Observe

SCIENCE MAGAZINE

ISSUE NO 4
APRIL 2025

Partnership

SEAQIS Collaboration with Tarlac City, Philippines in STEM Learning Training for Teachers

SEAQIS Impact

The 4th Ki Hajar Dewantara Award

Galon Gains:

How a Simple Switch Saved Millions in Jayapura

STEM for Early Childhood

Our Flagship Programmes

STEM Learning Programme
A hands-on programme that helps teachers bring STEM to life in the classroom, nurturing students' critical and problem-solving skills.

SEA-CEP
Southeast Asia Climate Change Education Programme (SEA-CEP)
Equips educators to embed climate change topics in their teaching, fostering awareness and sustainable action.

SEAQIS' Regional Training Courses
Specialised courses to strengthen educators' skills in:
a. Science Classroom Supervision (SCS)
b. Earth and Space Science (ESS)
c. Environmental Education for Sustainable Development (EESD)

Ki Hajar Dewantara (KHD) Award
Recognises outstanding teachers who drive innovation and impact in science education.

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Greeting From Seaqis

Dear QIServe Readers,

It is a pleasure to welcome you to the fourth issue of Observe Science Magazine.

This edition is especially meaningful as we reflect on the progress made and look forward to the future of science education in Southeast Asia. From highlighting the inspiring recipients of the Ki Hajar Dewantara Award to celebrating the strides we've taken in contextualising STEM and climate change education, this issue showcases how collaboration, innovation, and passion continue to shape our journey.

At SEAQIS, we believe that impact is measured not only by numbers but by the stories and experiences of those we serve. You will find those voices in these pages—educators leading change, students discovering new possibilities, and partners standing with us to transform learning environments across the region.

Together, let us stay committed to building a future where science education empowers, inspires, and evolves. Enjoy reading, and thank you for being part of our shared mission.

Reza Setiawan
SEAQIS Director

DARE to INNOVATE

Zuhe Safitra
Deputy director for administration
& Editor-in-Chief

It is with great pleasure that I present to you this fourth edition of SEAQIS Observe, focusing on one of the most crucial yet often overlooked domains in education: STEM for Early Childhood. As we navigate the evolving educational landscape of the 21st century, the early years of a child's life emerge not just as a time of foundational learning, but as a fertile ground for cultivating curiosity, critical thinking, and creativity—hallmarks of STEM education.

This edition seeks to highlight the transformative potential of STEM Learning when introduced in developmentally appropriate ways during early childhood. The articles and insights compiled here—ranging from innovative classroom practices to research-based strategies—aim to support and empower teachers, especially those working in early childhood settings, to embrace STEM not as an add-on, but as an integrated approach to teaching and learning.

At SEAMEO QITEP in Science (SEAQIS), we firmly believe that fostering STEM Learning must begin early, grounded in play-based, inquiry-driven, and contextualized learning experiences.

By nurturing children's innate curiosity and helping them make sense of the world through observation, exploration, and experimentation, we lay the groundwork for lifelong learning and future readiness.

To our dedicated teachers, this issue is a tribute to your pivotal role. Your passion, resilience, and innovation continue to inspire us. We hope the contributions in this edition not only inform your practices but also reaffirm your commitment to shaping young minds through meaningful, engaging STEM experiences.

Let us continue working together to build a future where every child has the opportunity to explore, discover, and thrive.

Warm regards,
Editor-in-Chief

Editorial **Message**

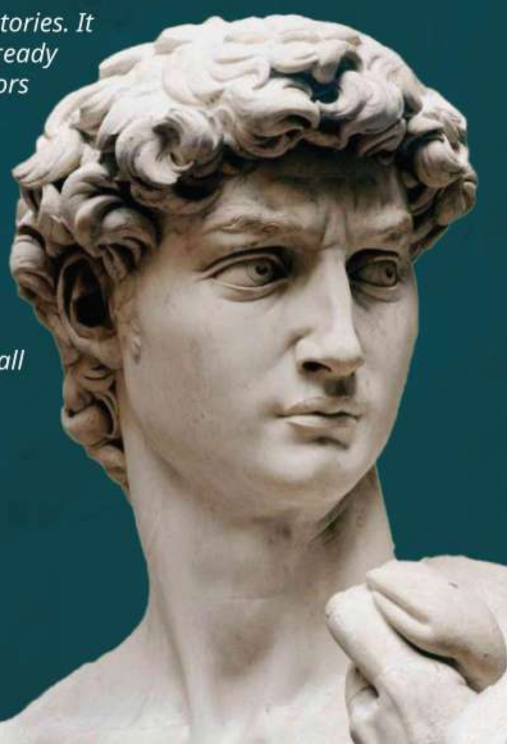
What does it mean to shape a better future—one class, one idea, one spark at a time?

In this fourth issue of Observe, we follow educators, partners, and changemakers across Southeast Asia as they bring science education to life. From climate lessons on coastal shores to students exploring motion through sailing boats, these stories show how learning becomes powerful when it's relevant and rooted in real-world experiences.

We celebrate passionate teachers, growing partnerships, and bold efforts to introduce STEM early. But we also face a pressing truth: many children in our region still wait for access to learning. Progress is happening—but so are the gaps.

This issue offers more than stories. It brings practical, classroom-ready strategies shaped by educators on the ground.

Whether you're teaching in a remote classroom, shaping education policy, or simply reading with a heart for change—this issue is for you. It's a reflection of how far we've come, and a call to shape what comes next—together.



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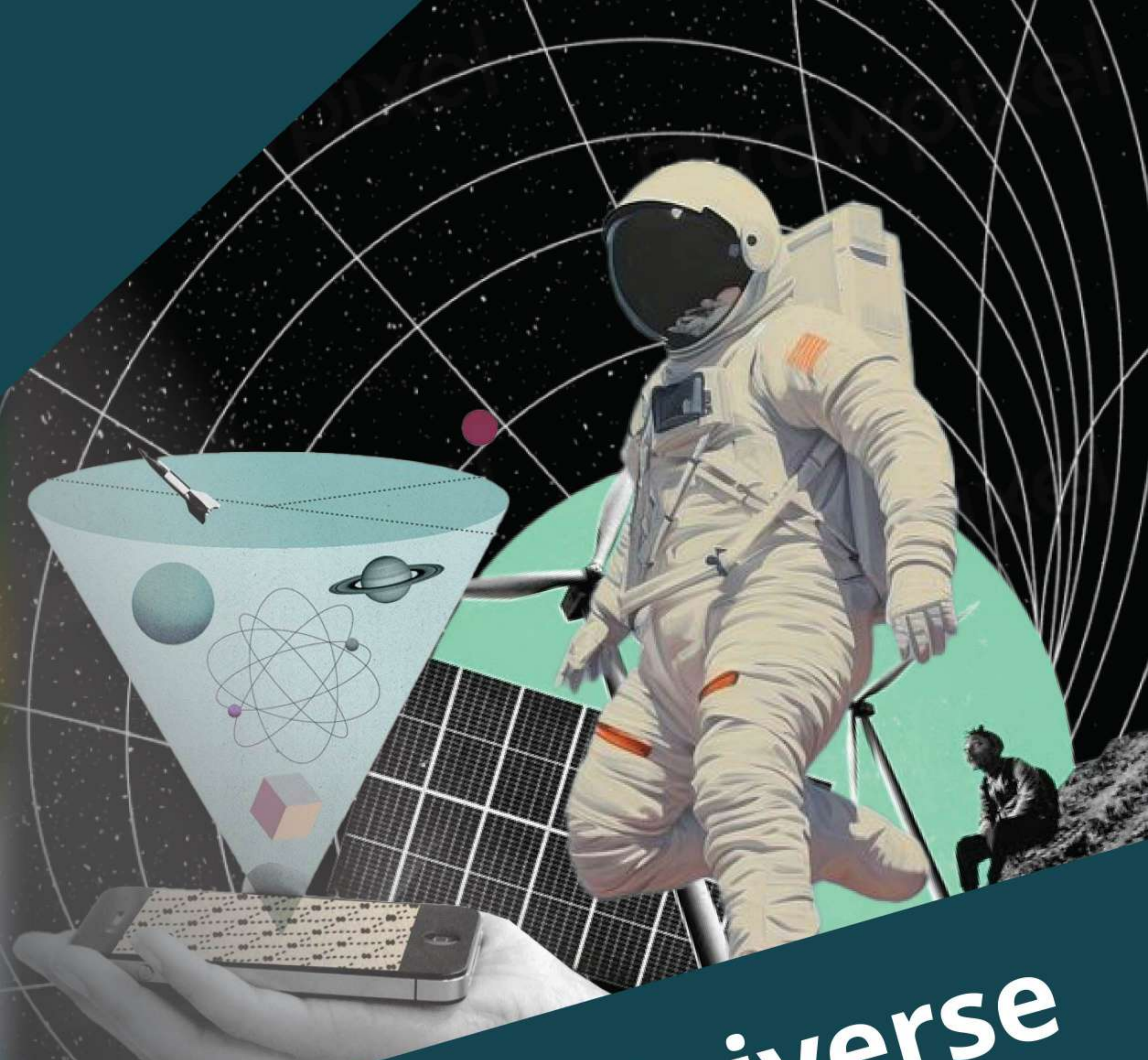

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Tech ‘n’ Universe

Depiction of the development of media, technology for the civilization of the universe

Transforming for Future

STEM for Early Childhood

Cover Illustration by:
Ucu Muhammad Nur
(SEAQIS Intern)

PARTNERSHIP

SHAPING THE FUTURE OF STEM EDUCATION

BEYOND CLIMATE EDUCATION

SCIENCE FACT

SEAQIS CORNER

NEW COMIC


Award
KHD Award
The Ki Hajar Dewantara

Celebrating Excellence in Science Education: Highlights from the 4th Ki Hajar Dewantara Award

SEAMEO QITEP in Science (SEAQIS) reaffirmed its role as a leading advocate for science education in Southeast Asia through the successful organisation of the 4th Ki Hajar Dewantara (KHD) Award and the SEAQIS International Conference on Science Education (SICSE) 2024, held from 5 to 6 November 2024 at Mason Pine Hotel, Bandung, Indonesia.

With the theme "Future-Ready Classrooms: Strategies for Digital Science Teaching," the event brought together eight outstanding science teachers from Brunei Darussalam, Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Timor-Leste. These nominees presented their innovative approaches to science teaching, focusing on making lessons engaging, relevant, and aligned with today's digital world.

The event also featured SICSE 2024, which included expert keynote presentations from Dr Simone Blom (Southern Cross University, Australia), Professor Xiang-Ping Wu (Chinese Academy of Sciences, China), and Professor Dr Kang Zhang (The Hong Kong University of Science and Technology, China). These distinguished figures also served as part of the judging panel for the KHD Award, where they evaluated each nominee's classroom innovation, student impact, and relevance to digital-era learning. Parallel sessions explored pressing themes in science education, such as STEM/STEAM learning, digital tools in classrooms, and 21st-century skills development.

The judging panel for the KHD Award, consisting of esteemed figures in science education and teacher development across the region, played a crucial role in evaluating the nominees. Their assessment focused on each teacher's ability to innovate within the classroom, impact students' learning, and integrate digital technologies effectively into science teaching.
The event culminated in the Awarding Night on 6 November, where the following teachers were honoured for their excellence in science education:

First Winner: Chan Sau Siong (Singapore)
Best Practice: Leveraging Station Rotation for Differentiated Digital Science Teaching and Nurturing 21st Century Competencies

Second Winner: Hafiz Anshari (Indonesia)
Best Practice: Enhancing Physics Learning Through Differentiated Automation-Enhanced Inquiry (DAPI) Model: The Water Rocket Project Case

Third Winner: Dayang Suzanah binti Haji Kurus (Brunei Darussalam)
Best Practice: Student Engagement in the Digital Age: The Effectiveness of Guided Inquiry-Based Blended Learning in Science Lessons

Additionally, audience favourites were recognised for their contributions: Zainudin bin Zainal Abidin (Malaysia) and Sutipong Jaikaew (Thailand).

Reflecting on the event, Zainudin from Malaysia remarked, "This award motivates us to become the best for our students. I hope SEAQIS continues this meaningful programme."

By bringing educators together in a spirit of innovation, collaboration, and recognition, SEAQIS continues to play a vital role in elevating the quality of science education across the region, inspiring teachers to embrace innovation and digital tools in their classrooms for the benefit of their students.


KHD
The 1st Place Winner
The 1st Winner
USD3,750


The 2nd Place Winner
The 2nd Winner
USD2,000


What is DAPI?
Differentiation
KHD
Award

SEAQIS Showcases Regional Impact During SEAMEC President's Visit to Indonesia

On 10 April 2025, SEAMEO QITEP in Science (SEAQIS) demonstrated its significant contributions to regional educational development during the SEAMEC President's visit to Indonesia. Hosted at SEAMEO RECFON, Jakarta, Indonesia, the event highlighted the growing importance of regional collaboration in enhancing educational outcomes across Southeast Asia.

The event opened with a series of welcoming remarks from key figures in the education sector, including Prof. Dr. Ir. Heri Hermansyah, Rector of the University of Indonesia, Datuk Dr. Habibah Abdul Rahim, Director of SEAMES, Madam Suharti, Secretary General of the Ministry of Primary and Secondary Education (MoPSE), and H.E. Mr. Juan Edgardo "Sonny" Angara, President of the SEAMEO Council and Secretary of Education of the Philippines. Each speaker underscored the need for stronger cooperation among Southeast Asian nations to advance education in the region.

