecosystem responses to stressors, and ecological restoration.

Our students actively participated in the discussion, posing thought-provoking questions that further enriched their knowledge.



Professor Leung's enlightening presentation left a lasting impression on our students, inspiring them with new perspectives and ideas. Additionally, they were given a rare chance to tour the research laboratories, providing them with first-hand exposure to cutting-edge scientific endeavors.



Overall, this educational trip served as a valuable experience for our students, broadening their horizons and fostering a deeper appreciation for the importance of marine environmental research and conservation efforts.



Students' Reflection Posters:

SAVE THE EARTH

香港城市大學「海洋污染國家重點實驗室」

3A13 梁沛融



印象深刻的經歷

- 學到了塑料污染對海洋生態系統造成的嚴重影響
- 學到了塑料垃圾對海洋生物造成的傷害以及對人類健康的威脅
- 讓我意識到我們需要立即採取行動來解決這個問題。

最欣賞的研究

- 生態海岸線研究
- 欣賞生態海岸線研究項目，利用石壁創造可持續且環保的生物多樣性和能源解決方案。
- 同時能美化海岸線的環境

我的行動

- 意識到個人可以為環境作出貢獻，如減少使用塑料產品，鼓勵他人加入行動，參與環保活動如清潔海灘和植樹造林。
- 持續關注和支持研究項目，特別是可再生能源和環境保護方面的研究。



參觀香港城市大學「海洋污染國家重點實驗室」

5C14 盧凱祺



好榮幸能夠得到千載難逢的機會，到「海洋污染國家重點實驗室」參觀，實在獲益良多。當日，梁教授向我們講述了有關生物多樣性的概念、保護生物多樣性方法以及海洋污染研究。

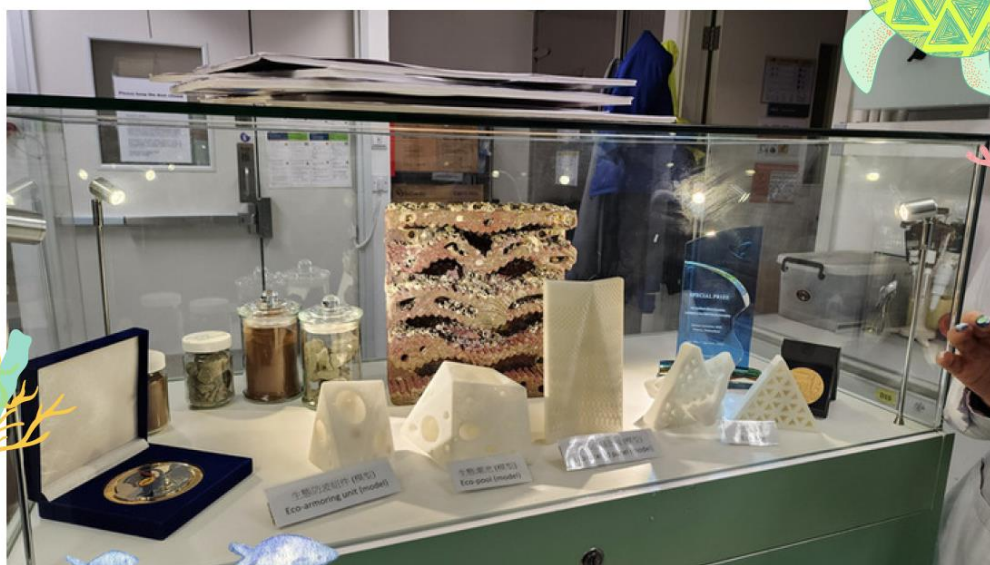
我明白到原來生物多樣性能為人類提供四種服務，分別為供應服務（如：食物、醫藥）、調節服務（如：調節氣候）、支援服務（如：為生物提供生存空間）及文化服務（如：科學價值）。其中支援服務的調息，對於生態系統是極為重要的，能幫助全球系統運作，例如能夠將太陽能轉化為整個生態系統食物鏈中的能量。由於植物能夠進行光合作用，另外細菌亦能將有機化學物轉化成無機化合物，然後再循環再用，這些都是幫助支撐整個地球的運作。因此，保護及提升生物多樣性是必不可少的。

