Providing creative resources such as Literature Maker and MOOCs to enhance cross-curricular learning in STREAM and promoting global exposure

透過提供Literature MAKER和MOOC課程等創意資源，以加強跨學科學習，推廣STREAM教育，並促進全球視野

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CCC KEI YUEN COLLEGE
中華基督教會基元中學

CityU
香港城市大學
City University of Hong Kong

School Vision and Mission

學校抱負及使命

Our Vision:

CCC Kei Yuen College is a Christian grammar school founded by the Hong Kong Council of the Church of Christ in China (HKCCCC) in 1982. Inheriting the spirit of "Serving & Preaching through Schooling" from HKCCCC and following God's words, "Together we grow in Him", we endeavor to provide students with quality whole-person education.

We strive to establish a happy learning environment where students have all-round development in moral, intellectual, physical, social, aesthetic and spiritual aspects. We recognize and put special attention to students' individuality and provide them with abundant opportunities to develop their individual potential so that they can grow up into teenagers who treasure themselves, cherish others and love God.

我們的抱負：

中華基督教會基元中學是一所基督教文法中學，一九八二年由中華基督教會香港區會創辦。本校秉承區會「透過學校，傳道服務」的辦學精神，並以「凡事長進，連於元首基督」為宗旨，向學生提供全人教育。

本校的辦學理想是建立一個愉快有紀律的學習環境，使學生在德、智、體、群、美、靈各方面得到均衡的發展；並且關注學生的個別特質，提供更多機會讓他們發展個人潛能，以成為愛己、愛人、愛神的有為青年。

Our Mission:

To establish a happy learning environment

To provide quality education

To develop individual potential

To pursue a fulfilling life together

我們的使命：

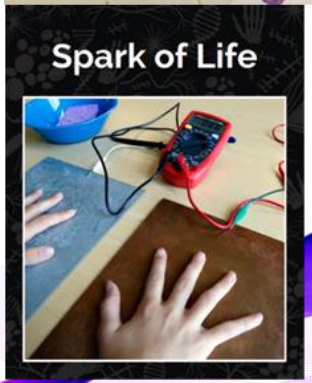
建立愉快校園，提供優質教育；
發展個人潛能，共創美好人生。

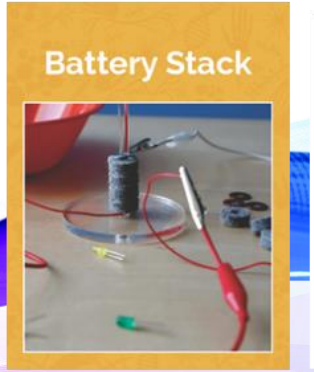
LONG-TERM TACTICS: SELF REGULATED LEARNING

SRL Literature Maker

The STREAM Subject (S.1-S.3)

Utilizing classic **science fiction** works, such as **Frankenstein** and **Sherlock Holmes**, to nurture creativity in maker and science discovery





CCCKYC MOOC INITIATIVE

S.1-5 students

can choose the university programmes they like:

- Massive Open Online Courses (MOOCs) offered by top universities worldwide, such as Harvard University, Yale University, Imperial College London, and HKU
- Up until 2024, 280 Kei Yuen students have completed over 400 MOOCs

MOOC

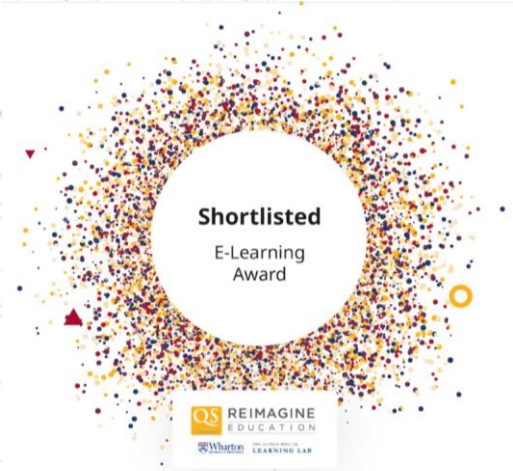
- **Massive**: 950+ universities;
  19400+ courses;
  220 million students (2021)
- **Open**: Free to learn;
  Charged for credentials
- **Online**: Mobile friendly
- **Course**: Technology, Business, Social Science, Science, Humanities, Language

https://www.coursera.org/
https://www.edx.org/
https://www.futurelearn.com/

Nurturing global citizens in the era of global uncertainty

Skills:

- Critical thinking
- Communications
- Creativity



Attitudes:

- Global citizenship
- Lifelong learning
- Self-directed learning

Six schools (Band 1/2/3) had joined the project

How can MOOCs impact students?

