

II. Digi-Science” Video Production Competition for Hong Kong Secondary Schools (2017-2018)

The competition was an experiment-based video making competition and aimed at promoting students’ interest in learning Science; developing students’ problem solving, communication and science process skills through demonstrating and explaining interesting experiments; and encouraging students to communicate scientific ideas to the public in a meaningful and creative way; and - raising students’ awareness of testing and certification and its importance to their daily life.

The competition was jointly organized by the *Hong Kong Association for Science & Mathematics Education* and the *Hong Kong Council for Testing and Certification (HKCTC)*. The main theme was “*Testing Science for Improving the Quality of Life*”. 25 teams (11 from junior and 14 from senior) of students from 19 secondary schools had participated in the competition this year. Awards ceremony was completed on 28th April, 2018.

The winners were:

Junior Secondary Division

Champion: CCC Yenching College

Title of Video: 茶葉中咖啡因的快速檢測

Team Members: Chan Cheuk Yin, Tam Hoi Ching, Cheung Tsz Ching

First runner-up: Diocesan Girls' School

Title of Video: Which popular soft drink is the fizziest?

Team Members: Chan Hayley, Tsui Vivienne

Second runner-up: St. Paul’s Secondary School

Title of Video: What is the most effective way to remove adhesive tape left on glass.

Team Members: Amy Yan, Natalie Wong

Merit: Chang Pui Chung Memorial School

Title of Video: 測定水樣本中的鈣含量

Team Members: 黃曉晴, 王嘉怡, 楊詠妍

Merit: PLK Choi Kai Yau School

Title of Video: Which is the most effective way for whitening teeth?

Team Members: Jasmine Chan, Kirsty Choy, Kaply Tang

Senior Secondary Division**Champion: St. Paul's Convent School**

Title of Video: Simple tests for metal ions in water sample

Team Members: Cao Tianyi, Chan Hei Lam

First runner-up: POH Chan Kai Memorial College

Title of Video: 電解質大比併

Team Members: Cai Yu Yi, Kong Mei Wa, Wong Sum Yu

Second runner-up: Chan Shu Kui Memorial School

Title of Video: 探測臭氧濃度

Team Members: Ho Lok Mei, Zhen Jing Tong

Merit: Chan Shu Kui Memorial School

Title of Video: 九龍塘區的二氧化氮濃度

Team Members: Fung Yu Shun, Lin Le Yhi, Leung Ting Hoi

Merit: STFA Leung Kau Kiu College

Title of Video: Gravimetric titration of milk by EDTA solution

Team Members: Wai Yin Tung, Tang Hoi Ching, Leung Ho Yan



Winners of "Digi-Science" Video Production Competition for H.K. Sec Sch(2017-18)

C. Chemistry Sub-Committee Members:



Dr. Bob Lui (Convenor)	King's College
Mr. Wong Chun Yin, Roi	Ho Lap College (Sponsored by SikSik Yuen)
Dr. Lam Siu Yan, Tara	St. Paul's Convent School
Mr. Lee Kam Chuen, Andy	T.W.G.Hs. Wong Fut Nam College
Mr. Leung Pang	Tsuen Wan Public Ho Chuen Yiu Memorial College
Mr. Or Choi Kuen	Sai Kung Sung Tsun Catholic School (Sec. Section)
Mr. Tang Siu Lung	DMHC Siu Ming Catholic Secondary School
Mr. Wong Chi Kong, Alex	HKASME
Mr. Lo Wai Cheong	SKH Li Ping Secondary School

Dr. Wong Chi Kit, Cement	Cheung Sha Wan Catholic Secondary School
Ms. Wong King Lok, Victoria	Marymount Secondary School
Mr. Fung Wing Kei	St. Paul's Co-educational College
Mr. Ben Ng	HKASME
Mr. Mok Ming Wai, Michael	Wah Yan College, Kowloon
Mr. Ho Ping Kuen	Heung To Middle School
Mr. Poon Chan Kwok	HKASME
Ms. Tam Lai Ming	The Mission Covenant Church Holm Glad College

4. 生物科 (Biology)

李志文 香港數理教育學會生物科召集人
Jimmy, Chi-man Li Biology Convenor, HKASME

A. Summary of Activities Held (2017-2018)

Date	Activity	Remarks
14 Oct 2017	(Biology) SBA Annual Conference Learning and Teaching Resources Selling Booth at <u>HKDSE-Conference</u>	In attendance: HKEAA Participants: Biology teachers from secondary schools
23 Dec 2017 & 24 Feb 2018	1st Hong Kong Biology Literacy Award (2017-2018) 1st Round This competition includes the Heat (23/12/2017) and 3-minute presentation contest cum Prize Presentation Ceremony (24/2/2018) . 8 TEAMS with HIGHEST AVERAGE SCORES in the Heat entered the 3-minute presentation The enrolment was encouraging, over 1588 students had participated. The Biology Subject Committee members had set up 4 centers on the same day altogether to accommodate our students' needs.	Participants: F.4 to F.6 students of all secondary schools   2017-2018 Hong Kong Biology Literacy Award - Prize Presentation Ceremony

B. Results of the Hong Kong Biology Literacy Award (2017-2018) - 3-minute Presentation Contest cum Prize Presentation Ceremony

Diocesan Boy's School – Group 2	Champion
Raimondi College – Group 1	First-runner up
Queen's College – Group 2	Second-runner up
Queen's College – Group 1	Third-runner up

Photos of the winners



C. Biology Subject Committee Member (2017-2018)

Dr. Yip Wing Yan, Valerie (Honorary Advisor)	The University of Hong Kong
Mr. Li Chi Man, Jimmy (Convenor)	HKASME
Mr. Tong Ling Poon, Andrew	Cheung Chuk Shan College
Ms. Chan Wing Man, Idy	Fanling Rhenish Church Secondary School
Ms. Lee Hoi Man, Sarah	The Education University of Hong Kong
Ms. Lau Ka Hoi, Audrey	Leung Shek Chee College

5. 綜合科學科 (General Science)

黃永基 香港數理教育學會綜合科學科召集人
Stephen, Wing-kei Wong General Science Convenor, HKASME

A. Summary of Activities Held (2017-2018)

Date	Activity	Remarks
25 Oct 2017	IS SBA Annual Conference	Organized by HKEAA Participants: Integrated Science teachers of all secondary schools
28 Apr 2018	2018 Science Assessment Test (Secondary 2 and 3)	Secondary 2 and 3 students
23 Jun 2018	STEM activity -- Project Sharing: Breeding of jellyfish, Production of honey and making / design of beehive in school	Organized by HKASME Participants: Secondary School teachers
30 Jun 2018	2018 Australia Big Science Competition	Organized by Australian Science Innovations Participants: All Secondary Schools
5 July 2018	2018 Science Assessment Test Dissemination Seminar	Organized by HKASME Participants: Secondary School teachers
6 July 2018	全港機械人海洋保育運動	全港中小學學生
20-22 July 2018	國際青少年科技實踐大賽	全港科學中學生

B. Highlights of Activities

I. Australian Big Science Competition 2018 (Hong Kong) organized by the Australian Science Innovations (Major sponsor: Australian National University) HK: **HKASME**

The “Australian Big Science Competition 2018 (Hong Kong Region)” was held in July-2018. The processing of results had been completed with 768 students’ certificates issued.

There are 4 types of award for each year-level and the cutting scores are listed below:

“High Distinction (HD)”, “Distinction (D)”, “Credit (C)”, “Participation (P)”

<u>Year Level -></u>	<u>Year 7</u>		<u>Year 8</u>		<u>Year 9</u>		<u>Year 10</u>	
Award Types:	Score Range	%	Score Range	%	Score Range	%	Score Range	%
HD	23-30	7	24-30	5	26-30	3	26-30	2
D	21-22	6	21-23	9	23-25	12	24-25	9
C	18-20	28	18-20	15	20-22	17	21-23	27
P	0-17	---	0-17	---	0-19	---	0-20	---
Average score	15.78	---	15.89	---	17.03	---	18.9	--

Top scorer in Year 10 (26)= Wong Ho Wai (St. Joseph' s College)

Top scorer in Year 9 (27)= Lau Allison Tsz Kwan (St. Paul' s Co-educational College)

Top scorer in Year 8 (30 [Full mark])= So Long Hei (St. Paul' s Co-educational College)

Highest scorers in Year 7 (24)= Lo chun nang (CCC Heep Woh College)

= Lau Tak Kin (PLK Ngan Po Ling College)

= Yan Ho Wan (PLK Ngan Po Ling College)

= Chiu Man Chi (SKH Lam Kau Mow Sec. School)

= Leung Ching Hong (SKH Lam Kau Mow Sec. School)

= Wong Wai Man (Stewards MKMCF Ma Ko Pan Memorial College)

Comparing with last year's overall data and results,

- The total number of participants increased by about 9%
- ONE OUTSTANDING results is the FULL MARK from **SO LONG HEI** of **St. Paul's Co-ed. College.**
- Except for Year 8, the average score for each level is higher than last year.
- Teachers could find a summary page of item analysis on the back of the certificate for each student. For each question, the objective of the question is classified and listed with corresponding correct response against the student's response with the population overall % correct.

