

From Knowledge to Action: Strengthening Environmental Education for Hong Kong's Green Transformation

Authors: Peggy Cheung, Kitty Tam and Damon Lee



Contents

Acknowledgement	1
Foreword	3
Abbreviations	4
Glossary	5
Executive Summary	8
Introduction	11
Why This Report?	11
From Knowledge to Action	11
Purpose of This Report	11
How This Report Was Developed	12
Implications	14
What the Evidence Shows	15
1. Environmental Content Is Present, but Learning Remains Fragmented	15
2. Teachers Value Experiential Learning but Face Implementation Barriers	15
3. Students Value the Environment but Do Not Always Feel Prepared to Act	16
4. A Shared Knowledge-to-Action Gap	17
Way Forward	20
Priority Action 1: Strengthen curriculum integration	20
Priority Action 2: Provide Continuous and Meaningful Experiential Learning	23
Priority Action 3: Strengthen Support for Teachers and Schools	25
NbS as a Flagship Whole-school Application	27
From Recommendations to Implementation: A 2026–2030 Pathway	30
Phase 1: Strengthen the Foundations (2026–27)	30
Phase 2: Apply and Support (2027–29)	30
Phase 3: Review and Decide (2029–30)	30
Indicative Action Framework	31
Expected Results	32
Conclusion	33
Appendices	34
Appendix 1. Teacher and Student Engagement: Methodology and Detailed Findings	34
Appendix 2. Theoretical Foundation: From Knowledge to Action	40
Appendix 3. Detailed Curriculum Mapping	41
Appendix 4. Illustrative Learning Outcome Enhancements	45
Appendix 5. Examples of Learning Tasks Integrating NSE’s Concept	46
Appendix 6. International Case Studies	48
Appendix 7. Five Best Practice Case Studies in Experiential Environmental Education for Hong Kong Schools	51
Appendix 8. Priority Action and Whole-school Learning Model Details	54
Appendix 9. Other Examples of Cross-curriculum Experiential Learning	59
Appendix 10. Experiential Learning Framework for Education for Sustainable Development	61

Acknowledgements

We would like to express our sincere gratitude to the funder of this report, The Robert H. N. Ho Family Foundation Hong Kong, as well as to those who provided timely and valuable advice, support, and assistance during its preparation. Special thanks go to the following individuals and organisations for their insights.

List of individuals (in alphabetical order):

Name	Affiliate/ Organisation
Calvin Au	Civic Exchange
Carmen Ng	Ex-principal, Hong Kong True Light College
Delton Li	Kadoorie Farm and Botanic Garden
Isabel Li	Ocean Park Hong Kong
Judy Wan	Ocean Park Hong Kong
Kam Sing Wong	Wu Zhi Qiao (Bridge to China) Charitable Foundation
Melody Kong	Little Woods Nature Education
Miki Chang	Kadoorie Farm and Botanic Garden
Ng Kam Hiu	Church of Christ in China Kei Chun Primary School
Vivien Cheng	The Green Earth
Xoni Ma	Outdoor Wildlife Learning Hong Kong
Yamme Leung	WWF-Hong Kong
Yiu Nga Yung	Ho Fung College (Sponsored by Sik Sik Yuen)
Zheng Yuk Yeung	HKMA David Li Kwok Po College

Authors: Peggy Cheung, Kitty Tam and Damon Lee

Designer: DESIGNORM

About Civic Exchange: Civic Exchange is an independent Hong Kong public-policy think tank established in 2000. We use in-depth research and dialogue to inform policy and engage stakeholders on addressing environmental and development challenges in Hong Kong. Our research covers four areas that make up a liveable city: environmental, economic, social, and governance. Civic Exchange has been ranked among the top 50 environmental think tanks in the world by the Lauder Institute at the University of Pennsylvania since 2011. For more information, please visit: civic-exchange.org

About Hong Kong 2050 is Now: Hong Kong 2050 is Now is a flagship programme under Civic Exchange, and was established jointly with the World Resources Institute, ADM Capital Foundation, and RS Group in 2019, with the aim of mobilising action to transition Hong Kong towards long term carbon neutrality by mid-century. For more information, please visit: hk2050isnow.org

Recommended citation: Cheung, P., Tam, K. and Lee, D. 2026. *From Knowledge to Action: Education for Hong Kong's Green Transformation* Civic Exchange. 64pp.

Published in 2026 by Civic Exchange

The full technical report provides the detailed research methodology, curriculum analysis, survey findings, stakeholder insights, and complete case studies.



Foreword



Professor Debra Roberts

Core Team Member, UNEP's Overshoot Report
Former Co-Chair, IPCC Sixth Assessment Working Group II (2015–2023)
Coordinating Lead Author, IPCC Special Report on Climate Change and Cities

We need an urgent reality check—one that requires us all to do more!

At current rates, human-induced warming will reach 1.5°C around 2030. This does not mean we should give up on the long-term temperature goal agreed to in Paris in 2015. What is necessary is that the world rapidly gets onto an 'overshoot, peak, and decline' pathway that holds temperature rise to the lowest level possible, then brings it down by the end of the century, all while taking adaptation actions that reduce vulnerability to the current or expected impacts of climate change. This is by no means an acceptable or preferred pathway; it is simply the best remaining option.

An overshoot pathway has profound implications for today's young people. The higher and longer the exceedance and peak stages of overshoot, the greater the risks to people and ecosystems, the more difficult adaptation becomes, and the greater the possibility of irreversible loss and adaptation limits being exceeded.

The decline stage that will help us keep 1.5°C in reach by the end of the century requires not only immediate and deep emissions reductions but also the removal of already emitted greenhouse gases. This means that societies must become better prepared to navigate increasing climate risks, complex trade-offs, and decisions under uncertainty. Education has an essential role in building that capacity.

Education must not be used to transfer responsibility for today's choices onto the next generation. It should, however, equip young people to understand the changing and complex world they are inheriting, evaluate evidence and possible responses, question decisions, participate meaningfully in shaping their communities as well as contribute to bold and ambitious action.

This report makes a valuable contribution by looking beyond the amount of environmental content taught in schools and asking how learning can be better connected and applied. Its emphasis on learning across subjects, repeated practical experience, and sustained support for teachers recognises that climate change and biodiversity loss do not fit neatly within conventional subject boundaries.

Hong Kong's dense, coastal, and subtropical environment provides an immediate setting in which students can investigate heat, extreme rainfall, biodiversity, and the relationship between urban development and natural systems. Nature-based Solutions offer one practical example of how students might examine a local challenge, understand ecological processes, assess competing priorities, and monitor the results of a response, allowing them to begin to understand how context-relevant action can contribute to global goals.

In an era of escalating climate risk, the ability to connect knowledge with judgement and action will be fundamental to growing society's adaptive capacity. I hope this report helps Hong Kong's educators, policymakers, and environmental organisations create the conditions in which young people can develop that ability and contribute confidently and responsibly to the difficult choices that lie ahead in an overshoot world. It is only by educating ourselves about the challenges that we can turn from bystanders into champions for change.



**Professor
Wong Kam-sing, GBS, JP**

**Former Secretary for the Environment,
Hong Kong SAR Government (2012-2022)**

During my tenure as Secretary for the Environment, I had the privilege of overseeing the development of climate action plans in Hong Kong after the Paris Agreement, including Hong Kong's Climate Action Plan 2030+ and Hong Kong's Climate Action Plan 2050 launched in 2017 and 2021, respectively. After my ten-year service as the 'environment minister', I am carrying on advocating climate action from various perspectives. This experience has reinforced my belief that policy and technology alone are not enough. A more successful green transformation also depends on people who understand the challenges, recognise their responsibilities, and are equipped to act.

This report asks an important question: how can environmental education help students translate knowledge into informed and responsible action? Its three priorities—strengthening curriculum integration, providing continuous and meaningful experiential learning, and strengthening support for teachers and schools—offer a practical way forward. I particularly welcome its emphasis on connecting and applying what is already taught, rather than simply adding more content to an already demanding curriculum.

Although I am no longer in a position to endorse the report's specific recommendations, I support its central direction. As Hong Kong advances its climate and biodiversity commitments, education and empowerment must remain at the heart of our efforts.

I hope this report encourages policymakers, educators, schools, environmental organisations, and communities to work together to equip young people with the knowledge, values, skills, and confidence to help build a carbon-neutral, climate-resilient, and nature-positive Hong Kong.

Abbreviation

CES	Citizenship, Economics and Society
EDB	Education Bureau, Hong Kong SAR Government
ESD	Education for Sustainable Development
ESP	Eco Stewardship Programme (Singapore)
IoT	Internet of Things
IPCC	Intergovernmental Panel on Climate Change
IUCN	International Union for Conservation of Nature
KEL	Key Environmental Education Leaders
KFBG	Kadoorie Farm and Botanic Garden
NbS	Nature-based Solutions
NGO	Non-governmental Organisation
NSE	National Security Education
PhBL	Phenomenon-based learning
SAR	Special Administrative Region
STEAM	Science, Technology, Engineering, Arts and Mathematics
WEEE	Waste Electrical and Electronic Equipment
YEA	Young Environmental Ambassador

Glossary

Action Competence	The ability and willingness of individuals or groups in taking actions on environmental issues, rather than simply gaining knowledge on them ¹ .
Circular Economy	An economic model that aims to eliminate waste and regenerate natural system through keeping materials constantly recycling, reusing and refurbishing ² .
Citizen Science	Scientific Research that requires public participation to increase scientific knowledge, for example by collecting data on water quality and local wildlife ³ .
Digital Education	Digital Education refers to the purposeful integration of digital technologies, including artificial intelligence (AI), digital tools and data driven approaches, into teaching, learning and school management to enhance learning outcomes and prepare students for the digital era. It aims to develop students' digital literacy, computational thinking, creativity and ethical use of technology ⁴ .
Ecological Civilisation	The PRC's guiding framework for development, distinguished from sustainable development by its emphasis on political and cultural dimensions and on redefining the human–nature relationship within planetary limits. Implemented through pollution reduction, circular and low-carbon economies, and green development, it is expected to be established in basic form by 2035 ⁵ .
Education for Sustainable Development	An interdisciplinary approach promoted by UNESCO to empower people with knowledge, skills, values, and behaviours needed to support a sustainable future, such as tackling topics like climate change and biodiversity loss ⁶ .
Environmental Education	A multi-disciplinary, cross-curricular learning process that develops understanding of natural ecosystems function and sustainable human–environment relationships. It cultivates critical thinking, problem-solving skills, and a lifelong, forward-looking concern for the environment, enabling learners to make well-informed, justifiable, and practical decisions regarding environmental conservation and to act as responsible citizens ⁷ .
Environmental Literacy	An awareness of and concern about the environment and its associated problems, as well as the knowledge, skills, and motivations to work toward solutions of current problems and the prevention of new ones ⁸ .
Environmental Stewardship	Taking personal and shared responsibility for the protection of natural environment through adopting sustainable and conservation practices ⁹ .
Experiential Learning	A learning process through which knowledge is created from experience. It proceeds through a four-stage cycle – experiencing, reflecting, thinking, and acting – in which learners engage in a concrete experience, reflect upon it, form concepts or general principles from it, and then test these through action, thereby generating new experiences. Deliberate engagement with all four modes of the cycle is held to produce deep learning, applicable to all forms of learning, development, and change across settings and throughout life ¹⁰ .
Green Transformation	The change of a city or economy towards a low-carbon, resource-efficient and environmentally sustainable ways of working and living ¹¹ .
National Security Education	Education promoted by the Hong Kong SAR Government on Hong Kong schools to help students to understand the importance and different domains of national security, which include ecological, resource security, and their related civic responsibilities ¹² .
Nature-based Solutions	Actions to protect, sustainably manage, or restore natural or modified ecosystems in ways that address societal challenges effectively and adaptively, while simultaneously delivering benefits for human wellbeing and biodiversity ¹³ .
Naturalist Intelligence	The ability to make consequential distinctions among organisms and entities in the natural world. It is one of the Multiple Intelligences identified by psychologist Howard Gardner ¹⁴ .

Phenomenon-based Learning	A constructivist learning approach popularised by Finland's educational system. Encouraging students to study a real-world phenomenon, such as climate change across multiple subjects rather than within a single subject ¹⁵ .
Project-based learning	A teaching method in which students learn by working in a project that requires investigation, reflecting and responding to a real-world question or problem ¹⁶ .
Resource Security	Ensuring reliable, sustainable and affordable access to essential resources such as water, food, and energy. It is closely connected to how resources are preserved and used ¹⁷ .
Service learning	A learning method integrates meaningful community service with academic coursework, allowing students to apply their knowledge while contributing ¹⁸ .
Values Education	An integral part of whole person education that fosters positive values and attitudes through the curriculum and authentic learning experiences. It develops students' ability to identify and evaluate values, make informed and ethical judgements, and act responsibly when addressing real-world issues and future challenges ¹⁹ .
Well-being	Well-being is a positive state experienced by individuals and societies. Similar to health, it is a resource for daily life and is determined by social, economic and environmental conditions ²⁰ .
Whole-school Approach	An approach that embeds sustainability values across every aspect of school life and community, including teaching curriculum and sustainable practices in daily campus and facilities operations ²¹ .

1. Jensen, B. B., & Schnack, K. (1997). The action competence approach in environmental education. *Environmental Education Research*, 3(2), 163–178. <https://doi.org/10.1080/1350462970030205>
2. Ellen MacArthur Foundation. (n.d.). *What is the meaning of a circular economy and what are the main principles?* <https://www.ellenmacarthurfoundation.org/topics/circular-economy-introduction/overview>
3. National Geographic Education. (2026). *Citizen science*. <https://education.nationalgeographic.org/resource/citizen-science-article/>
4. Education Bureau. (2024). *Blueprint for digital education development in Hong Kong primary and secondary schools*. Government of the Hong Kong Special Administrative Region. https://www.edb.gov.hk/attachment/en/edu-system/primary-secondary/applicable-to-primary-secondary/it-in-edu/DEBP/DEBP_Executive%20Summary_EN.pdf
5. Asian Development Bank. (2020). *Ecological civilization in the People's Republic of China: Values, action, and future needs* (ADB East Asia Working Paper Series No. 21). ADB. <https://www.adb.org/sites/default/files/publication/545291/eawp-021-ecological-civilization-prc.pdf>
6. UNESCO. (2026). *Education for sustainable development: What you need to know*. <https://www.unesco.org/en/sustainable-development/education/need-know>
7. Environmental Protection Department. (1999). *Advisory Council on the Environment: Environmental education (EE) in Hong Kong* (ACE Paper 3/99). https://www.epd.gov.hk/epd/english/boards/advisory_council/ace_paper9903.html
8. Hollweg, K. S., Taylor, J. R., Bybee, R. W., Marcinkowski, T. J., McBeth, W. C., & Zoido, P. (2011). *Developing a framework for assessing environmental literacy*. North American Association for Environmental Education. <http://www.naaee.net>
9. McLeod, L. J., Kitson, J. C., Dorner, Z., Tassell-Matamua, N. A., Stahlmann-Brown, P., Milfont, T. L., & Hine, D. W. (2024). Environmental stewardship: A systematic scoping review. *PLoS ONE*, 19(5), Article e0284255. <https://doi.org/10.1371/journal.pone.0284255>
10. Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.
11. OECD. (2025). *Environment at a glance indicators*. *OECD Publishing*. <https://doi.org/10.1787/ac4b8b89-en>
12. Education Bureau, HKSAR Government. (2021). *Curriculum framework of national security education in Hong Kong*. <https://www.edb.gov.hk/en/curriculum-development/4-key-tasks/moral-civic/nse/curriculum-documents.html>
13. IUCN. (n.d.). *NbS definition*. <https://inbs.iucn.org/understand/nbs-definition/>
14. Gardner, H. (2011). *Frames of mind: The theory of multiple intelligences*. Basic Books.
15. Symeonidis, V., & Schwarz, J. (2016). Phenomenon-based teaching and learning through the pedagogical lenses of phenomenology: The recent curriculum reform in Finland. *Forum Oświatowe*, 28, 31–47.
16. Buck Institute for Education/PBLWorks. (n.d.). *What is PBL?* <https://www.pblworks.org/what-is-pbl>
17. Education Bureau, HKSAR Government. (2021). *Curriculum framework of national security education in Hong Kong*. <https://www.edb.gov.hk/en/curriculum-development/4-key-tasks/moral-civic/nse/curriculum-documents.html>; World Economic Forum. (2011). *Water security: The water-food-energy-climate nexus*. Island Press.
18. National Youth Leadership Council. (n.d.). *Service-learning*. <https://nylc.org/service-learning/>
19. Education Bureau. (2022, December 15). *Values education*. <https://www.edb.gov.hk/en/curriculum-development/4-key-tasks/moral-civic/index.html>
20. World Health Organization. (2021). *Health promotion glossary of terms 2021*. WHO. Licence: CC BY-NC-SA 3.0 IGO.
21. European School Education Platform. (2022). *A whole-school approach to learning for sustainability: How to get started*. <https://school-education.ec.europa.eu/en/discover/tutorials/whole-school-approach-learning-sustainability-how-get-started>

Executive Summary

Hong Kong has strong foundations on which to advance education for sustainable development, including an established curriculum framework, an experienced teaching profession, clear policy commitments to sustainable development, and distinctive natural and urban environments that can serve as living classrooms.

As Hong Kong advances its climate, biodiversity, and green development agendas, preparing young people to contribute to this transition is increasingly important. Education for sustainable development is therefore more than a curriculum priority. It is an investment in environmental responsibility, future-ready competencies, and the capacity of the next generation to contribute to Hong Kong's green transformation.

The Challenge: Moving from Knowledge to Action

Environmental content is already present across Science, Geography, Citizenship, Economics and Society (CES), Values Education, and National Security Education. However, the presence of this content in the written curriculum does not necessarily mean that students experience environmental learning as coherent, practical or relevant to their lives.

The central question addressed by this report is:

How can education for sustainable development better equip students to translate knowledge into informed and responsible action?

The challenge is not simply to provide more environmental content. It is to connect knowledge across subjects, strengthen students' sense of responsibility, and provide meaningful opportunities for them to apply what they learn.

How This Report Was Developed

This report draws on a review of relevant junior secondary curricula and policy documents, engagement with teachers and stakeholders, a student survey, selected school visits, and local and international case studies.

The research was designed to identify policy-relevant patterns and practical opportunities. The student survey was not statistically representative of all Hong Kong secondary students, and the findings should be interpreted as indicative of participating students' experiences and perceptions.

What the Evidence Shows

The evidence identifies three principal findings.

First, **environmental learning is present across the curriculum but remains fragmented**. The curriculum covers climate change, biodiversity, resource use, consumption, waste and sustainable development across several subjects and learning areas. However, the relationships among these topics, and their connections with ecological security, responsibility and societal resilience are not always made explicit. This can make it difficult for students to develop a coherent understanding of how different environmental, social and economic systems interact.

Second, **teachers value experiential and interdisciplinary learning but face practical barriers**. Participating teachers consistently emphasised the importance of opportunities for students to apply their knowledge. They agreed experiential learning, interdisciplinary projects and engagement with real-world environmental issues as particularly valuable. At the same time, they highlighted barriers including limited curriculum time, insufficient resources, uneven teacher capacity and a lack of coordination.

Third, **participating students valued the environment and preferred hands-on learning, but many did not feel adequately prepared to act.** Among the students surveyed, environmental awareness was generally strong and hands-on learning was clearly preferred. However, many did not feel adequately prepared to respond to future environmental challenges. Although the survey was not designed to represent all Hong Kong students, the findings suggest a gap between environmental awareness and students' confidence, competencies and opportunities to apply their learning.

Taken together, the evidence indicates a shared knowledge-to-action gap. The next phase of education for sustainable development should focus on strengthening the connections between knowledge, responsibility and action.

Three Priorities for Hong Kong

This report proposes three system-wide priorities. Together, these provide a practical bridge between the continued enhancement of basic education and Hong Kong's wider transition towards green living, ecological conservation, and urban resilience during the 2026–2030 planning cycle.

Priority Action 1. Strengthen Curriculum Integration

Improve cross-curricular planning and strengthen connections among Science, Geography, CES, Values Education and National Security Education. This would help students understand the relationships among environmental sustainability, ecological security, civic responsibility and Hong Kong's wider development. **Values Education** provides an important opportunity to cultivate environmental responsibility and stewardship. **National Security Education** can connect environmental learning with ecological security, resource security, and responsible citizenship. These areas should complement, not replace, the scientific, geographic and social foundations of environmental education.

Priority Action 2. Provide Continuous and Meaningful Experiential Learning

Provide students with continuous opportunities to apply environmental knowledge through outdoor learning, citizen science, service learning, interdisciplinary projects, and whole-school sustainability initiatives.

Experiential learning should not be confined to occasional extracurricular activities. It should be **integrated into everyday teaching and linked to defined curriculum outcomes, progressively challenging and accompanied by structured reflection.** This can help students develop the confidence, competencies, and sense of agency needed to participate in environmental action and make informed decisions.

Priority Action 3. Strengthen Support for Teachers and Schools

Equip teachers and schools with the time, training, resources, and partnerships needed to deliver integrated and experiential environmental education.

This should include expanded professional development, curriculum-aligned teaching resources, stronger system-level coordination, and closer collaboration among schools, universities, environmental organisations, and government agencies. Support should be practical and responsive to the constraints teachers face.

A Flagship Implementation Model: Nature-based Solutions

Nature-based Solutions (NbS) offer a practical model through which the three priorities can be implemented together.

NbS offer a distinctive opportunity to reconnect students with nature and demonstrate how healthy ecosystems support biodiversity, climate resilience, and human wellbeing.