當中，我最深刻的便是實驗室的海洋污染研究。梁教授曾經提及國家的身體安全是指保護上述四種服務，達到可持續發展發展，而其方法就是保護及提升生物多樣性。而梁博士他們是研究關於海洋污染物的修復及影響，例如微塑膠污染，微塑膠於海洋是十分難清理的，而其中兩位研究員研發了微氣泡，作用是能夠將海洋中的微膠粒浮起，有便清理走。對我而言，他們的科學研究是令我目瞪口呆的，要於海洋清理微塑膠，對我而言根本是水中撈月，但他們運用知識及努力所研發的技術，竟然能夠將這些細微的塑膠從大海中移除。他們不懈的努力、認真研究的精神及無窮的想像力，是令我最為讚嘆的，令我相信到知識真的能夠改變地球命運。

然而，微塑膠污染的研究項目也是我最感興趣的。香港的微塑膠污染是日益嚴重，幾乎到每一個海灘都能夠看到塑膠的足跡，無處不在，若微塑膠入侵食物鏈，最終受害的會是人類。因此，微塑膠污染的問題是不可忽視的，同樣是無可避免。由於COVID-19，口罩的大量使用及不當處置，導致造成環境嚴重的微塑膠污染。2020年全年丟棄的口罩導致超過1370萬億微塑膠進入海洋，這嚴重破壞海洋的生物多樣性，影響地球的運作。阻止微塑膠污染是刻不容緩的，地球的命運就在我們手中，既然這些污染是由人類引致的，就由我們伸出橄欖枝，為拯救地球出一分力吧！

我們能為地球進行什麼幫助呢？究竟有什麼方法能夠阻止微塑膠污染呢？作為一個地球公民，我們都有責任保護以及珍惜地球。作為學生，我們不妨參加一些保育環境義工服務，例如到沙灘收拾垃圾，我們亦應向身邊的人分享有關塑膠污染的嚴重性，提高人們的環保意識，源頭減廢。而作為香港市民，保護環境應該由自己做起，我們不妨自備環保餐具及食物盒，以代替外賣使用的一次性塑膠用品，以及手搖飲料。此外，我們亦應自備環保袋購物，以代替即棄塑膠袋，既省金錢又保護環境，何樂而不為呢？

保護地球的行動不可以紙上談兵，若沒有人願意踏出第一步，保護行動就難以進行。因此，不妨由我們攜手協力做起，以愛護環境的心打動身邊的人，帶動更多地球公民一起為我們的家園出一分力。愛護地球，由你我做得到。



參觀香港城市大學

「海洋污染國家重點實驗室」

活動紀錄



1.當日所學：實驗室成立的經過，海洋污染的來源，實驗室過往為解決海洋污染而開始研究的項目，海洋污染與環境和人類的關係等

2. 最深刻部分：參觀實驗室，看見剛才教授所講的項目的產品真實的模樣，並有機會拿上手細看，一旁有研究員為其作解說，有趣！



3. 最感興趣的研究項目：生態海岸線，建設於海堤，設計美觀的同時，亦能夠提供微生境，增強生物多樣性和生態系統的功能，因而感興趣！

4.作為一個世界公民，我們平日可以減少塑膠的使用，為垃圾分類並回收，支持環保，來減輕海洋污染



Programme 12.

[6 Mar 2024] 林地生態實地考察

課程連結:

生態系

生物多樣性

目標學生: 中五生物科學生

學習目標:

- ✧ 透過野外考察，於生境取樣和進行實驗，親身體驗生態學的概念。
- ✧ 培養學生對奧妙生物世界的鑒賞，促進對生物的尊重。

活動亮點:

中五級於 3 月 6 日前往長洲明愛陳震夏郊野學園參加「新高中生物科野外研習課程」。透過野外考察，於生境取樣和進行實驗，親身體驗生態學的概念。希望培養學生對奧妙生物世界的鑒賞，促進對生物的尊重；記錄樹林出現的生物，量度環境的光度、溫度、濕度等非生物因素，亦取泥土樣本和生物樣本回實驗室檢驗，以了解樹林的生態。



Programme 13.