** e.g./ For year 7, the first and the last question of Student X have the following data:

Q1. -- understands that classification can change as new evidence becomes available. Correct Response = "B", Student Response = "C", Correct % (overall) = 75%.

Q30. -- identifies the properties of a substance that make it suitable for a given purpose. Correct Response = "D", Student Response = "C", Correct % (overall) = 37%.

Teachers could learn from their students' results about their strengths and weaknesses according to the scientific skills categorization (similar to our listing in local science curriculum). Some of the action terms used in this year's tests are listed for your reference:

- > Identify, recognize, Explain, determine, apply, understand, interpret, relation pattern,
- > Evaluate, predict

All questions are comprehension type. That is, students have to read and understand the data and / or graphics given before answering the questions. Though all questions are multiple choice items, some have multiple assertions – consisting of several inter-related true-or-false responses under different scenario. Such experience should be good for students as the test is not just assessing their scientific knowledge, but focus more on critical thinking and problem-solving skills. That is also the direction in the 21st Century science curriculum.

Another special trend that teachers may like to address is the less satisfactory performance (almost in all levels) with some quite low % correct ($< 15\%$) as exemplified in the following question types:

- Interpret data to draw conclusion.
- Interpret data presented graphically.
- Evaluate observation for consistency with physical processes

As this is the second year that the Big Science Competition have 4 different levels of assessment (previously 2 levels), we may need further results to check if the above trend is consistent.

We would like to take this opportunity to thank all teachers and schools in supporting the event.



C. STEM activity -- Project Sharing: Breeding of jellyfish, Production of honey and making / design of beehive in school



D. Science Assessment Test 2018

The Science Assessment Test (SAT) was developed by the Hong Kong Association for Science and Mathematics Education (HKASME) for evaluating the ability of students in Hong Kong, as well as those in nearby regions, in learning science at Junior Secondary level. It was first implemented in 2014, and thereafter improvements have been made to the design of the test and to the analysis of the results. The test consists of a 1-hour test paper comprising 24 multiple-choice questions in Section A and 2 short-response questions in Section B. With the SAT, the HKASME hopes to provide feedback to schools and to the education administration on the strengths and weaknesses of students in learning science at Junior Secondary level.

In order to keep the SAT to be in line with the most up-to-date approach of science learning, the questions are so set that the participants are not required to recall a lot of scientific facts. Instead, the SAT questions aim at testing students' scientific understanding as well as science process skills, namely observing, classifying, planning and designing, experimenting, interpreting and communicating. In fact, many of the SAT questions were set to help students appreciate the relevancy of science to daily life.

THE PARTICIPANTS

In 2018 SAT, the total number of participants was 2592, with 2373 from the Hong Kong SAR and 219 from the Macau SAR. The table below lists the breakdown of the 2592 participants according the class attended and sex:

Participants	Secondary 2 (S2)	Secondary 3 (S3)	Total
Boys	793	623	1416
Girls	673	503	1176
Total	1466	1126	2592

1. Overall Performance of the Participants

	S2	S3	Whole Group (WG)
Mean score: (out of 54)	29.5 (55%)	32.6 (60%)	30.8 (57%)
Standard deviation:	7.21 (13.3%)	7.70 (14.3%)	7.58 (14.0%)

2. Diamond, Gold, Silver and Bronze Awards given out in 2018 SAT

Award type	Number
Diamond	147 (5.7%)
Gold	497 (19.2%)
Silver	610 (23.5%)
Bronze	832 (32.1%)

E. General Science Sub-Committee Members:

Mr. Wong Wing Kei, Stephen(Convenor)	HKASME
Mr. Leung Chung Kee, Kelvin	China Holiness Church Living Spirit College
Mr. Poon Wai Kit	The Y.W.C.A. Hioe Tjo Yoeng College
Mr. Lau Tsz Kin, Dickson	S.K.H. Kei Hau Secondary School
Mr. Chan Ka Loi	Po Leung Kuk Ngan Po Ling College
Ms. Tam Lai Ming	The Mission Covenant Church Holm Glad College
Ms. Wong Ka Wai, Winnie	CCC Heep Woh Primary School (CSW)

6. 小學常識科 (General Studies)

吳德強 香港數理教育學會小學常識科召集人
George, Tak-keung Ng General Studies Convenor, HKASME

A. Summary of Activities Held (2017-2018)

Date	Activity	Remarks
24 Feb, 2018	2018 香港小學科學奧林匹克 (Hong Kong Science Olympiad for Primary Schools)	鳴謝：黃嘉蕙女士統籌 合辦：香港數理教育學會、香港教育 大學 對象：小學生 (小五至小六)
3 Mar, 2018	2018 小學校際科學思維競賽	合辦：香港數理教育學會、香港科學 園 對象：小學生 (小四至小六)

B. Highlights of Activities

1. 2018 Hong Kong Science Olympiad for Primary Schools



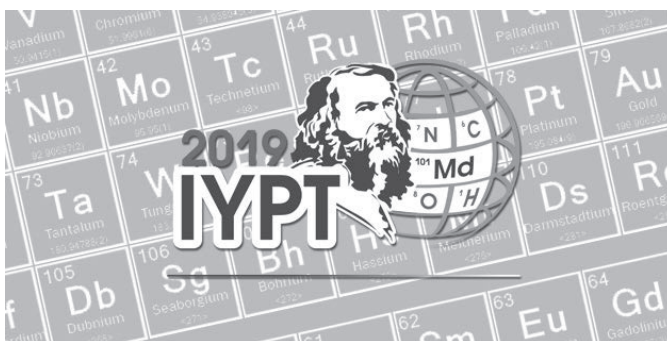
2. 2018 小學校際科學思維競賽

**C. General Studies Sub-Committee Members:**

Mr. Ng Tak Keung, George	HKASME
Mr. Li Chi Man, Jimmy	HKASME
Ms. Wong Ka Wai, Winnie	CCC Heep Who Primary School (Cheung Sha Wan)
Mr. Mak Tsz Pun	Lingnam University Alumni Association (Hong Kong) Primary School
Ms. Wong Wai Yee	TWGHs Ko Ho Ning Primary School
Ms. Lau Kin Yan, Candice	Christian Alliance Toi Shan H C Chan Primary School
Ms. Mak Wing Yi	St. Bonaventure Catholic Primary School
Ms. So Wing Yee	Alliance Primary School (Whampoa)

Science & Maths Learning and Teaching with context: “International Year / Day” and the Celebration of “2019 International Year of Periodic Table” (IYPT-2019)

Alex, Chi-kong Wong
Immediate Past Chairman, HKASME



Introduction

Different educators have different definitions of contextual teaching and learning. This article has no intention to go over the broad picture of contextual teaching and learning. Instead, with the introduction of activities related to the 2019-IYPT (International Year of Periodic Table, UN) by the Association in the coming school year (2018-19); an introduction of the UN-proclaimed “International Year / Day” is included for teachers’ reference with some plausible initiation of education events using such contexts. After all, teachers are encouraged to make use of such memorial events to engage their students’ learning at different horizons, especially with global views in mind. Of course, teachers may, together with community efforts and resources, develop their own “memorial day / week / month” to cope with their specific topics. Further, the introduction of advanced technology, for example AR & VR, in the above learning contexts may change the overall concept of our learning and teaching in the future.

While many are talking about STEM and details of in-class pedagogical strategies, only some front-line teachers would engage their students with global events like the International Years of Chemistry / Physics / ... This kind of “International Year / Day” may help teachers to have their views broadened as well as providing a chance for their students to exchange ideas and experiences with students all around the globe.