Seven SEAMEO Centres based in Indonesia participated in the event, sharing their achievements, innovative initiatives, and future collaboration opportunities with the Philippine Department of Education. Their presentations showcased the impact of SEAMEO's educational programmes and opened doors for deeper collaboration aimed at improving the quality of education across Southeast Asia.

One of the event's highlights was an exhibition displaying the accomplishments and products of the SEAMEO Centres. The exhibition served as a platform for participants to explore tangible outcomes of SEAMEO's work, providing an opportunity to strengthen institutional partnerships.

In addition, a courtesy call was made to the Indonesian Minister of Primary and Secondary Education, a pivotal moment to discuss ongoing initiatives, explore further opportunities, and reinforce educational and diplomatic ties between SEAMEO and the Indonesian government.

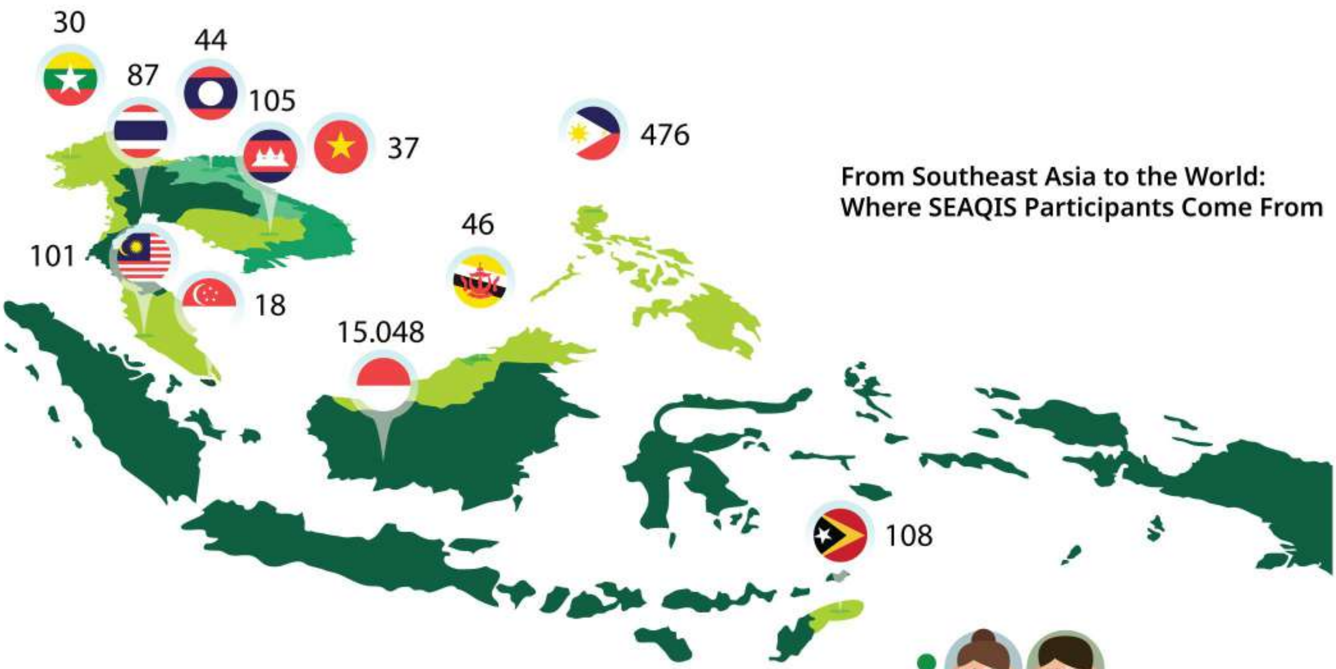
During the event, SEAQIS presented its remarkable achievements in supporting science education in the Philippines. Notably, the centre highlighted two STEM training programmes conducted in 2023 and 2024 for 60 teachers in Tarlac City, aimed at improving teaching skills and subject mastery. These programmes played a key role in enhancing the quality of STEM education, equipping educators with the tools necessary to foster a new generation of critical thinkers and problem solvers. In addition, SEAQIS took pride in showcasing the success of Bryant C. Acar, a master teacher from the Philippines, who received second place in the 2nd Ki Hajar Dewantara Award in 2018. Acar's recognition was pivotal in his advancement from national recognition to becoming a Top 50 finalist for the Global Teacher Prize 2021, a testament to the impact of SEAQIS's initiatives in supporting outstanding educators across the region.

Looking ahead, SEAQIS proposed a new collaboration with the Philippine Department of Education to implement the SEA-CEP (Southeast Asia Climate Education Programme) and provide training on climate change and STEM education for early childhood teachers.

This initiative aims to strengthen teacher capacity and promote locally relevant science learning, ensuring that future generations are equipped with the skills and knowledge necessary to tackle global challenges. Through this event, SEAQIS reaffirmed its role as a key player in advancing science education across Southeast Asia, fostering innovation, collaboration, and capacity building to enhance educational outcomes in the region.

SEAQIS Achievements in Numbers

At SEAQIS, we believe meaningful change begins with transformative programmes. Each initiative is a step toward classrooms that are relevant, future-ready, and rooted in sustainability.



From Southeast Asia to the World: Where SEAQIS Participants Come From

Our programmes and activities have been participated by

16,148 teachers and education personnel.

48 Other Countries

- Bangladesh
- Bhutan
- Fiji
- India
- Iran
- Japan
- Kenya
- Korea
- Maldives
- Mongolia
- Nepal
- Oman
- Pakistan
- Palestine
- Papua New Guinea
- Qatar
- Sri Lanka
- Tonga
- USA
- Uzbekistan
- Vanuatu

Publication

SEAQIS Journal of Science Education (SciEd)

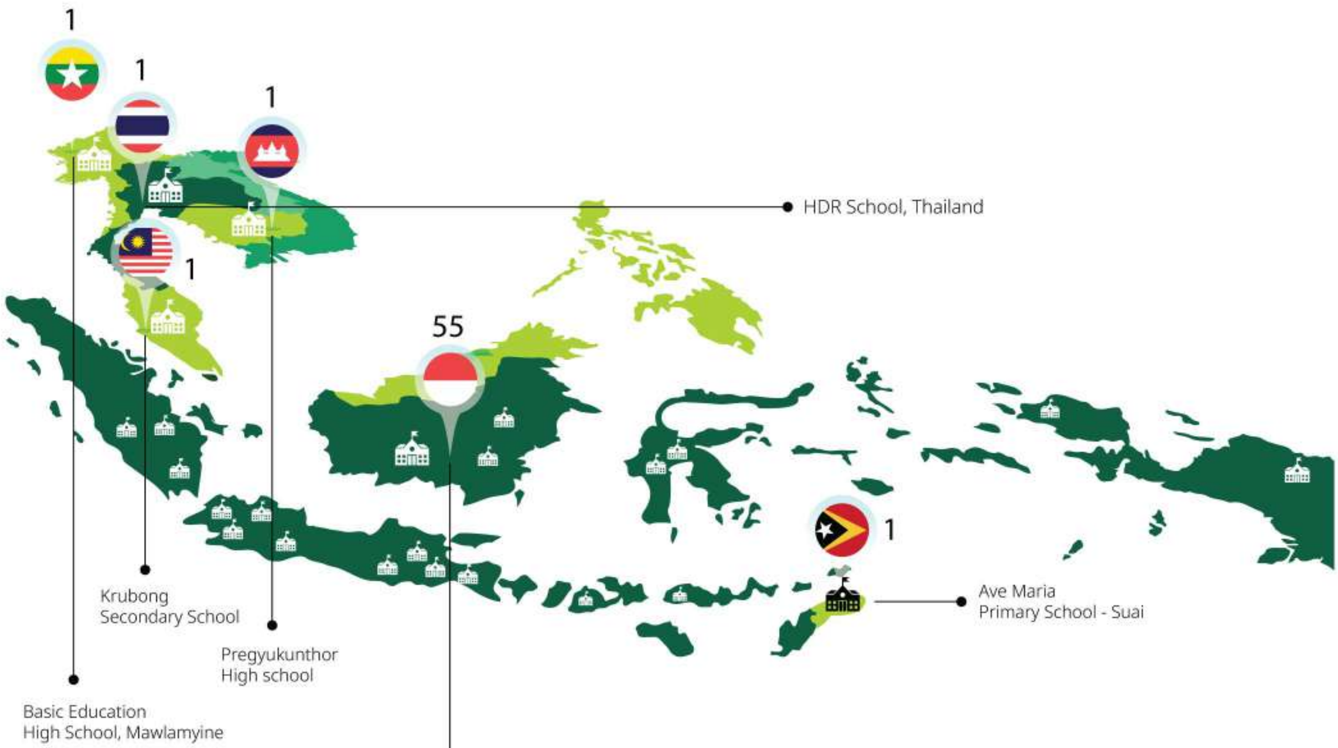
Total Articles Published: 40

Total Issues Published: 8

https://journal.qitepinscience.org/

science learning modules: 32

Through the Southeast Asia Climate Change Education Programme (SEA CEP), SEAQIS has developed 60 climate resilient schools in Cambodia, Indonesia, Malaysia, Myanmar, Thailand, and Timor-Leste.



Bandung:
Senior High School 1 Pangalengan
Primary School 196 Sukarasa
Senior High School 2
Vocational Senior High School 1
Senior Lab School UPI
Junior High School 11

Banjar:
Senior High School 2 Banjar

Banyuwangi:
Senior High School 1 Giri

Bekasi:
Binus School Bekasi

Bima:
SMAN 1 Kota Bima

Blitar:
Junior High School 3 Blitar
Senior High School 2 Blitar

Ciamis:
Senior High School 1 Banjarsari
Junior High School 1 Lakbok

Cianjur:
Sukatani Primary School Cibeber
Al-Hanif Islamic Junior High School Cibeber
Junior High School 2 Karangtengah
Muhammadiyah Creative Primary School

Demak:
Batursari 5 Primary School
Junior High School 1 Sayung

Kupang Timur:
SMA 2 Kupang Timur

Garut:
Senior High School 5 Pameungpeuk
Junior High School 1 Cibalong

Indramayu:
Tambak Primary School
Junior High School 2 Sindang
Junior High School 1 Sindang

Jayapura:
SMAN 7 Jayapura / SMA PGRI Jayapura

Karawang:
Junior High School 4, Kotabaru

Kediri:
Junio High School 1 Kepung, Kediri

Klaten:
Junior High School 2 Delanggu

Langsa:
SMAN 2 Langsa

Manggarai Barat:
SMPN 7 Welak

Natuna:
SMPN 2 Bunguran Timur
SMPN 3 Bunguran Timur

Pacitan:
Nature Elementary School Pacitan

Padang:
YARI Junior High School

Pandih Batu:
SMPN 3 Pandih Batu

Pangandaran:
Junior High School 1
Junior High School Sidamulih
Senior High School 1 Parigi

Pasuruan:
Yadika Junior High School Bangil

Pinrang:
SMPN 1 Mattirobulu

Pontianak:
Catholic Saint Petrus Senior High School

Purwakarta:
Ciseureuh 8 Primary School
Junior High School 2 Pasawahan

Semarang:
SMP IT Izzatul Islam Getasan

Subang:
Ciheuleut Primary School
Junior High School 4

Sumedang:
Junior High School 2 Tanjungsari
Junior High School 1 Jatinangor

Sungkai Tengah, North Lampung:
SMPN 1 Sungkai Tengah

Tanggerang:
SMA GENiUS

Tasikmalaya:
Senior High School 1 Sariwangi

Tidore Kepulauan:
SMPN 1 Tidore

Story from a SEAQIS Alumnus: Sowing Climate Awareness on the Coast of Kwanyar

Written by Reva Rensila Iasha

After taking part in the Earth and Space Science programme by SEAQIS in Bandung in August 2024, I was struck by a realisation: my school, located on the coast, is directly impacted by the ongoing effects of climate change. As a science teacher at SMP Negeri 1 Kwanyar, I see first-hand how vulnerable our coastal community is. Kwanyar, in Bangkalan Regency, East Java, sits along the edge of the Madura Strait—an area increasingly affected by rising sea levels, coastal abrasion, and extreme weather changes.

This realisation inspired me to bring climate change education into the science classroom, especially for my 7th grade students. But I knew it had to be meaningful. So I decided to weave in the local wisdom that our community holds—making science lessons not only informative but deeply rooted in the reality my students live every day.

Learning from Local Knowledge

In our class, learning about climate change is not limited to theory. We explore adaptation and mitigation through practical, relevant activities. One example is learning from the local coastal community's traditional knowledge in dealing with unpredictable weather at sea.

For generations, the people of Kwanyar have used adaptive fishing tools like sero, a bamboo fish trap, and togur, a specially designed net placed about 750 metres from the shoreline. These tools were developed to cope with changing weather conditions. My students investigate how they work, why they're effective, and how such knowledge is passed down through time.

Picture 1. Sea sidewalk on the coast of Kwanyar and Togur net placed 750 metres from the shoreline.

Observing Coastal Protection Firsthand

Another important topic we explore is the function of sea sidewalks—structures made of stone and concrete built along the coast to break waves and guard against sea-level rise. These play a crucial role in protecting homes and livelihoods. My students carry out field observations, assess their effectiveness, and discuss possible improvements.

Acting for the Future: Mangrove Rehabilitation

We also learn about climate change mitigation by taking direct action. One of our key activities involves joining mangrove rehabilitation projects around Kwanyar. These forests not only absorb carbon dioxide, but also shield the coast from erosion and support marine biodiversity.

My students take part in planting mangrove seedlings, cleaning up waste in mangrove areas, and raising public awareness about their importance. This hands-on involvement gives them a deep appreciation for environmental conservation.