School-based NbS should be a sustained cycle of enquiry, action and evaluation, not simply a planting activity. Students could collect baseline evidence, identify a challenge such as excessive heat, surface runoff, or habitat degradation, assess possible responses across subjects, and help design, implement, and maintain an intervention. Repeated measurements would allow them to evaluate benefits, identify trade-offs, and adapt the project over time.

Projects could enhance terrestrial, freshwater, or other habitats through shade trees, rain gardens, pond or wetland restoration, native planting, or pollinator habitats. This process brings the three priorities together through integrated learning, repeated practical experience, and sustained whole-school and technical support. It also complements established energy-, water-, and waste-related

initiatives. Students can apply knowledge from multiple subjects while contributing to biodiversity conservation, climate resilience, and campus sustainability.

NbS should initially be tested through a small number of well-supported demonstration schools, with appropriate technical guidance, ecological safeguards, teacher training, and monitoring. Lessons from these pilots could then inform wider adoption.

From Recommendations to Implementation

Implementation should proceed in phases, beginning with cross-curricular guidance, experiential-learning pilots, teacher-support networks and a small number of NbS demonstration schools.

The Education Bureau should provide overall leadership for curriculum integration and teacher support, working with the Environment and Ecology Bureau, other relevant government departments, schools, universities and environmental organisations. Each action should have a designated lead, defined outputs, measurable indicators, and a clear timetable.

Key Message:

Hong Kong does not primarily need more environmental curriculum content, it needs stronger connections between what students know, the responsibilities they recognise, and the actions they are equipped to take. By strengthening curriculum integration, expanding meaningful experiential learning, supporting teachers and schools, and testing NbS as a flagship whole-school model, Hong Kong can cultivate environmentally responsible citizens capable of contributing to ecological civilisation, sustainable development, and the city's green transformation.

Introduction

Why This Report?

Climate change, biodiversity loss, and environmental degradation require more than policy, technology and infrastructure. They also require people who can understand complex environmental issues, make responsible decisions and contribute to practical solutions.

As demand grows for green skills across sectors, students require not only environmental knowledge but also systems thinking, collaboration, problem solving, and the ability to respond to emerging sustainability challenges. Education therefore plays an important role in equipping young people to support Hong Kong's green transformation while preparing them for further study and emerging green career pathways²².

This report has been prepared at the outset of Hong Kong's 2026–2030 planning cycle. The consultation document for Hong Kong's first Five-Year Plan²³ identifies the continued enhancement of basic education, including science, STEAM, national education, and Values Education, and the advancement of green living, a green and low-carbon transition, ecological conservation, biodiversity protection, and urban resilience as priorities. The recommendations in this report provide a practical bridge between these agendas by connecting existing curriculum content, giving students repeated opportunities to apply their learning, and strengthening the capacity of teachers and schools.

This direction is also consistent with national priorities under the 15th Five-Year Plan period, including high-quality education, practical learning, and ecological civilisation education²⁴. They further support the implementation of Hong Kong BSAP 2035 by promoting biodiversity knowledge, capacity building, and community participation.

In 2025, Civic Exchange published *Learning for a Greener Future: Accelerating Climate and Biodiversity Action Through Education and Empowerment*²⁶. The report reviewed 482 publicly available secondary school development plans and found that only 27% referred to sustainable development, climate, or biodiversity. These findings suggested that **environmental issues were not yet consistently reflected in school-level planning and strategic priorities**.

A more fundamental question is raised: **are students missing education for sustainable development, or is relevant content already present but insufficiently connected, applied, and translated into meaningful experiences?**

Since the publication of the 2025 report, Civic Exchange has continued to engage with policymakers, teachers, schools, universities, environmental organisations and other education practitioners. This follow-up report examines what students are expected to learn, how education for sustainable development (ESD) is implemented, and whether students feel equipped to apply their knowledge.

The central research question is:

How can education for sustainable development better equip students to translate knowledge into informed and responsible action?

From Knowledge to Action

Environmental content already appears across Science, Geography, Citizenship, Economics and Society (CES), Values Education and National Security Education (NSE), but the presence of content in the written curriculum does not mean students experience it as coherent, practical or relevant. Topics may be taught in separate subjects without being connected to one another or to students' own lives, and this report examines why later.

Knowledge remains essential, but knowledge alone does not automatically produce confidence, responsibility or action. This report therefore uses the progression from knowledge to responsibility to action as its organising framework. Action is understood broadly, not as prescribing particular behaviours, but as helping students examine evidence, weigh different perspectives and understand how change can occur at individual, school, community and societal levels.

Values Education, NSE and experiential learning each offer practical ways to help close this gap and are explored as opportunities later in this report. Realising them also depends on teachers and schools having sufficient curriculum time, professional capacity and practical support, a theme this report returns to throughout.

Purpose of This Report

Rather than through a new standalone subject or additional curriculum content, this report considers how existing content can be better connected across subjects, reinforced through values and responsibility, and applied through experiential learning, and examines the support teachers and schools need to put these approaches into practice.

The report seeks to:

1. examine how environmental themes are represented across relevant curriculum and policy documents;
2. understand the experiences and perspectives of teachers, environmental educators and students;
3. identify factors limiting the translation of knowledge into confidence, competence and informed action; and
4. propose practical priorities and implementation pathways for Hong Kong.

The principal focus is junior secondary education, although several findings and recommendations may also be relevant to other stages of education.

Ultimately, the report aims to strengthen ESD so that it develops both environmentally responsible citizens and future-ready talent for Hong Kong's green transformation, capable of contributing to sustainable development and the national vision of ecological civilisation.

How This Report Was Developed

To better understand the challenges, Civic Exchange adopted a mixed-methods approach combining:

- a review of relevant curriculum and policy documents;
- focus groups and other engagement with teachers, environmental educators, and stakeholders;
- a survey of 156 secondary school students;
- visits to six selected schools; and
- a review of local and international case studies.

These engagements sought to identify the barriers, and opportunities for strengthening environmental education, as well as the support needed to help schools move beyond awareness-raising towards meaningful participation and lasting behaviour change.

The **curriculum review** examined how themes including climate change, biodiversity, sustainable development, resource use, sustainable consumption, ecological security and environmental responsibility are represented across relevant subjects and learning areas. It considered not only whether these themes were present, but also how they were connected and whether students were given opportunities to apply their learning.

Teacher and stakeholder engagement explored how environmental education is delivered in practice, which approaches participants considered most effective, and what barriers schools face. Discussions also considered the professional development, resources, partnerships, and system-level support required.

The **student survey** examined students' environmental knowledge and perceptions, preferred approaches to learning, reported behaviours and confidence in responding to future challenges. It included multiple-choice questions and numerical rating scales. The questionnaire and detailed results are provided in Appendix 1.

School visits offered practical examples of outdoor learning, campus sustainability, interdisciplinary activities and partnerships with external organisations.

Local and international case studies were selected to identify relevant approaches to curriculum integration, experiential learning, teacher development and whole-school implementation. These cases were used to identify adaptable principles rather than models for direct replication.

Interpreting the Findings

The research was designed to generate policy-relevant insights rather than statistically representative conclusions about all Hong Kong schools and students.

The student survey involved 156 respondents and was not based on a representative territory-wide sample. Its findings should therefore be interpreted as indicative of participating students' experiences and perceptions. Responses were self-reported and may have been affected by differences in interpretation, recall, or social-desirability bias.

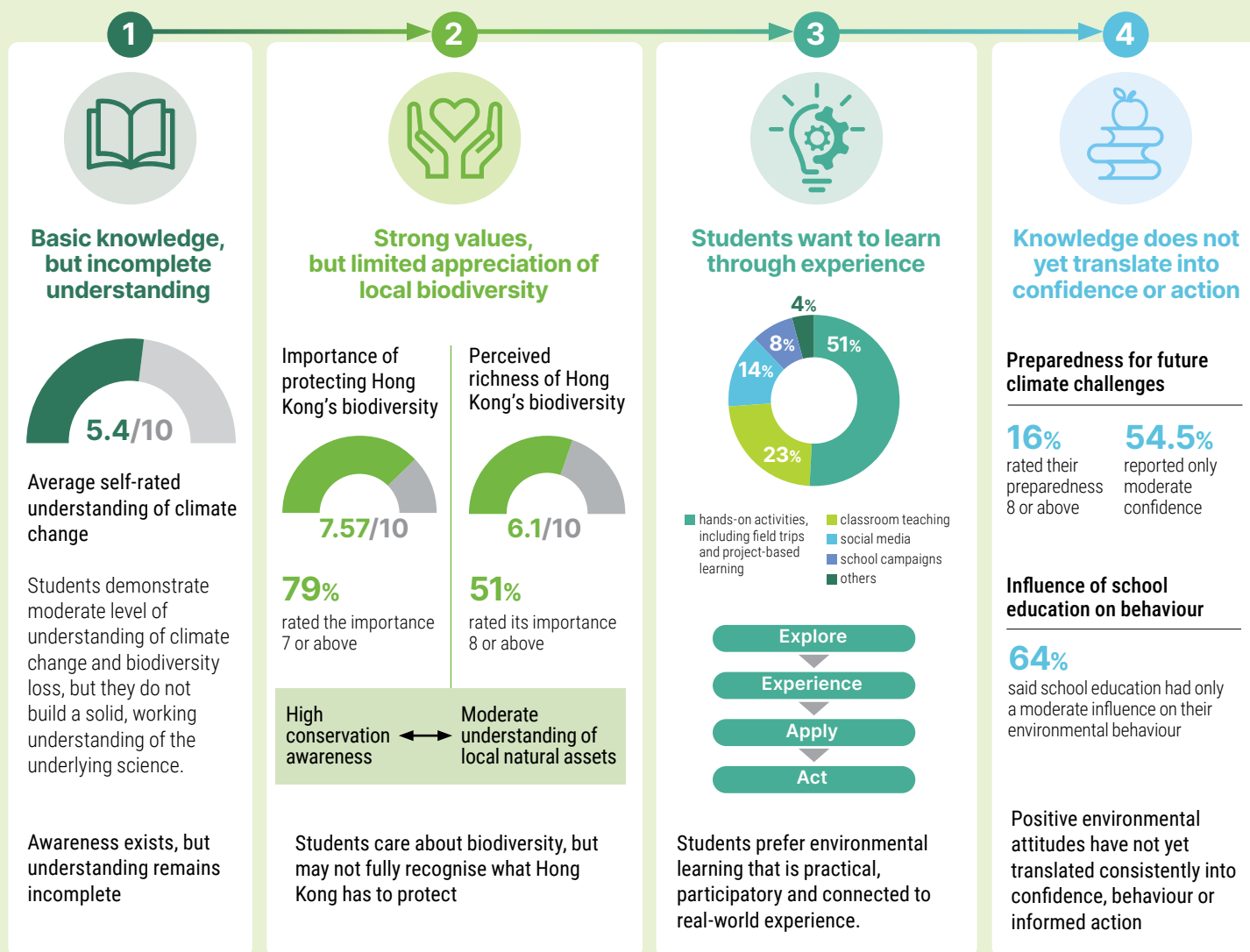
Participating teachers, stakeholders and schools may also have had a stronger-than-average interest in environmental education. School visits and international cases were selected to provide relevant examples rather than represent the prevalence of particular practices.

The research identifies recurring patterns, barriers and opportunities, but it does not establish a causal relationship between school education and student behaviour or measure lasting behavioural change. The report therefore focuses on students' knowledge, responsibility, confidence, competencies, and opportunities for informed action.

What Hong Kong Students Say About Environmental Education

Survey findings from 156 secondary school students

The survey is not intended to be statistically representative, but provides useful insights into students' environmental awareness, learning preferences and perceived preparedness.



The Education Gap

Awareness

Understanding

Confidence

Action



What students need



System Thinking



Experiential Learning



Action-Oriented Education



Confidence and Opportunity

Implications

These findings suggest that Hong Kong has established a solid foundation for environmental education. The next step is not to teach more sustainability content, but to create more opportunities for students to **apply their learning through authentic experiences that foster responsibility and lasting pro-environmental behaviour change.**

Key Message:

Students demonstrated strong environmental awareness and a clear preference for experiential learning. However, many did not feel well prepared to respond to future environmental challenges, suggesting that environmental education should move beyond knowledge acquisition towards building confidence, competence and opportunities for action.

-
22. UNESCO. (2020). Education for sustainable development: a roadmap. *Education for Sustainable Development: A Roadmap*. <https://doi.org/10.54675/yfre1448>
 23. Constitutional and Mainland Affairs Bureau. (2026). *The first five-year plan for economic and social development of the Hong Kong Special Administrative Region (2026–2030): Public consultation document*. The Government of the Hong Kong Special Administrative Region. https://www.hk5yplan.gov.hk/consultation/public/pdf/home/doc_consultation_en.pdf
 24. Ministry of Education of the People's Republic of China. (2026, June 29). 教育部关于印发《〈教育强国建设规划纲要（2024–2035年）〉落实机制（2026–2030年）》的通知. https://hudong.moe.gov.cn/jyb_xxgk/moe_1777/moe_1778/202606/t20260629_1442045.html
 25. Agriculture, Fisheries and Conservation Department. (2025). *Hong Kong Biodiversity Strategy and Action Plan 2035*. The Government of the Hong Kong Special Administrative Region. https://www.afcd.gov.hk/attachment/english/conservation/Con_hkbsap/updates_bsap/files/common/HKBSAP_2035_EN.pdf
 26. Yip, C., Chen, R., & Tam, K. (2025). *Learning for a greener future: Accelerating climate and biodiversity action through education and empowerment*. Civic Exchange.

What the Evidence Shows

1. Environmental Content Is Present, but Learning Remains Fragmented

A Knowledge-Rich Curriculum Foundation

Junior secondary curricula were selected for review because they are undertaken by all students, whereas subject choices at the senior secondary level vary according to individual interests, and are more strongly influenced by the Hong Kong Diploma of Secondary Education examination syllabus.

Our curriculum review finds that students encounter climate change, biodiversity conservation, ecosystems, natural hazards, resource management, sustainable consumption, and sustainable development across the junior secondary curricula, including **Science, Geography, and Citizenship, Economics and Society (CES)**.

Together, these subjects provide students with a solid foundation in understanding environmental challenges, ecological processes, and sustainable development.

Learning Remains Fragmented

Although environmental content is present, these topics are distributed across different subjects and often taught from separate disciplinary perspectives. Students may learn about ecosystems and biodiversity in Science, climate adaptation, and sustainable urban development in Geography, and responsible citizenship in CES, without sufficient opportunities to connect these areas of knowledge. A detailed mapping of sustainability-related topics across Science, Geography and CES is provided in Appendix 3.

This fragmentation matters because challenges such as climate change, biodiversity loss, and resource security are inherently interconnected. Understanding and responding to them requires students to consider scientific, environmental, social and economic dimensions together.

The principal curriculum challenge is therefore not an absence of environmental content, but limited integration and application. Rather than adding more material to an already demanding curriculum, Hong Kong has an opportunity to connect existing learning through interdisciplinary activities, project-based learning, and authentic environmental investigation.

These approaches could help students draw on knowledge from different subjects while developing systems thinking, collaboration and problem-solving skills. **ESD should not be judged solely by what students know, but by whether they are empowered to act on what they know.**

Key Message:

Hong Kong's junior secondary curriculum contains rich environmental content, but students may have limited opportunities to connect knowledge across subjects and apply it to complex, real-world challenges.

2. Teachers Value Experiential Learning but Face Implementation Barriers

Teachers Believe Students Learn Best Through Experiential Learning

Through focus group discussions and stakeholder engagement, teachers consistently emphasised that **students learn environmental issues more effectively when they engage actively:**

- field-based and outdoor learning;
- project-based and interdisciplinary learning;
- interactive workshops;
- investigation of real-world environmental issues; and
- opportunities for students to participate in environmental action.

Teachers believed these approaches help students connect curriculum knowledge with everyday life and apply classroom knowledge.

Teachers Need Greater Support to Put Environmental Education into Practice

However, teachers also identified significant barriers to providing such experiences consistently, including:

- limited curriculum time;
- insufficient practical and curriculum-linked resources;
- limited professional-development opportunities;
- difficulties coordinating across subjects;

- dependence on committed individual teachers or school leaders; and
- difficulty accessing sustained external expertise and implementation support.

Teachers expressed strong interest in **additional professional development and closer collaboration with universities, environmental organisations, and practitioners**. Such partnerships could give schools access to technical expertise, curriculum-aligned resources, and authentic learning opportunities that individual teachers may find difficult to develop independently.

These findings reveal a gap between teachers' preferred educational approaches and the conditions under which they work. Teachers were not primarily calling for additional environmental content. They were asking for the conditions needed to help students understand existing knowledge in context, connect it across subjects and with real-world issues, and consolidate their learning through practical application.

Key Message:

Teachers value experiential and action-oriented learning, but practical constraints prevent schools from providing it consistently.

3. Students Value the Environment but Do Not Always Feel Prepared to Act

The student survey explored participants' environmental knowledge and perceptions, preferred approaches to learning, reported behaviours, and confidence in responding to future environmental challenges. Although the survey was not statistically representative of all Hong Kong secondary students, it provides useful indications of how participating students understand and experience environmental education.

Knowledge and Perceptions

Many respondents demonstrated basic knowledge of environmental issues, including greenhouse gas emissions, biodiversity and the causes of biodiversity loss. However, students rated their own understanding of climate change at an average of only **5.4 out of 10**, indicating that they perceive themselves to have only **a moderate level of understanding**.

Besides, students generally recognise the importance of biodiversity conservation. The average rating for the importance of protecting

Hong Kong's biodiversity was **7.57 out of 10**, with 79% of respondents rating its importance as 7 or above on a 10-point scale, demonstrating **a strong appreciation of nature's value** among secondary school students.

However, students rated the richness of Hong Kong's biodiversity at an average of only 6.1 out of 10. This suggests a disconnect between their positive attitudes towards biodiversity conservation and their understanding of the local natural environment. Despite its small size and highly urbanised landscape, Hong Kong supports an exceptionally rich variety of habitats and species, making it one of the most biodiverse cities of its size²⁷.

Overall, students appear to hold positive environmental values, but their understanding of environmental challenges and their local relevance remains uneven.

Preferred Ways of Learning

When asked which approach they considered most effective for learning about environmental issues, **51%** of respondents selected **hands-on activities**, including field trips and project-based learning. A further **8.3%** selected **school campaigns**. These approaches were preferred more frequently than classroom teaching or learning through social media.

This finding closely reflects the feedback from teachers. **Both groups placed considerable value on experiential, participatory and action-oriented learning.**

Confidence and Application

Positive attitudes and environmental awareness did not always translate into confidence or reported action.

Only 16% of respondents rated their preparedness to respond to future climate-related challenges at 8 or above on a 10-point scale. A further 54.5% reported only a moderate level of preparedness.

Students also reported practising sustainable behaviours only occasionally. Approximately 64% indicated that school education had exerted only a moderate influence on their environmental behaviour. While many students recognised the importance of sustainability, **relatively few reported that school learning had strongly influenced their everyday decisions.**

These findings do not establish a direct causal relationship between school education and student behaviour. They do, however, indicate that curriculum exposure and positive environmental attitudes do not necessarily translate into confidence, practical competence or regular opportunities to act.

Students value...	Students need...
Protecting Hong Kong's biodiversity (79% rated its importance 7–10/10)	A stronger understanding of local biodiversity and environmental challenges
Hands-on learning (51% identified field trips and project-based learning as the most effective way to learn about environmental issues)	More opportunities to apply classroom knowledge
Learning through authentic experiences rather than passive instruction	Greater confidence in responding to future environmental challenges (only 16% rated their preparedness 8–10/10)
Environmental issues and sustainability	Meaningful opportunities to participate in environmental action

Key Message:

Participating students valued the environment and preferred experiential learning, but many did not feel adequately prepared to respond to future environmental challenges or apply their learning in everyday life.

4. A Shared Knowledge-to-Action Gap

The curriculum, teacher and student findings point towards a common conclusion: Hong Kong has an established foundation of environmental content, but students do not always experience this learning as sufficiently connected, practical, or action-oriented.

Students value environmental protection, and prefer hands-on approaches, yet many report only moderate understanding, preparedness and influence on their everyday behaviour.

What Drives Behaviour Change?

This challenge is well recognised in environmental education research. While knowledge is an essential prerequisite for informed decision making, it is rarely sufficient on its own to produce lasting behavioural change. Students also need opportunities to develop environmental values, a sense of personal responsibility, and the confidence that their actions can make a difference²⁸. Furthermore, research on behaviour change demonstrates that **sustainable habits are developed through repeated practice, social influence, and identity formation**, rather than through the transfer of knowledge alone²⁹. These mechanisms are set out in more detail in Appendix 2.

Taken together, the evidence suggests a shared knowledge-to-action gap:

- environmental knowledge is present but not always connected across subjects;
- teachers and students value experiential learning, but opportunities remain uneven;

- positive environmental attitudes do not necessarily translate into confidence or competence; and
- students may have insufficient opportunities to apply and reinforce their learning in authentic contexts.

Therefore, education for sustainable development should focus not only on **what students know**, but also on **how they connect, apply, and act upon that knowledge**.

This report therefore proposes that effective ESD should be viewed as a progression:

Table 1.
The Knowledge – Responsibility – Action Framework for ESD

Knowledge

Students understand climate change, biodiversity, ecosystem services, and sustainable development.



Responsibility

Students develop stewardship, civic responsibility, and an understanding of their role in responding to environmental challenges.



Action

Students investigate problems, assess possible responses, and apply their learning through projects and real-world action.