International Year as context



Since 1959 the United Nations (UN) has designated international years in order to draw attention to major issues and to encourage international action to address concerns which have global importance and ramifications. Such international years are expected to catalyze longer-term forms of information exchange, e.g. through partnerships and networking arrangements as well as through longer-term programs and projects, including sustained donor support. Most may not know that the first international year proclaimed by the UN was the “1959/60 World Refugee Year” which has a high relevance with Hong Kong. It is because at that time, there are a million Chinese fled from the mainland China to Hong Kong, the colonial region. That made one in every three persons in Hong Kong a refugee. Of course, the address being chosen was due to the still huge number (around 40 million) of refugees after the World War II.

The United Nations designates specific days, weeks, years and decades as occasions to mark particular events or topics in order to promote, through awareness and action, the objectives of the Organization. Usually, one or more Member States initially propose these observances and the General Assembly establishes them with a resolution. On occasion, these celebrations are declared by the specialized agencies of the United Nations, such as UNESCO, UNICEF, FAO, etc., when they concern issues that fall within the scope of their competencies. Some of them may be later adopted by the General Assembly. [Note 1]

Some Science Related International Years

The following table lists some International Year designated with science-related themes. What pattern could you draw in relation to the years? Have you participated in the celebration of some science-related International Years? Would you bring your students’ attention to such International Year in order to arouse their interest in related issues / topics / subjects?

Year	Thematic International Year [Note 1]
2019	International Year of Periodic Table
2015	International Year of Light and Light-based Technologies 
2014	International Year of Crystallography

2012	International Year of Sustainable Energy for All
2011	 <p>International Year of CHEMISTRY 2011</p> <p>International Year of Chemistry (IYC-2011)</p>
2010	 <p>International Year of Biodiversity</p> <p>2010 International Year of Biodiversity</p>
2005	International Year of Physics
1992	International Year of Space
1970	International Year of Education

You may find that there were only a few science-related International Years before 21st Century [compare with full list in Note 1]. What does this tell? Surely, that reflects the rapid advancement of science and technology in the last several decades and the widespread upgrade of our communication platforms which enhance information sharing and exchange.

In most science-related International Years, the lead units were those with expertise in the subject matter. In recent years, through various electronic platforms, more and more countries, cities and / or organizations could take part in celebrating or promoting the designated theme. Such international concerted efforts make education of the public about the designated theme more easily and could go even more in-depth. Outreach programs supported by various organizations also help to spread the culture with more effective education means.

Would such proclamation help in our teaching and learning?









This depends on how you value your position as a science teacher and at the same time as a scientist. Of course, for most science-related International Years, most concerned academic organizations would organize different educational activities to celebrate the year. Such activities could draw upon teachers and students in exchanging ideas and experience on focus topics of investigations and the celebration would fill up the whole year.

International Days – recurrent reminder of certain global issues that need concerted efforts with longer period

Other than International Years, the UN also assign certain days as “International Days” to raise

awareness of global issues and to encourage action by governments and communities to help spreading the news and to educate the public for global issues that need concerted efforts and require recurrent reminder over a longer period.


The following table includes some science- and maths-related International Days:

International Day	Celebrating Themes
11-Feb	International Day of Women and Girls in Science
3-Mar	World Wildlife Day
22-Mar	World Water Day 
22-Apr	International Earth Day 
20-May	World Bee Day 
5-Jun	World Environment Day
16-Oct	World Food Day
20-Oct	World Statistics Day 
10-Nov	World Science Day  
1-Dec	World AIDS Day
<p>You could obtain a full list of International Days at</p> <p>http://www.un.org/en/sections/observances/international-days/</p> <div>   </div>	

From the above list, you could easily observe some global problems that we are still facing. Some teachers may have already arranged activities with their students in the past. If you have not tried, you could check for examples with the “UNA-UK” teaching resource website at <https://www.una.org.uk/get-involved/learn-and-teach/international-days-bring-global-issues-life>. For most International Days, you could find a factsheet for teachers and a 60-minute activity for primary and secondary students. The advantage of having “international day” as learning context is that it provides more convenient points for teachers to arrange suitable activities in their yearly teaching program.

Other than International Days being announced by the UN, some special days are also commonly celebrated by science and maths educators. Examples of some very popular celebration days are: the “pi-day” [Mar-14], “mole day” [Oct-23], “Fibonacci Day” [Nov-23], Of course, you could set your desired issue and claim a day for your school celebration. One special example in recent years is the schedule of “STEM Day” in certain schools when all or some levels of students will work on some STEM activities, either as a concluding event for the year or as a promotion. At the moment, there is no proclamation of any official “International STEM day” yet [Note 1].

The IYPT-2019: “International Year of Chemical Elements” and its Celebration [Note 2]

	<p><i>The United Nations has proclaimed 2019 as the “International Year of Periodic Table of chemical elements” on 28-Dec-2017. This also celebrates the 150th Anniversary of the establishment of the Periodic System for chemical elements by the Russian Scientist, Dmitri Mendeleev in 1869.</i></p>
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< IYPT-2019 >... < 國際週期表年 >... < IYPT-2019 >.....< 國際週期表年 >

The United Nations (UN) has announced 2019 as the “International Year of the Periodic Table” (IYPT-2019). The UN has recognized the importance of raising global awareness of how chemistry promotes sustainable development and provides solutions to global challenges in energy, education, agriculture and health.

This International Year will bring together many different stakeholders including UNESCO, scientific societies and unions, educational and research institutions, technology platforms, non-profit organizations and private sector partners to promote and celebrate the significance of the periodic table of elements and its applications to society during 2019. [Check Note 3 at the end for some already announced celebrating events.]

The development of the periodic table of the elements is one of the most significant achievements in science and a uniting scientific concept, with broad implications in astronomy, chemistry, physics, biology and other natural sciences.

The IYPT is endorsed by a number of international scientific unions and the International Council for Science (ICSU). The IYPT will be administered by an International Steering Committee in collaboration with the UNESCO International Basic Sciences Programme and an International Secretariat, to start operating in early 2018.

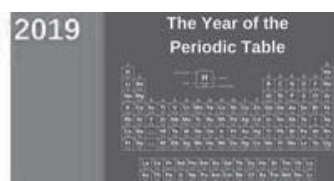
In addition to IUPAC, IYPT is supported by the International Union of Pure and Applied Physics (IUPAP), the European Chemical Sciences (EuCheMS), the International Astronomical Union (IAU) and the International Union of History and Philosophy of Science and Technology (IUHPAST).

All scientists will celebrate the IYPT in a number of ways. This IYPT will also trigger a wide range of cooperative undertakings within the context of the follow-up of the **2011 International Year of Chemistry** and the **2014 International Year of Crystallography**. Mentioning and trace of the related previous International Years of 2011 & 2014 let students know about the trend in scientific endeavor and collaborative work on a global scale. This further helps the spread of STEM education amongst teachers and students especially related to the UNESCO.

Just like the Year of Chemistry (2011-IYC), you will find many associations celebrating this important and meaningful year in many different ways. The table below are some historical icons in the 2011-IYC. For old members, especially chemistry teachers, you must have ideas about the grand celebrations of the IYC with many different events around the World. Locally, we also have many different activities round the year after the grand opening ceremony at CityU on 26 Feb 2011. The following photos may help old members to refresh their minds and new members to get a taste of what an international celebration might be.

 <p align="center">International Year of CHEMISTRY 2011</p>	
<p><i>Official logo of the IYC-2011</i></p>	<p><i>The grand opening ceremony of IYC2011 in Hong Kong at CityU (26/2/2011). Steering Committee of the IYC2011-HK was formed by 12 organizations / institutes. HKASME was one supporting organizations.</i></p>

We would initiate the celebration of the IYPT-2019 in Sep 2018 with the “**Element of the Month for IYPT-2019(HK)**”. For details of the celebrations, please refer to the Association website. [Note 5]. In addition to the celebration of the 150th Anniversary of the Periodic Table with the IYPT-2019, another grand celebration in 2019 is the **IUPAC-100**. As the **IUPAC** is a very important organization that serves the international scientific endeavor in the dual function of a basic science and a mission oriented union for 100 years, you may like to introduce the **IUPAC** to your students with the many associated activities already planned [Note 4].



