香港科學館 HONG KONG SCIENCE MUSEUM

教育通訊 Education Newsletter

春季 SPRING 2021　　第三十四期 VOL.34

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康樂及文化事務署
Leisure and Cultural Services Department

香港科學館
HONG KONG SCIENCE MUSEUM

各位 親愛的校長和老師：

在此謹祝各位在2021年身體健康、工作順利。香港科學館將繼續舉辦一連串專為老師和學生而設的教育活動，歡迎各位踴躍參加。

香港科學館拓展組

Dear principals and teachers,

We wish you good health and a great success in 2021. The Hong Kong Science Museum will continue to organise an array of educational programmes for teachers and students and we look forward to your participation.

Development Unit, Hong Kong Science Museum

The Science Behind PIXAR

彼思動畫的科學秘密

© Michael Malyszko

在**建構模型**區你可與巴斯光年一起擺好姿勢來個合照，並學習如何建構虛擬三維角色模型。

You can pose with Buzz Lightyear in **Modeling**, and learn how virtual 3D character models are created.

彼思動畫的科學秘密

1995年，全球首部全電腦動畫製作的電影《反斗奇兵》上映。自此，彼思動畫製作室不斷創作多部具突破性的電影，由《反斗奇兵》系列續集、《反斗車王》到近期上映的《靈魂奇遇記》等。究竟美術人員和電腦科學家如何互相合作，一起以創造力與想像力，結合藝術和電腦科技來建立說故事的新形式？

「彼思動畫的科學秘密」展覽由波士頓科學博物館與彼思動畫製作室共同策劃製作，帶你探索神秘的電影製作過程，讓你從前所未有的角度認識彼思動畫的製作流程，以及這些電影如何巧妙地融合科學、技術、工程、美術和數學（STEAM）概念，創造出你在銀幕上欣賞到的生動角色和逼真的場面。

展覽展出50多組有趣和吸引的互動展品，分為八個組別，分別介紹彼思動畫製作的技術程序。展覽除了資訊豐富和富啟發性的影片之外，還包括多項電腦及實體互動展品，讓你仿如身歷其境般深入了解每個幕後程序，體驗製作流程中的不同崗位。例如在**建構模型**區，你可嘗試根據美術師的草圖來創建出一個數碼雕塑模型。**建立骨架結構**區的展品探討虛擬骨骼的基本概念，並展示動畫師如何幫角色擺出不同的姿勢。在**布景與攝影**區中，你將學到如何控制攝影機，以模擬出《蟲蟲特工隊》裏昆蟲眼中的世界。另外，不要錯過與你最喜愛的彼思電影角色，包括巴斯光年、多莉等，合照留念！

展期：確實日期將於稍後公布
地點：香港科學館地下展覽廳

康樂及文化事務署主辦
香港科學館籌劃
展覽由波士頓科學博物館與彼思動畫製作室共同策劃製作
華特迪士尼（香港）有限公司全力支持

© Nicolaus Czarnecki

在**布景與攝影**區，你可學到如何模擬出《蟲蟲特工隊》內昆蟲眼中所見到的螞蟻島。
In **Sets & Cameras**, you can discover how to create a bug's-eye view of the Ant Island from *A Bug's Life*.

The Science Behind Pixar

The world's first entirely computer-animated feature film, *Toy Story*, was created and shown in 1995. Since then, Pixar Animation Studios has been creating many groundbreaking popular films, from the sequels of *Toy Story* and *Cars* to the latest film *Soul*. But how do artists and computer scientists work together and use their creativity, imagination, artistry and computer technology to introduce a new medium for storytelling?

"*The Science Behind Pixar*" exhibition, developed by the Museum of Science, Boston, in collaboration with Pixar Animation Studios, aims to take you through the mysterious filmmaking process and offers you an unparalleled insight into the production pipeline and how science, technology, engineering, art and maths (STEAM) concepts are ingeniously merged together to create the lively characters and realistic scenes you see on screen.

With more than 50 fun and engaging interactive exhibits, the exhibition is organised into eight sections, each focusing on a step of Pixar's technical process. Besides informative and enlightening videos, you will experience different roles within the production pipeline, through screen-based activities and physical interactive elements providing a behind-the-scenes immersive look at these processes. In **Modeling**, for example, you will have the opportunity to create a digital sculpture from an artist's sketch. **Rigging** discusses the basic concept of virtual skeletons and showcases how the animators pose characters. In **Sets & Cameras**, you will discover how the camera can be manipulated to create the bug's-eye view seen in *A Bug's Life*. And don't forget that there are many of your favourite Pixar film characters here, including Buzz Lightyear and Dory, waiting to take a picture with you!