This progression highlights that environmental education should not end with knowledge acquisition. Students need to examine evidence, consider different perspectives, understand competing priorities, and evaluate the consequences of different responses. Where programmes aim to support specific day-to-day behaviours, they should also draw on environmental psychology by identifying and removing barriers and using appropriate measures, such as voluntary commitments, prompts, feedback, incentives, and supportive community norms, to help students translate their intentions into sustained action³⁰.

The educational objective is to help students:

1. understand why environmental issues matter,
2. recognise individual, collective, and institutional responsibilities,

3. believe that they can contribute to positive outcomes; and
4. develop the confidence and competencies to take informed and responsible action.

The next step for Hong Kong is to strengthen the connections between existing knowledge, responsibility, confidence and practical application through interdisciplinary and experiential learning, supported by appropriate resources, partnerships and teacher development.

Key Message:

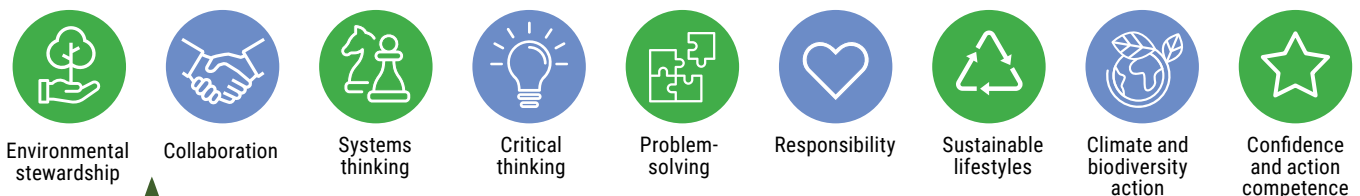
Knowledge is the starting point of environmental education, but meaningful environmental outcomes are achieved only when knowledge is transformed into responsibility and action.

Environmental Education Integration Framework

Environmental education is strengthened when multiple curriculum areas work together, supported by values, national security education and enriched through experiential learning.



Student Outcomes



Future-ready Students

Students develop the knowledge, values, skills and confidence to take informed action for a sustainable, resilient and carbon-neutral future.

27. Agriculture, Fisheries and Conservation Department. (2016). *Hong Kong biodiversity strategy and action plan 2016–2021*. The Government of the Hong Kong Special Administrative Region. <https://www.afcd.gov.hk/english/conservation/bsap/bsap.html>
28. Gifford, R. (2011). The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, 66(4), 290–302. <https://doi.org/10.1037/a0023566>
29. Lally, P., van Jaarsveld, C. H. M., Potts, H. W. W., & Wardle, J. (2010). How are habits formed: Modelling habit formation in the real world. *European Journal of Social Psychology*, 40(6), 998–1009. <https://doi.org/10.1002/ejsp.674>
30. McKenzie-Mohr, D. (2011). *Fostering sustainable behavior: An introduction to community-based social marketing* (3rd ed.). New Society Publishers.

Way Forward

The findings of this report suggest that the principal challenge is not a lack of environmental content, but a gap between what students learn and their ability to connect, apply and act upon that knowledge.

Addressing this gap does not require a new standalone subject or substantial additions to an already demanding curriculum. Instead, Hong Kong should focus on three priorities:

- 1. strengthening curriculum integration;
- 2. providing repeated and meaningful experiential learning; and
- 3. strengthening support for teachers and schools.

Together, these priorities can help students progress from environmental knowledge to responsibility, confidence and informed action.

Moreover, the three priorities are mutually reinforcing. Curriculum integration helps students connect environmental knowledge across subjects and relate it to values and responsibility. Repeated experiential learning enables them to apply that knowledge, develop competence and evaluate outcomes. Teacher and school support creates the conditions for these approaches to be delivered consistently and at scale.

Table 2.
How the three priorities address the knowledge-to-action gap

Priority	Primary gap addressed	Intended result
Curriculum integration	Fragmented knowledge	Connected understanding and responsibility
Repeated experiential learning	Limited application	Competence, confidence and informed action
Teacher and school support	Implementation barriers	Consistent and sustainable delivery

These priorities should be introduced through phased implementation rather than imposed as a single territory-wide programme. Initial actions should focus on developing guidance and resources, strengthening teacher capacity, and testing integrated approaches through a diverse group of demonstration schools.

Rather than presenting a long list of individual recommendations, this report consolidates them into three Priority Actions to provide a clearer implementation roadmap for policymakers, schools, and education practitioners. The details underpinning each Priority Action are presented in Appendix 8.

Priority Action 1: Strengthen curriculum integration

Connect Existing Environmental Learning

Climate change, biodiversity, sustainable development and resource use already appear across Science, Geography, Citizenship, Economics and Society (CES) and other areas of the junior secondary curriculum. However, this content is often taught separately within individual subjects.

Students may learn about ecosystems in Science, climate adaptation in Geography and responsible consumption in CES without being explicitly supported to connect these perspectives. Yet environmental challenges are inherently **interconnected**. Understanding these challenges requires **systems thinking**, considering scientific, social, economic and ethical dimensions together.

The priority should therefore be to connect existing content more coherently, rather than simply introduce more content.

Curriculum guidance could identify common environmental themes and show how they can be explored across subjects. Teaching notes could cross-reference related learning outcomes, suggest shared enquiry questions and provide examples of interdisciplinary activities.

For example, a cross-curricular investigation of urban heat could enable students to:

- examine heat transfer, plants and ecosystems through Science;
- investigate land use, urban farm and climate adaptation through Geography;
- consider public policy, community wellbeing and social equity through CES; and
- design and assess possible responses through STEAM or project-based learning.

This approach would help students understand environmental problems as interconnected systems while developing critical thinking, collaboration and problem-solving skills.

Connect Knowledge with Values Education

Curriculum integration should also connect environmental knowledge with questions of values and responsibility.

The Values Education Curriculum Framework provides an existing entry point. Values such as responsibility, commitment, respect, and benevolence can help students consider why environmental protection matters, and what responsibilities individuals, communities, businesses and governments hold.

Environmental responsibility should not be framed solely as a matter of personal lifestyle choices. Students should be encouraged to distinguish among actions that can be taken individually, collectively and institutionally, and to consider competing priorities and the consequences of different decisions.

Selected learning outcomes could therefore be strengthened without prescribing particular behaviours:

Table 3.
Illustrative integration of knowledge, values and responsibility

Existing learning outcome		Example of strengthened learning outcome
	Science Recognise the importance of practising low-carbon living.	Examine how individual and collective actions can contribute to climate mitigation, and reflect on shared responsibility and commitment for addressing climate change.
	Geography Understand the importance of forest conservation.	Evaluate forest conservation from ecological, social and economic perspectives, and relation to the values of benevolence, responsibility and common good .
	CES Practise green consumption.	Assess how consumption decisions affect society and the environment, how this demonstrates civic responsibility and commitment to future generations.

Further examples of strengthened learning outcomes are provided in Appendix 4. A complementary approach would be to strengthen cross-referencing between curriculum guides. For example, teaching notes could explicitly identify where related concepts are introduced in other subjects, enabling teachers to **reinforce common themes** such as environmental responsibility, stewardship, and sustainable development across the curriculum. This would help students connect scientific **knowledge with civic responsibility** while maintaining the flexibility of the existing curriculum framework.

Integrating ESD into NSE

NSE also provides a relevant framework for connecting environmental learning with ecological security, resource security, food security, societal security, and economic security.

Climate change, ecosystem degradation, and resource insecurity do not operate in isolation. Healthy ecosystems contribute to water regulation, food production, climate adaptation, public wellbeing, and disaster-risk reduction. Making these relationships visible can **strengthen systems thinking and help students understand why environmental protection matters to society**.

Table 4.
Alignment of environmental education topics with the junior secondary curriculum and NSE

Key Environmental Topic	Curriculum connections			NSE Learning Element
	Science	Geography	CES	
Nature-based Solutions	- Ecosystems - Biodiversity	- Ecological conservation - Natural hazards	Sustainable development	Ecological, societal and economic security
Decarbonisation	- Carbon cycle - Climate change	Climate change	Green finance	Resource and economic security
Sustainable Consumption	Resources	Resource management	Green consumption	Resource security
Waste Management	Waste treatment	Environmental management	Waste reduction	Ecological and resource security

Rather than treating environmental sustainability solely as an ecological issue, students can be encouraged to understand how healthy ecosystems contribute to broader societal resilience. Examples of tasks infusing NSE learning elements into existing content across Science, Geography and Citizenship, Economics and Society are provided in Appendix 5.

Local and national examples, including wetland conservation, sponge-city development, ecological restoration, renewable energy and urban greening, can help students examine how environmental, social and economic systems interact at different scales.

These real-world examples enable students to understand the **relationship between environmental stewardship, technological innovation and long-term national development**, while reinforcing the practical relevance of sustainability to their daily lives. This helps students develop systems thinking, and recognising that environmental challenges cannot be addressed in isolation.

Values Education and NSE should complement, rather than replace, the scientific, geographic and social foundations of environmental education. Their value lies in helping students connect disciplinary knowledge with responsibility, citizenship and societal resilience.

Actions Required

Hong Kong should:

- identify common environmental themes and make connections across Science, Geography, CES, Values Education and National Security Education;
- provide explicit cross-references among related curriculum learning outcomes;
- develop shared enquiry questions and interdisciplinary teaching examples;
- make environmental responsibility an explicit learning objective where appropriate;
- use local and national examples to connect environmental protection with sustainable development and societal resilience; and
- pilot a school-level planning and accountability mechanism requiring schools to set measurable whole-school objectives for cross-curricular ESD, allocate leadership and resources, and report progress through existing school planning and evaluation processes.

Key Message:

Hong Kong does not need substantially more environmental content. It needs stronger connections among existing subjects, values and real-world challenges.

Priority Action 2:
Provide Continuous and Meaningful
Experiential Learning

Move Beyond One-Off Activities

Knowledge alone is insufficient to drive pro-environmental behavioural change. The teacher engagement, student survey and school visits all point to the importance of experiential learning. Teachers considered fieldwork, outdoor learning and project-based activities among the most effective ways to help students apply environmental knowledge. Similarly, 51% of surveyed students selected hands-on activities, including field trips and project-based learning, as their preferred way to learn about environmental issues.

However, one field trip, campaign, or workshop is unlikely to develop lasting competence or confidence. **Students need continuous opportunities to investigate environmental challenges, test possible responses, reflect on outcomes, and take progressively greater responsibility.**

Experiential learning should therefore be:

- connected to curriculum learning outcomes;
- provided during normal curriculum time where possible;
- repeated across the junior secondary years;
- progressively challenging;
- interdisciplinary where appropriate;
- accompanied by structured reflection; and
- linked to authentic questions or visible outcomes.

Reflection is particularly important. Students should consider not only what they did, but what they learned, which values informed their decisions, whether their intervention was effective and what they would change. This transforms participation into purposeful learning.

Establish a Progression from Enquiry to Action

Schools could provide students with experiences across three complementary dimensions:

Table 5.
Research–Ecosystems–Action framework for experiential learning

Dimension	Purpose	Illustrative activities
Research	Investigate environmental conditions and interpret evidence.	Field enquiry, experiments, biodiversity surveys, environmental monitoring, and data analysis
Ecosystems	Develop direct understanding of nature and ecological processes.	Outdoor learning, habitat observation, ecosystem restoration, and campus biodiversity projects
Action	Design, implement, and evaluate informed responses.	Waste reduction, sustainable-consumption projects, citizen science, community conservation, and nature-based solutions

This framework need not prescribe identical activities for every school. Schools should retain flexibility to select experiences appropriate to their curriculum, campus, students and surrounding

community. The purpose is to ensure that **experiential learning becomes a sustained educational progression rather than a collection of isolated activities.**

A recurring weakness in ESD is that activities stop after the experience itself. Students should experience a six-stage learning cycle:



Please refer to Appendix 10 for full design principles and stage-by-stage guidance.

Digital tools, including environmental sensors, geographic information systems, remote sensing, data analytics, and appropriate uses of artificial intelligence, can support this progression by enabling students to investigate real conditions and evaluate possible responses. These approaches also support the Education Bureau's Digital Education agenda by enabling students to collect, interpret and apply environmental data through technologies.

A territory-wide pilot could test an indicative expectation for curriculum-integrated environmental learning across the three years of junior secondary education. Any eventual target should be based on pilot evidence concerning curriculum time, teacher workload, learning quality and different school contexts, rather than adopting an arbitrary number of hours at the outset.

The revised Geography curriculum Framework³¹ provides a useful foundation by requiring at least one enquiry-based fieldwork activity each year for S1–S3 students from the 2027/28 school year. This creates an opportunity to connect Geography fieldwork with Science, CES, STEAM, and Values Education.

Use Hong Kong as a Learning Environment

Hong Kong is particularly well suited to experiential environmental education. Around 40% of Hong Kong's land area is protected as country parks³², with wetlands, mangroves, geoparks, urban parks, and other natural habitats providing diverse outdoor learning environments. This close integration of urban and natural environments provides accessible settings for studying biodiversity, ecosystem services, climate adaptation, and sustainable development.

School grounds can also become living laboratories. Native planting, pollinator habitats, food-growing projects, rain gardens, environmental sensors, and waste-reduction initiatives can enable students to collect data, test ideas, and observe change over time.

These experiences can support wider educational goals. **Outdoor and project-based learning can develop social connection, leadership, resilience and problem-solving, while engagement with nature may also support student wellbeing.** This creates potential alignment with STEAM education, Digital Education, Values Education, and the Education Bureau's 4Rs Mental Health Charter³³.

Case Studies

Case study	Lead organisation	Approach	Main lesson	Subjects and areas integrated
Hiking Kei Chun Programme (山野生蹤) ³⁴	CCC Kei Chun Primary School	Progressive outdoor experiences connect different subjects with Hong Kong's landscapes and ecosystems.	Regular experiences that increase in depth and include reflection can build a lasting bond with nature than one-off outings.	Science, Geography, History, Chinese Language, Physical Education, Values Education
DLPK Soybean Exploration Journey ³⁵	Soyvestors, HKMA David Li Kwok Po College	Students participate in the soybean-growing cycle while examining soil health, biodiversity, climate change, food systems, and sustainable agriculture.	Learn how NbS connects several subjects with real-world environmental questions.	Science, Geography, STEAM, Values Education, CES
Nature Education Integrated Multiple Intelligences Programme ³⁶	Little Woods Nature Education	Nurtures gifted students with strong naturalist intelligence to becoming 'naturalist leaders' and share their knowledge with peers.	A peer to peer, train the trainer model builds a self-sustaining cycle of nature learning that does not depend only on teachers.	Biology and ecology, STEAM, Species identification, Peer teaching design
Nature-based Eco-literate Experiential Education Programme ³⁷	Kadoorie Farm and Botanic Garden	Partners with schools to co-design curriculum integrated, nature-based experiential learning, and teacher professional development to build eco literacy.	Long term partnerships, supported by curriculum resources and teacher capacity building, can embed experiential learning into everyday teaching and create lasting impacts.	Science, Values Education, STEAM, outdoor and inquiry-based learning, biodiversity, sustainability, teacher professional development

Detailed descriptions of these programmes are provided in Appendix 7. Additional examples of cross curricular experiential learning are provided in Appendix 9 to illustrate how different schools can adapt these approaches within existing curriculum arrangements.

International Experience

Experiential learning is **most successful when it is supported by institutional structures** rather than relying solely on individual teacher initiative. Examples from Singapore, Wales, Finland, and France demonstrate different approaches to embedding experiential learning into everyday school practice, including whole-school sustainability programmes, student-led environmental committees and protected interdisciplinary learning time (see Appendix 6).

Actions Required

Hong Kong should:

- integrate experiential learning into the formal education system that all junior secondary students receive repeated, curriculum-linked environmental experiences;
- build progressively from observation and investigation towards design, action and reflection;
- connect fieldwork and school projects across subjects;
- make greater use of campuses, and nearby natural areas as learning environments;
- pilot flexible implementation models before setting any territory-wide requirement;
- evaluate learning through knowledge, skills, reflection, confidence, and quality of participation, not participation alone; and
- develop an experiential learning framework for environmental education (Appendix 10).

Key Message:
Experiential learning should be sustained, curriculum-linked and progressively challenging. Its purpose is to develop students’ competence and confidence, not simply increase the number of environmental activities.

Priority Action 3:
Strengthen Support for Teachers and Schools

Create the Conditions for Implementation

Curriculum guidance and experiential-learning expectations will have limited effect unless teachers and schools receive practical support.

Teachers reported restricted curriculum time, insufficient teaching resources, limited professional development and difficulty accessing external expertise as important barriers. School visits also indicated that successful programmes often depend heavily on committed individual teachers or principals, making them difficult to sustain when staff or leadership changes.

Environmental education therefore needs to move from an initiative-dependent model to a supported system.

Table 6.
From implementation barriers to system support

Implementation barrier	System response
Limited curriculum time	Integrate activities into existing subjects, and enable shared cross-curricular time
Dependence on individual teachers	Establish whole-school coordination, and leadership responsibility
Lack of ready-to-use materials	Provide adaptable, curriculum-linked teaching packages
Limited confidence in fieldwork or technical topics	Offer practical professional development, and specialist support topics
Difficulty identifying partners	Create an accessible mechanism connecting schools with suitable providers
Short-lived student participation	Support multiyear projects, and meaningful student leadership roles
Unequal school facilities and capacity	Provide flexible models, and targeted resources for different school contexts

Provide Practical Professional Development

Teacher development should move beyond general awareness of sustainability. Teachers need practical support to:

- connect environmental themes across subjects;
- plan safe and purposeful fieldwork;
- facilitate enquiry and project-based learning;
- use local environmental data and case studies;
- guide student reflection and evaluate learning;
- have an understanding of conservation psychology;
- design appropriate experiential learning activities; and
- work effectively with external specialists.

Professional development should include examples teachers can adapt directly, opportunities to practise new approaches, and continuing communities of practice through which educators can exchange materials and experience.

Develop Curriculum-Linked Teaching Resources

Schools need resources that reduce preparation demands without imposing a rigid programme. These could include:

- interdisciplinary lesson sequences;
- fieldwork and campus-investigation templates;
- local environmental datasets;
- guidance on student reflection and assessment;
- risk-management guidance for outdoor learning;
- case studies from Hong Kong and Mainland China;
- technical guidance for biodiversity and campus greening; and
- adaptable activities for schools with different facilities and student needs.

Resources should clearly identify relevant curriculum outcomes, suitable year levels, required time, and materials, possible partner organisations, and options for adapting the activity.

Strengthen Whole-School Leadership

Successful implementation requires coordination beyond individual subject teachers. **School leaders can provide protected time, allocate resources, facilitate cross-subject collaboration, and ensure that environmental initiatives form part of school development** rather than remaining isolated extracurricular activities.

Each participating school could designate a coordinator or working group responsible for connecting curriculum, campus operations, student participation, and external partnerships. This would support a whole-school approach without requiring ESD to become a separate subject.

Hong Kong should **recognise cross-curricular ESD delivery within the existing School Development and Accountability (SDA) framework³⁸**.

In practice, this could include:

- Adding indicators to the Performance Indicators for Hong Kong Schools (PI) framework, that specifically look for evidence of cross-subject collaboration on sustainability themes, connecting to the existing Values Education Curriculum Framework and national security education expectations, so schools see ESD as reinforcing, not competing with, other mandated priorities;
- Prompting schools to report cross-curricular ESD planning and outcomes as part of their Annual School Plan / School Development Plan cycle;
- Including whole-school ESD integration as a discussion point during External School Reviews, so it carries the same institutional weight as academic and pastoral domains already reviewed;
- Pairing this with positive incentives, not just inspection. For example, priority access to Quality Education Fund grants or life-wide learning grant top-ups.

This shifts ESD from being one more thing competing for teachers' discretionary effort to being something school leadership has a structural reason to prioritise and defend.

Coordinate External Partnerships

Universities, NGOs, government departments and industry practitioners **can provide technical expertise, field sites, teaching resources and exposure to green careers**. However, teachers may find it difficult to assess the quality, curriculum relevance and practical requirements of available programmes.

A coordinated platform could enable schools to identify programmes by:

- environmental topic;
- curriculum area and year level;
- type and duration of activity;
- location and accessibility;
- teacher-support requirements;
- cost or funding availability; and
- intended learning outcomes.

Existing initiatives, including the Key Environmental Education Leaders (KEL) Catalogue³⁹, could provide a foundation for improving the visibility and coordination of available programmes.

External partners should support, rather than substitute for, teachers. The most effective partnerships build school capacity through co-designed resources, professional development and sustained engagement.

Support Ecologically Sound Campus Projects

Schools interested in biodiversity and greening projects often require specialised guidance. Without ecological expertise, campus greening may prioritise appearance and ease of maintenance rather than native species, habitat value or learning outcomes.

Schools need guidance on:

- selecting locally appropriate native species;
- designing habitats suitable for school environments;
- sourcing planting materials;
- managing safety and maintenance;
- monitoring ecological outcomes; and
- integrating projects with curriculum learning.

Capacity building should also extend to NGOs, government departments, technical advisers, landscaping practitioners, and the horticultural sector. This would help ensure that campus projects deliver genuine educational and ecological benefits.

For example, schools could **develop small scale native plant nurseries on campus**. Native plants play an important role in supporting local wildlife, restoring ecological functions, and creating more resilient urban ecosystems. However, the current local supply of native plant seedlings remains limited, which may constrain future greening and restoration initiatives.

Schools could propagate native species from seeds or cuttings and cultivate seedlings for use in their own greening projects or to share with neighbouring schools and community partners. This **transforms school campuses into living laboratories** where students participate in the complete lifecycle of ecological restoration, from seed collection and propagation to planting, monitoring and long-term stewardship.