[21 Mar 2024] Field Trip to Investigate Marine Debris and Microplastics @SWIMS

Curriculum Connection:

Ecosystem

Biodiversity

Target Level: S.4 Biology students

Learning Objectives:

- ✧ Investigate the issue of marine debris and microplastics.
- ✧ Educate students about the impact of garbage on marine ecosystems.
- ✧ Provide hands-on experience in categorizing and documenting debris to enhance understanding of marine pollution challenges.

Activity Highlight:

This March, our S.4 Biology students embarked on a field trip to Cape D'Aguilar in collaboration with the Swire Institute of Marine Science (SWIMS), a prominent marine research facility in Asia. The primary objective of the trip was to investigate the issue of marine debris and microplastics.

sea urchin



Before commencing their research, the students were given a comprehensive tour of the facility and were educated about the Marine Reserve in which it is situated. Following the introductory session, the students visited the renowned Lap Sap Wan, commonly referred to as 'Rubbish Bay'. This particular beach has gained notoriety due to its high levels of accumulated waste, making it a fitting location for witnessing the detrimental impact of garbage on marine ecosystems.

During their visit, the students actively categorized various types of debris, documenting their findings for further analysis. This experience provided students with valuable insights into the extent of marine pollution caused by debris and microplastics, contributing to a broader understanding of the ecological challenges faced by our oceans.



Classification of ‘plastic rubbish’:

Plastic rubbish is typically classified based on its resin identification code, which categorizes it into different types of plastic materials, such as PET, HDPE, PVC, LDPE, PP, PS, and others. This classification helps in determining appropriate recycling methods and processing.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|--|---|--|---|
| PETE | HDPE | PVC | LDPE | PP | PS | OTHER |
| polyethylene terephthalate | high-density polyethylene | polyvinyl chloride | low-density polyethylene | polypropylene | polystyrene | other plastics, including acrylic, polycarbonate, polyacetic fibers, nylon, fiberglass |
| soft drink bottles, mineral water, fruit juice containers and cooking oil | milk jugs, cleaning agents, laundry detergents, bleaching agents, shampoo bottles, washing and shower soaps | trays for sweets, fruit, plastic packing (bubble foil) and food foils to wrap the foodstuff | crushed bottles, shopping bags, highly-resistant sacks and most of the wrappings | furniture, consumers, luggage, toys as well as bumpers, lining and external borders of the cars | toys, hard packing, refrigerator trays, costume jewellery, audio cassettes, CD cases, vending cups | an example of one type is a polycarbonate used for CD production and baby feeding bottles |
| | | | | | | |

Students' Feedback:

4A04 Chow Ching Shun

I have learnt that microplastics impact the ocean and marine animals a lot. It was definitely a great adventure. The instructors explained a lot of details about the Cape D'Aguilar and Lap Sap Wan to us. After the trip, I will be more aware of the impacts of microplastics and will try to reduce the use of plastic in my daily life.

4A02 Cheung Cheuk Yin

I enjoyed this field trip. We saw the natural geographic views such as Cape D'Aguilar Sea Cave and Crab's Eye, and had experience in real-life touching of various marine organisms like sea urchins, sea cucumbers, crabs, etc. We also experienced how to classify different plastic rubbish in Lap Sap Wan. After this trip, I reflected on the severe environmental problem of microplastic in Hong Kong marine life.



4A13 Lo Wai Yan

In today's field trip, the instructors guided us to visit the research laboratory in SWIMS and let us touch the amazing marine life. He is patient in teaching us knowledge about micro-plastic. Now, I learnt more about how severely microplastic has impacted our planet. We had a chance to pick up and classify the type of plastic. I reckon that we must do something to cut back on the amount of plastic waste by using fewer disposable products.



Programme 14.