Climate Change Through Critical and Creative Thinking

To deepen their understanding, I encourage my students to think critically and creatively. They carry out mini research projects, give presentations, and explore topics like renewable energy, waste management, and water conservation. One task I assign is for them to interview local fishermen and photograph their daily catch. This helps students understand how fishermen adapt to climate change.

For instance, when extreme weather prevents fishing, many local fishermen shift to producing seafood-based products like shrimp crackers. My students found this not only fascinating but also inspiring—a real-world example of resilience.

Picture 2. Students of SMP Negeri 1 Kwanyar documenting fishermen's catch.

SEAQIS and PT PHR Bring Contextualised STEM Learning to Life in Riau

When 80 teachers from the regencies of Bengkalis, Kampar, Rokan Hilir, and Siak gathered in Pekanbaru, Riau Province, Indonesia in September 2024, they were not merely attending another training session. They came with purpose—with the determination to transform learning into something more relevant, meaningful, and impactful for their students.

That training marked the beginning of a wider journey initiated by SEAQIS in collaboration with PT Pertamina Hulu Rokan (PT PHR) WK Rokan. Through this strategic partnership, both institutions launched a teacher professional development programme focused on Locally Contextualised STEM Learning as part of PT PHR's Corporate Social and Environmental Responsibility (TJSL) initiative. The programme stands as a testament to SEAQIS commitment to transforming science education across Indonesia.

STEM with a Local Lens: Starting from the Familiar

Running from September 2024 to February 2025, the programme was designed to address real issues faced by local communities—climate change and the sustainable management of natural resources. But more than that, it sought to humanise science learning by grounding it in the everyday realities of students' lives.

The focus on climate change and natural resources goes beyond abstract concepts found in textbooks. For students, these topics are part of their lived experiences. Locally Contextualised STEM bridges this gap by bringing real-world issues into the classroom, enabling learners to engage with the challenges around them and equipping them to become part of the solution.

A Four-Stage Journey of Growth and Impact

The programme was delivered in four interconnected stages. It began with a four-day In-Service Training in Pekanbaru (17 from 20 September 2024), attended by 80 teachers and 44 headteachers. The sessions explored how STEM could be integrated into the national Pancasila Student Profile project-based learning model (P5), with particular emphasis on climate change and local environmental issues. Teachers left the training equipped with both knowledge and a renewed sense of mission.

The second phase, On-the-Job Learning 1, provided intensive online mentoring. Teachers were guided through the process of developing STEM-based learning materials—lesson plans, teaching modules, worksheets, and assessment tools—tailored to their school contexts. By the end of the phase, all participating teachers had successfully created project-based learning resources grounded in real-world problems.

In December 2024, the energy and creativity of the programme culminated in the STEM Competition. Student teams from primary, junior secondary, and senior secondary schools showcased their innovations addressing environmental challenges. Among the winners were:

- Primary School: UPT SDN 024 Petapahan Jaya
- Junior Secondary: SMP Negeri 4 Tambang
- Senior Secondary: SMA Negeri 5 Tualang
- Strongest Building Challenge: SMA Negeri 1 Rimba Melintang
- Strongest Bridge Challenge: UPT SMPN 1 Tapung Hulu
- Eco-Powered Car Challenge: UPT SDN 024 Petapahan Jaya

One particularly memorable moment was the unveiling of an eco-powered car designed by primary school students—a shining example of how young learners can apply STEM thinking to real-world issues.

The fourth and final phase, On-the-Job Learning 2, involved the actual implementation of project-based STEM learning in classrooms. Supported by SEAQIS and PT PHR mentors through classroom observations and

guidance, over 3,000 students across the province engaged in hands-on projects that nurtured creativity, collaboration, and problem-solving skills.

Real Change, Measurable Impact

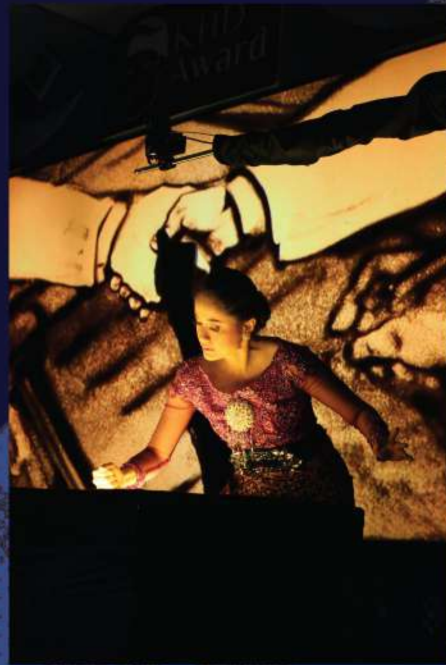
The impact of the programme was not merely anecdotal—it was backed by evidence. Using the Normalised Gain (N-Gain) method, evaluations showed that primary school teachers achieved a 70% increase in conceptual understanding, while junior secondary teachers reached 85%. Both scores indicate a high level of learning gain, demonstrating the effectiveness of the professional development model adopted.

More than just individual growth, the programme cultivated a community of innovative, collaborative educators. Teachers built professional networks, shared best practices, and created a culture of continuous improvement in their schools.

SEAQIS: A Catalyst for Educational Innovation

Throughout the programme, SEAQIS played a central role—not just as a facilitator, but as a catalyst for transformation. Its approach to Locally Contextualised STEM has proven to be a powerful bridge between scientific knowledge and students' lived realities. By grounding science in local issues, SEAQIS has helped teachers and students become active agents of change in their communities.
Importantly, local education authorities from the participating regencies were also involved as observers. Their presence ensured that the programme aligned with district policies and could be scaled sustainably within the regional education system.

It began in the classrooms of Riau. But this is only the beginning. Across Southeast Asia, the seeds of Locally Contextualised STEM are ready to take root—nurtured by passionate teachers, supported by bold partnerships, and driven by the urgent call of our changing world.


KHD
Award



KHD
Award

STEM Training


Empowering Filipino Science Educators through STEM: SEAQIS Strengthens Regional Collaboration in Tarlac City

In a modest classroom at San Juan De Mata Elementary School in Tarlac City, the future of science education quietly took root. For three days—27 to 29 November 2024—thirty science teachers from across the Philippines came together with a shared mission: to reimagine how STEM is taught, understood, and experienced by their students.

This professional development programme, titled The Science Teacher's Capacity Enhancement on STEM Learning, was initiated and facilitated by SEAMEO QITEP in Science (SEAQIS) as part of its ongoing commitment to elevate science education across Southeast Asia. By bringing world-class training directly to local educators, SEAQIS once again affirmed its role as a regional catalyst for transformation in science teaching and learning.

From Vision to Practice: Three Days of Immersive Learning

Led by SEAQIS Academic Team members Lintang Ratri Prastika and Dr Elly Herliani, the training offered a rich blend of theory and practice. Sessions covered global trends in science education, strategies for integrating interdisciplinary STEM approaches, and practical tools for developing classroom assessments rooted in real-world problem solving.

Teachers did not just listen—they engaged. Through collaborative workshops, they designed authentic STEM projects, brainstormed classroom challenges, and created learning materials tailored to their students' needs and contexts. These sessions created space not only for pedagogical development but also for meaningful peer-to-peer learning.

"The discussions helped me realise how relevant and powerful STEM learning can be in making science more engaging for students," said one participant. "This programme gave us tools, but more importantly, it gave us the confidence to use them."

A Regional Effort, a Shared Commitment

This training was more than a standalone event—it marked another milestone in SEAQIS' ongoing regional collaboration with Southeast Asian educators, particularly in the Philippines. By working closely with local schools and education authorities, SEAQIS ensures that its programmes are aligned with national educational goals while introducing regional and global best practices.

The closing session was a moment of reflection and renewal. Each teacher finalised a concrete action plan—strategies they would bring back to their own classrooms to spark curiosity, encourage experimentation, and empower students to become critical thinkers and problem-solvers.

Looking Ahead: A Stronger STEM Future for Southeast Asia

As the programme concluded, the sense of momentum was unmistakable. Teachers left with more than just knowledge—they carried home a renewed passion for their profession and a clear path forward.

By nurturing this kind of professional growth and cross-border collaboration, SEAQIS continues to lead efforts in building a strong, sustainable foundation for science education in the region. Programmes like this are not only about teaching science—they are about empowering educators to shape a generation of thinkers, innovators, and changemakers.

What started in one classroom in Tarlac City now echoes across Southeast Asia—an affirmation that when we invest in teachers, we invest in the future.

SEAQIS' Strategic Move in Introducing STEM from an Early Age

STEM is not only relevant for older students—its foundations can be introduced from early childhood through playful, hands-on, and exploratory activities. Recognising the importance of nurturing critical thinking, inquiry, and problem-solving from an early age, SEAQIS is now taking a strategic step to bring STEM learning into early years education.

This initiative began with a research and training programme aimed at assessing the readiness of early childhood teachers to implement STEM-based learning. Conducted by the SEAQIS Research and Development Division, the study involved 18 kindergartens, including school leaders and classroom teachers.
Why STEM in Early Childhood Education?

Young children are naturally curious. They enjoy asking questions, experimenting, and exploring their surroundings. STEM learning builds upon these natural behaviours, encouraging children to observe, investigate, and construct understanding through everyday experiences.

Despite its potential, many early years educators are still unfamiliar with effective STEM practices. Preliminary observations revealed several challenges: Misconceptions in basic science concepts Limited questioning techniques that hinder children's exploration A lack of skills related to scientific inquiry and hands-on investigation

SEAQIS' Holistic Approach: From Research to Action
To address these challenges, SEAQIS has designed a structured set of activities spanning the year 2025, combining research with professional development. These activities include:

Classroom observations to understand current teaching practices in science
Pedagogical training and science content enrichment for early years educators

Targeted STEM training workshops focused on practical strategies for early childhood contexts

Post-training classroom observations to assess improvements and implementation

Findings from this initiative will form the basis for developing a structured and contextualised STEM training programme for early childhood teachers.


Observasi SEAQIS STEM PAUD TK BPI Bandung

Empowering Teachers, Enriching Learning
By building teachers' capacity to integrate STEM meaningfully in the early years, SEAQIS aims to foster a generation of learners who are curious, confident, and equipped with the skills to explore and solve problems from an early age.
The results of this initiative will be documented in a formal research report and disseminated through publications and academic forums at the national and international level.

This marks a significant step in SEAQIS' broader commitment to advancing inclusive and quality science education across Southeast Asia—starting from the earliest years of learning.


Implementasi Pembelajaran STEM

SEAQIS Concrete Contribution to Climate Education in Southeast Asia

As the world grapples with the climate crisis, SEAQIS has emerged as a key regional player in promoting climate action through education. With its flagship initiative—the Southeast Asia Climate Change Education Programme (SEA CEP)—SEAQIS is not merely raising awareness, but actively transforming schools, educators, and communities across Southeast Asia into agents of change.

From Vision to Impact: The Evolution of SEA-CEP

Born out of the Environmental Education for Sustainable Development (EESD) initiative, SEA CEP was launched in 2021 to support the integration of Climate Change Education (CCE) across the education sector. What began as a concept has now evolved into a movement—backed by measurable progress and real-world transformation in schools and communities.

Key Achievements of SEAQIS through SEA-CEP

1. Empowering Educators as Climate Agents of Change

Over 100 teachers and school leaders have undergone Training of Trainers (ToT) programmes, equipping them with knowledge and strategies to implement and promote climate education, design STEM-based climate projects, and build Climate Resilient Schools (CRS).

2. Establishing Climate Resilient Schools (CRS)

To date, 60 partner schools across Indonesia have been actively engaged in developing CRS models. These schools mimic tropical ecosystem processes, integrate climate issues into their curricula and co-curricular activities, and promote low-cost, high-impact initiatives tailored to local ecosystems.

3. Building Climate Resilient Communities (CRC)

With 44 schools conducting outreach activities, SEA-CEP has directly involved over 12,600 students, 746 teachers, and 835 parents in climate action initiatives.
The programme also extends to external teacher/principal communities and even local farmer groups.

4. Developing Contextual and Practical Learning Resources

SEAQIS has produced numerous learning modules and project-based lesson plans aligned with the SDGs. Topics range from Virtual Water and Bioplastics to Sustainable Local Culinary Practices, allowing students to connect global issues with local action.

5. Regional Engagement and Inclusive Collaboration

SEA CEP has expanded its reach to teachers and educators from eight Southeast Asian countries, while also establishing inclusive collaborations—such as its urban resilience project with the disabled and elderly community (DILANS) in Bandung.

Looking Ahead: Scaling Up Regionally

SEA CEP is now entering Phase II (2024–2028), with plans to scale up CRS and CRC implementation throughout Southeast Asia. Participating schools from Cambodia, Malaysia, Thailand, Timor Leste and others are already engaging in SEA CEP's regional training and collaboration initiatives.

Lessons from the Ground

What sets SEA-CEP apart is its evidence-based, community-rooted, and context-sensitive approach. Every training, workshop, and dissemination activity has been tailored to real school environments. In many cases, SEA-CEP has shifted the mindset from simply teaching about climate change to living and modelling climate action.

Proof that Education Can Change the World

SEA-CEP is more than a programme—it is a movement led by educators and supported by communities. SEAQIS has proven that science education can be grounded, inclusive, and transformative. With every CRS and CRC, the region takes one step closer to climate resilience. If climate change is the challenge of our time, SEA-CEP is part of the solution—starting in the classroom, rippling through communities, and reaching across borders.