Actions Required

Hong Kong should:

- provide practical professional development focused on implementation;
- develop adaptable, curriculum-linked resources;
- strengthen the existing KEL network, and teacher learning circles;
- support whole-school coordination and leadership;
- embed cross-curricular ESD delivery as a recognised domain within the existing SDA framework;

- improve access to credible external partners and programmes;
- provide technical guidance for ecologically sound campus projects;
- offer targeted support reflecting different school capacities and contexts; and
- use pilots to identify workload, resource, and implementation requirements before wider adoption.

Key Message:

Environmental education cannot depend on individual teacher commitment alone. Teachers and schools need sustained institutional, and professional and technical support.

NbS as a Practical Whole-school Application

The three priorities set out above strengthen the foundations of ESD by connecting learning across subjects, providing repeated opportunities for experiential learning, and strengthening support for teachers and schools.

NbS offer a practical model for bringing these three priorities together within a single, authentic learning experience, rather than constituting a fourth parallel priority or a new curriculum topic.

Why Nature-based Solutions?

NbS are actions that protect, sustainably manage and restore natural or modified ecosystems while addressing societal challenges and delivering benefits for both people and biodiversity.

In a school context, this could include:

- creating native habitats for pollinators and other wildlife;
- installing rain gardens or vegetated drainage features to manage stormwater;
- increasing vegetation and shade to reduce heat exposure; and
- improving ecological connectivity between the school and surrounding green spaces.

The educational value lies not only in creating a greener campus, but in the process through which students identify a challenge, investigate existing conditions, design a response, participate in implementation, monitor results, and adapt the intervention over time.

A rain garden, for example, can become the focus of an interdisciplinary investigation:

Table 7.
Illustrative curriculum connections through a school rain-garden project

Curriculum area	Possible learning application
Science	Plant ecology, soil properties, water cycles, biodiversity and experimental design
Geography	Urban drainage, flood risk, land use, climate adaptation, and spatial analysis
CES	Community wellbeing, public decision-making, resource allocation and shared responsibility
Mathematics	Measurement, data analysis, comparison, and representation of change
STEAM	Site design, prototyping, sensors, and technical problem-solving
Values Education	Stewardship, responsibility, collaboration, and consideration of different needs
National Security Education	Ecological security, climate resilience, and societal wellbeing
Language and arts	Public communication, interpretation, storytelling, and visual design

NbS can therefore turn a physical campus intervention into a sustained learning framework, a living laboratory through which students connect knowledge across subjects and observe the consequences of decisions over time.

More Than Campus Greening

Not every planting or beautification initiative should be described as a NbS. **A NbS project should begin with a clearly identified societal or environmental challenge**, and use ecological processes to address it while delivering measurable benefits for biodiversity and people, rather than simply improving a campus's appearance.

A school-based project should move through the same six-stage cycle proposed in Priority Action 2, experience, investigate, reflect, act, share, sustain, applied to a physical intervention. Students establish a baseline, consider the wider ecological and social system, co-design a response with teachers and technical partners, implement it, monitor outcomes, and reflect on what should change.

This keeps students involved in the enquiry, decision-making, monitoring and communication that give the intervention its educational value, rather than allowing campus projects to become isolated facilities managed only by contractors. The adapted design

principles for a school-based NbS project, drawn from the IUCN Global Standard, are set out in Appendix 8.

A Whole-school Learning Model

A successful NbS project requires participation beyond a single environmental club or subject department. It can connect four dimensions of school life:

Table 8.
Whole-school dimensions of an NbS project

Whole-school dimension	Role in an NbS project
Curriculum	Subjects use the project for enquiry, data analysis, design, reflection, and assessment
Campus and operations	School grounds provide the site, while facilities and maintenance teams support implementation
Culture and participation	Students contribute to decisions, stewardship, peer learning, and public communication
Community partnerships	Universities, NGOs, government departments, and practitioners provide technical advice and mentorship

This approach allows different cohorts to contribute at different stages. One cohort might conduct the baseline survey and develop the design; another might monitor outcomes; later cohorts might evaluate results and propose improvements, creating continuity across school years rather than ending with one group of participants.

Student involvement should be meaningful but age-appropriate. School leadership, facilities staff and qualified external advisers remain responsible for safety, ecological suitability and long-term management.

Potential Applications in Hong Kong Schools

The appropriate intervention will depend on each school's environmental conditions, available space, curriculum priorities and capacity. Not every school requires a large garden, and schools with limited ground-level space should not be excluded.

Hong Kong already has a working example of this model. The Kadoorie Farm and Botanic Garden Dutchman's Pipe and Birdwing Butterfly Programme combines on-campus habitat creation with teacher training, curriculum-linked resources and technical support, and demonstrates several of the conditions a school-based NbS

project needs: ecological expertise informing design, sustained teacher involvement, and enough continuity for students to observe change over time (see Appendix 7). A broader demonstration programme should extend this model beyond habitat creation to test applications addressing urban heat, stormwater management, and soil condition.

Partnerships and Technical Support

School-based NbS require collaboration across education, ecology, research, and campus management. Key partners may include the Education Bureau, the Environment and Ecology Bureau, and Agriculture, Fisheries and Conservation Department, universities, professional institutes, and practitioners and environmental NGOs, working together to build the capacity of teachers and schools.

Actions Required

Hong Kong should:

- introduce NbS as a practical whole-school framework for environmental education rather than a separate curriculum topic;

- develop age-appropriate, curriculum-linked guidance informed by the IUCN Global Standard for Nature-based Solutions;
- establish a diverse group of demonstration schools to test different campus and community applications;
- provide teacher development, technical mentorship and implementation funding;
- build a network through which schools share evidence, designs, resources and lessons;
- strengthen knowledge of native species among landscaping contractors, nursery suppliers and campus staff; and
- develop common educational and environmental indicators to evaluate feasibility, workload and outcomes.

Key Message:

NbS are not proposed as an additional curriculum requirement. They provide a practical whole-school model through which Hong Kong can integrate existing curriculum content, deliver sustained experiential learning, and strengthen teacher and school capacity within one authentic project, while transforming school campuses into living laboratories for biodiversity, climate resilience and student learning.

31. Curriculum Development Council. (2026). *Geography (Secondary 1–3) curriculum framework*. Education Bureau. [https://www.edb.gov.hk/attachment/en/curriculum-development/kla/pshe/js_geog/Geography_\(F.1-3\)_Curriculum_Framework_en.pdf](https://www.edb.gov.hk/attachment/en/curriculum-development/kla/pshe/js_geog/Geography_(F.1-3)_Curriculum_Framework_en.pdf)

32. Agriculture, Fisheries and Conservation Department, HKSAR Government. (2025). *Hong Kong: The facts – Country Parks and Conservation*.

33. Education Bureau. (2025). *4Rs Mental Health Charter*. Hong Kong SAR Government.

34. 吳金曉. (2026). *山野生蹤 香港自然環境下的體驗式學習* (1st ed.). 中華書局 (香港) 有限公司.

35. Soyvestors. (2025). *聯校展示及交流會* | Soyvestors. Soyvestors. <https://www.soyvestors.com.hk/jointschoolshowcase2025>

36. Little Woods Nature Education. (2026). *關於我們 | 小樹林自然教育 Little Woods. 小樹林自然教育 Little Woods*. <https://www.littlewoodsnature.com/aboutus>

37. Kadoorie Farm and Botanic Garden. (n.d.). *Nature-based Eco-literate Experiential Education Programme (NEEEP): 2025/26 academic year partner school recruitment*. <https://www.kfbg.org/en/events/nature-based-eco-literate-experiential-education-programme-neeep-partner-school-recruitment>

38. Education Bureau. (2022). *Performance Indicators for Hong Kong Schools*. https://www.edb.gov.hk/attachment/en/sch-admin/sch-quality-assurance/performance-indicators/2022_Performance%20Indicators_Eng.pdf

39. Civic Exchange. (2026). *KEL Catalogue*. HongKong2050isNow. <https://www.kelhk.org/activities>

From Recommendations to Implementation: A 2026–2030 Pathway

Hong Kong does not need an entirely new environmental education framework. Instead, implementation should build on the strong foundations already established within the curriculum and strengthen the pathways that enable students to translate environmental knowledge into meaningful action.

Implementation should proceed progressively across the 2026–2030 planning period, with clear responsibilities, outputs, measures, and decision points. The three system-wide priorities should remain the central focus. School-based NbS should be treated as one potential application through which further evidence can be developed.

The final Hong Kong Five-Year Plan should recognise environmental education as a cross-cutting mechanism connecting the continued enhancement of basic education with the city's green and low-carbon transition.

Phase 1: Strengthen the Foundations (2026–27)

The first phase should establish the support required by teachers and schools. It should focus on:

- strengthening cross-curricular connections among Science, Geography, Citizenship, Economics and Society (CES), Values Education, National Security Education, and relevant STEAM learning;
- developing and test an integrated implementation model that defines a realistic set of learning objectives, and aligns them with available curriculum time, teacher staffing, workload, and readiness, with differentiated support for schools at different starting points;
- developing practical, adaptable and curriculum-linked teaching resources;
- establishing an experiential learning framework for ESD;
- expanding practical teacher professional development;
- strengthening the existing KEL network, which brings together environmental education NGOs and passionate teachers, to facilitate the exchange of experience, teaching resources and effective practices;
- promoting the KEL Catalogue to improve schools' access to environmental education programmes and opportunities; and
- evaluate educational value, curriculum-time implications, teacher workload and readiness, staffing needs, and implementation support before determining what should be adopted more widely.

Phase 2: Apply and Support (2027–29)

The second phase should apply the proposed approaches through schools and authentic environmental learning experiences. It should focus on:

- applying interdisciplinary and experiential approaches in different school contexts;
- providing students with repeated opportunities for education for sustainable development;
- strengthening whole-school approaches to sustainability;
- improving partnerships with universities, NGOs and other external organisations;
- where appropriate, provide schools with the technical and implementation support required to develop and maintain credible school-based NbS projects; and
- evaluate educational value, teacher workload, and implementation requirements.

Phase 3: Review and Decide (2029–30)

The third phase should consolidate the lessons generated through implementation and support wider adoption. It should focus on:

- reviewing the usefulness of curriculum guidance and teaching resources;
- identifying the resource, workload, and implementation requirements experienced by schools;
- sharing effective teaching resources and school practices through the existing KEL network;
- refining curriculum guidance, resources, and professional development;
- strengthening successful partnerships with external organisations;
- supporting in adapting approaches shown to be effective; and
- identifying effective approaches, including school-based NbS, for continuation and expansion.

Wider adoption should remain adaptable to different school capacities, campuses and contexts. Schools should not be expected to implement identical activities or NbS interventions.

Indicative Action Framework

The following framework is indicative. Responsibilities, outputs, and measures should be refined with the relevant stakeholders before implementation.

Action	Indicative lead and partners	Principal output	Indicative measure	Decision point	Phase
Establish a coordinated implementation and reporting mechanism	Education Bureau, with the Environment and Ecology Bureau, AFCD, schools and relevant partners	A 2026–2030 workplan connecting environmental education with Hong Kong's green transition	Responsibilities, milestones, and reporting arrangements agreed	Are authority, resources, and accountability sufficient for implementation?	1
Translate the four-theme curriculum mapping into cross-curricular guidance	Education Bureau, subject specialists, and teachers	Guidance connecting relevant subjects and learning areas	Curriculum connections are made explicit and used by participating schools	Is the guidance practical across different subjects and school contexts?	1
Develop practical teaching resources	Education Bureau with teachers, universities, and NGOs	Adaptable, curriculum-linked resources	Teacher use, reported usefulness, and reduced preparation barriers	Which resources should be refined or adopted more widely?	1
Establish an experiential learning framework	Education Bureau with schools and external partners	Framework for repeated, curriculum-linked learning	Frequency, continuity, and quality of student experiences	Does the framework support meaningful progression across year levels?	1-2
Develop the evidence base for school-based NbS	Civic Exchange, Education Bureau, participating schools, and technical partners	Supported projects, implementation learning, and evaluation	Curriculum fit, student learning, technical feasibility, maintenance, and environmental outcomes	Is there sufficient evidence of value and feasibility to justify continuation or wider adoption?	1-2
Provide repeated and meaningful experiential learning opportunities	Participating schools	Students participate in progressive, curriculum-linked experiential learning experiences	Frequency and continuity of experiential learning opportunities	Is there evidence of increased environmental knowledge, stewardship, and actions?	1-3
Strengthen teacher support and the KEL network	Education Bureau, KEL network, and partners	Professional development and stronger peer exchange	Teacher confidence, practical application and network participation	Is support reaching schools with different levels of capacity?	1-3
Strengthen whole-school implementation	Participating schools with relevant partners	Leadership and cross-subject coordination arrangements	Continuity beyond individual teachers or one-off activities	What institutional support is required for sustained delivery?	2
Share learning and support wider adoption	Education Bureau, schools, KEL network, and partners	Shared resources, cases, and implementation lessons	Additional schools adapt approaches supported by evidence	Which approaches should be expanded, adapted or discontinued?	3

Monitoring should assess more than participation numbers. It should examine:

- curriculum connections;
- frequency and continuity of experiential learning;
- student understanding, competencies, confidence, and stewardship;
- teacher confidence and practical application;
- whole-school leadership and coordination;
- access to credible external expertise;
- educational and environmental outcomes, where relevant; and
- whether effective approaches can be adapted across different school contexts.

Expected Results

Implementation of the roadmap should result in:

- a more coherent and systems-based understanding of climate change, biodiversity and sustainable development;
- stronger connections between environmental knowledge, values and responsibility;

- more regular opportunities for students to apply learning through authentic experiences;
- increased environmental competence, confidence, stewardship and problem-solving;
- greater teacher confidence and access to practical resources;
- stronger exchange among environmental education NGOs and passionate teachers through the existing KEL network;
- improved school access to environmental education programmes through the KEL Catalogue;
- stronger collaboration among schools and external organisations;
- more consistent whole-school support for environmental education;
- school campuses that function as living laboratories for biodiversity conservation and climate resilience; and
- tested examples that can be shared and adapted across Hong Kong schools.

Conclusion

This report began with a simple but important question:

How can education for sustainable development better equip students to translate knowledge into informed and responsible action?

From Knowledge to Action: Building on Strong Foundations

The findings suggest that Hong Kong already has a strong foundation on which to build. Sustainability concepts, including climate change, biodiversity conservation, and sustainable development, are embedded across the junior secondary curriculum through subjects such as Science, Geography, and Citizenship, Economics and Society. Values Education and National Security Education further provide important opportunities to strengthen students' sense of responsibility, stewardship, and commitment to sustainable development.

The challenge, however, is not a lack of environmental content, but ensuring that students are able to connect learning across subjects and apply what they have learnt in meaningful ways. **Education for sustainable development should therefore not be judged solely by what students know, but by what students are empowered to do.**

Research, together with the teacher focus groups, student survey, and school visits undertaken for this report, consistently points to the same conclusion: knowledge alone is insufficient to drive lasting behaviour change. Students need repeated opportunities to apply their learning, experience environmental stewardship, develop confidence in their ability to make a difference, and participate in authentic environmental action. These experiences are essential for transforming awareness into responsibility and responsibility into lifelong pro-environmental behaviours.

Connecting Knowledge, Values and Action

Achieving this transition requires more than curriculum content alone. It calls for stronger connections across subjects, whole-school approaches, experiential learning, teacher professional development, and sustained partnerships between schools, universities, environmental organisations, government, and the wider community. Together, these elements create the enabling conditions for students to develop not only environmental knowledge, but also the values, competencies, and agency needed to respond to the environmental challenges of the future.

Nature-based Solutions as a Practical Demonstration

Nature-based Solutions provide one particularly powerful pathway for bringing these elements together. By transforming school campuses into living laboratories, NbS enables students to investigate real-world challenges, apply interdisciplinary knowledge, collaborate with others, and experience the visible impact of their actions. In doing so, schools can simultaneously strengthen climate resilience, biodiversity conservation, and environmental stewardship while preparing students with the future-ready competencies needed for Hong Kong's green transformation.

The Next Chapter of Education for Sustainable Development in Hong Kong

Ultimately, the next phase of Education for Sustainable Development in Hong Kong is not about teaching more. It is about transforming environmental knowledge into sustained pro-environmental behaviour change by connecting what is already taught, strengthening the pathways between knowledge, values, responsibility and action. Achieving this requires high-quality experiential learning, locally relevant learning opportunities, stronger teacher capacity and support, cross-sector collaboration, and long-term engagement that enables students to develop lifelong sustainable habits.

By integrating education for sustainable development more effectively across the curriculum, expanding sustained experiential learning, supporting teachers and using nature-based solutions as a practical whole-school framework, schools will be well placed to cultivate environmentally responsible citizens who are equipped to contribute to ecological civilisation, sustainable development and Hong Kong's green transformation.

Taken forward through Hong Kong's 2026–2030 planning cycle, these measures would connect the continued enhancement of basic education with the city's wider goals for green living, biodiversity conservation and climate resilience.

The success of education for sustainable development should not be judged by what students know, but by what students are empowered to do. That is both the opportunity and the responsibility for the next chapter of education in Hong Kong.

Appendices

1. Teacher and Student Engagement: Methodology and Detailed Findings

1.1 Overview of Stakeholder Engagement

To complement the curriculum review and literature analysis, Civic Exchange undertook a series of stakeholder engagement activities to better understand the current opportunities, and challenges for strengthening environmental education in Hong Kong. The engagement aimed to gather practical insights from educators, students, and environmental education practitioners on how environmental knowledge can be more effectively translated into meaningful behaviour change.

Between September 2025 and July 2026, Civic Exchange conducted:

- **Two consultation meetings with members of the Key Environmental Education Leaders (KEL) Consortium**
Comprising environmental NGOs and organisations actively delivering environmental education programmes in Hong Kong. These discussions explored current practices, implementation challenges, and opportunities to strengthen collaboration across the environmental education sector.
- **Teacher focus group discussions**
Involving teachers from secondary schools, to understand their experiences in delivering environmental education, perceived barriers to implementation and views on effective teaching approaches.
- **A secondary school student survey**
Explored students' environmental awareness, learning preferences and confidence in responding to climate challenges.
- **School visits to primary, secondary and special schools implementing environmental education initiatives**
Observe existing practices and identify successful implementation models that could be scaled across Hong Kong.

The findings presented in this report are intended to provide practical insights rather than statistically representative results. Together, they informed the opportunities and priority actions identified in this report and complemented the curriculum review, and local and international case studies.

1.2 Teacher Focus Group Findings

Summary of Teacher Focus Group Findings

The teacher focus group meeting provides valuable insights into current practices, perceptions and challenges relating to ESD in Hong Kong secondary schools. Overall, the findings suggest that while environmental topics are already incorporated into classroom teaching, **significant barriers remain to delivering coherent and action oriented ESD.**

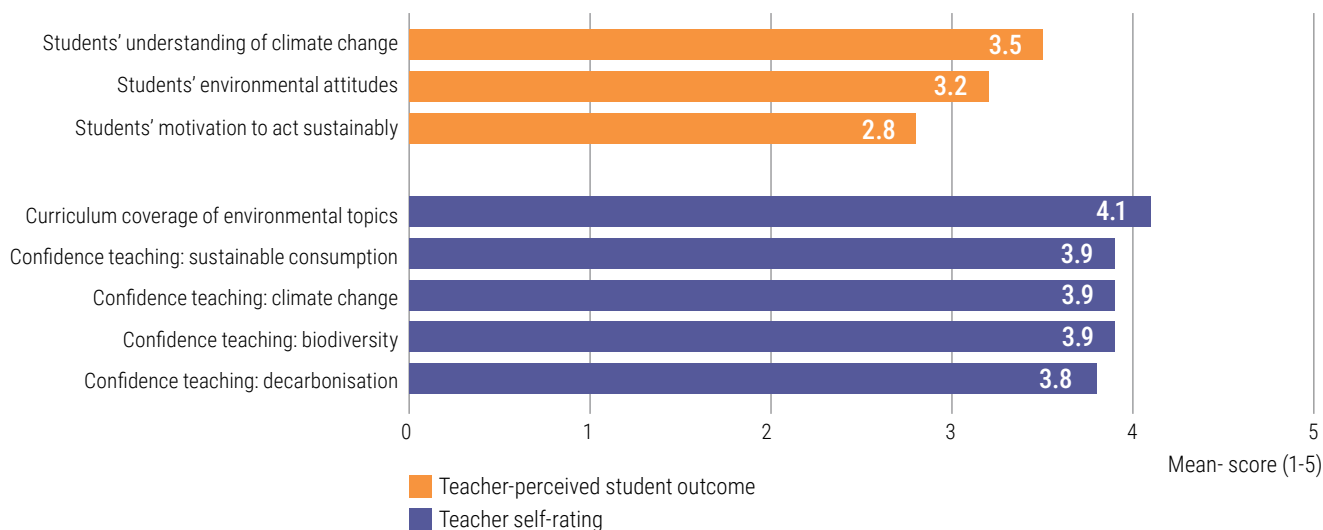
Teachers Report Strong Confidence, but Student Engagement Remains a Challenge

Teachers generally reported that environmental topics are well represented in their teaching, with an average rating of **4.1 out of 5** for the extent to which issues such as climate change, biodiversity and sustainable development are covered. They also expressed relatively high levels of confidence in teaching these topics, with average confidence ratings of approximately **3.8 out of 5** across climate change, biodiversity, sustainable consumption and decarbonisation. This suggests that the principal challenge is not teachers' willingness or subject knowledge, but how environmental education is organised and supported within schools.