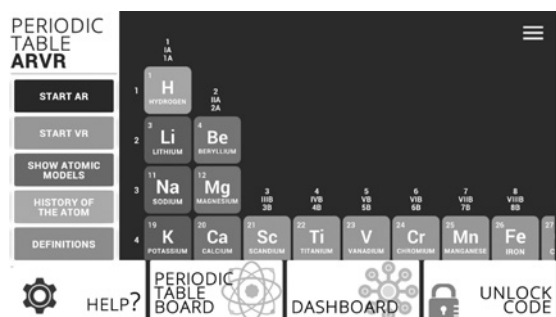
and **IUPAC** celebrations in 2019

The Way Forward

Often, people refer science and mathematics as international language. No matter which mother tongue you possess, science and mathematics always bear similar coding and reasoning function for all of us. And, in the long history of mankind, science and mathematics has contributed much in shaping the modern society. In order to let the science and maths educators to have a timely review of some important and advanced global issues, the regular assignment of thematic International Years and Days by the UN provides special context for teachers to shape more in-depth learning environment for their students. With the advance communication technologies, such activities could be initiated more easily to the globe. This also helps teachers and students

to join in international efforts and broaden our learning horizon. A special remark for the coming year (2018-19) is the UN proclaimed **“International Year of Periodic Table (IYPT-2019)”** [Note 2]. The HKASME will organize activities (beginning Sep-2018) to celebrate this issue [Note 5].

Lastly, teachers and schools are encouraged to organize their own celebrating events for other International Days and thus help to promote science and maths education from different perspectives. Further, powerful advanced technology like AR & VR could bring about complete new contexts and changes in our learning and teaching. You may check [Note 6] for some available ARVR science-related education packages and have a taste of what virtual touring could enhance learning and teaching with a technology-impregnated periodic table.



How ARVR works with the traditional Periodic Table? [Note 6]

Notes & References:

[1] International Years / Days and more references

(1)-- International Years designated by the UN :

<http://www.un.org/en/sections/observances/international-years/>

(2)-- UN International Year (list of years proclaimed from 1959/60 to 2024) ...

<http://www.un.org/en/sections/observances/international-years/index.html>

(3)-- Procedure for the proclamation of International Years

<http://www.unesco.org/new/en/member-states/resources/international-days-years-decades/international-years/>

(4)-- STEM jobs & Maths Holidays -- <https://stemjobs.com/math-holidays/>

[2] International Year of Periodic Table (IYPT-2019) & related activities.

Some started in 2018.

You may also plan your own celebrations ahead with your students in the coming days.

Below are some initial highlights for you.

(1)-- a new blog for the IYPT-2019

<https://blog.oup.com/2018/04/2019-year-periodic-table/>

(2)-- RSC news about IYPT-2019 {Royal Society of Chemistry}

http://www.rsc.org/images/iycinsertscnews_tcm18-212849.pdf

(3)-- ACS news about IYPT-2019 {American Chemical Society}

<https://www.acs.org/content/dam/acsorg/global/international/prospectus-iypt-12-09-2017.pdf>

(4)-- IAU celebrating IYPT-2019 ... {International Astronomical Union}

<https://www.iau.org/news/announcements/detail/ann18013/>

[3] IYPT-2019 & Russia World Cup 2018 –

Just a coincidence, Mendeleev’s original statue and his first proposed Periodic Table is located in St. Petersburg -- one of the 11 cities in Russia that has World Cup matches. Also, St. Petersburg is not only Russia's cultural capital, it is also a major industrial center with some of the finest universities and research institutes in the country. Peter the Great, the city's founder, was himself fascinated by engineering, technology, and all branches of science, and founded the first 'scientific' museum in the city, the bizarrely fascinating Kunstkammer. Nowadays, St. Petersburg has a wealth of museums dedicated to a wide range of scientific and technological disciplines, many of which are well worth checking out. There are also many science related events held in St. Petersburg which you could “participate online”.

Would you take the opportunity to introduce to your students about STEM issues in this City in the IYPT-2019?



<http://www.saint-petersburg.com/monuments/dmitriy-mendeleev/>

(1) St. Petersburg Science Festival --

<https://sciencefestivals.org/festival/st-petersburg-science-festival/>

(2) 10 top Museums in St. Petersburg --

https://www.tripadvisor.com/Attractions-g298507-Activities-c49-t35-St_Petersburg_Northwestern_District.html

(3) Museums of Science & Technology in St. Petersburg --

<http://www.saint-petersburg.com/museums/museums-of-science-and-technology/>

[4] **IUPAC Celebrating its 100th Anniversary** by 2019 -- <https://iupac.org/100/>



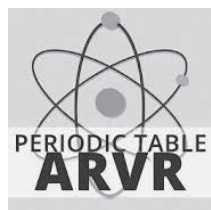
Many activities have already been planned and there will be more in the coming days. Some centenary events have already been initiated – for example, “Periodic Table of Younger Chemists” (11/6/2018), “Global Women’s Breakfast (12/2/2019)” – *one titled event is “Empowering Women in Chemistry: A Global Networking Event”*, “IUPAC Stories” -- *{ongoing stories will be added at <https://iupac.org/100/stories/> }*, “Periodic Table Challenge” -- *{will be launched in Jan-2019 and throughout the whole year}*, etc.

[5] **“Element of the Month” for IYPT-2019(HK)** – this will be the Association’s first IYPT celebrating activity. It will last from Sep-2018 to May-2019. All secondary school students could participate with their own way of presenting the application of any one element. Details of this competition and other celebrations could be found in the Association website.

[6] **Teaching and Learning with AR & VR** --

(1) <https://melscience.com/vr/> The MEL-Science has included some free lessons online for teachers’ reference. Totally 80 topics listed with VR elements are provided in the package.

(2) Periodic Table ARVR at <https://adonialearn.com/product/periodic-table-arvr/>



The Association from its 55th (2019) to 60th (2024)

Alex, Chi-kong Wong
Immediate Past Chairman, HKASME

Introduction

After the AGM on 16 Jun 2018, the Association enters the 55th year in serving Hong Kong with science and maths education basis. In five years' time, that will be our 60th Anniversary! According to the previous decades, that may be another grand celebration as of the 40th and 50th Anniversaries to address the effort of our forerunners – though some of them had left us gradually over these years.

For humans, 60 is considered old in the past but is classified as “young” nowadays with advancing science and technology. In contrast, the life-time of organizations becomes shorter and shorter as the world changes fast, and even faster with IT infiltration. Historical organizations like the HKASME may be viewed as antique if there is no new blood keep pouring in. Other than that, we are lucky to have many energetic “retired / old members” who have participated actively and even work consistently for the Association in all back-office issues. The Association would like to thank ALL old and new members keep supporting the Association from daily tasks to special events throughout the year. We are confident that we could continue our services to the sector and the society (being charitable since 2010) in the coming 5 years irrespective of the ever-changing scenario that we may face.

This article would like to explore some plausible foregoing issues that the Association may need to consider in the coming five years.

Resources

In view of resources, except for a relatively stable financial foundation, we always lack human resources. This becomes more severe in recent years as the education sector has been bombarded with lots of social requests -- from routine learning and teaching issues, to all sorts of life-issues that affect the development of our youngsters including psychological to environmental issues. All those events, even minor, could hinder our colleagues to input their efforts and time in keeping the Association alive. Luckily, we could still find some part-time helpers to fit in some labour-intensive tasks. However, for some high-order tasks (for example, analyzing or commenting performances), we still need the assistance from our dedicated experienced colleagues. As most of our tasks are volunteer work, we still hope that members could show

their willingness in helping some minor tasks in different events (e.g. online judging of some students' articles / issues). In return, members may also gain in-depth views to the standard of contemporary students' (and / or teachers') performance in certain areas which could help your continual professional development.

Apart from manpower, we also find increasing difficulties in finding suitable venues for different activities – especially those involving hundreds to thousands of participants. This is surely due to more and more activities being organized by their own schools in respond to the present trend of education ideology which focus at widening the learning experience of students in different perspectives. We would like to thank schools which have kindly offered assistance in our activities. We have no choice but to call for the sub-committee's help to settle their activity dates as early as possible. Alternatively, some committees have arranged competitions or activities with the virtual space which relieve the burden of the Office to find a suitable face-to-face location. One successful example is the "Digi-Science (previous Digi-chem) Video Competition" which have all students' tasks being handled through email and the YouTube links. Of course, such arrangement may have the disadvantage of lacking direct contact and immediate experience sharing.