SMAN 7 Jayapura: Reducing Single-Use Plastic Waste to Protect the Planet

Plastic waste has become a major threat to the ocean's health and the planet's ecosystems. An estimated 80% of all marine pollution originates from plastic, with around 8 to 10 million metric tonnes of plastic entering the ocean every year. If this trend continues, by 2050, plastic in the ocean is expected to outweigh all fish.

Even more alarming, according to the Environmental Protection Agency (EPA), almost 100% of all plastic ever produced by humans still exists today. Plastics take between 500 to 1,000 years to degrade, and even then, they only break down into microplastics—tiny particles that never truly disappear from the environment. Currently, it is estimated that there are 50 to 75 trillion pieces of plastic and microplastic in the ocean, forming massive garbage patches like the Great Pacific Garbage Patch.

This alarming reality highlights the urgent need for concrete action in education to raise awareness and empower young people to be part of the solution. The following case from SMAN 7 Jayapura illustrates how schools can drive meaningful environmental change through practical and context-based climate action.

SMAN 7 Jayapura, a partner school of SEAQIS under the Climate Resilient School Programme, responded to the challenge by launching an initiative to cut down on single-use plastic consumption. In July 2024, the school began using refillable gallon-based drinking water stations, replacing individual plastic bottles previously used by students and staff.

This simple change had a measurable and inspiring impact. Over the course of 7.5 months (around 150 school days), the school achieved the following:

4,800 single-use plastic bottles eliminated

201.6 kg of plastic waste avoided

354.816 kg of CO_2 emissions prevented

This initiative not only benefitted the environment but also brought significant financial savings:

Previous cost of bottled water: IDR 16,800,000

Cost of refillable gallon system: IDR 2,625,000

Total savings: IDR 14,175,000 in 7.5 months (equivalent to approximately IDR 1,890,000 per month)

These figures present a powerful case: sustainability can also be cost-effective.

SMAN 7 Jayapura's initiative aligns with global efforts to stop plastic before it reaches the ocean. Once plastic enters marine ecosystems, it becomes extremely difficult—if not impossible—to retrieve, particularly in the form of microplastics which have now been found in seafood, drinking water, table salt, and even the air.

Plastic waste is responsible for serious harm:

17% of marine species impacted by plastic are listed as endangered by the IUCN

Microplastics can enter the human body, posing health risks

Plastics often contain carcinogenic chemicals and endocrine-disrupting substances

Plastic production and incineration contribute significantly to climate change, as plastics are derived from fossil fuels

What SMAN 7 Jayapura has achieved is more than just a technical solution—it is a model of climate education in action. The school proves that with commitment and context-based learning, schools can lead the way toward environmental sustainability.

Other schools can take similar action by:

Installing water refill stations

Encouraging students to bring reusable bottles

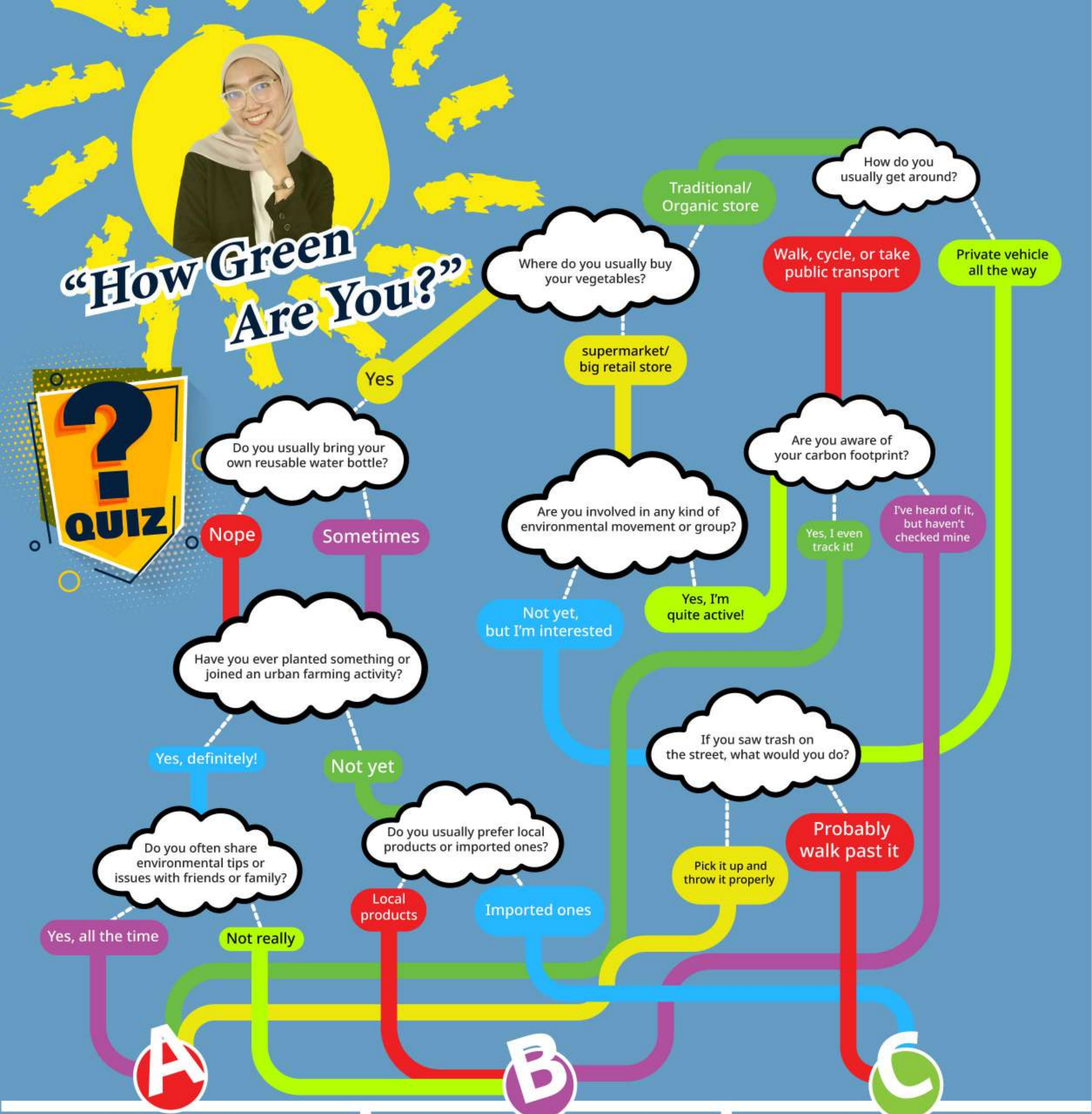
Reducing single-use plastics in school canteens
Educating school communities on plastic pollution

Organising beach or river clean-up campaigns

As oceanographer Sylvia Earle reminds us, "It is the worst of times but it is the best of times because we still have a chance." Let's take that chance—starting with our schools—to inspire real change for the future of our planet.

References:
Best practice data from SMAN 7 Jayapura (2024–2025), Climate Resilient School Programme – SEAQIS
UNESCO Ocean Literacy. Plastic Pollution in the Ocean. Retrieved from:https: //oceanliteracy.unesco.org/plastic-pollution-ocean/

"How Green Are You?"



A: The Eco-Warrior

You're a true champion for the planet!
- You're fully aware of how your actions affect the Earth and actively inspire others to care too.
- Traits: Visionary, responsible, proactive.

B: The Conscious Explorer

You're on the right path toward a greener lifestyle.
- You're building eco-friendly habits and just need a little extra push to get more involved.
- Traits: Curious, open to change, always learning.

C: The Green Newbie

You're just getting started—and that's totally okay!
- You may need more information and inspiration to kick off your sustainable journey.
- Traits: Practical, not yet exposed to much, looking for the right role model.


SEAQIS
#Daretoinnovate

Differentiated Digital Science Learning through Station Rotation

Mr Chan Sau Sion

In the rapidly evolving landscape of education, the integration of digital tools with student-centred pedagogy is no longer optional; it is essential. At Raffles Girls' School, Singapore, Chan Sau Siong, the first prize winner of the 4th Ki Hajar Dewantara (KHD) Award, exemplifies this transformation through an innovative teaching approach that combines station rotation, differentiated instruction, and 21st-century competencies (21CC) in science classrooms.

Empowering Students through Station Rotation

At the heart of Chan's approach is the station rotation model, where students rotate through three main stations: teacher-led, online, and offline (collaborative). Each station is carefully designed to align with students' varying levels of readiness and learning preferences, creating a dynamic and inclusive learning environment. This model was applied across three science disciplines: Lower Secondary Science, Chemistry, and Biology.

Personalised Learning with Purpose

The lessons begin with a pre-quiz to assess students' prior knowledge. Based on the results, students are grouped and assigned tasks that match their readiness levels. For instance, students with emerging understanding receive guided instruction in the teacher-led station, while more advanced learners engage in self-directed explorations via simulations or content creation tasks.

In the Lower Secondary Science lessons on chromatography, students progressed from hands-on practice to creating infographics and finally presenting their findings. In Chemistry, the topic of acids and bases was explored through wireless titration sensors, experiments, and simulations. In Biology, students reviewed gene expression processes using digital animations, group discussions, and virtual labs.

Cultivating 21st-Century Skills

The station rotation framework also supports the development of 21CC, including critical thinking, collaboration, communication, and adaptive learning. Group tasks require students to analyse data, present findings, critique peers' work, and adapt to different formats—whether through poster creation, animation, or simulation. These rich interactions not only deepen scientific understanding but also foster essential life skills.

Results that Speak Volumes
The impact of this approach was significant:

- In Lower Secondary Science, 87.6% of students improved, with nearly half showing a gain of over 37.5%.
- In Biology, 76% of students showed conceptual growth, particularly in understanding gene expression.
- Students reported high levels of engagement, enjoyment, and self-efficacy, appreciating the freedom to choose tasks and collaborate with peers.

Iterative Improvement for Deeper Learning

As a hallmark of action research, the lesson design was refined over two cycles:

- Station durations were adjusted for better time management.
- Instructions were streamlined for clarity.
- More task choices were added to promote student agency.
- Collaborative tasks were enhanced to increase peer interaction.

These improvements resulted in more meaningful discussions, better time-on-task balance, and increased ownership of learning.

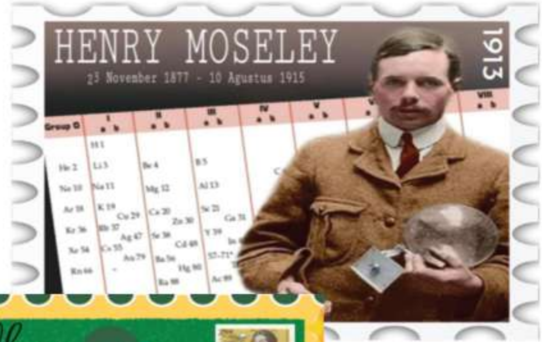
Implications for Southeast Asia

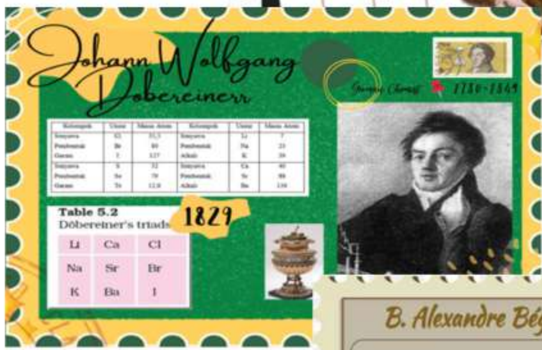
Chan's practice demonstrates how digital pedagogy and differentiated instruction can be seamlessly integrated to support diverse learners in science education. This approach aligns with SEAQIS's commitment to promote innovative, equitable, and forward-looking teaching practices across Southeast Asia.

His work serves as a powerful model for educators seeking to elevate student engagement and foster deeper learning through thoughtful lesson design, reflective practice, and the purposeful use of digital tools.

Chemophilately to Lexicochemistry Activities

Written by Benny Yodi





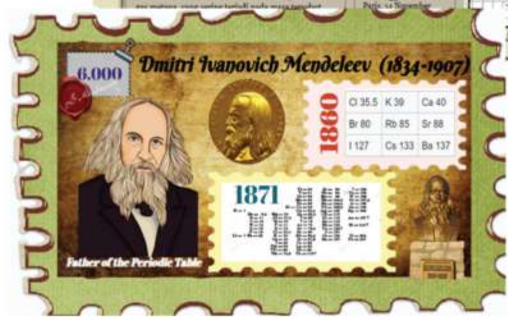


Figure 1. Chemophilately products in the historiochemistry of periodic tables made by students of SMAK Santu Petrus Pontianak, Indonesia

Chemophilately in Historiochemistry

Philately, the study and hobby of stamps, has long been a mass popular activity across the world. Among its various sub-disciplines, chemophilately is a fascinating meeting of chemistry and stamp collecting. Chemophilately is the study and collection of stamps featuring chemical elements, famous chemists, laboratory equipment, and chemical achievements. These become media to popularise chemistry itself (Rovner, 2007), and make an interdisciplinary approach to combine chemistry with history, art, and geography (as stamps come from different countries).

Chemophilately is more than a hobby—it is an instructional device that has the potential to enhance science education in numerous diverse ways. Periodic Table stamps help students memorise elements and their characteristics. Scientific equipment stamps get students familiarised with scientific devices. Historical stamps provide context to revolutionary scientific breakthroughs. Students get to learn about inventors' contributions by collecting stamps of prominent chemists.

In the current digital age, chemophilately activities are still relevant for incorporating historical aspects into chemistry education (historiochemistry). One of the activities that can be done is creating digital stamps related to the contributions of scientists, for example, regarding the development of the periodic table of elements. Students will learn about the inventor, the chemical concepts, and even evaluate its development. Here is an example of a chemophilately product created by the students.