Despite this confidence, teachers perceived students' learning outcomes to be considerably weaker. Students' understanding of climate change was rated at an average of **3.5 out of 5**, while their environmental attitudes were assessed at **3.2 out of 5**. Teachers expressed the greatest concern regarding students' motivation to adopt sustainable lifestyles, which received the lowest average rating of **2.8 out of 5**. These findings indicate a clear gap between curriculum delivery and students' willingness or ability to translate knowledge into responsible environmental behaviour.

Teacher-perceived student outcome and self rating on environmental topics

Mean-self rated scores, 1-5 scale



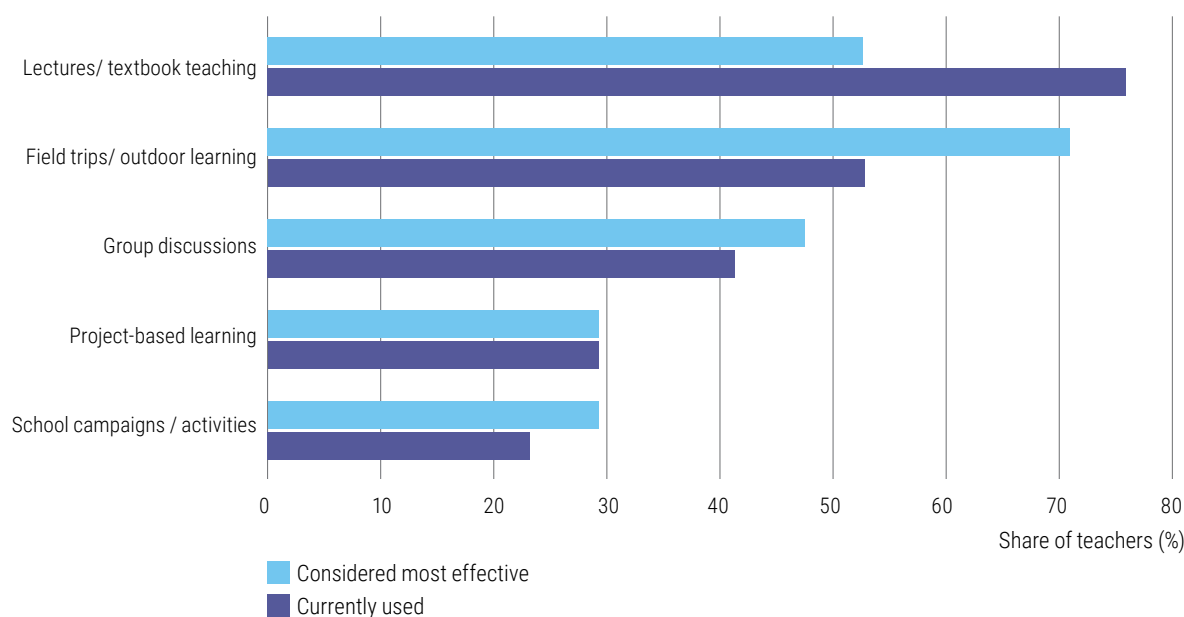
Lectures Still Dominate, Though Teachers See Field Trips as More Effective

The responses also reinforce the importance of experiential learning. Textbook based lectures remain the most used teaching method, followed by field trips, group discussions and project-based learning. However, outdoor learning and field-based experiences were most

frequently identified as the most effective teaching approaches. Teachers highlighted that authentic learning experiences enable students to connect classroom knowledge with real-world environmental issues, and are more likely to foster lasting understanding and behavioural change.

Current teaching methods and most effective teaching method considered by teachers

Share of teachers selecting each method (multiple selections allowed)



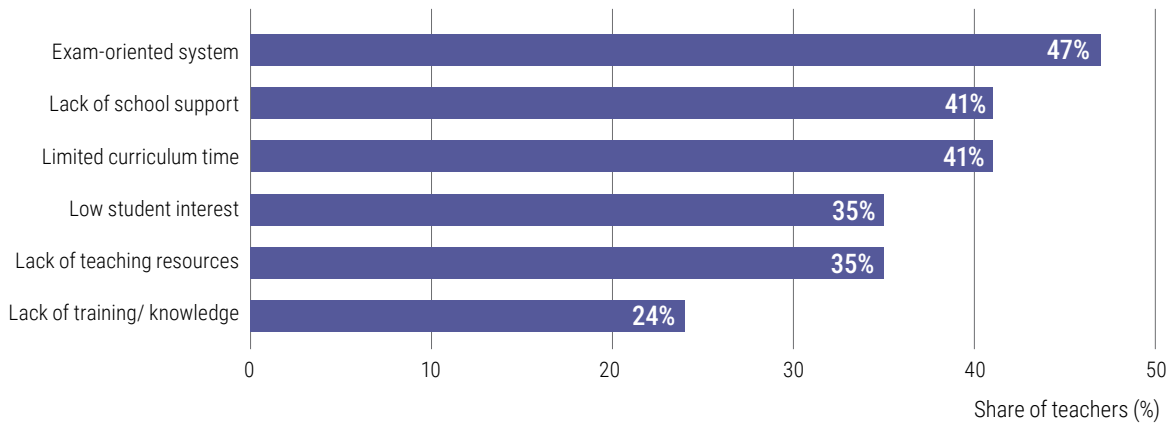
Exam Pressure, Limited Time and Insufficient Resources Are the Biggest Obstacles

Several structural barriers were consistently identified. The most frequently cited challenges included **insufficient curriculum time, an examination-oriented curriculum, inadequate teaching**

resources, limited school support, insufficient professional training, and low student interest. These findings suggest that existing curriculum content alone is insufficient to achieve the aims of ESD without stronger institutional support and greater flexibility for interdisciplinary and experiential learning.

Main challenges when teaching environmental issues

Main challenges cited by teachers, up to 3 selections



School Level Commitment to Sustainability Is Unclear

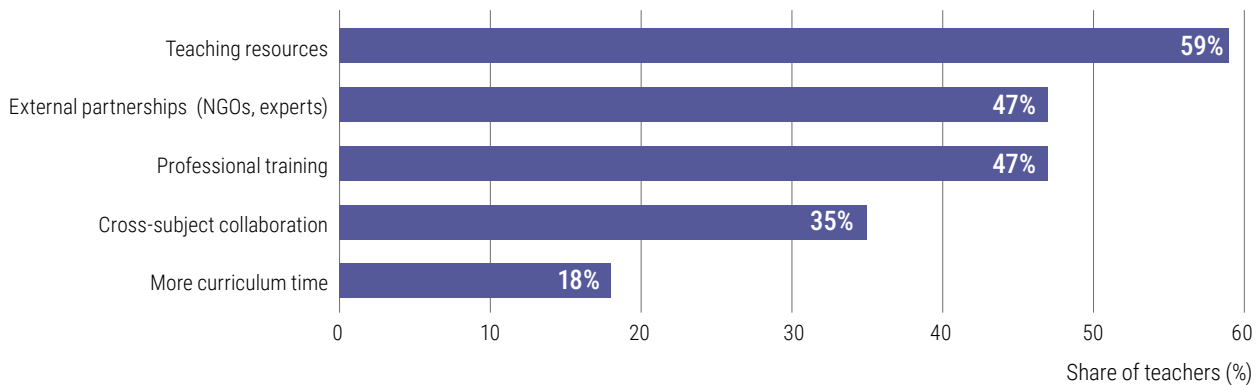
The discussion further revealed uncertainty regarding whole school implementation of ESD. More than half of respondents were unsure whether their schools had adopted a whole school approach to sustainability or whether ESD had been incorporated into the school development plan. Teachers also expressed only moderate agreement that ESD is a priority within their schools and that their schools effectively promote sustainable lifestyles. This suggests that ESD implementation is often dependent on individual teachers or subject panels, rather than being embedded within a coordinated whole school strategy.

Teachers Most Want Teaching Resources, Training and External Partnerships

The most requested forms of support were **ready-made teaching resources**, followed by **professional training**, and **external partnerships with NGOs or experts**, and then opportunities for cross subject collaboration, and additional curriculum time. This points clearly to what would most help teachers adopt more ESD activities without adding significant extra workload.

Teachers’ most wanted support for professional development in environmental and sustainability instruction

Support needed, up to 3 selections



Overall, the findings support the conclusion of the curriculum mapping exercise. Hong Kong's junior secondary curriculum contains substantial environmental content, and teachers generally feel capable of delivering it. However, the implementation of ESD remains fragmented, constrained by systemic barriers, and insufficiently focused on developing students' values, agency, and action competence. These findings reinforce the need for a more coherent whole school approach that better integrates curriculum content, values education, experiential learning, and opportunities for student led environmental action.

1.3 Student Survey Findings

Awareness Is High, but Understanding Remains Shallow

The survey suggests that students have acquired a basic awareness of key environmental concepts, but their understanding remains moderate. Students rated their own understanding of climate change at an average of 5.4 out of 10, indicating that they perceive themselves to have only a moderate level of understanding, which is

broadly reflected in the objective knowledge questions. Around 78% of respondents correctly identified greenhouse gas emissions as the primary cause of climate change, 77% correctly understood the definition of biodiversity, and 69% recognised habitat destruction as the primary cause of biodiversity loss. However, only 20.5% correctly identified all greenhouse gases listed in the survey, suggesting that while students are generally familiar with environmental issues, they do not build a solid, working understanding of the underlying science.

Values Are Strong, but Local Knowledge Is Weak

Although 79% students regarded biodiversity conservation as highly important, gave a rating of 7 or above, students' perception of Hong Kong's biodiversity richness was only moderate. This suggests that many students have limited awareness of Hong Kong's ecological assets, and may not fully appreciate that Hong Kong is recognised as one of the most biodiverse cities in Asia.

Knowledge Has Not Translated into Consistent Action

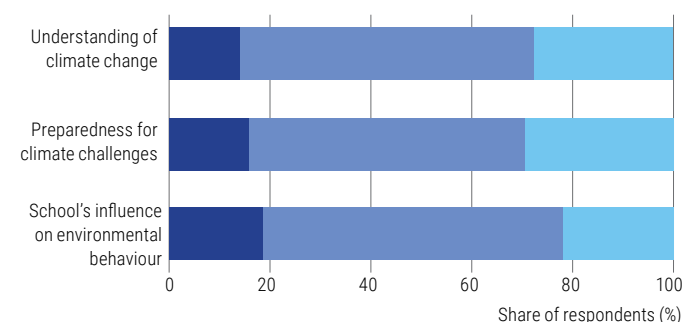
Sustainable behaviours, such as carrying a reusable bottle, saving electricity, recycling, and avoiding single-use items, are practised only occasionally, with an overall mean rating of 3.26 out of 5. Carrying a reusable bottle is the most common habit, with the highest average rating of 3.69 out of 5; other behaviours are typically described as 'sometimes' rather than routine, average ratings close to 3. This indicates that awareness and stated values have not yet become embedded lifestyle habits.

Students Feel Unprepared for Climate Risks

Confidence in coping with future climate impacts, such as extreme heat and heavy rainfall, was also moderate, with an average score of 5.3 out of 10. Only 16% rated their preparedness as 8 or above, while 54.5% students reported only moderate levels of confidence. This suggests that education has focused on conveying facts rather than building practical resilience or adaptive skills.

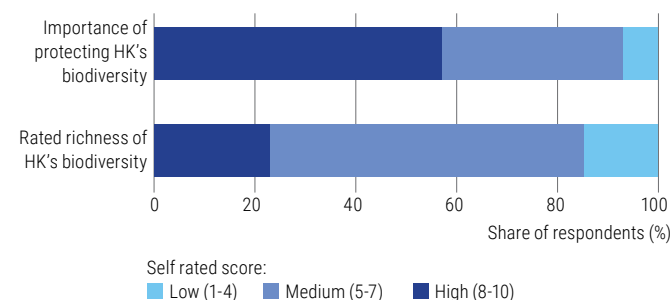
Perceived readiness for climate challenges among Hong Kong secondary students

Self-rated scores, 1-10 scale (n=156)



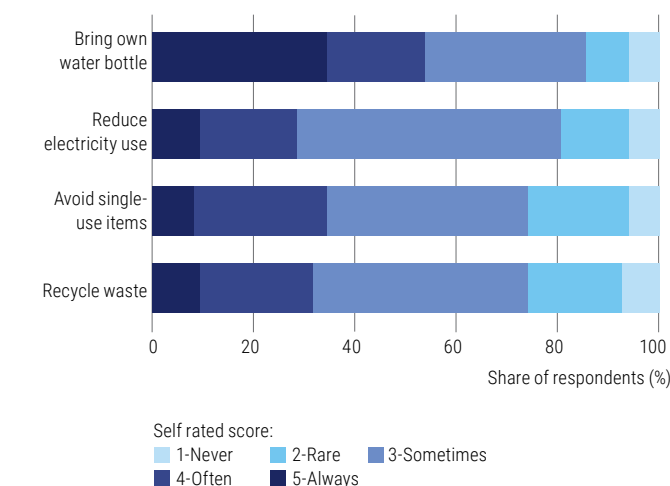
Perceived richness and value of Hong Kong's biodiversity among Hong Kong secondary students

Self-rated scores, 1-10 scale (n=156)



Sustainable behaviours among Hong Kong secondary students

Self-reported frequency among Hong Kong secondary students (n=156)



Schools Are a Source of Knowledge, but Not the Dominant Influence

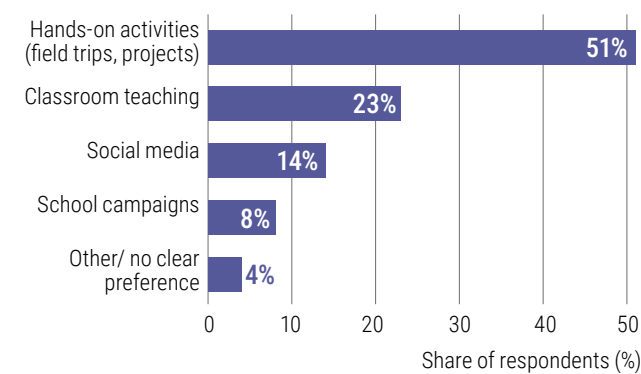
Students rate the influence of school environmental education on their own behaviour at **5.8 out of 10**. School lessons are among the most cited sources of climate knowledge, but they compete directly with social media and news, and are not the strongest driver of behavioural change.

Students Favour Hands-on Learning

Across the survey, students consistently express a **preference for field trips, project based work and other practical activities over conventional classroom teaching**. This is one of the clearest and most actionable findings.

Preferred methods of environmental learning by Hong Kong secondary students

"Most effective way to learn about environmental issues" (n=156)



Main Problems Identified

The survey points to four core issues that align with the curriculum review:

- 1. Awareness without depth.**
Climate change is a familiar topic, but understanding remains superficial and knowledge gaps persist, indicating that teaching introduces concepts without building comprehensive understanding.
- 2. Values without action.**
Students value biodiversity and sustainability but do not consistently practise related pro-environmental behaviours, revealing a gap between knowledge, values, and action that current education has not closed.
- 3. Knowledge without resilience.**
Low confidence in facing climate risks shows that education emphasises facts over the practical skills needed for adaptation and preparedness.

4. Teaching without sufficient engagement.

The clear preference for experiential learning suggests traditional classroom methods alone are insufficient, and that project based, inquiry-based, and community connected approaches are needed to translate learning into genuine engagement and action.

1.4 Survey Methodology

To understand the current status of ESD in Hong Kong secondary schools, this study adopted a **mixed methods approach** comprising teacher focus group discussions and a student questionnaire survey. The two methods provided complementary perspectives on the current state of environmental education in Hong Kong secondary schools, enabling the study to examine both educators’ experiences of curriculum implementation and students’ environmental knowledge, attitudes, and behaviours.

Teacher focus group

Three teacher focus group discussions were conducted following teacher professional development seminars organised by Civic Exchange. Participating teachers represented a range of secondary schools and teaching backgrounds. Each focus group lasted approximately 30 to 45 minutes and was facilitated using a **semi structured discussion guide covering key topics related to ESD**, including curriculum implementation, teaching challenges, resource needs, and opportunities for improvement. In addition to the guiding questions, teachers were encouraged to participate in open discussions to share their experiences, observations, and recommendations. The qualitative insights obtained from these discussions informed the analysis of the current implementation of ESD in schools and helped identify common barriers and opportunities.

Student questionnaire survey

To capture students’ perspectives, an **online questionnaire survey was conducted among Hong Kong secondary school students from Secondary 1-6**. The survey was distributed through Civic Exchange’s existing education networks, including Young Environmental Ambassador (YEA) alumni, secondary school teachers, and social workers, who were invited to share the survey with students within their schools and networks. The questionnaire explored students’ awareness and understanding of climate change and biodiversity, their attitudes towards environmental protection, their self-reported sustainable behaviours and their perceptions of the role of schools in environmental education. **A total of 156 valid responses were received**. The survey findings were analysed alongside the curriculum mapping and teacher focus group findings to provide a comprehensive assessment of the strengths and gaps in environmental education in Hong Kong.

1.5 Student Questionnaire Survey Template

1. Are you currently a secondary school student in Hong Kong?
 - Yes
 - No
2. What grade are you currently studying in?
 - (S1)
 - (S2)
 - (S3)
 - (S4)
 - (S5)
 - (S6)
3. Have you heard about climate change?
 - Yes
 - No
4. Where did you mainly learn about climate change? (Select all that apply)
 - School Lessons
 - Social Media
 - News
 - Family and Friends
 - Others
5. Which of the following is a major cause of climate change?
 - Plastic Pollution
 - Greenhouse Gas Emissions
 - Volcano Activities
 - Shift in the Earth's Orbit
6. Which of the following is/are greenhouse gas(es)?
 - (1) Carbon dioxide
 - (2) Methane
 - (3) Water vapour
 - (4) Nitrogen
 - (1) Only
 - (1) & (2) Only
 - (1), (2) & (3) Only
 - All of the above
7. Which of the following best defines biodiversity?
 - The number of organisms in an ecosystem.
 - The variety of all living organisms, including genetic, species, and ecosystem diversity.
 - The study of endangered species only.
 - The number of ecosystems in a specific country.
8. What is the primary reason for the recent rapid loss of biodiversity?
 - Natural climate cycles
 - Increased predation
 - Habitat destruction and fragmentation
 - Volcanic activity
9. How would you rate your understanding of climate change?
 - Not at all familiar (1)_____Very familiar (10)
10. How would you rate Hong Kong's biodiversity richness?
 - Very Low (1)_____Very high (10)
11. How important do you think it is to protect biodiversity in Hong Kong?
 - Not important (1)_____Very important (10)
12. How often do you bring your own water bottle?
 - Never (1)
 - (2)
 - (3)
 - (4)
 - Always (5)
13. How often do you reduce use of electricity?
 - Never (1)
 - (2)
 - (3)
 - (4)
 - Always (5)
14. How often do you recycle waste?
 - Never (1)
 - (2)
 - (3)
 - (4)
 - Always (5)
15. How often do you avoid single-use items (whether plastic, paper, or wood)?
 - Never (1)
 - (2)
 - (3)
 - (4)
 - Always (5)
16. How prepared do you feel to deal with climate-related challenges (e.g. extreme heat, heavy rainfall) in Hong Kong?

Not prepared (1)_____Well prepared (10)
17. To what extent has school education influenced your environmental behaviour?

Not at all (1)_____A lot (10)
18. What do you think is the MOST effective way to learn about environmental issues?
 - Classroom teaching
 - Hands-on activities (e.g. projects, field trips)
 - School campaigns
 - Social media
 - Other
19. What would motivate you to adopt a sustainable lifestyle?

2. Theoretical Foundation: From Knowledge to Action

Desktop analysis of the junior secondary Science⁴⁰, Geography⁴¹, and Citizenship, Economics and Society (CES)⁴² curricula indicates that the challenge facing ESD in Hong Kong is not an absence of environmental content, but rather the lack of mechanisms that translate knowledge into a sense of responsibility, and responsibility into sustained action. Science and Geography already cover climate change and biodiversity to varying degrees, while CES develops the civic and governance dimensions of sustainability, including responsible consumption, public policy, and international cooperation. Yet across all three subjects, student outcomes in pro-environmental behaviour remain weak, and the gap between knowledge and action persists.

Why Knowledge Does Not Lead to Action

All three junior secondary curricula implicitly assume a version of the linear model: teach the science or the policy context, students understand, students act. Decades of environmental psychology research indicate that this model does not reflect how behaviour change actually occurs. It is worth noting that CES, which explicitly focuses on civic responsibility, responsible consumption, and the common good, is the curriculum most naturally aligned with the responsibility stage of this model. However, even CES treats environmental responsibility primarily as a discussion topic and a set of values to appreciate, rather than as a capacity to exercise through structured, habitual, or visible action. Three psychological mechanisms in particular are under-served across all three curricula.

Psychological Distance

Issues framed as global, future, or affecting other people tend to feel less urgent than issues framed as local, present, and personal. This may explain why curriculum examples such as polar bears or

references to the Kyoto Protocol function as comparatively weak motivators for Hong Kong students, since neither connects to their immediate environment⁴³.

Diffusion of Responsibility

Messaging that states that environmental protection is everyone's responsibility can, paradoxically, function as a message that no one in particular is responsible, unless the curriculum explicitly counters this through assigning concrete, personal commitments⁴⁴.

Efficacy Beliefs

Students need to believe that their own actions matter before they will act consistently. Without this belief, learners tend toward learned helplessness. None of the three curricula currently builds efficacy beliefs in an explicit or structured way. Science and Geography do not include outcome-oriented tasks requiring students to implement or monitor a real-world change, while CES, despite its civic responsibility framing, similarly stops at discussion and reflection, rather than building the practical experience of causing a change that makes a difference⁴⁵.