Technological Impact

Technology not only influences our learning and teaching, it has immense impact on the Association's back-office development.

As an educational association, all sorts of technological impacts and influences on learning and teaching would affect the Association's development. However, due to limited resources, we could only work more consistently in delivering messages or information about the changes instead of direct involvement in the research. Of course, sharing sessions could be arranged with frontline teachers with appropriate timing and location. Yet, all such activities and / or sharings would rely heavily on the subject-committees' decision with partial contribution from all frontline teachers and researchers. All teachers are reminded that our mailpack / newsletter and the yearly Teachers' Journal (usually published by September each year) welcome contributions in the form of articles and / or notes, reviews, messages. Luckily, we are still financially sound to maintain the publication of the yearly Journal as a formal and constant communication channel with all members, non-members and our global science and maths colleagues.

The web-presence of the Association (www.hkasme.org) began lately from 2000. Since then, there had been some trials to upgrade the system. However, due to lack of constant administrative manpower, progress is far from satisfactory. With the help of some part-time

helpers, the basic IT-infrastructure at the Office (the hardware, software and an intranet with electronic documentation) could be managed marginally to meet most daily routines – emails, online posting, shared-documents, ... We have introduced online applications for most recent activities so as to minimize error of information and save time for other clerical work. Yet, some teachers still get lost of that and some members still reframe from getting electronic documents. Apart from the few who are still not used to the change of transactions in electronic form, various communication channels become more popular and the office has gradually adapted the change. Updating of Association activities and news could be handled more easily through the web presentation and we hope members could be kept informed instead of the routine monthly newsletter / mailpack in coming days.

However, one particular area that had not been enhanced is the sales of equipment and references. As curriculum and publication changes fast, the need for traditional references has dropped. Again, due to limited resources, the handling of sales request may not be easily updated. So, there is much room for improvement in this area. For example, an updated catalogue would be well-received. We could just try our best to get things worked with whatever structure we have.

There is no intention of thorough research of the application of current and future technologies here. There is no harm to have a brief list of such for the Association and members to consider as we march towards 2024 (our 60th Anniversary). This includes the introduction of ARVR, AI, 3D-printing, blockchain, mobile technology, personalized learning systems, big data technology, into various levels of learning, instruction and even assessment. Actually, some of the above may have already been tried in some institutes. Exchange of ideas and experience sharing could be more easier now with various kinds of networked channels. Of course, the Association welcome any teachers and parties to join in and share or even collaborate in different programs in promoting such practices. However, due to limited resources, advanced in-depth research may not be possible at the present state. Yet, there is no restriction for members to initiate different ideas in different subject areas. Some possible future directions with applied technologies may include “blended learning”, “SEN support (students with Special Education Needs)”, “free online courses / competitions at different levels”, etc. Though small in numbers relative to the whole student population, special methods and / or strategies in handling the SEN students worth take special attention.

As technology advances, the same problem about “digital divide” as with the 20th Century may still exist in coming years. Hence, just like the historical development of the Association, we still rely on any methods that could help to make things work – that is, both lo-tech and hi-tech strategies will still linger on.

Curriculum and Learning

Similar to all sectors of learning, the change in knowledge acquisition is fast and wide. The publication of a single central curriculum and assessment guide could not match with the ever-changing demand on the learning (and the instruction) side. The use of alternate syllabus for actual implementation at your own institute or even class is not new. Ideas of matching the “intended curriculum”, “implemented curriculum” and “achieved curriculum” could be explored continually with different institute background and / or context being addressed. Another hot issue should be the experiment with inter-disciplinary learning. Planning STEM education programs in different institutes actually needs the consideration of all the above with different staged sessions from Primary to Secondary. Especially for curriculum programs related to Science, the learning schedule may have topic sequence changed and not follow our original traditional tracks with specific topics at specific stage. One simple example is the learning of more advanced topics at earlier stage (Primary or Junior Secondary), like environmental impacts, DNA, etc. which related to certain aspects that they need to work with their ongoing projects. Hence, the “learn-on-a-needed-base” strategies may be a key area that the Association should address. Similar to technological impact, especially “personalized learning systems” to meet different target groups, the research and trials of different sets of curriculum for different types of students and learning groups will surely be another important address. Anyway, curriculum development and the follow-up modes of learning, instruction and assessment would be on a continual trail.

The Association by 2024 (60th Anniversary)

No one has the crystal-ball to declare firmly what the Association will be by 2024 at its 60th anniversary. Though advancing technologies may have severe impact on our format of teaching and learning, the Association infrastructure may not be able to cope with every link that is being created technologically. This is in particular being heavily restrained by our limited scope of hardware and development in terms of long-term sustainability, both financially and administrative-based. Yet, with our long 54 years of ups and downs (including financial downturns), the Association could continue to survive with our limits being pushed to extremes by 2024. Even if we are ambitious to expand in certain areas, for example, more STEM-related activities or programs; the most important focus is still the recruitment of more manpower in handling all sorts of activities – from planning to implementation and follow-up back-office tasks.

Anyway, the Association will still act as a “platform” in the coming years, physically or virtually, for all science and maths teachers and educators to exchange ideas, share experience and organizing activities at various levels with the effort of all dedicated members and partner

organizations. Once again, we must thank in advance all old and new members that support our coming activities. After all, the most important issue of the Association is still the recruitment of more new blood for coming events, whether traditional and new, and sharing of various STEM items with lo-tech and / or hi-tech elements. We just hope members could be more considerate when things are not working as assumed in terms of the commercial sector with our limited resources.

References:

##-- ARVR for education --

<https://arvrjourney.com/harnessing-your-superpower-with-augmented-reality-e0f15a27c73c>

#-- State of Technology in 2025 – Future Forecast

<http://www.quantumrun.com/future-timeline/2025/future-timeline-subpost-technology>

.... Yuksel sees BACH as a model for learning all sorts of difficult things, like foreign languages. “You could design the system however you want,” she told *Fast Company*. “As long as it’s a task that can be broken down into different levels of difficulty, you can increase the difficulty as cognitive load falls below a certain threshold.” As predictions for the future go, this brain-reading-piano-teacher thing is at least as cool as it is creepy.

##---- 21 Tech tipping points by 2030 ...

<http://www.businessinsider.com/21-technology-tipping-points-we-will-reach-by-2030-2015-11>

##---- 8 predictions in 2025 --

<https://singularityhub.com/2015/05/11/the-world-in-2025-8-predictions-for-the-next-10-years/#m.0001095vi36cjf7av4q204dnohhua>

In 2025, in accordance with Moore’s Law, we’ll see an acceleration in the rate of change as we move closer to a world of true abundance. Here are eight areas where we’ll see extraordinary transformation in the next decade:

1. A \$1,000 Human Brain
2. A trillion-sensor economy
3. Perfect knowledge
4. 8 billion hyper-connected people
5. Disruption of healthcare
6. ARVR

7. Early days of JARVIS – more advanced AI systems become live in all daily communication systems (audio, visual, electronic, etc.).
8. Blockchain

##--- What will digital life look like in 2025?

<http://www.pewresearch.org/fact-tank/2014/12/31/what-will-digital-life-look-like-in-2025-highlights-from-our-reports/>

..... 5 points to note:

1. The internet will become “like electricity” in people’s lives – more widespread and less visible
2. Some very fundamental human activities – things like learning, thinking, working, and being “present” with others – will be transformed by these changes.
3. The problems of privacy and digital divides could worsen.
4. Humans, their institutions, and their norms never adapt to changed circumstances as quickly as the technology advances and often do not respond even to obviously pressing problems until after catastrophe occurs.
5. Clear majorities of experts we canvassed favoured an open internet with end-to-end architecture and net neutrality principles, and they fear that powerful organizations like corporations and governments might foul things up.

##---- 10 Breakthrough Innovations that will shape the World in 2025

<https://www.fastcompany.com/3032260/10-breakthrough-innovations-that-will-shape-the-world-in-2025>

##--- The future of learning 2025

https://www.researchgate.net/publication/260863799_The_Future_of_Learning_2025_Developing_a_vision_for_change

##--- Education in 2025

<https://www.zinmag.nl/media/6922/2025-education-in-polycom-survey-enus.pdf>

##--- Resources about “STEM” from NSTA: Engineer it, learn it Science & Engineering Practices in Action Classroom Resources ...