1

Personalized Learning

2

Self-Directed / Self-Regulated Learning

3

Multicultural Peer Learning

4

Lower cost

Using MOOCs for versatile educational purposes

- Global education: A variety of foreign universities (Harvard, Stanford, …)
- Language education: Subjects from foreign universities (English, Korean, Japanese, …)
- Career planning: A variety of subjects

Using MOOCs for versatile educational purposes

- Gifted education: Advanced courses (“Anatomy” for students in Band 3 school)
- Vacation homework: Flexible schedule (“MOOC-at-Home”)
- Project preparation: A variety of subjects (e.g., sustainability)

Summer 2020: “MOOC-at-Home”

- Typical activities (e.g., study trips) are not feasible during the travel restriction
- 2020 summer: “MOOC-at-Home” campaign
  - Self-directed learning (dashboard, support booklet, orientation webinar)
- 95 out of 101 HK SS Form 3 (K9) students completed 210 MOOCs
  - One student completed 87 MOOCs

Observations from research studies

- Students have a positive experience with MOOC learning
- If students are entirely new to MOOCs, their MOOC learning experiences are less positive.
- Students were well-supported by “hard resources” and “soft resources” when attending MOOCs.
- Students’ criteria on selecting a MOOC: Interesting; Subjects that cannot be learned in their study

- Tang, S., Lei, C. U., & Wei, H.Q. (2024, December). The Impact of Learning Experiences in MOOCs on Students' Future Study Plans. in *Proceedings of the 2024 IEEE International Conference on Engineering, Technology & Education*.
- Tang, S., Lei, C.U., & Wei, H. Q. (2023) The Effect of Learning Strategies Adopted in K12 Schools on Student Learning in MOOCs. *Journal of Computer Assisted Learning*.
- Lei, C. U., & Wei, H. Q. (2022, June). Developing Student's Global Competencies at Scale in an Affordable MOOC K12 Outreach Initiative. In *Proceedings of the 2022 ACM Conference on Learning@Scale* (pp. 321-324).