Exhibition Period: The exact date will be announced soon
Venue: G/F Exhibition Hall, Hong Kong Science Museum

Presented by the Leisure and Cultural Services Department
Organised by the Hong Kong Science Museum
Produced by the Museum of Science, Boston in collaboration with Pixar Animation Studios
Fully supported by The Walt Disney Company (Hong Kong) Limited

© Michael Malyszko

在「建立臉部骨架結構工作站」，你可利用控制裝置在翠絲的臉上創造出各種表情。
At the 'Face Rigging Workstation', you can use rig controls on Jessie's face to create expressions.

© Nicolaus Czarnecki

透過展品「水的模擬」，你可探索模擬水流時所需要的步驟。
In 'Simulating Water', you can explore the steps required to create a water simulation.

The Science Behind Pixar was developed by the Museum of Science, Boston in collaboration with Pixar Animation Studios.
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智能新力軍

人類之所以稱為萬物之靈，是因為我們懂得使用工具來完成任務，以及不斷加以改善，提升效率，令人類在地球上比其他物種生活得更舒適。早期機器的設計和發明，主要希望能分擔重複而煩悶的工作，或是協助人類體力上難以應付的任務。隨着多元化電子零件的研發和電腦的廣泛應用，大大提升了機械工具的靈活性，更把機械世界推向智能化，創造出各式各樣先進的電子產品。而這些工具做出的動作遠比人類精確，為我們帶來輕鬆、愜意的生活。今天我們以「機械人」一詞泛指由早期簡單的自動機械裝置，以至最先進的人工智能類人型機械人。

機械人的研究和發展迅速，本地科研機構已把這些技術應用在建造業和商業上，並獲得顯著的成果。這全新的展區特別介紹相關的本地科研項目和所應用的技術。項目包括航拍技術如何協助建構建築工地的立體模型，幫助工程人員檢視工程的進度；機械臂如何按照不同的工件進行燒焊和砌出外型獨特的磚牆；無人商店如何利用人工智能和機械營業運作、以及機械人怎樣肩負餐飲運送和清潔消毒的工作。在未來，希望有更多創新科研產品，造福社會！