<http://ngss.nsta.org/Classroom-Resources.aspx#aboutresources>

##-- 3D learning / instruction & assessment.

<http://www.nextgenscience.org/three-dimensions>

Condolence to Dr. Tin Ka Ping



from 1919 to 2018

Our respected entrepreneur and philanthropist Dr. Tin Ka Ping (田家炳博士) has left us on 10 July 2018 in the age 99.

Though Dr. Tin had not supported the Association directly, his pass away still worth our deepest condolence due to his widespread support in different sorts of educational activities.

The major sponsorship related to the Association is the “lifelong” (over 20 years) yearly support to our well-received “Fun Science Competition” (co-organized with a number of other associations including the Science Museum) by the Tin Ka Ping Foundation (田家炳基金會). Hundreds of talented students participated and learnt from each other on a special day each year at the Science Museum.



Poster of Fun Science Competition 2018



Judging panel and participating students of
Fun Science Competition 2018



Mr. Tin Wing Sin from Tin Ka Ping Foundation was supporting us on
the day of Fun Science Competition 2018.

兩岸四地中學物理教學研討會

鄭自良
香港數理教育學會前主席

第四屆「兩岸四地中學物理教學研討會」於2018年2月21日至23日在香港舉行，出席的香港、澳門、中國內地及台灣代表共50多人，包括中學老師和大專院校的學者。

本會向大會簡介香港 STEM 教育的發展(包括在推行中要關注和解決的問題)，並作《香港數理教育學會與內地及亞洲地區教育交流(包括STEM教育)》的報告。香港保良局胡忠中學林國良老師與湖南師範大學附屬中學高級教師李湘黔合作研究，由林老師在會上作了《以水火箭展示STEM教學活動設計與策略在中港物理課程中的異同》的報告，得到與會者好評。

第一至三屆研討會

籌辦兩岸四地中學物理教學研討會的宗旨，是希望為四地的中學物理教師提供一個交流平台，分享教學經驗，增進了解，擴闊視野，促進四地中學物理教師的專業化發展，提升教學水平。

首屆研討會由澳門物理界倡議，經四地物理教育工作者協商，於2011年12月在澳門舉行。本會參加的資深會員包括前主席鄭自良校長、前物理組召集人伍瑞球校長、鄧自本先生(教育局前總課程發展主任)、呂夢茹女士(教育局前高級課程發展主任)等共七人。

來自兩岸四地的學者有我國著名理論物理學家郝柏林院士(1934 – 2018)、中國物理學會第九屆教學委員會副主任吳祖仁教授、楊再石教授和中學分委秘書長劉鋒博

士；澳門物理暨教育研究會會長楊燦基；臺灣師範大學物理系主任賈至達教授和高雄師大理學院院長何明宗教授等。大會報告包括有郝柏林院士的《物理是一種文化》、吳祖仁的《腦科學與物理教育》、楊再石的《移動互聯網下的泛在教育》、劉鋒的《21世紀 中國大陸中學物理課程改革簡介》、黃福坤教授的《臺灣的中學物理教學--個人20年的觀察/作為與經驗分享》、本會代表的《香港中學物理教育簡介--現狀和改革》、梁亦星的《澳門中學物理教育現狀》。大會又分八個專題進行分組交流。

第二及第三屆研討會分別於2013年12月在內地深圳及2015年在台灣墾丁舉行。本會物理組召集人劉志豪博士及前主席鄭自良校長參加了在台灣舉行的第三屆會議，並作了《香港數理教育學會在促進中學物理教育和物理教師專業發展方面所扮演的角色》的大會主題報告。

內地和台灣兩岸老師就同一課題進行對比教學演示

安排內地和台灣老師，就同一課題進行對比教學演示，是第三屆大會一個富有創意的嘗試。主辦方(台灣國立高雄師範大學理學院和國立台南第一高級中學)提出了“摩擦力”和“電磁感應”兩個主題。臺灣的吳原旭老師和上海的沈志輝老師分別進行了《摩擦力》的教學演示，四川的周昌鮮老師和臺灣的盧正良老師分別對《電磁感應》進行了教學演示。四位老師的教

學設計各具特色，啟發性強，很受歡迎。

“對比教學設計演示”亦反映了兩岸物理教育的文化差異和改革，引起了與會代表的興趣和熱烈討論。

成立中華物理教育研究聯盟

第三屆大會期間，還通過正式成立「中華物理教育研究聯盟」。聯盟旨在通過學術交流，共同攜手跨越四地社會制度和文化差異，進一步增進兩岸四地物理教育工作者的聯繫和友誼。

「中華物理教育研究聯盟」得到我國一批著名物理學家的關心和支持。應邀擔任聯盟顧問的有：中國科學院院士、北京大學原校長陳佳洱，中國科學院院士郝柏林，中國科學院院士、核子物理學家、腦科學家唐孝威，中國物理學會原副理事長、物理教育家趙凱華。

本會將繼續加強與兩岸四地和亞太地區科學教育工作者的聯繫

1982年本會在香港主辦「理科教育學會國際議會(ICASE)」亞太區研討會第四屆會議，探討在職教師的專業培訓，內地廣東、上海、等地有不少科學教育工作者參加。時時任中國物理學會《物理教學》雜誌主編的上海華東師範大學密子宏教授出

席會議，至2004年離世前一直和香港數理學會保持密切聯繫，並與本會合作，先後於上海舉辦滬港理科教育研討會(1984)及第七屆理科教育學會國際議會亞太區會議(1991)。期後，又與本會合作出版《物理教學(英文版)》和《漢英雙語物理教學讀本》，在內地推進物理雙語教學。

第五屆、第六屆「理科教育學會國際議會(ICASE)」亞太區研討會分別在馬來西亞及汶萊舉行。歷屆會議，本會均有派代表出席，與來韓國、東南亞、英國、西德等地的科學教育工作者建立聯繫，共同探討「科學探究」、「科學、技術、社會聯繫(STS)」等議題。面向廿一世紀，不少國家和地區都把培養學生的創造力(creativity)和解決問題的能力作為學校的教育目標之一，並發展到今天的STEM教育。本會自1991年起，每年均舉辦與此教育目標相關的「趣味科學比賽」，亦吸引澳門教育界的關注，並曾派隊參賽。

去年，廣西師範大學科學教育研究所羅星凱教授及泰國黃贊財教授(理科教育學會國際議會前會長)出席本會主辦的「一帶一路的STEM教育：教師的挑戰和機遇」研討會(2017年11月)，擔任主講嘉賓。

今後，本會將一如既往，繼續保持和加強與兩岸四地和亞太地區科學教育工作者的聯繫，促進科學教育發展。

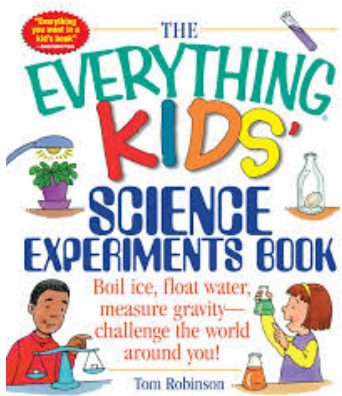
Books & Equipment for your STEM Design Hands-on and Minds-on Science & Maths

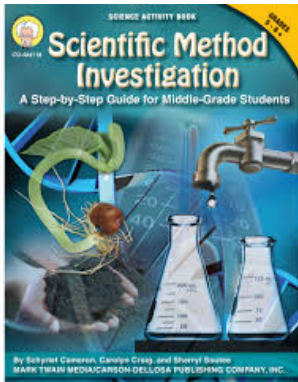

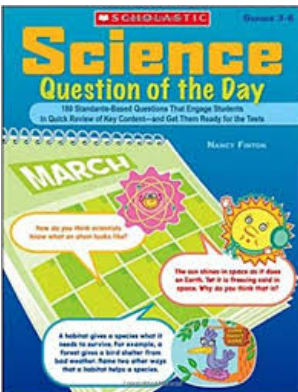
**** What are exactly good STEM references?**

There is no “good answers”. It’s just like any consumer choices – all depends on your goals and stage in implementing your “School STEM policy” at the moment. For example, if you start with activities and have not much time; the most useful references are those hot-pick experiments and / or investigation ideas. Also, some of our common playful equipment and materials could help your design in attracting students at the beginning stages. However, if you want some in-depth references that help you to design more advanced projects; you need some references that give you insights in different directions. Of course, our hot-pick equipment and materials are also useful for you as you can “play around” with such materials / equipment in many different ways.