By incorporating digital and artistic aspects into learning, the learning outcomes achieved become better. Presentation of results can be conducted to delve into the students' mastery of the material they have created. To assess the product created, the following rubric guide can be used.

Table 1. Rubric for assessing chemophilately products

Parameter	Criteria
Informative	accurately includes the year, inventor's name, inventor's photo, images of the findings, and the principles of the periodic table designed
Analysis	providing an accurate analysis of the advantages and disadvantages of the periodic table
Collaboration	All team members work together effectively.
Novelty	The concept and the resulting work are different from others and are arranged properly.
Legibility	interesting, clear, and easy to understand

Integrating generative artificial intelligence (Gen-AI) in chemophilately

Yuriev, Wink, and Holme (2024) have developed a conceptual framework on the rise of Gen-AI in chemistry education. This conceptual framework contains four domains.

a. The first domain is instructional control, which reflects the environment and practices of AI usage. This includes context and application. The context of Gen-AI can be used in classrooms, laboratories, and assessments to provide transformative opportunities in enhancing the learning experience. The application of Gen-AI starts from classroom preparation (planning), facilitating problem-solving, to assisting in writing lab reports.
b. The second domain is students' agency, which emphasises perception (attitude) and the active involvement of learners (learning experience). The attitude of understanding perception, acceptance, and ethics is crucial for the successful adoption of AI in the context of education. The learning experience provided needs to be personalised and adaptive.
c. The third domain is cognitive operation, which highlights the intellectual engagement and the development of skills required and developed by AI devices. The application of generic skills (such as critical thinking), the development of new skills (such as prompt engineering), and AI literacy are necessary to interact effectively with AI systems. Assignments involving AI require intellectual engagement and critical thinking.
d. The final domain demands the ability to account for and adapt to advancements in AI technology. Educators must keep up with AI developments; for example, currently, AI is limited in reasoning about chemistry. Therefore, educators need to have the ability to handle visual inputs or modalities such as organic reaction mechanisms.

In the context of chemophilately learning, students must be facilitated in the use of Gen-AI such as ChatGPT. However, students need to be taught to reconsider the output provided by Gen-AI. If a chemistry question is given to ChatGPT, it will provide a neatly written response but is limited to questions that involve more complex application-interpretation and non-text information (such as compound structure images) (Fergus, et al., 2023). This output is reasonable but not necessarily correct (Talanquer, 2023). Students need to be trained in prompting strategies to achieve satisfaction in utilizing Gen-AI, for example, using the 5S strategy: set the scene, be specific, simplify the language, structure the output, and share feedback (Tassoti, 2024).

Lexicochemistry for compiling the chemophilately products

Lexicochemistry learning is an activity that combines the principles of computerised lexicography into chemistry education. The ultimate goal of this activity is to produce a digital encyclopaedia on specific chemistry topics. In its implementation, AI plays a role in helping learners gather declarative and procedural information about the discussed topic. Klosa (2014) suggests six phases in the process of compiling this computerised lexicographic product, considering hypertextualization, user interaction, and multimedia. The process includes the preparation phase, data collection, computerisation, data processing, data analysis, and publication preparation. All stages are adjusted to the characteristics of the chemistry topics conducted in class.

Table 2 Students Trajectory in the Lexicochemistry Activity

Phase	Activity
Preparation	At this stage, students are introduced to the final objectives of the lexicochemistry project that will be conducted (groups, final targets, deadlines, work process stages, and assessment rubrics). To facilitate the activity, the teacher can prepare a template for the digital encyclopedia that will be created (using Google Sites). Make sure to provide space for students' creativity to develop the encyclopaedia.
Data collection	At this stage, students seek the information needed to compile the encyclopaedia. Students can be facilitated with certain learning resources, Gen-AI media, or other media. At this stage, students need to be trained to avoid plagiarism and to select every piece of information. Scaffolding techniques are used to help students who have difficulty finding information.
Computerization	The selected information is digitised into the existing template. The encyclopaedia should be multimedia to make it more engaging. For other topics, it may be necessary to integrate skills in using other applications such as digital molecule creation with KingDraw or ChemDraw, or other data processing applications.
Data processing	At this stage, the students and their team test the accessibility and completeness of the information from the product they created.
Data analysis	At this stage, a justification is made for the encyclopaedia that has been created. Students present the content and their understanding related to what has been created. Revisions may be made before being published to others.
Publication	The testing was conducted on students from different classes. Users provided assessments regarding their experience accessing the encyclopedia using the User Experience Questionnaire developed by Hinderks, Schrepp, and Thomaschewski (available at https://www.ueq-online.org/). The measured aspects include the pragmatic quality (feature usability) and hedonic quality (interaction experience) of a website's appearance.

Assessment from each phase contributes to the final value of this project. As a form of appreciation for the performance of the students, a project completion certificate report is given, which includes all achievements in each phase. It is hoped that this will provide a challenging and enjoyable learning experience for the students. This lexicochemistry project can be applied to various chemistry learning topics aimed at creating a chemical information database, such as compiling an encyclopaedia of laboratory equipment, atomic theory, natural acid-base indicators, molecular geometry, organic compounds, and so on. Guidance in the first four stages needs to be conducted seriously to ensure the accuracy of the information before publication. Validated products can become learning resources. Thus, teachers and students can collaborate in creating learning products.

Reference:
Fergus, S., Botha, M., & Ostovar, M. (2023). Evaluating academic answers generated using ChatGPT. Journal of Chemical Education, 100(6), 1672–1675. https://doi.org/10.1021/acs.jchemed.3c00087
Klosa, A. (2014). The lexicographical process (with special focus on online dictionaries). In R. Gouws, U. Heid, W. Schweickard, & H. Wiegand (Eds.), Dictionaries: An international encyclopedia of lexicography. Supplementary volume: Recent developments with focus on electronic and computational lexicography (pp. 517–524). De Gruyter Mouton. https://doi.org/10.1515/9783110238136.517
Rovner, S. L. (2007). Chemophilately. Chemical & Engineering News, 85(51), 29–31. https://doi.org/10.1021/cen-v085n051.p029
Talanquer, V. (2023). Interview with the chatbot: How does it reason? Journal of Chemical Education, 100(8), 2821–2824. https://doi.org/10.1021/acs.jchemed.3c00472
Tassoti, S. (2024). Assessment of students' use of generative artificial intelligence: Prompting strategies and prompt engineering in chemistry education. Journal of Chemical Education, 101(5), 2475–2482. https://doi.org/10.1021/acs.jchemed.4c00212
Yuriev, E., Wink, D. J., & Holme, T. A. (2024). The dawn of generative artificial intelligence in chemistry education. Journal of Chemical Education, 101(6), 2957–2959. https://doi.org/10.1021/acs.jchemed.4c00836

Reaching the Unreached: Transforming Education Access for Out-of School Children and Youth in Southeast Asia

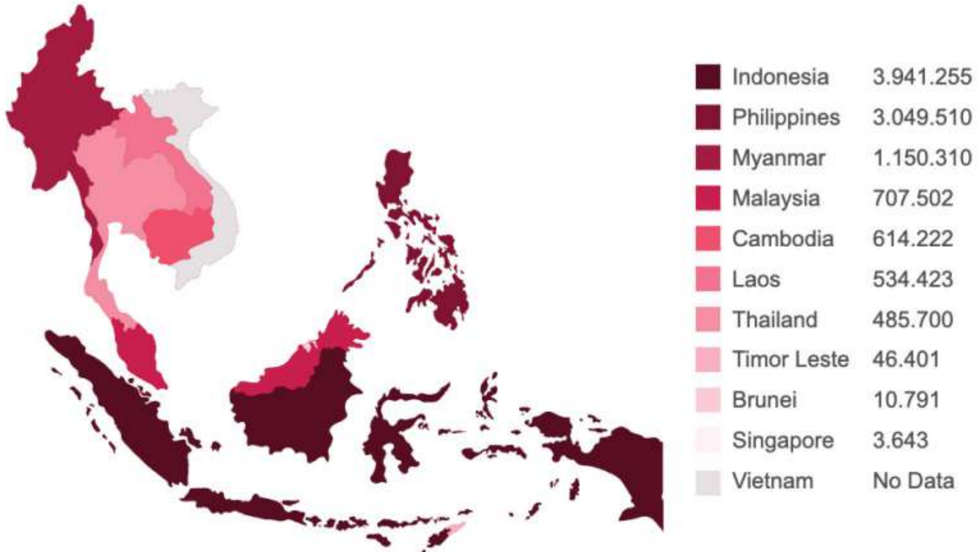


Figure 2. Number of out-of-school children, adolescents and youth of primary and secondary age, both sexes (2023)4

While global education systems advance with digital innovation and post-pandemic recovery efforts, millions of children and youth across Southeast Asia remain on the margins—never having entered school, having dropped out, or finding themselves excluded from formal systems due to multiple vulnerabilities. The Rapid Scoping Study on Out-of-School Children and Youth in Southeast Asia, conducted in 2024 by EdTech Hub and the SEAMEO Secretariat, shines a critical light on this urgent issue and provides practical recommendations for inclusive educational reform.

A Silent Crisis: Over 11 million Out of School

An estimated 11.8 million children and youth in Southeast Asia are currently out of school, according to the study. This figures—an increase from previous estimates—represents 4.7% of the global total, and reflects the lingering educational impact of the COVID-19 pandemic, compounded by economic hardship, conflict, and systemic inequities.

While Indonesia and the Philippines report the largest absolute numbers, Cambodia and Lao PDR exhibit some of the highest proportions of out-of-school children and youth (OOSCY). In contrast, Singapore and Vietnam report relatively low rates, indicating the effectiveness of sustained education policies and targeted investment.

Why Are They Not in School?

The study found that no single cause leads to children being out of school; rather, a complex intersection of factors contributes to exclusion, including:

Financial hardship: Poverty remains the most pervasive barrier, with many families prioritising work over schooling.

Gender and cultural expectations: Boys are more likely to leave school to work, while girls often face early marriage or care responsibilities.

Disability and health issues: Children with disabilities frequently face exclusion due to lack of infrastructure, while mental health challenges—often worsened by the pandemic—further limit access.
Geographical and infrastructural constraints: Remote areas continue to suffer from poor transport, limited school facilities, and exposure to natural disasters.

Notably, the reasons for exclusion vary between and within countries, highlighting the importance of context-specific interventions.

The Human Element: Teachers and Communities as Catalysts

Despite these challenges, the study identified powerful enabling factors. Teachers across the region often make extraordinary efforts—adjusting schedules, conducting home visits, and providing motivational incentives—to help OOSCY remain engaged in learning. In Timor-Leste, for instance, educators involved in non-formal learning initiatives have demonstrated flexible, student-centred approaches, with scheduling tailored to learners who work during the week.

Such findings were made possible through fieldwork led by SEAMEO Centres across Southeast Asia, with SEAQIS responsible for coordinating and analysing data collection from Timor-Leste.

Collaboration between schools and families emerged as another critical success factor. WhatsApp groups, regular home communication, and caregiver engagement in planning were cited as effective strategies for sustaining school attendance.

EdTech: Promise and Pitfalls

The study also examined the role of educational technology (EdTech). While technology is no substitute for systemic reform, it holds considerable potential to support flexible learning, particularly in remote or marginalised communities.

Mobile phones and televisions were identified as the most accessible and impactful devices. However, digital exclusion remains a key concern, especially for children from low-income families or those with limited digital literacy. As such, the study calls for investments in low-tech and inclusive learning solutions, and professional development for teachers to effectively integrate digital tools.

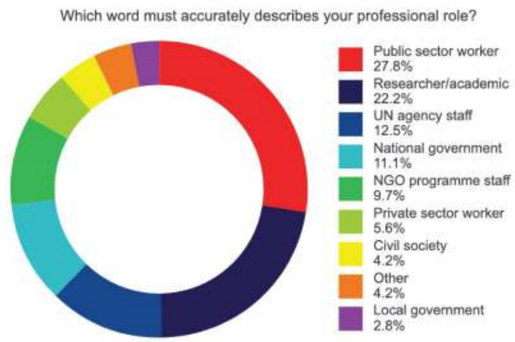
Five Policy Pathways Forward

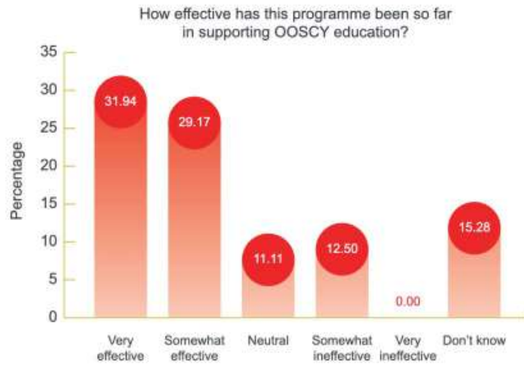
1. Remove financial barriers through conditional cash transfers and multisectoral partnerships.
2. Strengthen alternative education pathways including TVET, non-formal education, and foundational skills development.
3. Introduce holistic support structures for mental health, disabilities, and community-based support.
4. Harness technology inclusively by developing locally relevant digital resources and infrastructure.
5. Improve data systems with standardised, disaggregated, and regularly updated information accessible to stakeholders.