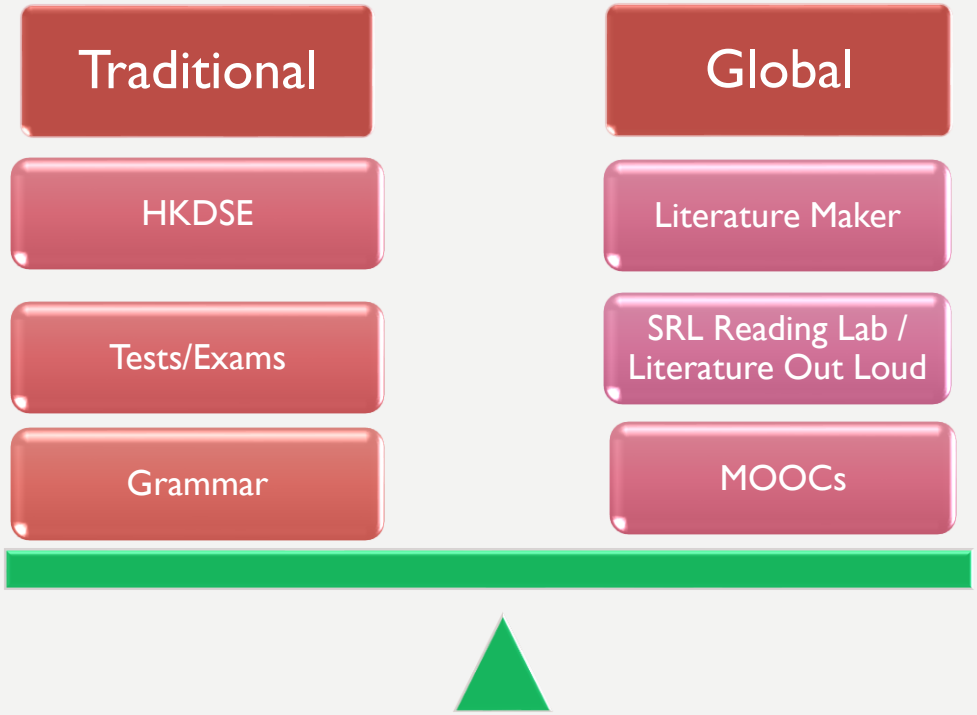
Future Works

- Aligning with UN Sustainable Development Goals and sustainability skills

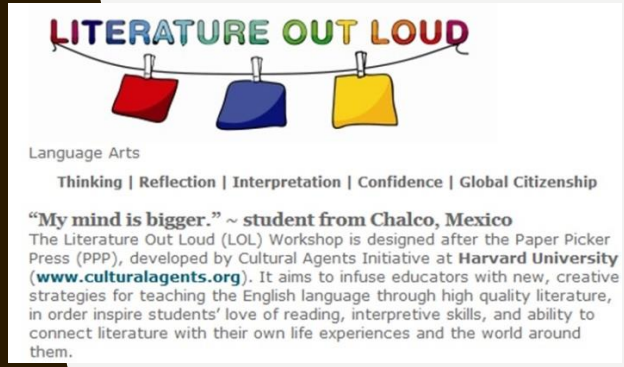
https://economicgraph.linkedin.com/research/global-green-skills-report

Public domain, via Wikimedia Commons

OBJECTIVES: LEARNING ENGLISH IN A GLOBAL CLASSROOM



S.1- S.2 LITERATURE OUT LOUD PROGRAMME

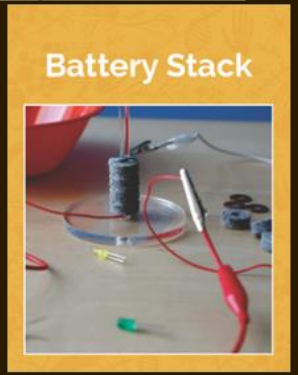


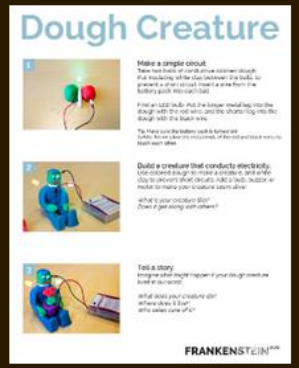
- Explore English literature through multiple art forms
- Read, re-write, respond and interpret literary texts in new and collaborative ways
- Organize a learning celebration event to showcase their products

SRL Literature Maker

The STREAM Subject (S.1-S.3)

Utilizing classic **science fiction** works, such as **Frankenstein** and **Sherlock Holmes**, to nurture creativity in maker and science discovery





Connection between Literature Maker (Maker + Discovery) and MOOCs (Enhancement)

Forms

S.1-S.3

Guiding Principles

1) Students have **options** 2) Students are **supervised** 3) Progress is **tracked**

Curriculum

Literature Maker programmes and STREAM-related MOOCs

Forms	Literature Maker	STREAM-related MOOCs for Advanced Learners (Enhancement)	
S.1	S.1 Literature Maker – The Frankenstein Project (Arizona State University) and Learning Celebration	S	The Science of Gastronomy (The Hong Kong University of Science and Technology)
		S	Science of Exercise (University of Toronto)
		T	Programming for Everybody (Getting Started with Python) (University of Michigan)
S.2	S.2 Literature Maker – The Sherlock Holmes Project and Learning Celebration	T	Intro to AR/VR/MR/XR: Technologies, Applications & Issues (University of Michigan) *
		R	Sharpened Visions: A Poetry Workshop (California Institute of the Arts)
S.3	S.3 Literature & Life Education Maker – a) STREAM-related readers b) design thinking process b) tackle daily life problems & social services	E	Introduction to PhET Simulations for STEM Education (University of Colorado)
		A	Fundamentals of Graphic Design (California Institute of the Arts)
		M	Data Science Math Skills (Duke University)

OPERATION

SCHEDULE OF TOPICS

Course Outline and Schedule of Topics (2024-2027)