地點：香港科學館二樓電訊廊
票價：常設展覽廳參觀人士不另收費

康樂及文化事務署主辦
香港科學館籌劃
合作伙伴：香港科技園機械人技術促進中心

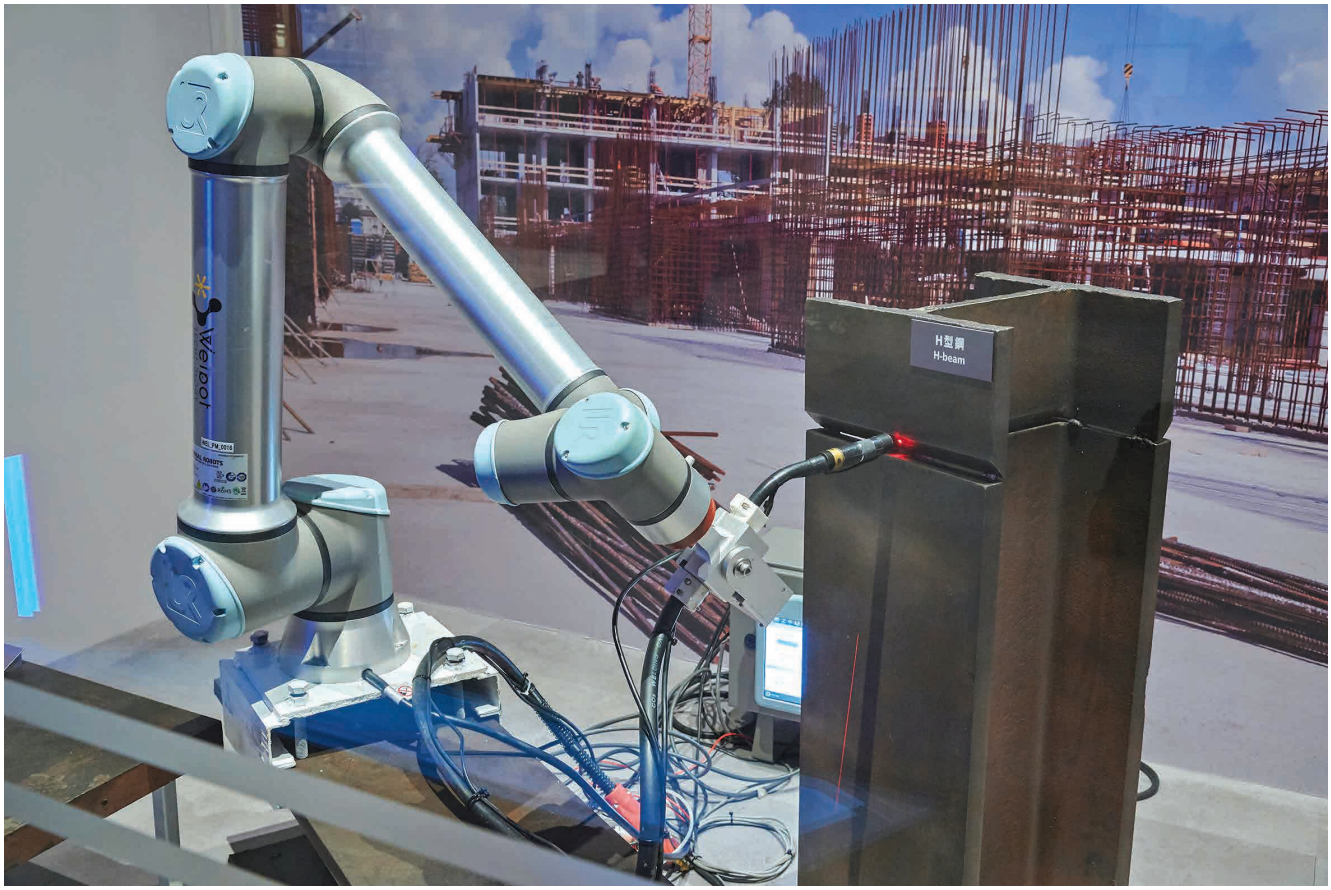
Robohelpers

Humans are considered the apex species because we are able to use tools to accomplish tasks and keep improving the tools to become more efficient, thus allowing us to live more comfortably than any other species on Earth. Humans designed and invented early machines primarily to avoid having to do repetitive and tedious chores, or to assist us with tasks that were physically challenging. With the development of diversified electronic components and the widespread application of computers, machines and tools have become increasingly flexible and intelligent, resulting in the invention of all kinds of advanced electronic products. These machines and tools are capable of accurate movements that no humans are capable of and they make life more convenient. Nowadays, the term "robot" covers machines from the early simple automata to the most advanced artificial intelligence-enabled androids.

With rapid advances in research and development, local institutes have applied robotic technologies in construction and commerce with remarkable results. This brand-new exhibition area features local research projects and related applied technologies. These projects include: how drones and aerial photography are used to build 3D models of construction sites, which help engineers review project progress; how robotic arms weld according to different workpieces and build unique brick walls; how unmanned shops are run using artificial intelligence and machines; and how robots deliver meals and carry out disinfection. We look forward to seeing more new innovative scientific research and products which will make our society better!