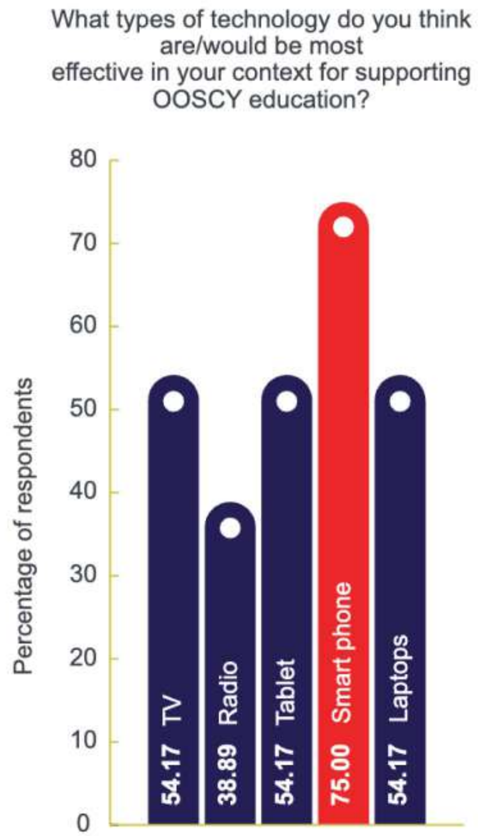
Conclusion: A Call for Regional Solidarity

The issue of OOSCY is not merely a statistic—it is a question of rights, dignity, and regional development. If Southeast Asia aspires to be a region of innovation and equity, no child must be left behind. The collaborative spirit shown in this study—bringing together ministries, educators, researchers, and SEAMEO Centres—offers a strong foundation for continued action.
By recognising the lived realities of OOSCY and crafting responses rooted in empathy, evidence, and innovation, the region can move towards a more just and inclusive education system—one that truly leaves no learner behind.

Reference:
EdTech Hub & SEAMEO Secretariat. (2024). Out-of-school children and youth in Southeast Asia: A rapid scoping study. ASEAN-UK SAGE Programme. https://elibrary.seameo.org/viewdetail/content/2596







HOTS Questions: Igniting Higher-Level Thinking in the Classroom

Have you ever wondered why students can memorise formulas yet struggle to solve real-life problems? The answer may lie in the kind of questions we're asking. In many classrooms, learners are rarely pushed beyond recall. But to truly prepare them for the complexities of the 21st century, we must challenge them to think. Enter HOTS—Higher Order Thinking Skills.

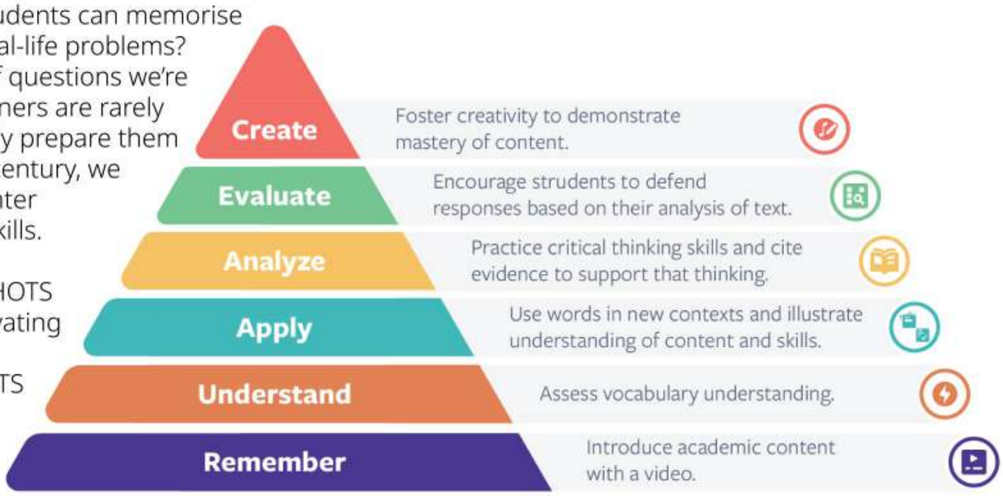


image: https://blog.flocabulary.com/higher-order-thinking/

Far more than just a buzzword, HOTS questions are vital tools for cultivating critical, creative, and reflective learners. So what exactly are HOTS questions? Why do they matter? And how can teachers develop them effectively?

What Are HOTS Questions?

HOTS (Higher Order Thinking Skills) questions go beyond basic recall and comprehension. They require students to analyse, evaluate, and create—the highest levels of Bloom's Revised Taxonomy.

In practice, HOTS questions encourage learners to:

- Make connections across concepts
- Apply knowledge in unfamiliar contexts
- Solve problems
- Justify reasoning with evidence

These are questions that challenge the brain—and build it too.

Why Are HOTS Questions Important?

1. Essential for 21st-Century Learning

Today's world demands more than rote learning. Students need to think critically, solve novel problems, and adapt to constant change. HOTS questions train them for this.

2. Closing the Global Achievement Gap

International assessments like PISA and TIMSS consistently highlight gaps in students' reasoning skills. Developing HOTS-based assessment helps better align classroom practices with global standards.

3. Reflections of Quality Teaching

A teacher's questions reveal the depth of their teaching. HOTS-based questions reflect a shift towards student-centred, inquiry-based learning, where exploration and deep thinking are at the heart of every lesson.

How to Construct HOTS Questions

According to SEAQIS's guide, writing HOTS questions involves more than tweaking existing ones. It requires intentional design. Here's a simple roadmap:

1. Start with a Strong Stimulus

Use real-world data, visuals, texts, or case scenarios. These set the context and spark thinking.

2. Choose the Right Action Verbs

Select action verbs that align with HOTS cognitive domains. For example:

- Analyse: distinguish, organise, compare
- Evaluate: assess, critique, justify
- Create: design, propose, invent

3. Incorporate Unfamiliar Situations

To promote authentic thinking, design scenarios that students have not explicitly encountered before—forcing them to apply learning in new ways.

4. Encourage Open-Ended Responses

Use extended responses or open tasks that allow for multiple valid answers and creative expression.

5. Use a HOTS Checklist

Ensure the question:

- Requires complex thinking
- Goes beyond memorisation
- Is contextual and relevant
- Encourages exploration or innovation

Example of a HOTS Question:

Stimulus: A graph showing trends in household energy consumption.
Question: "Based on the graph, analyse how appliance usage affects electricity demand. Suggest two innovative solutions to reduce consumption."

This type of question tests data interpretation, reasoning, and problem-solving creativity—all HOTS components.

Final Thoughts

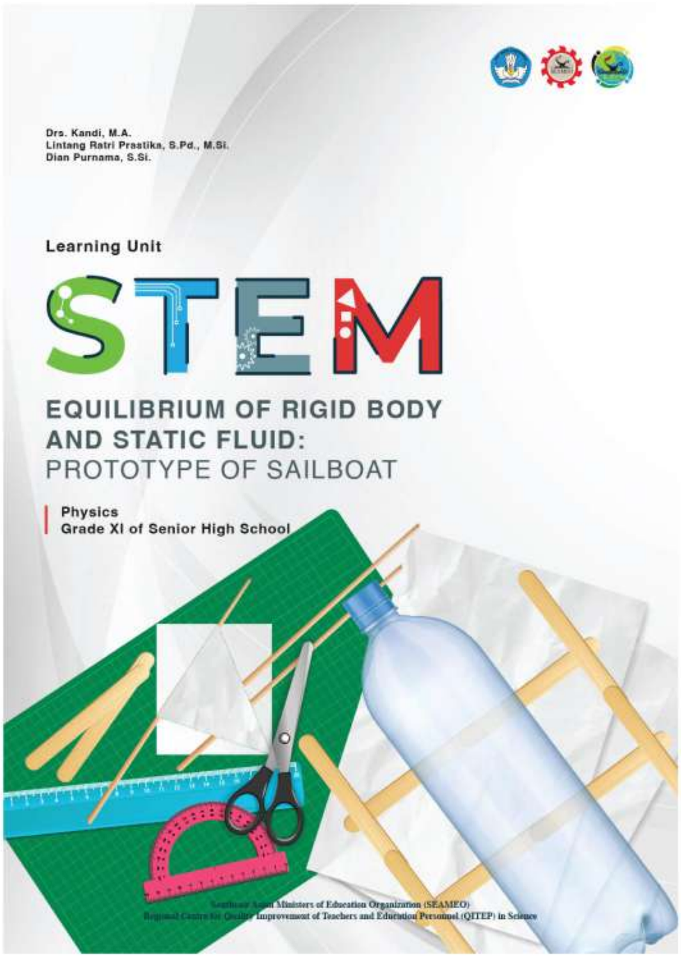
Creating HOTS questions is not just about designing better tests—it's about nurturing better thinkers. By incorporating HOTS into everyday teaching, we equip students not just to pass exams, but to navigate the world with intelligence, creativity, and resilience.

Let's stop asking questions that require memorisation. Let's start asking the questions that truly matter.

Reference:
Kamalia Devi, P., Setiadi, H., & Prastika, L. R. (2020). Developing HOTS-Based Questions. Bandung: SEAMEO QITEP in Science.

Implementing the “Sailing Boat” STEM Project in the Physics Classroom

Creating engaging and meaningful learning experiences in physics doesn’t always require complex tools. Sometimes, a simple hands-on project like building a sailing boat prototype can bring science to life. This tutorial provides step-by-step guidance for implementing a STEM-based, project-oriented lesson on Equilibrium of Rigid Bodies and Static Fluids—an ideal match for the Year 12 Physics curriculum.



Project Objective
To help students understand and apply the concepts of centre of gravity, torque, and Archimedes’ principle through the design, construction, and testing of a functional model boat.

Step-by-Step Implementation Guide
1. Preparation Phase
A. Required Prior Knowledge:
- Centre of gravity and equilibrium in rigid bodies
- Archimedes’ principle
- Torque and density concepts

B. Suggested Materials (per group):
- Used plastic bottles (for boat body)
- Electric fan (for wind propulsion)
- Ice-cream sticks, skewers, plastic or paper for sails
- Modelling clay, coins or marbles (as weights)
- Measuring scales, scissors, tape, glue

C. Teaching Resources:
- Short videos showing unstable or capsizing boats
- Student Worksheets (provided in the STEM Unit)
- Rubrics for assessment (behavioural, cognitive, practical)

2. Session One: Exploration and Design
Time Allocation: 2 x 45-minute sessions
A. Introduction (10 minutes)
- Greet students and set the context
- Show a video clip of a capsizing boat to prompt curiosity
- Initiate class discussion: "Why do some boats capsize? How can we prevent this?"

B. Phase 1: Reflection (20 minutes)
- Pose an open-ended challenge: "How can we keep a boat balanced and floating?"
- Guide students to brainstorm key physics concepts involved

C. Phase 2: Research (20 minutes)
- Students explore scientific principles using the internet or textbooks
- They begin forming ideas to solve the identified problem

D. Phase 3: Discovery (30 minutes)
- In groups, students sketch initial designs of their boats
- Discuss sail position, weight placement, and body shape
- Present design concepts to the class

E. Phase 4: Application (5 minutes)
- Assign students to construct and test their boats at home
- Instruct them to document the entire process with photos or short videos

3. Session Two: Testing and Presentation
Time Allocation: 2 x 45-minute sessions
A. Review & Motivation (10 minutes)
- Recap key physics concepts from the previous session
- Prompt reflection: "What challenges did you face while building your boat?"

B. Phase 4 Continued: Application (25 minutes)
- Students refine their boats and carry out final testing in class
- Teacher provides feedback and observations

C. Phase 5: Communication (40 minutes)
- Each group presents their design, results, and lessons learned
- Focus on persuasive, structured presentation delivery
- Peers ask questions and vote for the most innovative design

D. Closing (15 minutes)
- Guide class to summarise learning outcomes
- Highlight how this activity connects with real-world maritime science
- Conduct self-assessment and submit documentation

Assessment
Use a blended assessment approach:
- Attitudes: Collaboration, curiosity, responsibility
- Knowledge: Multiple-choice questions with justification
- Skills: Rubrics for project design, product quality, and presentation

Top Tips for Success
- Start with a powerful problem or visual to stimulate interest
- Emphasise that the process and collaboration matter more than perfection
- Encourage students to experiment and learn from failure
- Use rubrics transparently to promote reflection and responsibility

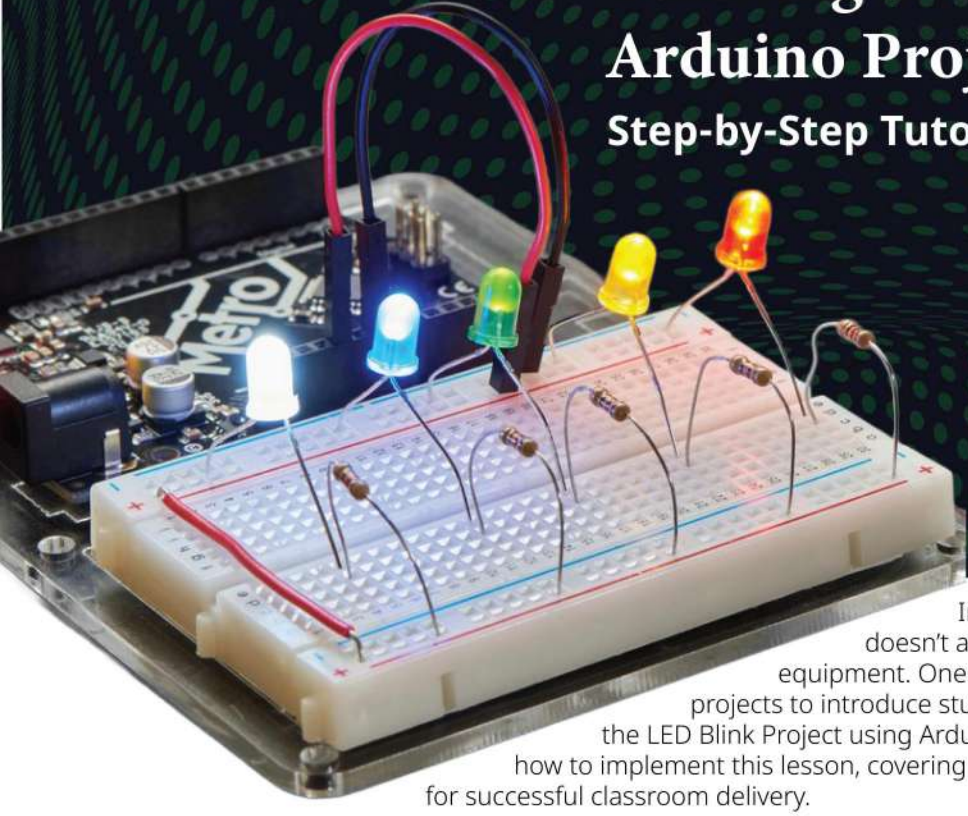
Conclusion
The "Sailing Boat" STEM project transforms physics from theory into experience. By engaging students in building, testing, and presenting their work, we foster not only conceptual understanding but also innovation, problem-solving, and teamwork. This is more than a physics lesson—it's a preparation for the real world.