Year	Cycles	1st and 2nd Cycles - Literature (80 minutes)	2nd to 4th Cycles – Maker (200 minutes)	Assessment	Cross-curricular connection	Enhancement (MOOCs)
S1 (12 cycles) The Frankenstein Bicentennial Project (Arizona State University) (*Mary Shelley*)	1-4	Chapters 1-4 + Literature Out Loud (WHQ+NETs)	1. Automata (MLM/LKY2)	Design Thinking Journal	English and D&T	Over 4000 MOOCs from the HKUxKYC Coursera MOOC Initiative
			2. Battery Stack (MLM/LKY2)	Design Thinking Journal	English, Physics and D&T	
	5-8	Chapters 5-8 + Literature Out Loud (WHQ+NETs)	3. Dough Creature (MLM/LKY2)	Design Thinking Journal	English, Physics and D&T	
			4. Frankentoy (MLM/LKY2)	Design Thinking Journal	English, VA, D&T and Physics	
	9-12	Chapters 9-12 + Literature Out Loud (WHQ+NETs)	5. Scribble Bot (MLM/LKY2)	Design Thinking Journal	English, Physics and D&T	
			6. Spark of Life (MLM/LKY2)	Design Thinking Journal	English, Physics and D&T	
S.1 Learning Celebration (Two OLE periods in June / July)						

Curriculum Mapping (KLAs)

Year	Unit	Science	Technology	Reading (LaC)	Engineering	Arts	Mathematics
S1 The Frankenstein Bicentennial Project (Arizona State University) (*Mary Shelley*)	1. Automata	**Integrated Sciences** 1.1 Learning about science (Application and impact of science) 3.1 Living things (Vital functions of living things)	**Design and Technology** Materials and Structures (Structures & Mechanisms)	**Language Arts** - Reading and Enabling Skills - Communication /Interaction Strategies - Features of Different Text Types	Students are expected to make an automaton, a moving mechanical device that imitates the movement of a living thing		
	2. Battery Stack	**Integrated Sciences** 5.1 Energy changes (Forms of energy and Energy conversion) 8.1 Simple circuit (Circuit symbols and circuit diagrams, and Switch)	**Design and Technology** Materials and Structures (Material Processing)	**Language Arts** - Reading and Enabling Skills - Communication /Interaction Strategies - Features of Different Text Types	Students are expected to learn the materials of a voltaic pile and try an early electrical experiment		
	3. Dough Creature	**Integrated Sciences** 4.1 Cells - the basic units of living things (Level of organization of living things) 8.1 Simple circuit (Closed circuit)	**Design and Technology** Materials and Structures (Materials & Resources and Material Processing)	**Language Arts** - Reading and Enabling Skills - Communication /Interaction Strategies - Features of Different Text Types	Students are expected to make their own creature and bring it to "life" with a bulb, buzzer, or motor		

app.formative.com/formatives/671f06b8b7ee2d2c7419afd5/results/1?columnGroupBy=questions

(01/11/2024 - Even No.) STREAM LOL Lesson Two

Edit | Responses | Summary

Preview | Assign | Present

TOTALS 1 2

Required

(STREAM Book P.21) What elements (or examples) do you see so far that fit into one or more of the three categories (romanticism, horror or gothic)? Discuss your ideas by writing 100 words or draw a picture about it.

Responses | Frequency

Questions | Active | Settings 2

1H 1A22 HENRY

HORROR

Victor Frankenstein's father had a friend that had fallen on hard times. He went to visit him. When he saw the way his friend and his daughter were living, his father's heart almost broke. So his father offered to help. Nevertheless, the friend was very proud so he refused any help from the father. The friend was ill. The only money came from small jobs his daughter did for the people in town. When she wasn't working, the young woman spent most of her time taking care of her sick father. My father heard that his friend was dying. Frankenstein's father, again, wanted to help. His father decided to visit his friend again. Sadly, he found the girl crying over her dead father's body. He didn't want to see his old friend's daughter left out on the street. He took care of her. Two years later, THEY WERE MEEEEEEEEEEEEEEEEEEEEEEERMARRIED.

1E 1A24 Ercan

I think it is horror,because Victor Frankenstein in the story he made a horror monster by some human bodys

1L 1A30MIKSHANG LIMBU

app.formative.com/formatives/671f06b8b7ee2d2c7419afd5/results/2

(01/11/2024 - Even No.) STREAM LOL Lesson Two

Edit | Responses | Summary

Preview | Assign | Present

TOTALS 1 2

Required

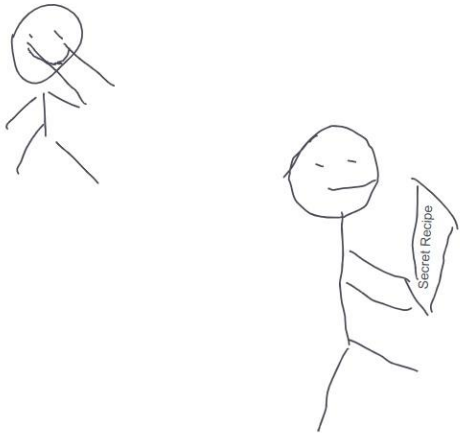
(Technology Security) Based on the story of Tu Youyou and Mary Shelley, why is safeguarding biosecurity/science and technology security important to our country? Discuss your ideas by writing 100 words or draw a picture about it.