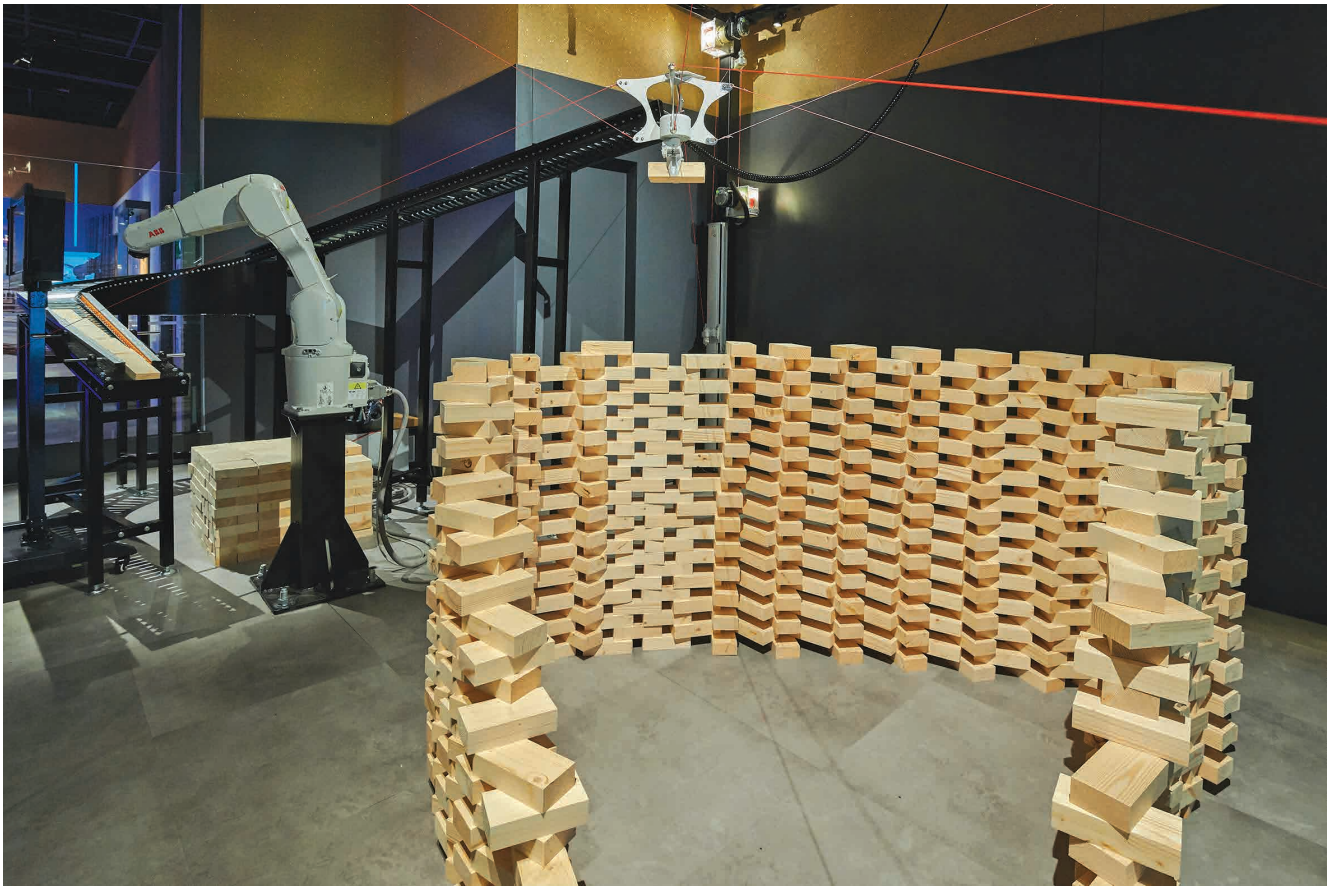
Venue: Telecommunications Gallery, 2/F, Hong Kong Science Museum
Admission Fee: No extra fee is required for museum visitors of Permanent Exhibitions

Presented by the Leisure and Cultural Services Department
Organised by the Hong Kong Science Museum
Partner: Robotics Catalysing Centre (RCC), Hong Kong Science and Technology Parks Corporation



自適應焊接機械人
Adaptive Robotic Welder

飯糰自主機器人
Autonomous Rice Robots



砌磚機械人
CU-Brick Robot

地球科學廳

探索地球46億年的歷史是一個充滿趣味又令人驚嘆的學習過程：地球是如何形成的？它的內部如何運作？甚麼是板塊運動？形態各異的岩石又是如何形成的？地球科學廳成立的目的就是讓大家更了解地球 —— 我們的家。

展覽分為四大主題，展出超過28組互動展品、模型和場景，解釋火山爆發、地震、海嘯等自然現象的成因，以及颱風的威力。展覽同時展現香港多樣性的地質，將香港過去四億年來，不同地質年代的岩石和地質公園的絕美景緻一一呈現市民眼前。展覽還會展出珍貴而色彩豐富的礦石和岩石標本。

Earth Science Gallery

Exploring Earth's 4.6 billion years of history is a journey full of fun and surprise: How did Earth form? How does its interior work? What is plate tectonics? How are different types of rocks formed? The Earth Science Gallery allows all of us to learn more about our Mother Earth.