[26 Mar 2024] Talk on National Security Education – “New Energy Applications and Nuclear Power in China”

Curriculum Connection:

Bioethics

Biosecurity

Target Level:

S.1-2 Science and S.3-5 Biology students



Activity Highlight:

Dr. Tso Wong Man Yin, Chairman of the School Sponsoring Body, came to the school to give a lecture. Through Dr. Wong's sharing and interaction with students, students can grasp the latest development situation of the country and increase their understanding of Hong Kong, the country, and the contemporary world. The scope of Dr. Wong's lectures is on China's environmental protection achievements and renewable energy applications.

COP28 Climate Change Conference

The COP28 Climate Change Conference in late 2023 concluded that development of zero and low emission technologies, including **nuclear energy** would need to be accelerated in order to support the 2050 targets.

It is the first time ever since the establishment of the COP that **nuclear energy has been recognised as one of the solutions to reduce emissions**. This has laid a solid foundation for governments around the globe to speed up the development of nuclear energy.

24 participating countries of the COP28 Climate Change Conference, including United States, United Kingdom, Canada, France and Japan, signed a Ministerial Declaration to call for **global nuclear energy capacity by 2050**.



Students' Feedback:

香港真光書院 生物科 延伸學習活動 活動反思

中 四

日期：26-3-2024

姓名：張卓妍 (2)

- 活動名稱：國家安全教育講座—「我國新能源應用 / 核電」
- 內容簡介：由辦學團體主席曹王敏賢博士到校進行講座，透過王博士的分享及與學生的交流，讓同學可以掌握國家的最新發展形勢，增加同學對香港、國家及當代世界狀況的了解。王博士的講座範疇是中國的環境保護成就和再生能源應用。
- 活動日期：26/3/2024
- 活動時間：下午 2:20-3:20
- 講者：辦學團體主席曹王敏賢博士
- 列出中國在環境保護和再生能源應用方面所取得的一些成就。
核能提供了中國約 4.81% 的能源，核電廠的建設十分安全，數量亦遠遠領先了其他國家。
- 有效運用核電如何造福我們的社會？
核電減少對環境有害，因燃燒化學燃料而產生的二氧化碳，減低對環境的影響，並用於工業、醫學、考古等用途。
- 記錄一項在這次講座中，你從曹王敏賢教授所獲得而令你印象最深刻的學科知識。試描述內容和解釋令你最印象深刻的原因。
假如香港附近有核電廠洩漏輻射，我們應留在室內，不宜外出，關好門窗，用毛巾掩蓋好窗隙，直到^核放射性物質衰退期（最好7個）完結，因為空氣中有輻射塵，避免接觸放射性物質是最理想的解決。

Programme 15.

[26 Mar 2024] Frog Dissection (Junior) Workshop

Curriculum Connection:

System Biology

Target Level:

S.1-2 Science and S.3 Biology students

Learning Objectives:

- ✧ Provide an opportunity for junior-level students to explore frog anatomy and physiology.
- ✧ Enhance students' understanding of organ systems, skeletal structure, and body system functions through hands-on dissection.
- ✧ Encourage interactive engagement as students examine internal organs and discuss their functions.
- ✧ Cultivate scientific curiosity and teamwork among students.



Activity Highlight:

The Frog Dissection (Junior) Workshop provides an exciting and educational opportunity for junior-level students with an interest in Life Science to delve into the intricacies of frog anatomy and physiology. By participating in this workshop, students not only acquire practical skills as they dissect a frog specimen, enhance their understanding of organ systems, skeletal structure, and body system functions.