Responses | Frequency

Questions | Active | Settings 2

1H 1A22 HENRY

Secret recipe for special medicine.

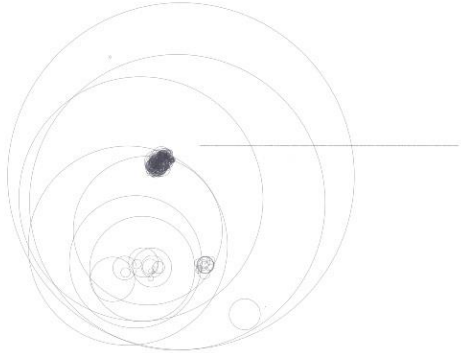


1E 1A24 Ercan

Safeguarding biosecurity and technology security is crucial for our country. Tu Youyou's discovery of artemisinin exemplifies how scientific advancements can greatly enhance public health, making it essential to protect such innovations from misuse. Conversely, Mary Shelley's "Frankenstein" serves as a cautionary tale about the dangers of unchecked scientific exploration, which can lead to ethical dilemmas and societal harm. By prioritizing biosecurity, we can prevent bioterrorism and ecological disasters, ensuring that scientific progress serves humanity positively. This responsible approach fosters public trust in science and technology, ultimately contributing to national and global security.

1L 1A30MIKSHANG LIMBU

Safeguarding biosecurity and science and technology security is crucial for our country as it protects public health, national security, and ethical standards. The story of Tu Youyou, who discovered artemisinin to combat malaria, exemplifies the positive impact of scientific innovation when conducted responsibly. In contrast, Mary Shelley's "Frankenstein" serves as a cautionary tale about the dangers of unchecked scientific ambition. By ensuring rigorous oversight and ethical conduct in research, we can harness technological advancements for the greater good while preventing misuse or unintended consequences. Protecting these domains fosters trust, promotes sustainable progress, and ultimately safeguards societal well-being.



In Mary Shelley's original story, Victor Frankenstein was a science student with a secret project. He built a person out of dead body parts and brought it to life.

When his creature began to move, Victor became scared of it. He thought his creature looked like a monster, and he let it run away.

In this activity, you will make an *automaton*—a machine that seems to be alive!

Victor Frankenstein used surgery, chemistry, electricity, and other methods to build his creature and bring it to life. This illustration is from an early edition of Mary Shelley's 1818 novel.

MAKE A CREATURE

1. Plan your automaton.

Play with the sample projects. When you turn the handle, look at how the foam circles work together to make the decoration on the top move. The foam circles are part of a cam system.

What will you put on top of your automaton?

Can you make something that looks like it's alive?

2. Build a cam system.

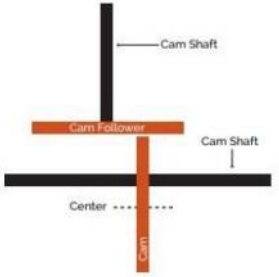
Take a plastic container and turn it upside down. Insert a small piece of straw into the hole on the top. Tape it into place.

Thread a skewer through the straw, then push it through the middle of a foam circle. Adjust everything so the foam circle is inside the container, near the top.

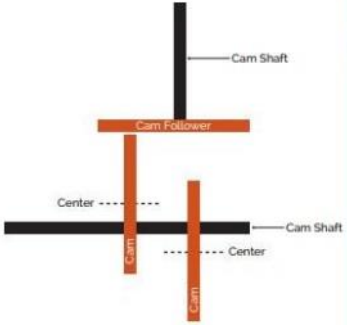
AUTOMATA

Try different variations to get different motions!