The gallery has four themes featuring over 28 sets of interactive exhibits, models and installations which serve to explain the causes of natural phenomena such as volcanic eruptions, earthquakes, tsunamis, as well as the power of typhoons. The gallery will also take you through the geology of Hong Kong over the past 400 million years and the stunning scenery of the Hong Kong Geopark. Don't miss the invaluable and colourful minerals and rock specimens.

俯瞰地球
Earth from Space

地球：我們的家

在浩瀚無邊的宇宙裏，悄然存在着一個對我們來說獨一無二的藍色星球 —— 地球。地球上的生命，包括人類都只是生活在最外層的地殼上。如果將地球好像西瓜一樣剖開，便會發現地殼之下有着熾熱的內部結構。

Earth: Our Home Planet

In the boundless universe, there is a unique blue planet – our Earth. Life forms on Earth, including humans, only live on the outermost crust. If you cut open Earth like a watermelon, you will find the blazing interior structures underneath the crust.

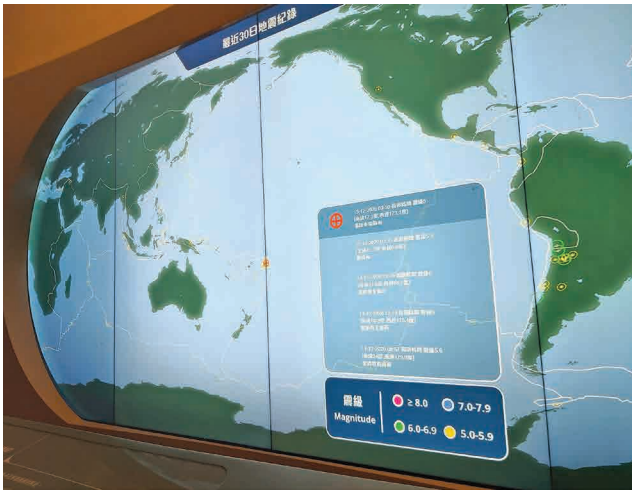
宇宙無限
Infinite Universe

地動山搖：地球內部的力量

地球核心的高熱能量推動板塊緩慢移動，令地貌在不知不覺間演化。高山峻嶺、深谷陡坡，令人類自覺渺小。地球內部的力量也會為地表帶來突如其來、迅速而激烈的變化，例如火山爆發、地震和海嘯等，展現出驚人的威力。

Roaring: Power within Our Planet

Intense heat energy from Earth's core drives the tectonic plates to move slowly, causing the landform to evolve unconsciously. The high mountain ranges and steep valleys make people feel dwarfed by nature. The tremendous internal energy of Earth also brings about sudden and drastic changes to the surface, such as volcanic eruptions, earthquakes and tsunamis.



板塊地圖
Boundary Map

模擬海嘯
Tsunami Tank

塑造地球：地球外圍的力量

外在因素把由地球內部力量構成的地貌加以塑形。地球外圍的力量主要來自太陽輻射。空氣和水吸收能量後形成風和雨，不斷侵蝕地表。除了大自然的影響，人類對環境的改變亦不容忽視。人口急劇增長和科技發展對整個地球系統的運作帶來舉足輕重的影響。

Shaping: External Forces of Our Planet

External forces shape the landforms created by Earth's internal energy. Solar radiation is the main source of these external forces. Air and water absorb energy, forming wind and rain which cause erosion of the crustal surface. In addition to the influence of the nature, human impact on the environment also cannot be neglected. Rapid population growth and technological development have exerted a profound effect on the entire Earth system.

氣候變化
Climate Change

樹輪解碼
Decoding Tree Ring

嘆為觀止：蔚為奇觀的香港地質

香港雖然是彈丸之地，但豐富的地質結構和岩石種類足以讓地質學家為之着迷。香港除了受風災威脅之外，發生強烈地震和海嘯的機會甚微。然而，專家發現在一億四千萬年前，香港曾出現過一次古代超級火山爆發，於糧船灣一帶形成舉世知名的六角柱石群。

Breathtaking: The Stunning Geology of Hong Kong

Despite its small size, Hong Kong has a rich diversity of geological structures and rock types. Apart from the threat of typhoons, Hong Kong is less prone to strong earthquakes and tsunamis. Surprisingly, experts found that there was an ancient supervolcano eruption 140 million years ago, forming world-class hexagonal rock columns in the High Island region.