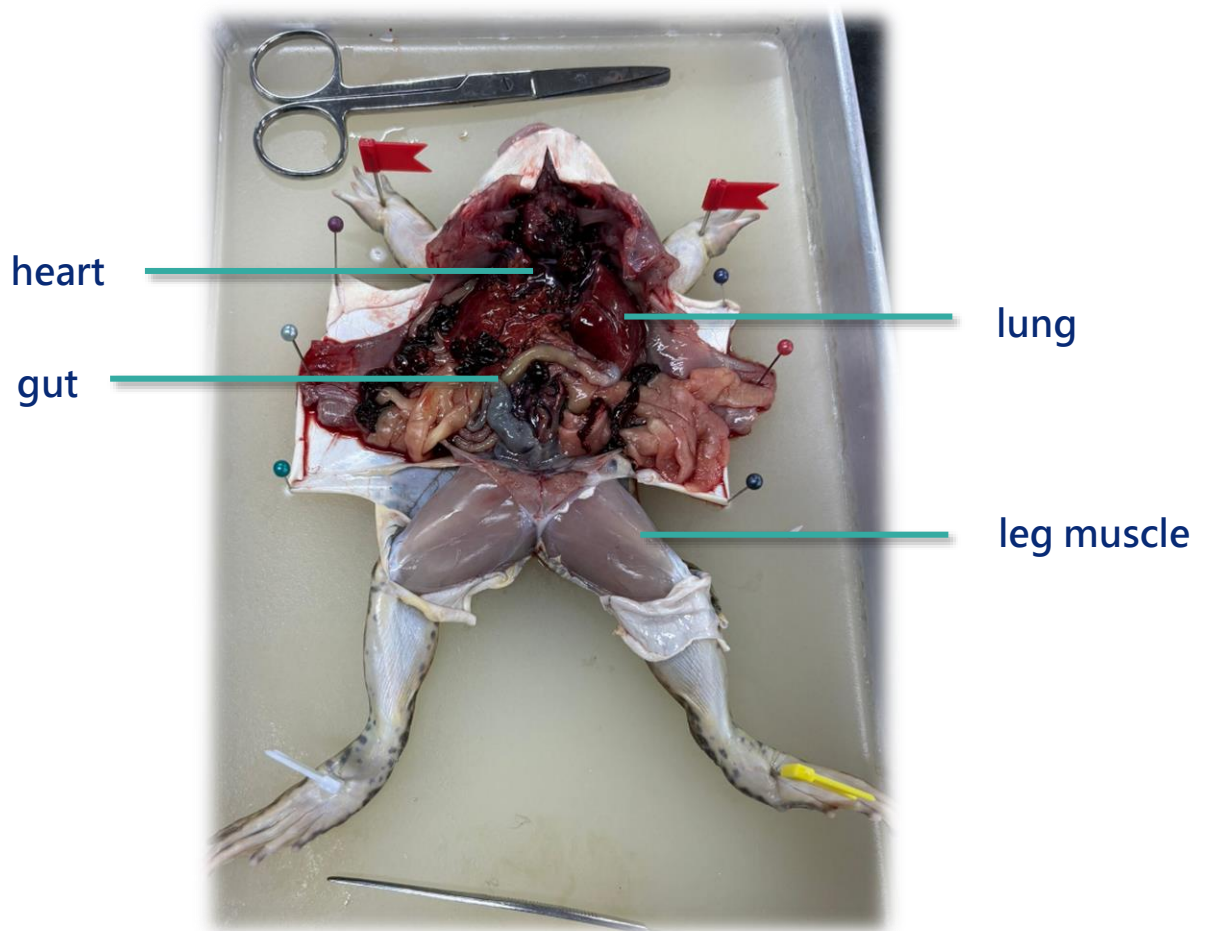
The workshop encourages interactive engagement as students examine internal organs, identify significant structures, and engage in discussions regarding their respective functions.

This immersive experience not only cultivates scientific curiosity but also fosters teamwork among students.

Moreover, it serves as a memorable platform for students to connect theoretical knowledge with real-world application, thereby fostering a profound appreciation for the natural world and the complexities of living organisms.



Dissected Frog with labels:



Programme 16.

[8 Apr 2024] 生物學知識增潤課程 — 赤柱岩岸實地考察

課程連結:

生態系

生物多樣性

目標學生: 中一至中二科學科和中三生物科學生

學習目標:

- ✦ 讓學生在專題講座所學習到的分類知識，於自然生境上應用。

活動亮點:

生物科邀請到香港中文大學生命科學學院為學生推行赤柱岩岸實地考察，學生細心觀察不同種類的生物，引發他們對生物學的興趣，亦仔細觀察和思考生物結構和環境的關係，進行環境數據收集和分析，發揮探究精神。



學生們正數算樣方中的物種數量。



Programme 17.