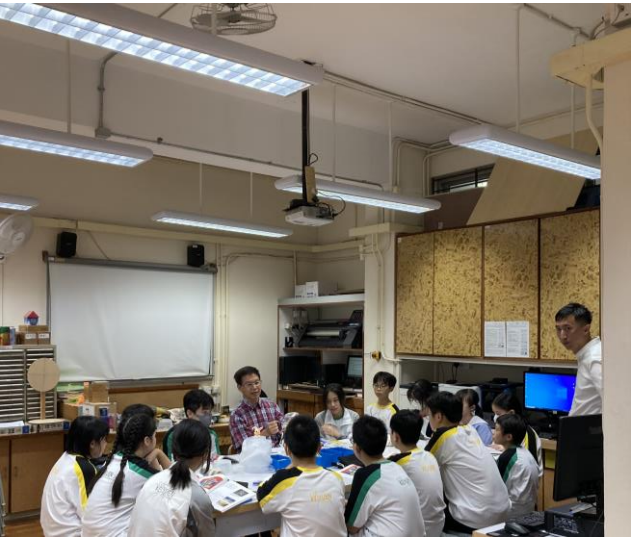
Up and Down, Round and Round



Up and Down, Back and Forth

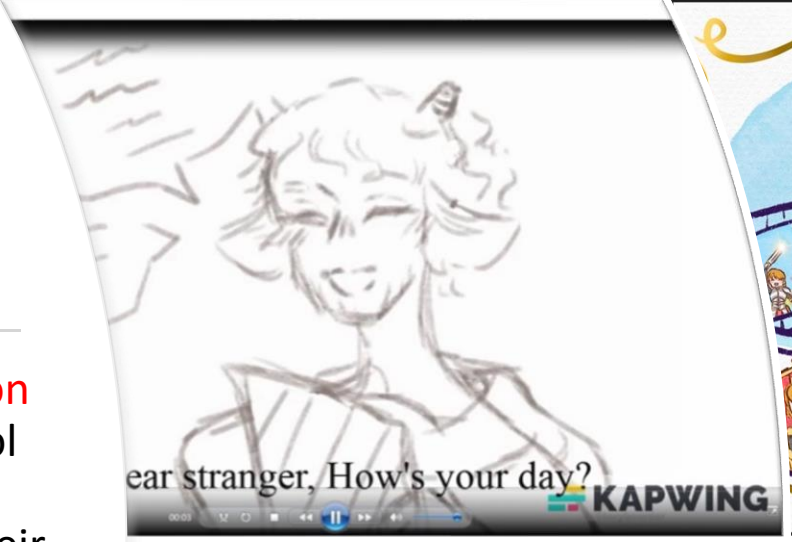



HITACHI



Literature Out Loud Learning Celebration

- Learning Celebration took place at School Mini Hall. Students were presenting their work, including artworks, videos, animations, radio drama, and role play.



CCCKYC Global Classroom Features

(2) Literature Out Loud

a) Explore English literature through multiple art forms
b) Targeting S.2 students
c) Read, re-write, respond and interpret literary texts in collaborative ways
d) Organize a learning celebration to showcase their products

M assive
O pen
O nline
C ourse

(4) European Virtual Exchange Programme

a) Explore and compare various cultural aspects of Hong Kong and another European country
b) Analyze cultural stereotypes and challenge assumptions
c) Develop their capacity for critical thinking, creativity, self-expression, personal growth empathy and cultural understanding

(6) Introduction of Global Week in regular classroom

a) In cooperation with intercultural organization
b) Expose them to different teaching styles and experience a different learning culture
c) Facilitate students in engaging in self-regulated learning and cross-curricular learning

S.1– S.2 | S.3 – S.4 | S.5

(1) SRL ERaC Reading Lab

Promoting STEM through literature

a) Students can choose the materials they lik
b) Targeting S.1 to S.2 students
c) Equip students with reading (SRA Reading Lab), listening (Hemispheres) and speaking skills (Read Aloud)

(3) SRL Literature Maker – The STREAM Subject (S.1-S.3)

a) Utilizing classic science fiction works, such as Frankenstein and Sherlock Holmes, to nurture creativity in maker and science discovery
b) To promote the application of technology enhancements in students' daily lives, encouraging them to explore the intersection of imagination, science, and real-world applications

HARVARD UNIVERSITY

Yale University

Imperial College London

(5) CCCKYC x HKU MOOC Initiative

a) S.3-5 students can choose the university programmes they like
b) Mentor will provide guidance while mentees are taking online university courses
c) HKU and Coursera will fully subsidize the fee of their completed MOOCs