確實開放日期將於稍後公布
地點：香港科學館一樓
票價：常設展覽廳參觀人士不另收費

The exact opening date will be announced later
Venue: 1/F, Hong Kong Science Museum
Admission Fee: No extra fee is required for museum visitors of Permanent Exhibitions

礦物館藏
Mineral Collection

介紹糧船灣超級火山
Introduction of High Island Supervolcano

2021香港科學節

二十一世紀是全球一體化和科技迅速發展的年代。現今科技日新月異，每天都有新科技面世，不僅提高了我們的生活質素，也逐步改變我們的生活模式和社會文化。科技的應用讓我們在衣、食、住、行上變得更方便、更多元化和更全球化，而且對各領域的未來發展都有所影響，例如資訊與通訊應用、智慧機器、能源與環保、先進材料、以及生物科技與醫療。

科技是一把雙刃劍，當人們正在享受它帶來的好處時，其危害也在接踵而來。因此，我們需要有穩固的科學知識和科學文化，懂得善用科技的優勢，以應對未來生活的變化和挑戰。今年的科學節以「科技創未來」為主題，希望大家了解到科學與科技的最新成果和將來的發展趨勢。

今年的科學節有約90個合作伙伴及單位參與，為大家精心設計了約160項特色活動。精選活動包括：讓一家大小在輕鬆的氣氛下享受科學的「玩轉科學嘉年華」；以STEM為主題的嘉年華「STEM x SCM」；讓你體驗世界各地特色科學活動的「裘槎科學周」。還有更多其它精采活動，包括展覽、參觀及導賞、科學講座、工作坊和比賽等，大家必定能在科學節找到你喜愛的活動。

大家快來參加2021香港科學節，一起探索、發掘和享受科學的樂趣！活動詳情和報名方法，請瀏覽2021香港科學節網頁。

2021香港科學節
HK SciFest 2021

HK SciFest 2021

The 21st century marks an era of global integration and rapid technological development. Nowadays, technology changes with each passing day and new technologies come into existence every day. Not only does it improves our quality of life, but also gradually changes our lifestyle and social culture. The application of technology has made our lives more convenient, more diversified and global in the aspects of clothing, food, housing and transportation, and also has an impact on the future development in various fields, such as information and communication application, intelligent machines, energy and environmental protection, advanced materials, biological technology and medical treatment.

Technology is a double-edged sword. While people enjoy benefits brought about by it, drawbacks also follow. Therefore, we need solid scientific knowledge and culture and to take advantages of technology wisely so as to deal with changes and challenges in the future. This year's HK SciFest focuses on "Technology for Our Future" and aims at allowing everyone to understand the latest achievements in science and technology, as well as the development trend in the future.

With the joint efforts of about 90 partners and units, we have developed about 160 featured programmes for you this year. Highlighted events include: "Fun Science Carnival" for families to enjoy science in a light-hearted way; STEM-themed carnival "STEM x SCM"; "Croucher Science Week" for you to experience featured science activities from around the world. Apart from these highlighted events, there are exhibitions, visits and guided tours, science lectures, workshops, competitions, etc. You will surely find your favorite activities in the HK SciFest.

Come and join us in HK SciFest 2021. Let's explore, discover and have fun in science! For programme details and enrolment methods, please visit the website of HK SciFest 2021.

康文署寓樂頻道

康文署新的一站式網上文康資訊學習平台「寓樂頻道」經已面世。新頻道同時增設「101入門教室」，增加市民對各個範疇的認識和興趣，市民安坐家中也可接觸各式藝文康體資源，探索知識新領域。

康文署「寓樂頻道」強調「寓教於樂」，以「得閒上網click — click 藝文康體樣樣識」為口號。除「101入門教室」外，頻道設有六大分類（博物館、閱讀、表演藝術、運動、園藝和綠化，以及豢養動物的大型公園），提供網上展覽、演出、運動示範等各類影片，亦上載推廣網上閱讀和有關康文署轄下大型公園的動植物等資訊。

教室亦增設「互動+01」系列，運用網絡技術創造互動體驗，內容包括博物館虛擬導賞節目、網上互動體育訓練課程和公園虛擬導賞團等。

康文署「寓樂頻道」將定期更新內容，緊貼藝文康體最新發展，讓市民全方位接觸康樂文化資訊，歡迎市民瀏覽。

LCSD Edutainment Channel

The Leisure and Cultural Services Department (LCSD) has launched the Edutainment Channel, a new one-stop online platform covering informative and learning materials on aspects of culture and leisure. The new channel also features a 101 Academy, aimed at deepening the public's understanding and interests in various fields. By way of online academy videos, members of the public can access arts, cultural, recreational and sports resources and explore new scopes of knowledge from the comfort of their homes.