For more detailed guidance and complete learning materials, download the official STEM Learning Unit book from: **https://s.id/sailboat_STEM**

Reference
Purnama, D., Prastika, L. R., & Kandi. (2018). STEM learning unit: Equilibrium of rigid bodies and static fluids – Sailing boat prototype. Bandung: SEAMEO QITEP in Science.

Teaching Simple Arduino Project: LED Project

Step-by-Step Tutorial for Teachers



Integrating STEM into the classroom doesn't always require complex or expensive equipment. One of the simplest yet most powerful projects to introduce students to digital electronics and coding is the LED Blink Project using Arduino. This tutorial will guide teachers on how to implement this lesson, covering the objectives, materials, steps, and tips for successful classroom delivery.

Learning Objective

Students will be able to:

- Build a basic LED circuit on a breadboard.
- Understand the concept of digital signals (HIGH and LOW).
- Write and upload Arduino code to control an LED.
- Modify timing behavior through programming.

Tools and Materials

Per group of 2–3 students:

- 1 Arduino UNO board
- 1 Red LED
- 1 330-ohm resistor
- Jumper wires
- Breadboard
- USB cable
- Laptop/computer with Arduino IDE installed

Prerequisite Knowledge

Before starting, students should be familiar with:

- The function of an LED and resistor.
- Basic electricity concepts: current flow, polarity.
- The purpose of a microcontroller (Arduino).

Step-by-Step Instructions

1. Build the LED Circuit

Have students set up the following on their breadboard:

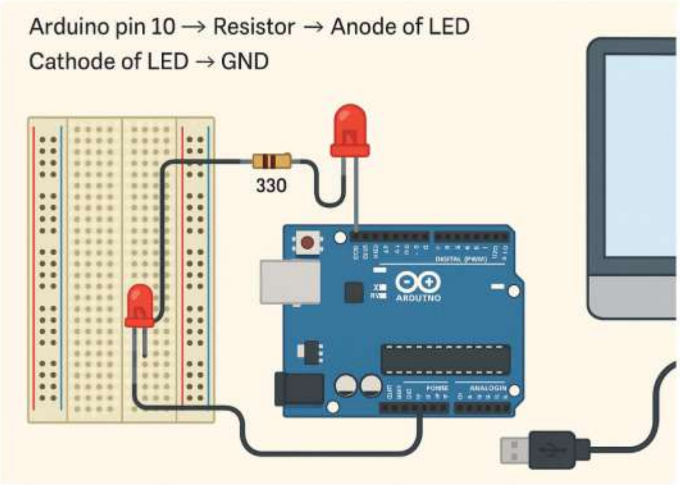
- Connect the anode (long leg) of the LED to pin 10 via a resistor.
- Connect the cathode (short leg) of the LED to GND.
- The resistor (330 ohm) prevents the LED from burning out.

Wiring Summary:

Arduino pin 10 → Resistor → Anode of LED
Cathode of LED → GND

2. Connect the Arduino

- Plug the Arduino into the computer using the USB cable.
- Launch Arduino IDE on the computer.



3. Write the Code

Ask students to type or paste the following basic code:

```
void setup() {
  pinMode(10, OUTPUT); // Set pin 10 as an output
}

void loop() {
  digitalWrite(10, HIGH); // Turn LED on
  delay(1000);            // Wait 1 second
  digitalWrite(10, LOW);  // Turn LED off
  delay(1000);            // Wait 1 second
}
```

4. Upload the Code

In Arduino IDE, select:

- Board: Arduino UNO
- Port: COM port detected for your Arduino

Then:

- Click the Verify button to compile the code.
- Click the Upload button to send the code to the Arduino.

The LED should now blink on and off every second.

Modification Challenge

To check understanding, challenge students to modify the blink delay to 3 seconds:
delay(3000); // Replace both delay values with 3000
Ask them to explain how the delay() function works and how the timing affects the LED.

Troubleshooting Tips

- LED not lighting up? Check the polarity and wiring.
- Upload error? Ensure the correct port is selected and cable is properly connected.
- LED too bright/dim? Try a different resistor (220–470 ohm).

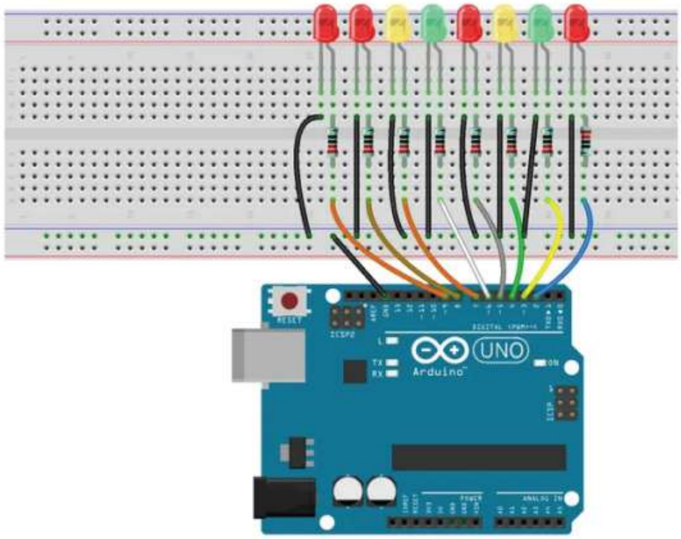
Classroom Tips

- Demonstrate the setup on a projector before students try it.
- Allow students to experiment with different pins or multiple LEDs.
- Use this activity to introduce basic coding concepts like loops and timing.

Learning Reflection

- What did you learn about digital control?
- How do you think blinking lights are used in the real world?
- What would you like to control next using Arduino?

This simple project not only introduces basic programming and electronics, but also lays the foundation for future innovation. As students light up a tiny LED, they're also lighting up their curiosity.




FROM THE DIRECTOR OF INDEPENDENCE DAY
A ROLAND EMMERICH FILM
THE DAY AFTER TOMORROW
WHERE WILL YOU BE?
TWENTIETH CENTURY FOX PRESENTS
A CENTROPOLIS ENTERTAINMENT / LIONS GATE / MARK GORDON COMPANY PRODUCTION
A ROLAND EMMERICH FILM "THE DAY AFTER TOMORROW" DENNIS QUAID JAKE GYLLENHAAL IAN HOLM
EMMY ROSSUM SELA WARD MUSIC BY HARALD KLOSER CO-PRODUCER THOMAS M. HAMMEL FILM EDITOR DAVID BRENNER A.C.E.
PRODUCTION DESIGNER BARRY CHUSID DIRECTOR OF PHOTOGRAPHY UELI STEIGER, ASC EXECUTIVE PRODUCERS STEPHANIE GERMAIN UTE EMMERICH KELLY VAN HORN
PRODUCED BY MARK GORDON ROLAND EMMERICH STORY BY ROLAND EMMERICH
SCREENPLAY BY ROLAND EMMERICH & JEFFREY NACHMANOFF DIRECTED BY ROLAND EMMERICH
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Intense Situations of Peril

The Day After Tomorrow: Fiction or a Glimpse into Our Climate Future?

The Day After Tomorrow
Directed by: Roland Emmerich
Writers: Roland Emmerich & Jeffrey Nachmanoff
Starring:
Dennis Quaid | Jake Gyllenhaal | Emmy Rossum | Ian Holm | Sela Ward
Genre: Science Fiction

The Day After Tomorrow: When Nature Responds to Human Negligence

What would happen if the Earth were struck by polar storms within a matter of days, leaving humans caught in the midst of extreme climatic chaos? Directed by Roland Emmerich and released in 2004, The Day After Tomorrow is not just a disaster movie filled with action, but a stark warning about the consequences of human negligence towards the planet, presented through spectacular visuals and dramatic tension.

The story centres around Jack Hall (played by Dennis Quaid), a paleoclimatologist who warns the government about the potential global catastrophe caused by climate change. His research reveals that global warming has led to massive polar ice melt, disrupting the thermohaline circulation (global ocean currents), particularly the Atlantic Meridional Overturning Circulation (AMOC). As the AMOC collapses, global climates shift dramatically, triggering superstorms, giant hailstorms, deadly tornadoes, and eventually a new ice age. In the midst of the chaos, Jack struggles to rescue his son, Sam (Jake Gyllenhaal), who is trapped with his friends in the New York Public Library, fighting for survival in a freezing city.

Science/Factual Phenomena (Reality vs. Fiction)

Although the narrative of the film is expedited for dramatic effect, The Day After Tomorrow draws upon real scientific theories. Below are some of the phenomena depicted in the film and their current status in the real world:

Global Warming

The film opens with dramatic visuals: massive ice sheets in Antarctica breaking apart unexpectedly. This scene symbolises one of the most tangible consequences of global warming that we are currently witnessing in the real world. According to the UK Met Office, 2025 is predicted to be one of the hottest years on record, with global temperatures increasing by between 1.29°C and 1.53°C compared to pre-industrial levels, even with natural cooling events like La Nina occurring. This highlights the increasing influence of greenhouse gases, keeping global temperatures above 1°C for twelve consecutive years.

Science Info

Global warming occurs due to the increased concentration of greenhouse gases like carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) in the atmosphere. These gases trap infrared radiation (heat) reflected from the Earth's surface, causing the planet's temperature to rise.

Polar Ice Melt & AMOC Disruption

In the film, Jack Hall warns the world that disruption of the North Atlantic Current (AMOC) could trigger a global climate shift. This warning is

increasingly relevant to our current situation. "If the North Atlantic Current is disrupted, we could be looking at a global climate shift," says Hall. In reality, the Arctic sea ice reached its lowest extent in 47 years in March 2025, with satellite records showing 14.33 million square km. This signals the accelerated pace of global warming, causing disruption to polar ecosystems and potentially weakening the Atlantic Meridional Overturning Circulation (AMOC), which could destabilise global climate patterns in the long term.

Science Info

AMOC (Atlantic Meridional Overturning Circulation) is a large-scale ocean current system that transports warm water from the tropics to the north and cold water back south. This process plays a critical role in maintaining global climate stability.

Tornadoes & Hailstorms

The film features a series of tornadoes destroying Los Angeles, while giant hailstorms pour down on Tokyo. These scenes illustrate the chaotic and unpredictable nature of the atmosphere when energy levels within it increase.

This situation mirrors real-life events, such as recent devastating storms in Texas and Oklahoma, accompanied by tornadoes, flooding, and hailstorms that caused significant casualties and damage.

Science Info

Tornadoes form when warm, moist air meets cold, dry air, creating extreme temperature and pressure differences. These differences generate swirling winds at incredibly high speeds. Hailstorms occur when water droplets rise into very cold layers of the atmosphere, freezing and then falling back to Earth because they are too heavy to remain aloft.

Extreme Global Cooling

The film culminates with a superstorm that pulls cold air from the stratosphere and freezes New York City within seconds. In the movie, extreme global cooling occurs in a matter of days due to the collapse of the oceanic circulation (AMOC). While such rapid cooling is unlikely in reality, scientists are observing signs of AMOC slowdown that could have significant long-term impacts on global climates, such as harsher winters or droughts.

Science Info

In the film, the superstorm sucks cold air from the stratosphere and freezes the city instantly. Scientifically, this scenario is highly improbable, but there is some basis for it:

If AMOC weakens severely, regions like Europe and North America could experience extreme cooling due to the absence of warm ocean currents flowing from the Atlantic. This could trigger:

- Longer, harsher winters
- Regional temperature drops even as the globe continues to warm

A Humanitarian Call

Beyond the storms and ice that blanket the world, the film raises a crucial question: “How far are we willing to go to save our planet?” The Day After Tomorrow not only portrays destruction but also resilience, the relationship between father and son, forced policy changes, and developing countries becoming refuge havens.

The Day After Tomorrow serves as a reflection of the future—or perhaps the present—if we continue to delay meaningful action to save the Earth. It sends one clear message:
This film is not about 'what will happen tomorrow,' but 'what could happen if we keep neglecting the planet.'

Film Commentary

- **Anthony Leiserowitz**, Director of the Yale Program on Climate Change Communication, acknowledged that although the film focuses more on dramatization, The Day After Tomorrow has had a significant impact in sparking public conversations about climate change. He views the film as a "cultural primer" that has influenced how we understand the potential effects of extreme climate change in the future.
- **Sunshine Menezes**, Director of the Rhode Island Center for Environmental Studies, describes the film as an effective tool to start a broader conversation about climate change. While she notes that the film alters some scientific details for dramatic effect, she believes it successfully introduces important concepts about the uncertainties and risks of the climate change challenges we currently face.