Absence of Hope-Building Content

The three junior secondary curricula weighted toward causes, impacts, and the identification of challenges, with comparatively little textured content on solutions that are working.

Climate communication research indicates that fear-and-fact-only content, presented without credible hope, tends to produce avoidance rather than engagement^{46,47}.

3. Detailed Curriculum Mapping

Purpose and Scope of the Curriculum Mapping Exercise

A systematic curriculum mapping exercise was conducted to examine the extent to which climate change, environmental conservation, with particular reference to biodiversity, and sustainable development are incorporated into the junior secondary curricula of Science, Geography, and Citizenship, Economics and Society (CES) in Hong Kong. The exercise sought to determine whether all students acquire a foundational understanding of these topics during their compulsory lower secondary education. Junior secondary curricula were selected for review because they are undertaken by all students, whereas subject choices at the senior secondary level vary according to individual interests, and are more strongly influenced by the Hong Kong Diploma of Secondary Education examination syllabus.

Assessing Alignment with Values Education and National Security Education

The mapping exercise also examined how curriculum content aligns with the priority values and attitudes outlined in the Values Education Curriculum Framework, as well as the relevant Key Stage Three learning elements of NSE. This enabled an assessment of not only the coverage of environmental and sustainability related topics, but also their integration with broader educational objectives concerning values formation and civic responsibility.

Environmental and Sustainability Learning: Present but Fragmented Across Subjects

The review found that topics relating to climate change, biodiversity, and sustainable development are present across the junior secondary curriculum. However, these concepts are dispersed across different subjects, and presented as separate topics rather than as interconnected issues. This fragmented approach may limit students' ability to develop a comprehensive understanding of the complex relationships between the causes and impacts of climate change, biodiversity loss, and the range of mitigation and adaptation strategies available. Furthermore, the review identified inconsistencies in the terminology and language adopted across different subjects. The absence of a common and coherent framework may reduce students' ability to make meaningful connections between related concepts and may also weaken the development of shared values and attitudes that underpin ESD.

Translating Curriculum Mapping into Practical Learning Experiences

To make the proposed mapping actionable, for each topic, an illustrative hands-on activity that a school could use to deliver it, drawing in part on the **four thematic categories of the Key**

Environmental Education Leaders (KEL) framework, namely decarbonisation, nature-based solutions, sustainable consumption, and waste management.

The KEL framework was developed by Civic Exchange as part of its community empowerment initiative, with the aim of translating research into actionable climate strategies, and supporting educators in embedding ESD within school communities.

Leveraging Existing Environmental Education Resources

Building on the curriculum mapping exercise, the framework identifies a range of **illustrative learning activities that either complement or are already recommended within the curriculum**. These include the *Climate Fresk* workshop, educational board games such as *Mega Watt* and *Law of the Forest*, and visits to learning venues including the Jockey Club Museum of Climate Change, CLP Pulse, H₂O Public Education Centre, Hong Kong Biodiversity Museum, The Nature Conservancy oyster reef restoration site, Kadoorie Farm and Botanic Garden, Mil Mill, WEEE Park, and Redress etc.

These activities were selected because they provide authentic, place-based, and experiential learning opportunities that extend beyond textbook knowledge. Importantly, many of these experiences address multiple curriculum objectives simultaneously.

For example, a single activity may deepen students' understanding of climate change while also strengthening their appreciation of biodiversity, sustainable resource management, responsible consumption, and the values of environmental stewardship and civic responsibility. By connecting concepts across disciplines and enabling students to apply their learning in real world contexts, **these integrated experiences help develop a more coherent understanding of sustainability issues**, making learning more meaningful, memorable, and effective.

Remaining Gaps in Curriculum Implementation

Despite the availability of these high-quality educational resources, **schools currently lack a structured mechanism** for selecting, sequencing, and integrating such experiences into the curriculum, or for protecting sufficient curriculum time for their implementation amid the demands of core examinable content.

Subject: Geography					
Curriculum Info	Course Content	Values Education	National Security Education#	KEL Theme	Suggested Activities
Natural Environment-River	Relationship between topography, climate and rivers	National Identity, Respect for Others, Benevolence, Unity	3.3	Sustainable consumption	Visit River revitalization projects in HK
Natural Environment-Impact of the natural environment on people's lives	Understand how the natural environment affects the way of life of the people	National Identity, Respect for Others, Benevolence, Unity	3.6	Decarbonisation	Climate Fresk
Trend of Urban Development - Building Sustainable Smart Cities	Understand the concept of sustainable development	Responsibility, Commitment, Diligence, Perseverance	3.6	Decarbonisation Nature-based Solution	Visit Airside (Kai Tak) Visit urban mini forest
Natural Hazards	- Understand the preventive and remedial measures to reduce losses - Factors affecting the abilities to cope with natural hazards	Perseverance, Empathy, National Identity	3.5, 3.8	Nature-based Solution	Visit TNC Oyster farm/ Long Valley
Water Resources	- Understand the concept of water resources - Learn about the water resource management strategies in North China	Responsibility, Empathy, Unity	3.7	Sustainable consumption	Visit H2O Public Education (H2OPE) Centre
Sustainable Agricultural Development	- Interrelationship between people and the environment - Understand that technologies adapted to the local environment can be used to raise the quantity and quality of agricultural produce - Understand the importance of food security	Diligence, Responsibility, Commitment	3.6	Sustainable consumption	Farm the City site visit
Industrial Development - NEV	Learn about the reasons for the rapid development of China's NEV industry	National Identity, Responsibility	3.9	Decarbonisation	
Ecological Conservation	Understand the importance of conserving forest ecosystems for the global environment (climate regulation, maintaining biodiversity, preventing soil erosion and protecting water resources)	Respect for Others, Benevolence, Responsibility	3.7	Nature-based Solution	KFBG's TGBS Premium-Certified forest restoration site
	Understand the measures implemented for forest conservation and restoration in China	Respect for Others, Benevolence, Responsibility	3.5	Nature-based Solution	Hands-on ecological restoration activities
Climate Change	- Understand the concepts of greenhouse effect, global warming and climate change - Understand how human activities lead to climate change	Responsibility, Commitment, Unity, Perseverance	3.6	Decarbonisation	Climate Fresk
	- Understand the effects of climate change on different parts of the world - Extended learning part: Understand how the melting of sea ice and permafrost in the polar regions further enhances global warming	Responsibility, Empathy, Benevolence	3.8	Decarbonisation	Climate Fresk
	Learn about the mitigation and adaptation strategies adopted to combat climate change	Responsibility, Commitment, Unity, Perseverance	3.7	Decarbonisation	Hands-on ecological restoration activities
	- Learn about the main actions taken by different organisations to address climate change through international agreements - Extended learning part: Learn about the strategies Hong Kong has adopted to combat climate change	Responsibility, Commitment, Unity, Perseverance, Law-abidingness	3.10	Decarbonisation	Visit the Jockey Club Museum of Climate Change

Subject: Science					
Curriculum Info	Course Content	Values Education	National Security Education#	KEL Theme	Suggested Activities
5.4 Earth's resources-fossil fuels	Concerns about using fossil fuels (e.g. limited supply and pollution problem)	Responsibility, Commitment, Benevolence	3.7	Decarbonisation	Climate Fresk
	Fresh water is a precious natural resource and the importance of water conservation	Responsibility, Commitment, Perseverance, Diligence, National Identity	3.6	Sustainable consumption	Visit WSD Service Reservoirs
	Needs and considerations for developing renewable energy sources	Responsibility, Commitment, Benevolence, Diligence	3.7	Sustainable consumption	Boardgame - Mega Watt
6.2 Ecosystems - habitats and ecosystems	Ecosystem is the interactions between organisms and their environment	Benevolence	3.5, 3.7	Nature-based Solution	Visit TNC Oyster farm/ Long Valley
6.3 Biodiversity and conservation	Recognise the importance of biodiversity to the stability of an ecosystem and the sustainable development of the natural environment	Benevolence	3.5, 3.7	Nature-based Solution	Boardgame - Law of the Forest Visit Hong Kong Biodiversity Museum / Endangered Species Resource Centre
6.4 Climate change	- Some human activities can disrupt the balance of carbon dioxide in Nature - The impacts (e.g. global warming) of intensified greenhouse gas emissions on the environment and human health - The importance of practising low-carbon living	Responsibility, Commitment, Benevolence	3.10	Decarbonisation	Climate Fresk
	Advantages of planting for the environment and its role in mitigating the climate change	Responsibility, Commitment, Perseverance, Diligence	3.7	Nature-based Solution	
10.4 Energy saving	Different ways of using electricity towards low carbon living / the reduction of carbon footprint	Responsibility, Commitment, Benevolence	3.7	Decarbonisation	Visit CLP Pulse
13.1 The atmosphere-carbon removal	Different methods on carbon dioxide gas removal and storage (e.g. forestation, biochar, direct air capture)	Perseverance, Responsibility, Commitment, Diligence	3.8	Decarbonisation	KFBG - Biochar
13.3 Rocks and minerals • acid rain and ocean acidification	Recognise the causes of acid rain and ocean acidification, and its effects on the environment and living things	Responsibility, Commitment, Benevolence	3.8	Decarbonisation	Climate Fresk
13.5 Useful materials from crude oil (Extension Part)	- Plastic is manufactured from crude oil - New plastics are invented based on the emerging needs in our society	Responsibility, Commitment, Benevolence, Diligence	3.7	Sustainable consumption	School sharings and workshops by Invisible Company
13.6 Environmental problems associated with the use of materials (Extension Part)	Environmental problems and solutions associated with the use of materials (e.g. plastics, metals)	Responsibility, Commitment, Benevolence, Diligence	3.7	Sustainable consumption	Visit Mil Mill/WEEE Park/The Loops/Gaaup Up

Subject: Citizenship, Economics and Society					
Curriculum Info	Course Content	Values Education	National Security Education#	KEL Theme	Suggested Activities
1.3 Financial Education-Green consumption	Making good use of resources and practising green living (e.g. reduce waste at source, saving energy)	Responsibility, Commitment, Benevolence	3.7	Decarbonisation	Climate Fresk
	Making sensible consumer decisions (e.g. understanding the rights and obligations of consumers, factors affecting choices of goods/services), identify the differences between 'needs' and 'wants'	Responsibility, Commitment, Benevolence	3.7	Sustainable consumption	Visit Redress Seminars by Redress / Retrovert
	How to reduce waste, protect the environment and conserve resources of the earth by practising green consumption	Responsibility, Commitment, Benevolence, Diligence, Perseverance	3.6, 3.8	Waste Management	Visit Redress / Food Angel experience centre/ WEEE Park/ Vessel Repair/ Gaau1 Up
1.4 Rights and Duties	One needs to respect the rights of others, consider the overall interests of society and abide by the law	Respect for Others, Law-abidingness, Benevolence, Diligence, Unity	3.6	Sustainable consumption	
2.3 Public Finance of Hong Kong	Relationship between public finance and citizens • Economic decisions of the society can affect our lives as well as the environment	Perseverance, Diligence, Commitment, Responsibility, Benevolence	3.7, 3.8	Nature-based Solution	Visit Urban Mini-forest Project
2.4 Economic Performance and Human Resources of Hong Kong	Opportunities and challenges for youth employment - recent changes and future trends of development of industries	Perseverance, Diligence, Commitment, Responsibility, Benevolence	3.5	Decarbonisation	
			3.6, 3.10	Waste Management	Visit Mil Mill/Food Angel experience centre/ WEEE Park
3.3 Our Country's Political Structure and Its Participation in International Affairs	How the Belt and Road Initiative safeguards national security (resource security)	Responsibility, Commitment, Diligence, Perseverance	3.10	Sustainable consumption	Visit Daya Bay Nuclear Power Station
3.4 The World in Response to Global Issues	The need for countries to deal with global issues through international cooperation based on the principle of sovereign equality	Responsibility, Commitment, Benevolence, Diligence	3.10	Decarbonisation	Climate Fresk

National Security Education – Key Stage 3 (Junior Secondary) Related Learning Elements:

- 3.3 Understand the components of our country's territory and further understand the geographical features of our country
- 3.5 Learn about our country's development and achievements in areas such as the economy, national defence, society, culture, science and technology, healthcare, transportation infrastructure, ecological conservation, bioengineering, aerospace, thereby enhancing our national pride
- 3.6 Have a further understanding of the importance of national security in ensuring people's security, major national interests and sustainable development
- 3.7 Learn about the basic content of a holistic approach to national security, including the substance of 'One Overall Goal' (including the major fields of national security), and the highlighted concept of 'mega security'; and learn that the various fields of security (such as military security, economic security, science and technology security, cybersecurity, resource security, ecological security, biosecurity, outer space security, deep sea security, polar security) are interrelated, mutually supportive, as an organic whole
- 3.8 Learn about the threats/challenges faced by the major fields of national security (ecological security, polar security) and approaches/methods to safeguard national security, establishing a sense of vigilance against potential danger
- 3.9 Learn about the role of science and innovation and technology industries in safeguarding national security in our country and Hong Kong
- 3.10 Learn about the importance of enhancing international common security, promoting the collective well-being of mankind, and creating a community with a shared future for mankind, through understanding the historical development of our country and the world, and our country's participation in international affairs; and appreciate the significance of giving equal weight to development and security

4. Illustrative Learning Outcome Enhancements

Table 9.
Examples of values-infused learning outcomes across Science, Geography and Citizenship, Economics and Society, adding an explicit responsibility outcome to existing content

Existing Wording	Illustrative Enhanced Learning Outcome (Add or Replace)
Science	
Science Unit 6.4. Recognise the importance of practising low carbon living.	Recognise that protecting the climate and biodiversity is a responsibility shared by everyone. Identify or commit to at least one personal action reflecting this responsibility .
Science Unit 5. Recognise that fossil fuels are non-renewable resources and understand the advantages of renewable energy sources	Recognise that the transition from fossil fuels to renewable energy is a shared responsibility requiring action at individual, community and policy levels. Identify one way in which a personal energy choice contributes to or detracts from this collective responsibility, and explain why this matters beyond individual benefit.
Science Unit 10. Calculate a personal carbon footprint and suggest ways to reduce personal energy consumption.	Calculate a personal carbon footprint, and recognise that reducing carbon emissions is a responsibility shared by individuals, communities, and governments rather than by any one group alone. Commit to one sustained change in personal energy use, explain why this change reflects the values of responsibility and commitment , and identify one action that only governments or institutions, rather than individuals, have the power to take.
Geography	
Geography Module 3.2. Understand the importance of forest conservation and the measures taken by governments and organisations to protect forest ecosystems.	Understand that ecological conservation is a civic and intergenerational responsibility , and evaluate one forest conservation measure using the values of stewardship , commitment , and the common good. Identify what individuals, communities, and governments each owe to the natural environment, and explain how failing to fulfil these responsibilities affects people beyond the local area and beyond the present generation.
Citizenship, Economics and Society	
CES Module 1.3. Practise green consumption and recognise the importance of reducing waste and conserving natural resources for future generations.	Practise green consumption and recognise that responsible consumer behaviour is an expression of civic responsibility , care for the common good, and commitment to future generations. Select one specific consumption choice made in your household or school, evaluate whether it reflects or conflicts with the values of sustainability and moderation, and propose one realistic change that would bring it into greater alignment with these values. Explaining what prevents that change from being made and who has the responsibility to remove that barrier.

5. Examples of Learning Tasks Integrating NSE's Concept

The examples demonstrate that simple bridging tasks can connect related concepts within and across subjects, while providing students with explicit practice in applying the mega security framework.

The infused task retains the original learning content, explicitly introduces the mega security framework, and asks students to

identify the interdependence of two or more security dimensions, such as ecological, food, resource, biosecurity and societal security. In doing so, students develop the integrative mode of thinking expected in NSE while simultaneously addressing gaps in the current treatment of sustainability.

Table 10.
Examples of tasks infusing NSE mega security thinking into existing content across Science, Geography, and Citizenship, Economics and Society

Existing Content	Infused Wording (Add or Replace)
Science and Geography (Cross-Subject)	
Geography Modules 3.2 and 3.3 taught separately, with no required link between them. <i>Students study forest conservation (Module 3.2) and climate change (Module 3.3) as separate modules with no required connection.</i>	Add one bridging task (Geography, spanning Modules 3.2 and 3.3): Using climate change and biodiversity loss as your example, show how ecological security , food security and resource security are interconnected, applying the same mega security thinking introduced in NSE.
Science Unit 6.4 and Geography Module 3.2 taught separately, with no required connection. <i>Science covers biodiversity and ecosystems; Geography covers forest conservation as a land use issue.</i>	Add one cross-subject bridging task (Science and Geography): Using the NSE concept of mega security , explain how the loss of a local ecosystem, such as a mangrove, a freshwater wetland, or a hillside forest, creates interconnected risks across ecological security , food security , and public health (Biosecurity). Your response should draw on the ecological knowledge covered in Science and the land use and conservation knowledge covered in Geography, demonstrating that security threats to the natural environment are never isolated to a single field.
Geography	
Geography Module 2.2. Understand the uneven global distribution of water resources and the strategies used to manage water scarcity in different regions.	Analyse water scarcity through the lens of NSE resource security . Explain why water security is identified as a dimension of national security, provide one international example where water scarcity has intensified political tension or affected food production, and assess the implications for Hong Kong specifically, given its dependence on the Dongjiang water supply from Guangdong Province. Apply the NSE principle that resource security , ecological security and food security are interrelated fields, and explain how protecting the catchment ecosystems of the Dongjiang simultaneously serves all three.
Geography Module 3.1. Understand the development of new energy industries in China, including new energy vehicles and the transition to cleaner energy sources, as a case study in industrial development.	Analyse China's development of new energy vehicles, and its renewable energy expansion through the dual lens of economic security and science and technology security . Explain how reducing dependence on imported fossil fuels strengthens a country's resource security , and evaluate how the new energy transition illustrates the NSE principle that economic security and resource security are mutually reinforcing rather than separate fields. Then consider what this implies for Hong Kong's own energy policy: identify one measure that would improve Hong Kong's resource security, and explain the trade-offs involved in adopting it, using the same integrated security framework.

Citizenship, Economics and Society	
CES Module 1.3. Practise green consumption and recognise the importance of reducing waste and conserving natural resources for future generations.	Recognise that patterns of unsustainable consumption collectively weaken resource security, which NSE identifies as interconnected with economic security, food security and ecological security. Apply the mega security mode of thinking: trace how the overconsumption of one category of goods, for example, single-use plastics, fast fashion, or heavily packaged food products, creates resource security risks at the local, national, and global levels. Then identify one systemic change, beyond individual consumer behaviour, that would address this risk at its structural root, explaining which level of government or which type of institution would need to act and why individual action alone is insufficient.

6. International Case Studies

Learning from International Experience

The recommendations presented in this report are informed not only by stakeholder engagement in Hong Kong, but also by international examples of good practice. While each education system operates within its own policy and cultural context, several common approaches emerge that are directly relevant to the challenges identified in this study, including limited curriculum time, fragmented curriculum delivery, and the need to translate environmental knowledge into sustained behaviour change.

Rather than recommending new curriculum subjects, these international examples demonstrate how environmental education can be strengthened by embedding sustainability within existing teaching, school culture, and everyday practice.

Singapore: The Eco Stewardship Programme

Challenge addressed

How can sustainability be strengthened across schools without increasing curriculum time?

Approach

Singapore's Ministry of Education launched the Eco Stewardship Programme (ESP) in 2021 as a whole-school approach structured around four domains, namely Curriculum, Campus, Culture and Community, with the explicit aim of nurturing every student into what the Ministry terms an eco-steward for life⁴⁸.

Rather than creating a stand-alone sustainability subject, **ESP enhanced the teaching of sustainability within existing Science, Humanities, and Character and Citizenship Education curricula**, while simultaneously upgrading school infrastructure, for example through the SolarNova rooftop solar programme, and embedding daily habits such as food waste reduction into what the Ministry calls 'Everyday Responsibilities'. A number of schools, such as Commonwealth Secondary School, have built on-campus eco-habitats, including a rainforest corridor, a stream and a wetland, that function as living laboratories for biology and geography lessons rather than as separate extracurricular features⁴⁹.

Lessons for Hong Kong

ESP demonstrates that whole-school sustainability transformation can be achieved by enhancing existing subjects rather than displacing syllabus time, directly addressing the time pressure constraint identified in the research background to this report.

United Kingdom and Wales: The Eco-Schools Programme

Challenge addressed

How can schools sustain environmental action beyond individual teachers or one-off activities?

Approach

Eco-Schools, developed by the Foundation for Environmental Education in 1994, is among the largest environmental education programmes in the world, **engaging more than twenty million students across over one hundred countries**⁵⁰. In Wales, approximately **90%** of schools across every local authority participate, reaching more than **four hundred thousand pupils**⁵¹.

The programme operates through a seven-step process:

- form a student-led Eco-Committee
- reviewing on-campus environmental performance
- developing an action plan;
- monitoring and evaluation;
- informing and involving local community;
- linking to the curriculum and
- applying for Bronze, Silver, Green Flag or Platinum accreditation⁵².

A review of the programme found that it strengthened students' practical environmental skills through authentic tasks⁵³. The programme assigns responsibility for environmental action to a student led committee within a defined, externally recognised accreditation framework, rather than leaving sustainability initiatives to the discretion of individual teachers. By engaging students in addressing environmental issues where they can see tangible results, this approach establishes lasting structures that promote continuity, sustained engagement in sustainability initiatives, and cultivates a sense of responsibility, and a sustainable mindset that extends beyond school into everyday life and the wider community.