The LCSD's Edutainment Channel, combining education with entertainment, is best captured by its slogan "One click to treasures – Culture & Leisure". Apart from 101 Academy, the channel, with its vast resources grouped into six categories (museums, reading, performing arts, sports, horticulture and greening as well as major parks with animal collections), provides numerous videos on online exhibitions, performances and sports demonstrations. Also included is information on the promotion of online reading and flora and fauna of the LCSD's major parks.

A "vis-a-vis +01" series, which utilises Internet technology to create an interactive experience, is added to the Academy. Series included are museum virtual-guided tours, online interactive sports training programmes and virtual guided tours of parks.

Contents of the Edutainment Channel will be updated regularly to keep people abreast of the latest developments in arts, culture, recreation and sports. The public is most welcome to visit the channel.

其他學生活動 Other Student Programmes

1. 小小科學家探索活動 —「活躍的地球」
Little Scientists Exploration Programme – "Dynamic Earth"

香港科學館舉辦小小科學家探索活動，旨在藉着饒富趣味性的實驗，向高小學生介紹與特定主題有關的科學知識。本館於本學年推出「活躍的地球」探索活動，讓學生學習火山活動和香港地質等地球科學知識。歡迎**學校及家長教師會**報名參加，詳情請瀏覽本館網頁。

地點：香港科學館實驗室

適合程度：小四至小六學生

費用：每人36元（此為學生優惠費用，其他優惠不再適用）

名額：每節40人（科學館可視乎實際情況而調整名額）

語言：粵語

截止報名日期：活動日期**前兩星期**

聯繫課程：小學常識科「日常生活中的科學與科技」

The Little Scientists Exploration Programme aims to introduce scientific knowledge of specific topics to senior primary students through fun experiments. In this school year, the Hong Kong Science Museum will organise "Dynamic Earth" to let students learn about topics of earth science, such as volcanic activity and Hong Kong geology. **Schools and Parent-Teacher Associations** are welcome to apply. For more information, please visit the website of the Museum.

Venue: Laboratory, Hong Kong Science Museum

Suitable for: P4 – 6 students

Fee: $36 each

(This is the concessionary fee for students. Other discounts are not applicable.)

Quota: 40 students per session

(The Museum may adjust the quotas according to the actual situation.)

Language: Cantonese

Application deadline: **Two weeks before** the day of the session

Curriculum Link: Primary School General Studies "Science and Technology in Everyday Life"

2. 學校參觀 School Visit

凡學校團體人數達20人或以上，或特殊學校團體人數達10人或以上，即可以學校名義申請學校參觀。所有申請會以先到先得方式處理。

註：如學校團體中有家長義工，請先聯絡本館職員查詢購票事宜。

School groups of 20 or more members, or groups from special schools of 10 or more members, are eligible for School Visit Application. All applications will be processed on a first come, first served basis.

Remarks: For school groups with parents / volunteers, please contact our staff for details of admission fee before the date of visit.

3. 巡迴展覽 Travelling Exhibition

香港科學館為推展博物館教育服務至學校，現提供三套展覽免費借給學校，以豐富學生的知識。展覽以中英對照的展板形式製作。**學校須自行安排運送、裝拆及歸還展覽**。有關借用詳情請瀏覽本館網頁或與本館職員聯絡。

To extend the Museum's education services to schools, three exhibitions are now available on loan to schools for free to enrich students' knowledge. They are produced in the format of graphic panels with Chinese and English texts. **Schools shall be responsible for installation and dismantling as well as round-trip transportation of the exhibition.** For loaning details, please visit the website of the Museum or contact our staff.

各項學校活動查詢 School Programme Enquiries

2732 3220

(星期一至五：上午9時至下午1時及下午2至5時，公眾假期除外)

(Monday to Friday: 9am - 1pm, 2pm - 5pm, except public holidays)

2311 2248

hkscmschool@lcsd.gov.hk

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