References

Media Indonesia. (2024). Sinopsis The Day After Tomorrow: Film bencana ilmiah perubahan iklim di seluruh dunia. Retrieved from https://mediaindonesia.com/hiburan/713039/sinopsis-the-day-after-tomorrow-film-bencana-ilmiah-perubahan-iklim-di-seluruh-dunia

Met Office. (2024). 2025 global temperature outlook. Retrieved from https://www.metoffice.gov.uk/about-us/news-and-media/media-centre/weather-and-climate-news/2024/2025-global-temperature-outlook

Climate.gov. (2025, March 22). 2025 winter maximum sea ice extent Arctic smallest on record. Retrieved from https://www.climate.gov/news-features/event-tracker/2025-winter-maximum-sea-ice-extent-arctic-smallest-record?utm_source

Associated Press. (2023, November). Climate change threatens the North Atlantic's currents, ecosystems, and stability: Commentary. Retrieved from https://apnews.com/article/oklahoma-flooding-deaths-weather-40b64f26f878c37fb5eccb9ff118c35f

Mongabay. (2023, November). Climate change threatens the North Atlantic's currents, ecosystems, and stability: Commentary. Retrieved from https://news.mongabay.com/2023/11/climate-change-threatens-the-north-atlantics-currents-ecosystems-and-stability-commentary

Yale Climate Connections. (2024, May). The enduring influence of The Day After Tomorrow, 20 years later. Retrieved from https://yaleclimateconnections.org/2024/05/the-enduring-influence-of-the-day-after-tomorrow-20-years-later/

Why is the Colour Blue So Rare in Nature?

The Secret Behind the Sky, the Ocean, and Peacock Feathers

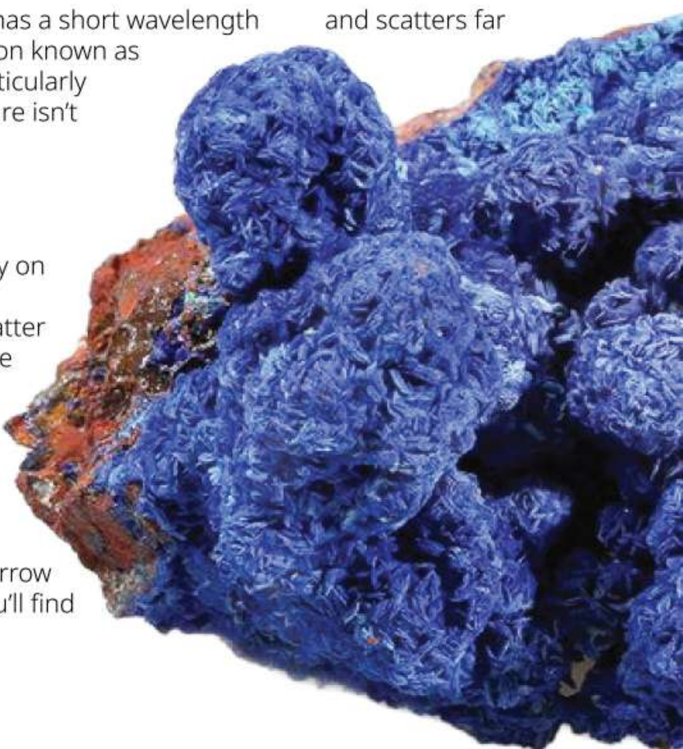
The Uncommon Colour in a Colourful World

Take a moment to think about blue in the natural world. While blue is an incredibly common colour in human-made items—think of jeans, logos, and blueprints—it's surprisingly rare in nature. You don't come across many naturally blue flowers, animals, or even fruits. But why?

This apparent rarity of blue in the natural world is more than just a quirky observation. It's linked to the way light behaves, the biology of creatures, and even the chemistry behind pigments.

The Physics of Blue: It's All About Light

The first part of the mystery lies in how blue light is produced. Blue light has a short wavelength and scatters far more than other colours. This is why the sky appears blue—a phenomenon known as Rayleigh scattering—but it also means that creating blue pigments is particularly challenging in the natural world. In fact, most of the "blue" we see in nature isn't actually blue!



The Illusion of Blue: Structural Colouration

Take a peacock's feathers or a blue butterfly's wings, for instance. These creatures don't use pigments to create their blue colour. Instead, they rely on structural colouration, which involves the microscopic structure of their feathers or wings. These tiny structures manipulate light, causing it to scatter in such a way that only blue light is reflected back to our eyes, creating the illusion of colour. The "blue" we see is not a pigment but an optical illusion, a captivating trick of nature!

The Rarity of Blue Pigments in Plants and Animals

Compared to colours like green or red, true blue pigments are quite rare in nature. One of the few exceptions is the blue morpho butterfly, whose striking blue wings are a result of structural colour, and the blue poison arrow frog, which uses the pigment indigoidine. However, if you look closely, you'll find that blue pigments are much less common in both the plant and animal kingdoms than their more prevalent counterparts.

Why? One theory suggests that blue pigments require more energy to produce, and evolution tends to favour colours that are easier and more energy-efficient to make. Green, for example, is more common because chlorophyll—the pigment responsible for photosynthesis—is naturally green.

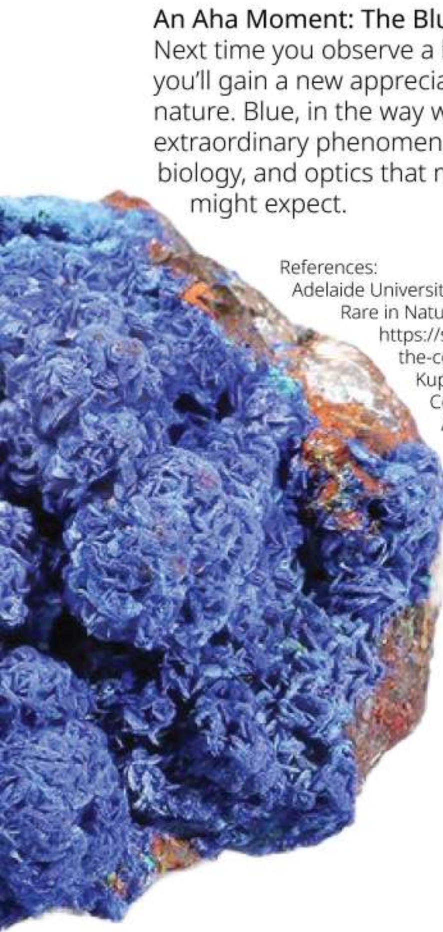
The Blue Sky and the Blue Sea: Not Quite What You Think
When you gaze at the sky or the ocean, you're actually seeing reflections of light—not objects that are inherently blue. The ocean absorbs longer wavelengths of light (such as red and yellow), while shorter wavelengths (blue) are reflected back. The sky, on the other hand, scatters blue light due to the air molecules in Earth's atmosphere.

So, in a sense, the blue of both the sky and the sea is an optical effect, not a "true" colour like red or green.

The Evolutionary Mystery: Why Do Humans See Blue?
Humans have a unique ability to perceive the colour blue—one that isn't shared by all animals. In fact, many creatures, including most mammals, can't see blue at all! It turns out that humans have three types of colour receptors in our eyes, and one of them is particularly sensitive to the shorter wavelengths of light (which correspond to blue).

This ability likely evolved to help our ancestors spot ripe fruit or edible plants, which in certain environments often exhibited hues that had a bluish tint.

An Aha Moment: The Blue You See Isn't Always "Blue"
Next time you observe a blue sky or a peacock's feather, you'll gain a new appreciation for the complexity of colour in nature. Blue, in the way we perceive it, is a rare and extraordinary phenomenon—a combination of physics, biology, and optics that makes it feel more elusive than you might expect.



References:
Adelaide University. (2019, August 20). Why is the Colour Blue So Rare in Nature? University of Adelaide. Available at: https://set.adelaide.edu.au/news/list/2019/08/20/why-is-the-colour-blue-so-rare-in-nature
Kupferschmidt, K. (2021, January 6). Why is the Colour Blue So Rare in Nature? Live Science. Available at: https://www.livescience.com/why-blue-rare-in-nature.html

Bridging Science and Sustainability: SEAQIS' Role in the Future of Southeast Asia's Education


Robotic Training


STEM Training


STEM Implementation in school

Southeast Asia is on the brink of a significant educational transformation, driven by the global need for sustainability, technological advancement, and social equity. SEAMEO QITEP in Science (SEAQIS) continues to lead the charge in shaping science education across the region, with a strong focus on inquiry-based learning, climate education, and the integration of technology. This commitment has been at the core of SEAQIS' mission since 2017 and remains central to its strategy for the future.

A Foundation in Education Innovation

Since its establishment, SEAQIS has consistently worked to enhance the quality of science education across Southeast Asia. It has helped foster a generation of learners who not only understand scientific principles but are also equipped with the creativity and problem-solving skills necessary to address real-world challenges. By integrating Science, Technology, Engineering, and Mathematics (STEM) with broader educational trends, SEAQIS encourages students to think critically and innovatively about the world around them.
As SEAQIS moves forward, it aims to strengthen its approach through three strategic directions that go beyond STEM:

1. Inquiry-Based and Problem-Solving-Oriented Learning: Encouraging Curiosity and Action

The traditional approach of rote memorization is being replaced by an emphasis on inquiry-based learning, which encourages students to ask questions, explore, and find solutions. By shifting the focus from content-heavy lessons to real-world applications, SEAQIS aims to nurture not only scientific knowledge but also the skills necessary for critical thinking, collaboration, and creativity.
Through inquiry-based STEM projects, students will tackle local and global issues, from designing sustainable solutions to exploring environmental conservation. These projects will allow them to actively apply their learning to complex, real-world problems.

2. Integrating Technology and ICT in Science Learning

As digital technologies continue to evolve, SEAQIS is

incorporating Information and Communication Technology (ICT) to enhance the science learning experience. Virtual experiments, digital simulations, and online collaboration tools will be integrated into classrooms to make science education more interactive, engaging, and accessible.
While technology is vital, SEAQIS also ensures that students gain Computational Thinking (CT) skills, preparing them for the future not just in STEM fields but also in broader disciplines. These skills equip students with a systematic and logical approach to problem-solving, fostering adaptability and analytical thinking.

3. Climate Change Education as a Key Focus

In response to the environmental challenges facing Southeast Asia, SEAQIS has prioritized climate change education. From rising sea levels to biodiversity loss, the region is increasingly vulnerable to environmental issues, making it essential for students to understand and engage with sustainability efforts.

SEAQIS supports teachers in incorporating climate change education into their lessons, fostering a generation of environmentally-conscious students. By integrating sustainability and environmental stewardship into science education, SEAQIS empowers students to become change-makers in their communities.

Moving Forward: A Vision for Dynamic and Inclusive Science Education

By focusing on inquiry-based learning, the integration of technology, and sustainability, SEAQIS envisions a future where science education is dynamic, inclusive, and responsive to the needs of society. The goal is not only to teach scientific concepts but also to equip learners with the skills and mindset necessary to address the challenges of the 21st century. Through continued regional collaboration and a commitment to educational innovation, SEAQIS is poised to shape the future of science education in Southeast Asia.

Climate Resilience through SEA-CEP 2024 Phase 1

STEM Training

STEM in Computational Thinking Training

A New Chapter Begins: Welcoming Dr Apriyagung as SEAQIS Deputy Director for Programme

SEAQIS is pleased to welcome Dr Apriyagung as its new Deputy Director for Programme. He will serve from 1 January 2025 to 31 December 2027—a role that aligns perfectly with his lifelong dedication to advancing the quality of education through collaboration, innovation, and strategic leadership.

Born in Jakarta and educated across Indonesia and Australia, Dr Apriyagung brings over two decades of experience in education policy, teacher professional development, and international cooperation. He holds a PhD in Educational Administration from Monash University, Australia—a foundation that has guided his impactful contributions to both national and global education sectors.

Dr Apriyagung's career reflects a consistent commitment to public service. Beginning as a lecturer and English teacher, he later held several strategic roles within Indonesia's Ministry of Education. His work has played a central role in key national initiatives, including the development of quality assurance systems and the transformation of teacher education.

Internationally, he served as a Loaned Expert to UNESCO in Paris for the International Task Force on Teachers for Education 2030. In that role, he supported global policy dialogue, programme coordination, and resource mobilisation to strengthen the teaching profession worldwide.

Domestically, Dr Apriyagung has been instrumental in shaping Indonesia's recent education reforms. As Coordinator for Partnership and Public Communication at the Directorate of Teacher Professional Education, and through his work with the Teacher Education Transformation Taskforce, he led cross-sectoral initiatives to improve the quality and equity of teacher training nationwide.

In his new role at SEAQIS, Dr Apriyagung is set to lead regional programmes with a vision rooted in empowerment, collaboration, and evidence-based practice. His broad experience and global perspective will be invaluable as SEAQIS continues its mission to strengthen science education across Southeast Asia.

We are excited to embark on this new chapter under his leadership and look forward to the innovations and partnerships that lie ahead.

DISCOVER STEM

STEM MAY SEEM COMPLEX AND FULL OF PUZZLES, BUT THAT'S HOW THE WORLD WORKS. THERE'S NOTHING WRONG WITH FAILING AS LONG AS YOU NEVER STOP TRYING AND STAY EAGER TO GAIN KNOWLEDGE.

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