One example is our recent hot-pick – the foldscope. Now, we have 2 different versions of foldscopes (A) a paper-made one that needs your students’ effort in constructing that from a paper card; (B) is a deluxe version with lighting. The “foldscope” idea is a hot issue around the world recently hoping that every student could have their own microscope that works with both in-class and outdoor investigation – NOT JUST for biological tasks, but anything that needs microscopic investigations, e.g. crystals, powder, gems, structures of daily objects and changes, ... Please check the introduction of the foldscope in sections below.

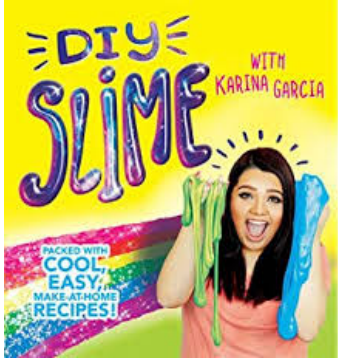
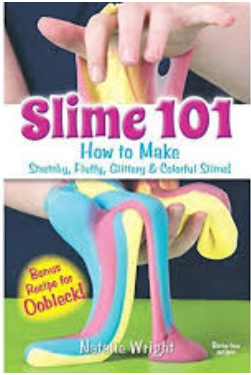
Reference Books:

Title	Remarks	Price (member /non-member)
<u>The everything kids easy Science experiments book</u> <i>(e.g. Explore your 5 senses. Discover density & sound Examine matter & acid/base Investigate electricity & light with Lab, questions, notes, hidden habitat, diamond poem, classify,)</i>	<ul style="list-style-type: none"> ■ Have lots of FUN science related activities (some can complete within 15 min) ■ Include 5 chapters themed: Biology, Chemistry, Physics, Human Body and Planet Earth. ■ Most activities have hints or answers 	\$150 / \$160 

	<ul style="list-style-type: none"> ■ 	
<p><u>Scientific Method</u> <u>Investigation – a step-by-step</u> <u>guide for middle-grade students</u></p> 	<ul style="list-style-type: none"> ■ To promote scientific literacy by teaching the steps of the scientific method and enabling students to become problem solvers in everyday life. ■ Facilitates planning for diverse learning styles and skill levels of middle-school students 	\$170 / \$190
<p><u>Soda Bottle Science</u></p> 	<ul style="list-style-type: none"> ■ 25 easy, hands on activities that teach key concepts in physical, earth and life sciences – and meet the Science Standards 	\$170 / \$180
<p><u>Science question of the day</u></p> 	<ul style="list-style-type: none"> ■ Good set of short questions for each day. ■ 180 standards-based questions that engage students in quick review of key contents ■ Integration of the engaged questions is similar to wide-spread revision 	\$150 / \$170

.... → Ask for more updates at the Office (2333-0096)!

Earth Day – STEM DIY References: (2018 Theme = End plastic pollution)

<p>Polymer / Plastic Ideas: Various Polymer sets ??</p> 	<p>Slime sets: materials / books →:</p> 	<p>e.g.1/ Slime 101 e.g. 2/ Plastics & Polymers Science Fair Projects -- using hair gel, soda bottles, slimy stuff e.g. 3/ The Adventures of a plastic bottle → ?? <u>Will you ask your students to develop a story / game about plastics? ... Or ... an investigation on plastic / polymeric items?</u> ⇒</p>
<p>** There are sets of slime (Super Slime Large Kit) on sale at \$ 240 / 260 (member / non-member) at the Office. Enough for whole class exploration.</p>		

2 Reference Books for in-depth STEM investigation or design :

(sBk-1):

“SUPER Science Challenges” -- Hands-on Inquiry Projects

for Schools, Science Fairs, or Just Plain Fun Go for their families!

By Janice VanCleave -- an author of more than 50 children's science books with sales over 2 million.

→ “Science challenge” is a science problem that can be solved through investigation. Select a science challenge that interests you and your students, then start with curiosity and a desire to learn something new! →→ For each challenge, the following sections can be found: “What you need to know”, “How does ____ work?”, “What does that have to do with ____?”, “Fun facts”, “Real-life science challenge”, “Experiment”,

➔ For teachers, science inquiry and assessment hints are available.



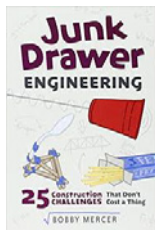
(sBk-2)

“Rubber Band Engineer”

... -- Yes, rockets or similar machines can be dangerous toys! Recent news about several of such dangerous toys may stir up your students. Instead of banning them, you may try to guide them to make something of their OWN and play safely under your guidance.

This book, with vivid photos, guide your students to create surprisingly simple to very complex designs from household materials such as paper clips, pencils, paint stirrers, etc... Of course, you need lots of rubber bands for the creations. 😊😊😊 Have fun 😊😊😊

“Junk Drawer” books – Making use of “wastes” for STEM activities ...



(jBk-1):

“Junk Drawer Engineering” (price: \$180)

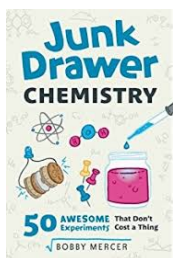
-- 25 construction challenges that don't cost a thing! By Bobby Mercer – a high school physics teacher with a handful of books sharing fun for science.

➔ **There is no need for expensive, high tech materials for your STEM projects. ...**
Check the 25 challenges inside the book.



➔ Example:

← ... Guess what is this and what “junk materials” they use to construct them. How could that be transformed into a challenging competition?



(jBk-2):

“Junk Drawer Chemistry” (price: \$180) -- 50 awesome

challenges that don’t cost a thing! ... Same author as (Bk-1).

One sample challenge is “rubber egg” – more than just egg in vinegar – how many variations could you design with just egg and vinegar? What’s the science behind?

!!!*→>>>> For BOTH “Junk Drawer” books above (bk-1 and bk-2), there is a video talking about “*How to organize your ‘Junk Drawer’*”? ... that guides your students to gather “wastes” or “junk materials” to get through their STEM learning years – which could extend throughout their school life!

https://www.youtube.com/watch?v=2FcU_jAgZhI

“FREE” STEM Learning Magazines online...

-- get updated with colleagues in other parts of the World ...

<p>STEM Primary:</p>	<p>STEM Secondary: → Check →</p>	<p>⇒ https://www.stem.org.uk/news-views/magazines</p>
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New / Hot Equipment / Materials -- ... ask for updates at Office (2333-0096)



(E-1) **Foldscope: An Origami-Based Microscope [\$60 / \$80] – A Paper**

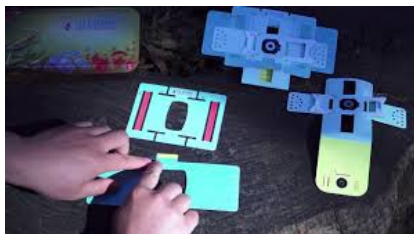
Microscope?!

....

DIY & Environmental !!!



Yes, it's a NEW type of instrument for your coming STEM activity / program ... with minimal cost ... AND... hands-on, minds-on related. The use of this foldscope package is just limited by your imagination.



→→ Just get the right pieces ^^ AND ... fold according to instruction (included in a very slim pack).

Foldscope is **an ultra-affordable field microscope**, that you build from common materials such as paper. It is designed to be produced affordably, to be durable, and to give optical quality similar to conventional research microscopes. with magnification of 140X and imaging resolution of 2 micron. Foldscope brings microscopy to new places – could be your kitchen or mountain top. Compatible with almost all camera phones!

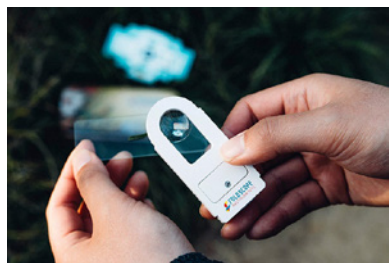
Sample magnified image from the paper-microscope ...



← Get some for your STEM classes!