Lessons for Hong Kong

The Eco-Schools model illustrates the importance of creating institutional structures that support long-term behaviour change.

Key lessons include:

- empowering students to lead sustainability initiatives;
- providing external recognition and accreditation;
- embedding environmental action into school governance;
- maintaining continuity across different student cohorts.

These approaches closely support this report's recommendation to strengthen experiential learning through student leadership and whole-school participation.

Finland: Phenomenon-Based Learning

Challenge Addressed

How can schools provide meaningful interdisciplinary learning on sustainability while maintaining subject-based assessment requirements?

Approach

Since 2014, the Finnish national core curriculum for basic education has required schools to deliver at least one period of phenomenon-based learning (PhBL) each year, an approach in which a real-world phenomenon, such as climate change, energy, or migration, is studied through an interdisciplinary lens that deliberately sets aside conventional subject boundaries for a defined period⁵⁴.

For example, a renewable energy project may combine the physics of solar power generation, the geography of regional climate impact, and the economics of green industry incentives within a single sustained inquiry, allowing students to apply knowledge from multiple subjects to a single authentic problem⁵⁵.

Lessons for Hong Kong

Phenomenon Based Learning demonstrates that interdisciplinary sustainability education does not require extensive curriculum reform. Instead, schools can preserve subject-based teaching while providing protected opportunities for students to explore complex sustainability challenges through integrated inquiry⁵⁶. This approach offers a practical model for addressing curriculum fragmentation while recognising the time and assessment constraints faced by Hong Kong schools.

France: Paris OASIS Schoolyards Programme

Challenge Addressed

How can schools become more climate-resilient while creating richer learning environments and enhancing biodiversity?

Approach

Launched in 2018 as part of the Paris Resilience Strategy, the OASIS Schoolyards Programme **transforms traditional asphalt**

schoolyards into green, climate-resilient spaces through Nature-based Solutions⁵⁷. The programme includes:

- Replacing impermeable asphalt with permeable surfaces to improve rainwater infiltration.
- Planting trees, native vegetation, and creating pedagogical gardens to enhance biodiversity, and provide shade.
- Installing outdoor classrooms and natural play areas to support experiential learning.
- Incorporating rainwater management features, such as rain gardens and water play elements.
- Co-designing schoolyards with students, teachers, and school communities to ensure the spaces meet educational and recreational needs.
- Opening many schoolyards to the public outside school hours, providing neighbourhood 'cool islands' during heatwaves.

Lessons for Hong Kong

The OASIS programme demonstrates that school campuses can become living laboratories for sustainability, where infrastructure improvements simultaneously support climate adaptation, biodiversity conservation, and student learning:

- increased green space and biodiversity within dense urban areas;
- improved rainwater management, and reduced urban heat island effects;
- created more opportunities for outdoor and experiential learning through pedagogical gardens and outdoor classrooms⁵⁸;
- strengthened student engagement with nature by integrating environmental learning into everyday school life; and
- established a long-term, city-wide implementation model supported by sustained government funding and cross-departmental collaboration.

Common Lessons for Hong Kong

Although Singapore, Wales, Finland, and France have adopted different approaches, several common themes emerge.

Table 11.
Common lesson learned from international case studies and implications for Hong Kong

Common lesson	Implication for Hong Kong
Build on existing curriculum rather than adding new subjects	Strengthen integration across Science, Geography, CES, Values Education, and National Security Education
Create whole-school approaches	Embed sustainability into school culture, campus management and everyday practice
Provide authentic experiential learning	Enable students to investigate, design, and implement real environmental solutions
Empower students through leadership	Encourage student ownership of sustainability initiatives, and long-term environmental stewardship
Support teachers with practical resources	Provide curriculum-linked lesson plans, professional development, and partnerships with external organisations
Establish institutional mechanisms	Create structures that ensure sustainability programmes continue beyond individual teachers or short-term projects

Key Takeaways

The international examples reviewed in this appendix reinforce a common conclusion: **effective environmental education is not achieved by adding more curriculum content, but by creating institutional mechanisms that enable students to repeatedly apply their knowledge through authentic experiences.**

For Hong Kong, this suggests that the priority should be to strengthen existing curriculum structures through:

- integrating environmental education with Values Education and National Security Education;
- expanding experiential learning opportunities;
- supporting teachers with practical resources and partnerships; and
- using NbS as a whole-school learning framework that transforms school campuses into living laboratories.

7. Five Best Practice Case Studies in Experiential Environmental Education for Hong Kong Schools

1. Hiking Kei Chun (山野生蹤) Programme

Developed by: CCC Kei Chun Primary School

Overview

Hiking Kei Chun takes students beyond the classroom to explore Hong Kong's mountains, wetlands, coastlines, villages, and geoparks through a **series of field experiences that build up in difficulty over time**. Each trip is designed as a full learning experience rather than a simple outing. Students look into local ecosystems, observe wildlife, and geological features, learn about rural conservation and village culture, and reflect on the relationship between people and nature through guided discussion. Parents, conservation experts, and community partners also join selected activities, so that learning is reinforced beyond the school gate⁵⁹.

Learning elements

Science, Geography, History, Chinese Language, Physical Education, and Values Education are woven together through repeated outdoor inquiry, environmental observation, place-based learning and reflective practice.

Skills and values developed

Environmental literacy, perseverance, responsibility, commitment, unity, national identity, and stronger physical and mental wellbeing through sustained time in nature.

Key insight:

Regular, progressively harder outdoor experiences, linked to classroom learning and values education, help students build a lasting bond with nature. This strengthens environmental stewardship, resilience, and whole person growth.

naturally improve soil health through a process called biological nitrogen fixation. This reduces the need for man-made nitrogen fertiliser, which in turn helps to lower the greenhouse gas emissions linked to fertiliser production⁶⁰. Students take part in the whole growing cycle, from seed selection and planting to monitoring growth, harvesting, and reflecting on what sustainable food production means for the environment. **The learning is deepened through talks, scientific investigations, community outreach, and student presentations.**

Learning elements

Science covers plant biology, ecosystems, nutrient cycling, biological nitrogen fixation, and climate change. Geography covers sustainable agriculture, land use, food systems, and resource management. STEAM and Digital Education involve scientific investigation, data collection and environmental monitoring. Citizenship, Economics and Society (CES) covers food security and sustainable consumption.

Skills and values developed

Responsibility, stewardship, commitment to sustainable lifestyles, and an appreciation of how Nature based Solutions can tackle several problems, such as climate action, soil health, and food security, at the same time.

Key insight:

Sustainable agriculture gives students a hands-on way to see how NbS can support climate action, soil health and food security together, through authentic, interdisciplinary learning.

2. DLPK Soybean Exploration Journey

Developed by: Soyvestors, in partnership with HKMA David Li Kwok Po College

Overview

This programme uses **sustainable agriculture as a real-world context for interdisciplinary learning**. By growing soybeans on campus, students explore how soil health, biodiversity, climate change, and food systems relate to one another. Soybeans are legumes, and they

3. Nature Education Integrated Multiple Intelligences Programme

Developed by: Little Woods Nature Education, in partnership with a local school

Overview

This year long programme mixes indoor lessons, outdoor field trips and self-directed research. Gifted students who show a stronger naturalist Intelligence are chosen by teachers to take part. The model has three steps: first, students build authentic ecological and biodiversity knowledge through games and interactive learning; second, they visit field sites to identify and observe species firsthand, guided by professional ecologists; third, they create teaching

materials to pass their knowledge on to schoolmates. Outcomes include a hand drawn, then professionally produced, local bird species memory game used during recess, and a campus tree discovery route covering six common species, with trained students acting as tour guides.

Learning elements

Biodiversity knowledge and species identification, gamified and interactive learning, field based ecological observation, and the design and delivery of peer teaching materials.

Skills and values developed

Learning autonomy, creativity, and effective peer to peer communication. Trained 'naturalist leaders' go on to inspire the next group of leaders, creating an ongoing, student led cycle of nature learning on campus.

Key insight:

Nature education can be combined with multiple intelligences learning through a peer-to-peer model. Training a group of naturalist leaders builds a self-sustaining learning cycle that reduces reliance on teachers and outside organisations.

4. Dutchman's Pipe and Golden Birdwing Butterfly Conservation Programme

Developed by: Kadoorie Farm and Botanic Garden (KFBG)

Overview

KFBG shows how a long-term partnership between an environmental organisation and a school can support lasting, curriculum linked experiential learning while contributing to local biodiversity conservation. Schools receive everything needed to set up a conservation project on campus, including native plant seedlings, raised planting beds, trellises, soil, fertiliser, and expert ecological advice, after a KFBG specialist has assessed the campus for suitable planting sites. Ten curriculum linked lesson plans, complete with worksheets and classroom activities, are delivered by school teachers across the year. KFBG also runs capacity building workshops so that teachers can confidently lead the programme. Students and teachers then work together to monitor the planting site, record ecological observations and contribute to the conservation of two locally protected species.

Learning elements

Curriculum linked learning in biodiversity conservation, species identification, pollination, ecological interactions, and habitat restoration through authentic, long-term conservation activities.

Skills and values developed

Stewardship, systems thinking, observation skills, patience and long-term commitment. Student feedback also pointed to greater optimism and a stronger sense of agency, with students feeling more confident that their actions can contribute to biodiversity conservation.

Key insight:

Long term partnerships that combine curriculum resources, teacher training, and technical support help schools build experiential learning into everyday teaching, making it more sustainable and giving students real hope and agency.

5. Nature-based Eco-literate Experiential Education Programme (NEEEP)

Developed by: Kadoorie Farm and Botanic Garden (KFBG)

Overview

NEEEP is a three year initiative running from the 2025/26 to 2027/28 academic years. The programme positions KFBG as a 'Nature's Classroom' and invites partner schools to co create place-based learning experiences in an authentic natural setting, where students can explore nature through all their senses. KFBG and partner schools will co-develop 30 sets of school based, eco literate teaching materials built around eight proposed eco literacy themes, all linked to the curriculum. Teachers receive an 80% subsidy for professional development training, and schools receive a 33% subsidy for student field trips to KFBG or for in school experiential activities. All resulting materials are shared through an open platform so that other schools can also benefit.

Learning elements

Science forms the core, through hands on, curriculum linked inquiry-based investigation. This is supported by STEAM learning, sustainability education, and eight cross disciplinary eco literacy themes that are co-developed with each partner school rather than delivered as a fixed package.

Skills and values developed

Scientific inquiry skills, eco literacy, and a stronger sense of connection to nature through direct sensory experience. Teachers also build confidence and capacity through structured professional development, real conservation stories from KFBG, and ongoing exchange with a wider network of like-minded schools.

Key insight:

Long term collaboration between schools and environmental organisations can build teacher capacity, co-develop curriculum aligned resources, and embed nature based experiential learning into mainstream education, creating a scalable model for ESD across Hong Kong.

Summary Table

Programme	Lead organisation	Learning approach	Subjects and areas integrated
1. Hiking Kei Chun (山野生蹤)	CCC Kei Chun Primary School	Progressive, place based outdoor journeys with reflection	Science, Geography, History, Chinese Language, PE, Values Education
2. Soybean Exploration Journey	Soyvestors, with HKMA David Li Kwok Po College	Whole cycle campus farming and inquiry	Science, Geography, STEAM, Values Education, CES
3. Nature Education Multiple Intelligences Programme	Little Woods Nature Education	Train the trainer, peer to peer teaching	Biology and ecology, gamified learning, peer teaching design
4. Dutchman's Pipe and Golden Birdwing Butterfly Programme	Kadoorie Farm and Botanic Garden	Long term, curriculum linked conservation project with teacher training	Biology, ecology, biodiversity conservation, Values Education
5. Nature-based Eco-literate Experiential Education Programme	Kadoorie Farm and Botanic Garden	Long term, curriculum linked nature based experiential learning, teacher capacity building	Biology, ecology, biodiversity conservation, Values Education

8. Priority Action and Whole-school Learning Model Details

Table 12.
Overview of priority actions

Priority Action	Details
1. Strengthen Curriculum Integration	1.1 Strengthen interdisciplinary learning 1.2 Enhance curriculum mapping 1.3 Integrate Values Education and NSE 1.4 Adopt whole-school approaches to sustainability
2. Expand Experiential Learning	2.1 Outdoor learning 2.2 Action oriented environmental learning 2.3 Citizen science and service learning 2.4 School partnerships
3. Strengthen Teacher Support	3.1 Teacher training 3.2 Teaching resources 3.3 KEL Catalogue 3.4 Teacher learning circle

1. Strengthen Curriculum Integration

1.1 Strengthen interdisciplinary learning

The curriculum analysis identified that climate change, sustainable development, and biodiversity content is already distributed across Science, Geography and CES, but is never formally cross-referenced between subjects.

A **shared glossary, and explicit cross-referencing** are recommended to ensure that students experience these as a single coherent body of knowledge rather than three unconnected treatments of related material taught in different years by different subject panels. Finland's phenomenon-based learning approach (see Appendix 6), offers a workable model for this coordination, in which a single protected period of interdisciplinary study each year is used to draw together content that otherwise sits in separate subject silos, without requiring the wholesale redesign of any individual subject's syllabus.

1.2 Enhance curriculum mapping

It is suggested that the Education Bureau issue a **non-statutory cross-curricular supplement identifying the shared ESD themes across the three subjects**, specifying a minimum set of cross-references that each subject panel should state explicitly to students, and providing a suggested topic sequencing across Secondary 1 to 3.

Schools should also encourage different subject panels to collaborate before the start of each academic year to develop a cross-curricular teaching plan. Through joint planning, teachers can identify complementary topics, coordinate the sequencing of

learning experiences, reinforce common concepts across subjects, and design interdisciplinary activities that help students develop a more coherent understanding of sustainability issues. The curriculum mapping produced through this research could serve as a reference, and starting point for schools and curriculum developers when designing these cross curricular teaching plans.

1.3 Integrate Values Education and NSE

It is further recommended that the Education Bureau annotate the curriculum guidance documents for Science and Geography, for each module, a named priority value from the Values Education framework, a relevant National Security Education learning element, and one suggested discussion prompt that a teacher can use to make these connections visible to students within an existing lesson.

Research consistently indicates that values integration is most durable when values are named explicitly and reinforced across multiple subjects rather than implied through content alone⁶¹. The NSE mega security concept, which holds that ecological, resource, food, and societal security are mutually dependent rather than separate fields, is particularly well suited to this purpose, since it provides a ready-made intellectual framework for connecting climate and biodiversity content across all three subjects. Critically, this annotation requires no syllabus revision, no new content, and no additional timetable time. It is an editorial intervention in existing documentation.

1.4 Adopt whole-school approaches to sustainability

Cross-curricular teaching plans and annotated guidance, as set out in the above, address how sustainability is taught. A whole-school approach addresses how a school behaves as an institution, so that what students learn in the classroom is reinforced, rather than contradicted, by the school's own operations, culture, and community relationships.

International practice offers a well-established model for this. UNESCO's Education for Sustainable Development for 2030 framework asks schools to address four areas together, **greening the curriculum, greening teacher training, greening school facilities**, and greening the wider community, rather than treating sustainability as a subject taught separately from how the school itself is run⁶². Singapore's Eco Stewardship Programme, a model more closely aligned with Hong Kong's context, links curriculum, campus operations, and community partnerships within a single framework, illustrating how a whole-school approach can be embedded without requiring a new external accreditation system (see Appendix 6).

For Hong Kong schools, adopting a whole-school approach need not mean introducing a new scheme from outside. It could begin more modestly, by asking schools to identify one or two visible links between the cross-curricular teaching plans developed under 1.2 and the school's own practices, such as connecting a Science unit on waste management with the school's actual recycling arrangements, or a Geography unit on energy with the school's own electricity use. This help **students experience sustainability as something the school does**, not only something the curriculum teaches.

2. Expand Experiential Learning

While the current curriculum provides students with a foundation of knowledge about climate change, biodiversity, and sustainable development, many learning experiences remain classroom based and theoretical. Experiential learning enables students to apply knowledge in authentic contexts, develop practical skills, strengthen their sense of agency, and appreciate the relevance of sustainability to their daily lives.

Research further suggests that structured action projects are more effective than classroom-based learning alone in **developing action competence, and empowering young people to become active contributors to sustainable development**^{63,64}.

To maximise educational impact, experiential learning should move beyond one off activities towards sustained programmes that support long term engagement with environmental issues. **Effective programmes should incorporate structured reflection to help students connect their experiences with curriculum concepts, opportunities for follow up action** that enable students to apply and extend their learning, and continuous learning experiences that reinforce knowledge, skills, and positive behaviours over time⁶⁵. Such an approach is more likely to foster lasting changes in environmental understanding, attitudes, and action competence than isolated learning experiences. Detailed framework could refer to Appendix 10.

2.1 Outdoor learning

To strengthen experiential learning, greater emphasis should be placed on outdoor and field-based learning opportunities that allow students to investigate environmental issues directly. Activities such as ecological field studies, biodiversity surveys, visits to country parks, coastal habitats, waste management facilities, and climate related education centres can help students observe environmental challenges first hand and connect scientific concepts with local contexts. These experiences also provide opportunities to integrate learning across curricula, enabling students to understand the interrelationships between environmental, social, and economic issues.

Beyond strengthening environmental understanding, research has shown that **outdoor learning can improve student engagement, physical activity, mental wellbeing, and social relationships**, while fostering resilience and a stronger connection with nature⁶⁶. These wider benefits also align with the **Education Bureau's 4Rs Mental Health Charter**, which encourages schools to promote Rest, Relaxation, Relationships and Resilience through a whole school approach to student wellbeing⁶⁷.

2.2 Action oriented environmental learning

Schools should also be encouraged to adopt project-based environmental learning that requires students to **investigate real sustainability challenges, and develop practical solutions**. Rather than completing isolated classroom assignments, students could undertake projects addressing issues such as food waste, energy conservation, urban heat, biodiversity enhancement, or plastic reduction within their own schools or communities. Such projects **promote collaboration, critical thinking, problem solving, and communication skills**, while enabling students to **experience how individual and collective actions can contribute to positive environmental outcomes**.

2.3 Citizen science and service learning

Citizen science and service-learning programmes should be further expanded to provide students with meaningful opportunities to contribute to environmental conservation beyond the classroom. Participation in biodiversity monitoring, habitat restoration, community waste reduction initiatives, or water quality monitoring enables students to collect real data, support ongoing scientific research, and engage directly with their local communities. Through these experiences, students move beyond learning about sustainability to **becoming active participants in environmental stewardship**, thereby strengthening both their environmental values and action competence.

2.4 School partnerships

Effective experiential learning also depends on strong partnerships between schools and external organisations. Collaboration with NGOs, universities, government departments, and professional bodies can **provide schools with specialist expertise, authentic learning sites, educational resources, and practical learning opportunities** that individual schools may be unable to develop independently. Existing programmes and facilities offered by environmental organisations, museums, universities, and public education centres represent valuable resources that can enrich classroom learning while reducing the burden on teachers to design activities from the beginning.

3. Strengthen Teacher Support

3.1 Teacher training

A structured ESD professional development programme with three tiers:

1. Classroom-level tier

Addressing how to embed values and NSE linkages into existing lessons, and use local data effectively.

2. Subject panel level tier

Addressing cross-curricular planning, and the use of reflection tasks as assessed evidence of values development.

3. School leadership tier

Addressing the institutional conditions for sustained ESD implementation, including timetable protection and external partnership.

Sustained, practice focused professional learning programmes should be adopted, as research consistently identifies this approach as the most effective means of producing lasting improvements in classroom practice⁶⁸.

3.2 Teaching resources

A set of cross-curricular ESD teaching units should be designed, so that teachers can justify the activity within the assessed requirements of their own subject. The teaching units should include a student reflection prompt using the shared Values Education vocabulary, and a cross-reference to the relevant NSE learning element. They should also provide up to date scientific evidence, locally relevant case studies, and practical examples developed in collaboration with universities, government departments, NGOs, and professional organisations, ensuring that teaching materials remain accurate, credible, and aligned with the latest research.

Real world data, such as life cycle comparisons of reusable and single use products, resource use associated with recycling, and evidence demonstrating the effectiveness of individual and collective environmental actions, can help students develop a more evidence-based understanding of sustainability while fostering hope that positive change is achievable.

The resource package should also include place-based outdoor learning materials for all 18 districts of Hong Kong, enabling schools to make greater use of their local communities as learning environments while strengthening students' connection with local community and surrounding nature. Making ESD the path of least resistance, rather than an additional burden, is the most reliable mechanism for increasing take-up among time-pressured teachers⁶⁹.

3.3 KEL catalogue

Civic Exchange has developed the Key Environmental Education Leaders (KEL) Catalogue Platform, which brings together environmental education programmes, workshops, field visits and experiential learning opportunities offered by a wide range of NGOs into a single, accessible online platform.

The platform helps reduce the time and effort to identify suitable external learning opportunities that align with curriculum objectives. It also facilitates collaboration between schools and external organisations, broadening students' exposure to real-world environmental challenges and solutions while reducing the planning burden on individual teachers.

3.4 Teacher learning circle

Ongoing teacher learning communities should be established that bring together teachers with an interest in ESD to exchange teaching resources, share practical experiences and effective classroom strategies. These learning communities should also involve universities, environmental NGOs, and other organisations with expertise in environmental education, enabling teachers to access the latest research, innovative teaching approaches, and practical implementation support.

Regular peer learning opportunities can strengthen teachers' confidence, encourage innovation, and reduce the sense of isolation often experienced when introducing new approaches to teaching. Learning circles can also facilitate collaboration across subjects, enabling teachers to jointly develop interdisciplinary learning activities, and share successful implementation practices.