[13 Apr 2024] 「計算我們日常生活中的碳足跡」比賽

課程連結:

環境保護

生態系

目標學生: 中三生物科學生

學習目標:

- ✧ 提高學生的環保意識，鼓勵他們選擇低碳生活模式。
- ✧ 通過參加比賽，讓學生了解並計算日常生活中的碳足跡，並提出減少碳足跡的可行方法。

活動亮點:

為配合本校「響應環保」主題，提高學生的環保意識，鼓勵學生選擇更低碳的生活模式，生物科安排了八位中三級學生參加由香港大學理學院舉行的「計算我們日常生活中的碳足跡」比賽。當中四位同學，分別是 3A 班的梁嘉如、梁沛融和伍穎姿，以及 3B 班的黃嘉寶更加勇奪榮耀。

學生透過衣、食、住、行四個範疇，記錄了日常生活中所製造的碳足跡，及後以匯報的方式展現收集的數據，並且提出一些可行的減少碳足跡的方式。最後，四位同學在問答比賽中表現優異，而且在匯報環節中展現了出色的合作精神，在其它團隊中突圍而出，收穫了金獎的佳績。



在比賽當日，學生首先參觀了香港大學內多個環保設施。學生們對於利用這些先進的科技來鼓勵大眾實行環保而感到新奇。例如在飯堂外的一個智能飯盒外借機器成功引起她們的興趣。學生更即時提供了智能飯盒外借機器在學校的應用，可見她們對於校園環保亦想出一份力。

同學在是次比賽收穫良多。除了榮耀以外，更重要的是實踐環保的知識和信念。

如何計算碳排放量：

例如用水的排放係數是 $0.43 \text{ kgCO}_2/\text{m}^3$ ，即是每立方米的用水量會排放 0.43 kg 的二氧化碳。

如果一個家庭在一個月內使用 10 立方米的水，碳排放量就是： $10 \times 0.43 = 4.3 \text{ kgCO}_2$

學生回饋：



3A12 梁嘉如

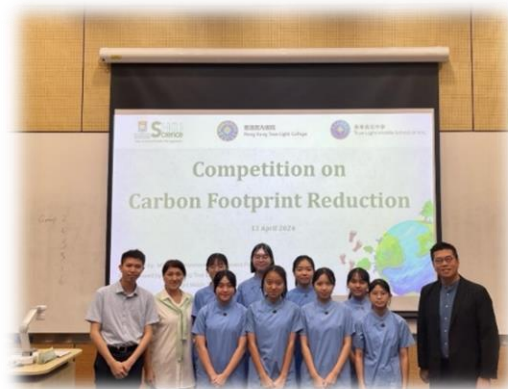
是次活動對我來說是嶄新的體驗，也是一次難能可貴的機會學習。很慶幸有這個難得的機會於香港大學向專業人士、其他學校的同學面前報告自己和組員的研究。過程中得著甚多，包括何謂碳排放、計算碳足跡的方式和報告的技巧。經過是次活動，我更驚覺自己在日常生活中不經意間便禍害地球不少。日後定會盡量實踐碳中和，幫幫地球先生。

3A13 梁沛融

這次在香港大學進行有關碳足跡的匯報後，實在令我獲益良多。首先，通過參觀香港大學的環保設施，令我明白到原來生活很多地方也會生產碳排放，但同時亦有很多方法去減少碳足跡。其次，通過製作簡報，令我學會了很多團隊合作，和演講的技巧。在這次比賽中，我的組別取得了金獎，實在萬分榮幸，希望未來有更多類似的活動可以參加，擴闊學習視野。

3A18 伍穎姿

是次比賽中，我們計算了平時生活中的碳排放。最初我十分擔心製造匯報和收集數據困難。幸好，我的組員們為了比賽，各自提供水費單、電費單等，才能利用這些數據繪製出我們的碳足跡；在計算方面，我們亦得到老師的協助，幫助我們整理思緒。不枉費各位組員與老師的心機，我們最終能在眾多隊伍中脫穎而出，實在有賴各位一路上的幫忙。



請掃描二維碼觀看由香港大學團隊為我校製作的影片！