(E-2) Foldscope – the deluxe version (with lighting, battery and a set of slides)



“Foldscope (B): Deluxe Version”, with lighting & glass slides

< The previous version “Paper Foldscope (A)” is listed above >

→ **Aim: A microscope in the pocket of every child !** ←



This NEW SET of foldscope is a deluxe version of the “Paper microscope” promoted last year. It consists of (1) a small hand-held microscope (lens 140x) with lighting and batteries and (2) a set of slides (some empty and some with specimens) – enclosed in a package. Further, a (3) lens piece is available for students’ construction [the paper foldscope, plan not included but could be downloaded] and compare.

Only for biology?

No! The foldscope could be used for any exploring situation that requires microscopic images. That include in-class and outdoor activities. Different professionals have tried to use this foldscope in their own tasks / exploration: naturalists, gem-collectors, bee-keepers, scrap-metal collectors, parasitologists, space scientists, herders, etc... Of course, if you want to include some hands-on construction experience with your students, you can use the Foldscope Package (A) [the complete paper foldscope plan is included].

More references:

Videos about activities with “Foldscope” : <https://www.foldscope.com/>

Diagnosing Diseases with the Foldscope : <https://youtu.be/ky-cqSI5mwE>

Sample images explored : <https://youtu.be/vQJDV4GE4aY>

The foldscope community -- <http://microcosmos.foldscope.com/>

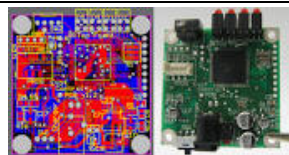


← Join the global investigation with

your foldscope. The aim is to allow every child to own their own microscope and hence could extend their STEM activities in and out of classrooms. More than 130 countries have tried this foldscope and more is coming. The developers' target is over 1 million around the World.

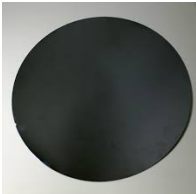



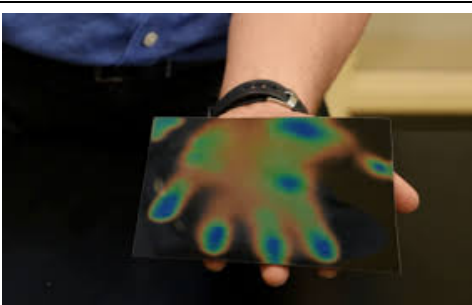
(E-3) 專利紙製電路 – A Paper circuitry set [\$140 / \$160]





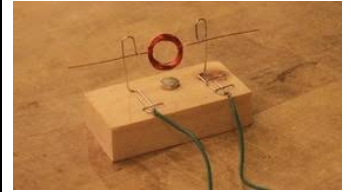

One box contain basic parts: Paper circuit board, simple LED circuitry, parallel LED circuitry, electric fan, USB fan, flash light,

Other versatile material for different investigative design:

<u>Equipment on sale:</u>		<u>Price</u> <u>[member/non-]</u>
(ES-1) Pure Silicon Slice (Diameter 12.5 cm)		\$160 / 170
(ES-2) Phosphorescent Vinyl (square 30 cm)		\$190 / 210

(ES-3) Liquid Crystal Plastic Sheet (different sizes up to 30 cm)		from \$100 to ~200 (for different size)
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**** New Equipment / Materials for STEM – [\$ = price member / vs. non-member]**

	1. Human Electrostatic conductive ball [\$ 40/50] – human contact could initiate lighting of the ball. Join hands of several people to see if the ball still lights up – what does this prove?
	2. USB plasma balls [\$ 60/70] – fluorescent when connected to USB power source. With contact of fingers / hands / other objects, colour will change due to electrostatic charges.
	3. DIY D.C. electric motor package [\$ 20/30] – for various STEM activities and experiments related to electricity and magnetism
	4. DIY kit: Mechanical catapult [\$30/40] --
3D paper folding model	5. DIY small animal visual mirage toys [\$ 10]



Items to celebrate the **IYPT-2019**.... – for prize,

for investigation, for daily decoration, ... (IYPT = International Year of Periodic Table)



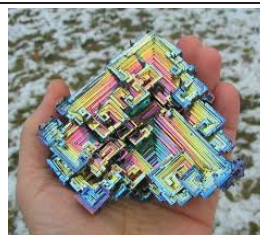
■ **(iE-1) Gallium metal (Ga)** -- a very dense ($\sim 6 \text{ g cm}^{-3}$) metal that

exist in liquid form at our room temperature ($\sim 30 \text{ deg C}$). The real sample could easily freezes and melts with warm and cold water with infinite times. *How would you guide your students with the changes using suitable particle models? Explore further its special properties with other elements (e.g. Al)...*

**** This is a hot item. Better phone up the office to check if stock lasts.**

- **(iE-2) Bismuth metal** and colourful crystals (Bi) – It is a brittle metal with silvery white color when freshly produced, but surface oxidation can give it a pink tinge. Bismuth is marginally radioactive, and the most naturally diamagnetic element, and has one of the lowest values of thermal conductivity among metals.





- Check the wonderful colourful crystal with the heated metal. **[** Note: the crystals are fragile, take care! **]**

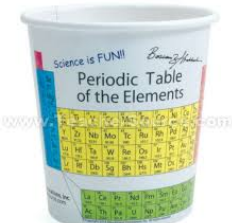



■ **(iE-3) Metal Specimen Set :**

consists of 10 specimen tubes with elements: Cu, Al, Bi, Sn, Zn, Fe, Mn, Cr, W, Pb. There could be a lot of comparisons and / or activities you can play around with the specimen. [\$100 / \$110 (member / non-member)]



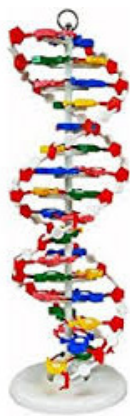
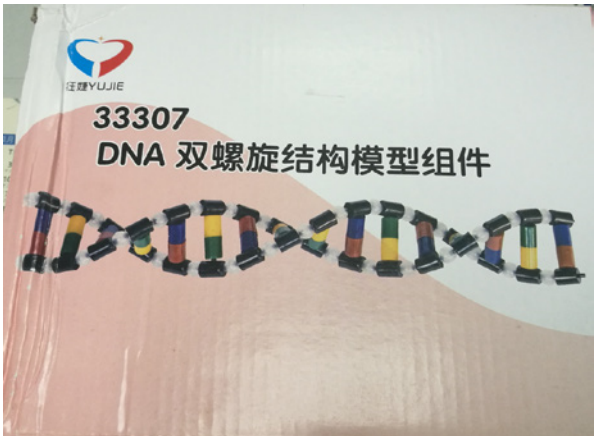
Item	Material / Equipment	Remarks
1	uv detecting beads 	<ul style="list-style-type: none"> ■ The beads will change colour around 400-315 nm (UV-A) and 315-280 nm (UV-B). The other ranges UV-C, visible or IR will appear white. ■ There are lots of changes / assemblies / .. that could be played with these beads. E.g. pack a few in drinking straws for home-use, making neck-lace, fixed in different parts of instruments or set-ups, ... ■ Could be used for checking the effectiveness of different sunblock materials (e.g. water, shadow, sunscreen, different glass materials, ...) ■ uv under varying climate conditions
2	Heat sensitive pencils 	 <p>Other than the hands, could other “heat source” make the changes?? Similarly applied for item below!</p>
3	Heat sensitive periodic table 	<ul style="list-style-type: none"> ■ Is this an exothermic or endothermic process? Discuss. ■ Made from heat-sensitive paper. ■ But if you are in a hot / warm area, you better have the periodic table put in the freezer beforehand. That would give more satisfactory results.

4	Heat sensitive Cup (with Periodic Table) 	Think about how the cup could change colour. And, what keeps it from changing colour, e.g. at different temperature?
5	Heat sensitive paper – for general use 	There are several colours and temperature ranges for change is 31-39 deg C. This could be an incentive for students to design different kinds of experiments based on temperature, light and energy.

DNA Models --

As DNA has been included in the S1 curriculum, quite a number of teachers ask for different sorts of DNA model sets. That include:

- (1) the largest tall table demo set (already constructed);
- (2) fixed twin helix that could be twisted and dissembled for different teaching / investigative purposes
- (3) small sets of ball-and-stick items for construction purposes. ... Ask office for more.

DNA	(1) Table demo set: 	(2) 
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