4. Leverage Nature-based Solutions as a Whole-school Learning Framework

Nature-based Solutions is not introduced here as a fourth strand of content alongside curriculum integration, experiential learning, and teacher support. It is the practical vehicle through which those three priority actions can be delivered together within a single, whole-school project: a campus NbS project draws on the cross-curricular content identified in Priority Action 1, takes the form of the experiential learning described in Priority Action 2, and gives teachers a concrete, resourced activity of the kind Priority Action 3 is designed to support.

4.1 Alignment with the IUCN Global Standard

Although NbS are increasingly recognised internationally as an effective approach to addressing interconnected challenges such as climate change, biodiversity loss, and human wellbeing, **the concept remains largely absent from Hong Kong's curriculum.**

Teachers also reported limited confidence in designing interdisciplinary, project-based environmental learning, and identified a need for practical guidance, curriculum-aligned resources, and examples of good practice.

School-based initiatives should be informed by the principles of the IUCN Global Standard for Nature-based Solutions. This would introduce students and schools to internationally recognised concepts of integrity, while ensuring that school projects contribute to genuine environmental outcomes rather than symbolic greening.

Adapted for a school setting, the principles would require projects to:

Table 13.
Applying NbS principles in a school context

NbS principle	Application in a school project
Address a societal challenge	Identify a campus or community issue such as heat, surface-water runoff or habitat loss
Design at an appropriate scale	Establish a baseline, consider the project site conditions and its connection with the surrounding neighbourhood or ecosystem
Achieve biodiversity benefits	Implement ecologically appropriate interventions using suitable species, and technical guidance to improve biodiversity and ecosystem functions
Ensure feasibility	Assess costs, maintenance, safety, and long-term responsibility before implementation
Support inclusive participation	Involve students, teachers, school management, campus staff, and relevant community members
Manage trade-offs	Balance competing needs, including uses of space, water demand, accessibility, and maintenance
Use adaptive management	Monitor outcomes, and modify the project in response to evidence
Support sustainability and scaling	Document learning, and share effective models with other schools

Simplified assessment tools and age-appropriate teaching resources could help students understand these principles. The purpose would be to encourage evidence-based design and ecological integrity rather than turn the Global Standard into a school certification exercise.

Table 14.
Illustrative school-based NbS applications

Local challenge	Possible NbS application	Possible indicators
Limited habitat and biodiversity	Native planting and plant nurseries, pollinator habitat or small aquatic habitats	Species observed, habitat condition, plant survival
Urban heat	Shade trees, layered native vegetation, green roofs or walls where technically suitable	Surface and air temperature, shaded area, thermal comfort
Heavy rainfall and runoff	Rain gardens, bioswales, permeable planting areas, or small wetlands	Infiltration, water retained, runoff observations
Poor soil condition	Composting, mulching, soil restoration, or food-growing systems	Soil moisture, organic matter, plant health
Weak connection with local nature	Biodiversity trails, habitat monitoring and citizen-science projects	Student participation, observations submitted, learning outcomes
Limited ecological connectivity	Planting designed to support locally occurring birds, butterflies and pollinators	Use of habitat by target species, vegetation structure

4.2 Demonstration and peer learning

Schools are more likely to attempt a whole-school NbS project when they can see one working elsewhere. The NbS Campus Challenge, jointly developed by Civic Exchange and the Education Bureau, demonstrates **how student-led campus projects can connect classroom knowledge with real-world action**: students investigate local environmental conditions, design evidence-based solutions and present implementation proposals, applying knowledge from different subjects in the process.

These projects help students understand how NbS contribute to climate adaptation, climate mitigation, and biodiversity conservation while demonstrating that environmental action can begin within their own school communities. Importantly, the process **strengthens scientific inquiry, and future-ready competencies**.

Hong Kong should initially test this approach through a small and diverse group of demonstration schools. This provides an **essential bridge between theory and practice** by giving teachers practical implementation models covering project planning, stakeholder engagement, curriculum integration, and long-term maintenance. Establishing a small set of local demonstration schools and systematically documenting their experience, including setbacks as well as successes, would let other schools adapt a proven approach, and accelerate the mainstreaming of whole-school sustainability education across Hong Kong.

4.3 School greening support network

The ecological quality of school projects will depend partly on the knowledge and materials available to schools. Landscaping decisions are often made according to appearance, cost, and ease of maintenance, with insufficient consideration of native species, habitat value, genetic provenance, or ecological function.

A school-based NbS programme should therefore include capacity building for landscaping contractors, nursery suppliers, and campus facilities staff. This could cover:

- identification and appropriate use of native species;
- biodiversity-sensitive planting design;
- responsible sourcing and plant provenance; and
- avoidance of invasive or ecologically unsuitable species.

Native-plant mini nurseries could eventually allow schools to participate in propagation and peer exchange.

4.4 Monitoring Educational and Environmental Outcomes

Evaluation should assess both what students learn and whether the intervention performs as intended. Counting participating students, planted trees, or completed activities would not be sufficient.

Table 15.
Illustrative indicators for school-based NbS

Outcome area	Illustrative indicators
Curriculum integration	Number and range of subjects using the project; curriculum outcomes addressed
Student learning	Change in knowledge, systems thinking, problem-solving and ability to interpret evidence
Responsibility and efficacy	Student confidence, sense of stewardship and perceived ability to contribute
Participation	Degree of student involvement in investigation, design, monitoring, and decision-making
Teacher capacity	Teacher confidence, use of resources and sustained cross-subject collaboration
Biodiversity	Species presence, habitat condition, plant survival, and ecological suitability
Climate resilience	Changes in shade, temperature, infiltration or water retention, where relevant
Institutional sustainability	Maintenance arrangements, leadership support, and continuation across school years
Knowledge sharing	Teaching materials, student presentations, peer visits and models adopted elsewhere

Indicators should be proportionate to the project and feasible for schools to collect. Universities and technical partners could support the development of common monitoring methods, while students participate in data collection, and interpretation as part of their learning.

Pilot evaluation should also examine unintended consequences and trade-offs, including maintenance demands, water use, safety, accessibility, competing uses of school space, and unequal capacity among schools.

4.5 Green career pathways

As cities increasingly adopt NbS to strengthen long-term climate resilience, demand for relevant skills is expected to grow. Embedding NbS in school learning equips students with knowledge and practical skills that support Hong Kong's green transformation while exposing them to expanding career opportunities. Through hands-on projects and engagement with practitioners, schools can help students understand how environmental action connects to future employment in the growing green economy.

9. Other Examples of Cross-curriculum Experiential Learning

Table 16.
Suggested experiential learning activities for integrating sustainability education across the junior secondary curriculum

Activity	Subjects involved	Duration	Description
1. Local Climate and Biodiversity Investigation Project	Science, Geography, Citizenship, Economics and Society (CES)	One school year	Each class adopts a nearby ecosystem or local environmental issue, such as an urban green corridor, wetland, school campus or neighbourhood. Students collect real local data, including biodiversity, water quality, urban heat, flooding risk or weather records from the Hong Kong Observatory, through repeated field visits across the year. They investigate how environmental change affects food security, public health, and community wellbeing, before reflecting on how their work demonstrates values such as Responsibility, Commitment, and Unity.
2. School Sustainability Action Challenge	Geography, Science, CES, Values Education	One school term	Students identify a genuine sustainability challenge within their school or district, such as food waste, excessive energy use, campus heat, water conservation or waste reduction. They collect evidence, analyse causes, develop practical solutions and present recommendations to school management, a Green Committee or community partners. Students then implement one agreed action while monitoring its impact, demonstrating that environmental issues can be addressed through collective action rather than individual awareness alone.
3. Sustainable Living Behaviour Challenge	Science, Geography, Values Education, CES	Two to four weeks	Students commit to one sustainable lifestyle change, such as reducing food waste, choosing low carbon transport, or saving electricity, and monitor their behaviours over several weeks. Science lessons quantify environmental benefits, while Geography and CES examine how individual behaviour interacts with government policy and wider social systems. Students reflect on habit formation, personal responsibility and how sustainable behaviours can become everyday practice.
4. Socio-Scientific Issues Activity	Science, Geography, CES, Chinese Language or English Language	Three to four lessons	Students investigate authentic Hong Kong sustainability issues, such as coal phase out, renewable energy, building decarbonisation, food waste, ecosystem restoration or coastal protection. Using a claim, evidence and reasoning approach, they analyse scientific evidence, consider different stakeholder perspectives, and evaluate the trade-offs of alternative climate solutions through debates, presentations or policy recommendations.
5. Case Study Bank	Cross curricular	One lesson per term	Students collaboratively build a digital repository of successful sustainability case studies from Hong Kong and around the world, including ecosystem restoration, renewable energy projects, circular economy initiatives, and biodiversity recovery. The resource grows each year as different classes contribute new examples, helping students understand that environmental challenges are accompanied by achievable and evidence-based solutions, thereby strengthening their sense of agency and optimism.

Activity	Subjects involved	Duration	Description
6. Smart Campus IoT Investigation	Science, ICT, Geography, Design and Technology	Four to eight weeks	Students use Internet of Things (IoT) sensors to collect real time environmental data around the school, such as temperature, humidity, air quality, noise levels or energy consumption. They analyse the data to identify sustainability issues, such as urban heat hotspots, or inefficient energy use, before proposing evidence-based improvements to create a smarter and more sustainable campus. This introduces students to data literacy, environmental monitoring, and smart city technologies while linking scientific inquiry with digital innovation.
7. AI for Climate Solutions Hackathon	Science, ICT, Geography, CES, Mathematics	One to two days (Hackathon) or four to six weeks (Project based)	Student teams investigate a real sustainability challenge, such as reducing food waste, improving recycling, conserving biodiversity, or increasing energy efficiency. Using AI tools, data visualisation or simple coding platforms, they analyse datasets, generate solutions and develop a digital prototype, campaign, or decision support tool. Teams pitch their ideas to teachers, industry mentors or community partners, promoting creativity, systems thinking, and responsible use of AI to address environmental challenges.

10. Experiential Learning Framework for Education for Sustainable Development

Introduction

At present, many schools select ESD activities based on availability, cost, and convenience, so provision varies widely in quality. This is a reasonable response to real constraints, but it has a cost. Some activities are enjoyable or informative without necessarily developing the competencies that ESD aims to foster: systems thinking, values and responsibility, collaboration, and the confidence to act.

Given tight syllabuses and competing demands on lesson time, including values education and national security education, teachers need a benchmark that helps them choose well without adding new work, not a longer list of options.

Rather than prescribing a fixed list of approved activities, this framework sets out such a benchmark: eight design principles, and a six-stage learning cycle for ESD experiential activities.

Design Principles

The following eight design principles are built on international guidance⁷⁰ on high-quality experiential and outdoor learning, and are expressed in terms that are practical for junior secondary teaching in Hong Kong.

Table 17.
Proposed design principles for high-quality ESD experiential activities

Design principle	Purpose	What this looks like at junior secondary level in HK
Authentic environmental context	Addresses a real, local environmental issue that students can observe, measure or influence.	Country park litter audit, urban tree carbon survey, Mai Po wetland study.
Interdisciplinary, hands-on inquiry	Students actively investigate, measure, build or create, drawing on multiple subjects, e.g. Science, Geography, Mathematics, Visual Arts, Chinese, and English.	Estimating a tree's carbon storage using measurement tools and a formula, writing up findings.
Systems thinking	Students trace causes, consequences and feedback loops within an environmental system, not isolated facts.	Tracing how food choices connect to greenhouse gas emissions, land use and household waste.
Reflection and values development	Structured space for students to consider why an issue matters, and who is responsible.	A debrief weighing stakeholder interests before proposing a solution.
Student agency and action	Students apply what they have learned by designing, proposing, or carrying out a response, however small.	Drafting a low carbon canteen menu, a campus recycling plan, or a short policy proposal.
Partnership and community engagement	Connects the school with practitioners, researchers, or community organisations, giving students opportunities to gain real-world experience.	Working alongside conservation staff, farmers or NGO researchers.
Continuity and follow up	The activity is part of a sequence, whether a return visit, an ongoing campus project, or a shared output, not a single isolated outing.	A campus farm or eco garden that each cohort builds on.

An activity does not need to score highly on every principle to be worth using. A half-day visit may reasonably deliver authentic context and hands-on experience, leaving reflection and action to the school. What matters is that all eight principles appear somewhere across a school's ESD provision over a year, not that each activity attempts all of them.

A Learning Cycle

A recurring weakness in environmental education is that activities stop after the experience itself. The six-stage cycle below shows how a single activity or a linked set of activities can be structured so reflection and action follow experience, rather than being left to chance.

Table 18.
Experience, Investigate, Reflect, Act, Share, Sustain: a learning cycle for ESD experiential activities

Stage	What happens	Typical activity elements
1. Experience	Direct contact with a real environmental context.	Guided visit, field survey, hands-on workshop, site tour.
2. Investigate	Gathering evidence, data or first-hand accounts to understand the issue in depth.	Measuring, sampling, interviewing a practitioner, comparing case studies.
3. Reflect	Connecting findings to personal and civic responsibility.	Structured debrief, values discussion, written or spoken reflection.
4. Act	Applying learning by designing or carrying out a response, at whatever scale is realistic.	A campus proposal, behaviour change pledge, or design task.
5. Share	Communicating findings or outcomes beyond the group.	School assembly, poster, social media post, citizen science data submission.
6. Sustain	Building the activity into an ongoing programme.	Repeat visit, campus farm rota, annual survey that each cohort adds to.

In practice, most externally sourced activities cover only the Experience and, to some extent, the Investigate stages well, since these are what a half day visit or workshop can reasonably deliver. The remaining stages are most efficiently built by the school itself, through a short pre-visit briefing, a structured debrief, a small follow-up task, and a channel for sharing outcomes. Closing the loop typically needs 30 to 40 minutes of classroom time, not a longer or costlier programme.

Alignment with Values Education and National Security Education

The framework aligns directly with existing policy priorities. Reflection and student agency map onto the Values Education Curriculum Framework's priority values and learning elements of

NSE. This alignment is developed in detail earlier in the report, including subject-level annotation and discussion prompts.

For schools, the practical implication is that a well-designed ESD activity can serve all three policy agendas through the same lesson time, without additional content or timetable pressure.

Applying the Framework: Examples from the KEL Catalogue

The following examples are drawn from the KEL Catalogue⁷¹, all suitable for junior secondary students, illustrate different design principles and different formats, from a single field visit to a year-long programme.

Table 19.
Selected catalogue activities mapped against the framework

Activity	Provider	Why it illustrates the framework
Urban Tree Carbon Estimation Workshop (深林探秘之旅：樹木好「碳」)	Conservancy Association	Field measurement of tree carbon storage, combining Mathematics, Biology, and Geography in one task. A strong model for cross-subject co-planning. Demonstrates: interdisciplinary inquiry, systems thinking.
Carbon Detective (零碳偵探)	The Green Earth	A community carbon walk followed by a stakeholder role-play to design low-carbon proposals. Moves through Investigate, Reflect and Act within a single session. Demonstrates: systems thinking, reflection, agency and action.
Campus Growing Programme: From Soil to Sprout	Kadoorie Farm and Botanic Garden	Multi session programme, with teacher capacity building, and ongoing farm management. Shows what the Sustain stage looks like when built into an activity's design. Demonstrates: continuity, partnership, student agency.
Jockey Club Food Production Centre Tour and Upcycling Workshop	Food Angel	Links food waste to food insecurity, pairing a rescue-centre visit with a hands-on upcycling task. Demonstrates: authentic context, reflection, values integration.

Single-observation activities, such as a field trip, seminar or workshop, remain useful for anchoring the Experience stage, particularly for less confident students. The risk is treating them as complete ESD provision. Paired with a short debrief and a small follow-up task, they close the loop; left unpaired, they reinforce awareness without reaching reflection or action.

Conclusion

With limited curriculum time, the educational quality of experiential learning is more important than the quantity of activities provided. By providing clear design principles, and a learning cycle that connects

experience with reflection and action, this framework helps schools develop more effective ESD activities. It also aligns ESD with the government's priorities in values education and national security education, enabling well designed experiential learning to support multiple curriculum goals without increasing pressure on the junior secondary timetable.

40. Curriculum Development Council. (2025). *Supplement to the Science Education Key Learning Area Curriculum Guide: Science (Secondary 1 to 3) curriculum framework*. Education Bureau.
41. Curriculum Development Council. (2026). *Geography (Secondary 1–3) curriculum framework*. Education Bureau. [https://www.edb.gov.hk/attachment/en/curriculum-development/kla/pshe/js_geog/Geography_\(F.1-3\)_Curriculum_Framework_en.pdf](https://www.edb.gov.hk/attachment/en/curriculum-development/kla/pshe/js_geog/Geography_(F.1-3)_Curriculum_Framework_en.pdf)
42. Curriculum Development Council. (2024). *Citizenship, Economics and Society curriculum guide (Secondary 1–3)*. Education Bureau.
43. Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. *Psychological Review*, 117(2), 440–463. <https://doi.org/10.1037/a0018963>
44. Gifford, R. (2011). The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *American Psychologist*, 66(4), 290–302. <https://doi.org/10.1037/a0023566>
45. Hornsey, M. J., & Fielding, K. S. (2020). Understanding (and reducing) inaction on climate change. *Social Issues and Policy Review*, 14(1), 3–28. <https://doi.org/10.1111/sipr.12058>
46. O'Neill, S., & Nicholson-Cole, S. (2009). "Fear won't do it": Promoting positive engagement with climate change through visual and iconic representations. *Science Communication*, 30(3), 355–379. <https://doi.org/10.1177/1075547008329201>
47. Moser, S. C. (2016). Reflections on climate change communication research and practice in the second decade of the 21st century: What more is there to say? *Wiley Interdisciplinary Reviews: Climate Change*, 7(3), 345–369. <https://doi.org/10.1002/wcc.403>
48. Ministry of Education, Singapore. (2021, March 4). *Learn for life: Equipping ourselves for a changing world, nurturing stewards of the environment* [Press release]. <https://www.moe.gov.sg>
49. Ministry of Education, Singapore. (2022, March 8). *Strengthening our contributions towards the green economy and empowering the next generation of sustainability leaders* [Press release]. <https://www.moe.gov.sg>
50. Keep Wales Tidy. (n.d.). *Eco-Schools*. <https://keepwalestidy.cymru/eco-schools/>
51. Welsh Government. (2024, October). *Welsh young people lead the way championing 30 years of Eco-Schools* [News release]. <https://www.gov.wales>
52. Keep Wales Tidy. (n.d.). *Eco-Schools*. <https://keepwalestidy.cymru/eco-schools/>
53. Welsh Government. (2023). *Review of the Eco-Schools environmental education programme in Wales (2018–2022)* (GSR Report No. 56/2023). <https://www.gov.wales>
54. Lonka, K. (2018). *Phenomenal learning from Finland*. Edita.
55. Symeonidis, V., & Schwarz, J. F. (2016). Phenomenon-based teaching and learning through the pedagogical lenses of phenomenology: The recent curriculum reform in Finland. *Forum Oświatowe*, 28(2), 31–47.
56. Lähdemäki, J. (2018). PISA and curriculum design: How to implement phenomenon-based learning. In K. K. Kumpulainen (Ed.), *Finland's wonders of education*. Education Hub.
57. European Climate Adaptation Platform (Climate-ADAPT). (2022). Paris Oasis Schoolyard Programme, France. <https://climate-adapt.eea.europa.eu/en/metadata/case-studies/paris-oasis-schoolyard-programme-france>
58. Blanc, N., Clauzel, C., About, C., Riché, A.-L., Gippet, M., & Bortolamiol, S. (2025). *Schoolyards greening for connecting people and nature: An example of nature-based solutions?* *npj Urban Sustainability*, 5, Article 64. <https://doi.org/10.1038/s42949-025-00252-6>
59. 吳金曉. (2026). *山野生蹤 香港自然環境下的體驗式學習* (1st ed.). 中華書局 (香港)有限公司.
60. Oklahoma State University Extension. (2023). Management of soybean inoculum. <https://extension.okstate.edu/fact-sheets/management-of-soybean-inoculum-pss-2925>
61. 課程發展議會. (2026). *《價值觀教育課程架構》*. 香港特別行政區政府教育局.
62. UNESCO. (2020). *Education for sustainable development: A roadmap*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000374802>
63. Jensen, B. B., & Schnack, K. (1997). The action competence approach in environmental education. *Environmental Education Research*, 3(2), 163–178. <https://doi.org/10.1080/1350462970030205>
64. Mogensen, F., & Schnack, K. (2010). The action competence approach and the 'new' discourses of education for sustainable development, competence and quality criteria. *Environmental Education Research*, 16(1), 59–74. <https://doi.org/10.1080/13504620903504032>
65. Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Prentice Hall.
66. Children & Nature Network. (2022). *The benefits of nature connection: A systematic literature review*. <https://www.childrenandnature.org/resources/the-benefits-of-nature-connection-a-systematic-literature-review/>
67. Education Bureau. (2025). *4Rs Mental Health Charter*. Hong Kong Special Administrative Region Government.
68. Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). *Effective teacher professional development*. Learning Policy Institute. <https://doi.org/10.54300/122.311>
69. Fullan, M. (2007). *The new meaning of educational change* (4th ed.). Teachers College Press.
70. UNESCO. (2020). *Education for sustainable development: A roadmap*. UNESCO Publishing. <https://www.unesco.org/en/articles/education-sustainable-development-roadmap>
71. Civic Exchange. (2026). *KEL Catalogue*. HongKong2050isNow. <https://www.kelhk.org/activities>

**In an era of escalating climate risk,
the ability to connect knowledge
with judgement and action will be
fundamental to growing society's
adaptive capacity.**