



SPH



APPLIED SCIENCE
ACADEMY
*Sekolah Pelita Harapan
Center of Excellence*

APPLIED SCIENCE ACADEMY

BENEFITS & IMPROVEMENTS | ACHIEVEMENTS & TESTIMONIES
APPLICATION & RESEARCH PROCESS | ONBOARDING & REGULATION



What is ASA?

The Applied Science Academy (ASA) at Sekolah Pelita Harapan aims to be at **the forefront of investing in the empowerment of our younger generations.**

starting from high school levels by providing an **authentic research environment** in areas that the student is passionate about.

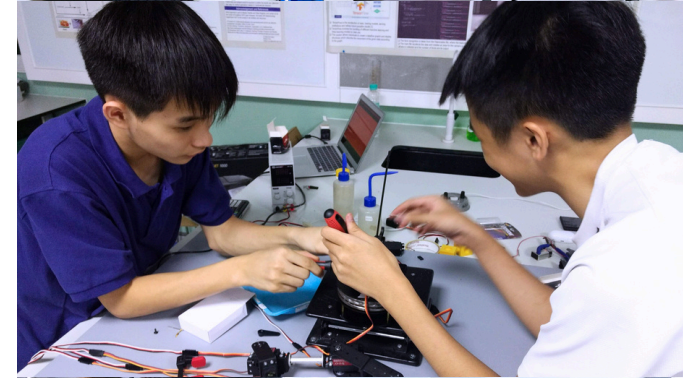
In the Academy, **students work with mentors from different areas of research**, such as biotechnology, advanced physics, robotics, data science, pharmacy, alternative energy, and many more.

Passion Avenue for Science

FOR SPH STUDENTS IN GRADE 10, 11, and 12

- ✓ Exclusive research-based initiative
- ✓ Afterschool activity
- ✓ Professional mentors guidance
- ✓ Strengthen core learning
- ✓ Develop the differentiator factors for successful college and professional career

“
116
students
in total
mentored
since
2018
”



About ASA Director



DR. EDEN STEVEN
ASA Director

Dr. Eden received his Ph.D. in Physics at the National High Magnetic Field Laboratory (NHMFL) at Florida State University (FSU), USA. He spent 2 years as a postdoctoral fellow at NHMFL while also serving as adjunct faculty in the Physics department at FSU before he returned home to Indonesia. He has been active in research for the last 15 years across multi-disciplinary fields in materials physics, robotics, edge computing, IoT and applied AI systems; a co-founder of multiple startup companies; a holder of multiple technology patents; and directed high school STEM research initiatives. He has mentored over 100 high school students in his careers through his STEM programs. He is a proud alumni of Sekolah Pelita Harapan (SPH).

Published **30+ papers** with **several Nature affiliated journal**

Co-founded multiple startup companies (edu-tech, industrial IoT/AI, insect tech)

Held **multiple technology patents** (materials tech, insect tech)

Pioneered innovative high school STEM initiatives in Indonesia (Applied Science Academy, Nikola Academy)

Scan QR to access Dr.Eden's CV



Highlights at SPH LV

100+
high school students
interdisciplinary research

10+
undergraduate students

- One student admitted to computer science program in US universities with full scholarships.
- One student admitted to MIT PhD program in EECS.
- Two students earned Jardine Scholarship at Cambridge University and Oxford University with full funding, living coverage, and monthly stipend.
- Two students admitted to AMGEN Scholars Program at ETH Zurich.
- Students admitted to top various top universities, including Dartmouth College (ivy), Imperial College London, U. of Toronto, UIUC, U. of Chicago, Washington, Wisconsin, UCSD, HKUST, and more.

Director's Message

Science is more than knowledge. It reveals the laws and order that shape our universe. Simply put, it helps us understand how things work in the beautiful world God has created. By understanding how things work, we can develop new ideas, technologies, and solutions that benefit society. The process of discovering how things work is known as research.

At the Applied Science Academy (ASA), students are immersed in research-based activities across interdisciplinary fields driven by their curiosity. We strongly believe in the value of research-based learning. It builds character, develops time management, and teaches independence, perseverance, and self-learning. In research, failure is often the beginning of success. Through experiments and persistence, great discoveries emerge.

ASA was established in 2018 with the vision of providing the SPH community with a state-of-the-art research program where high school students can discover their passions and develop strong skills and portfolios for their future. It is an after-school program where students freely explore ideas under the guidance of experienced mentors with full access to laboratory facilities.

Over the past seven years, ASA has grown within the SPH Lippo Village community. We have built strong partnerships and developed expertise in mentoring student research. Several student projects have been published in international journals, and many research prototypes have been developed. Many of our alumni have gone on to top universities around the world, some receiving prestigious scholarships as a result of their academic achievements and ASA research experience.

I would like to thank the school for supporting and funding ASA over the past seven years as it developed into one of the most authentic high school research programs in the world. Significant effort, funding, and dedication have been invested in building ASA with the intention that once the program was well established at SPH Lippo Village, it could expand to other SPH campuses. Today, we are ready for that next step.

We are excited to announce that ASA will begin expanding to other campuses, starting with SPH Kemang followed by additional SPH campuses in the coming years.

ASA now enters a new chapter with the introduction of ASA-NEO, a more structured and refined program. This phase expands mentorship through additional full-time mentors and introduces new research opportunities, including emerging fields such as artificial intelligence. Students will also gain access to the ASA project tracking database, a newly established alumni network, and expanded laboratory access to support science, engineering, and innovation.

With ASA-NEO, our mission remains the same: to empower students to transform curiosity into knowledge, ideas into experiments, and learning into meaningful contributions to society. Through ASA research alongside the IB academic program, we are committed to maximizing students' future opportunities and inspiring the next generation of scientists, engineers, and problem-solvers.



**DR. EDEN
STEVEN**

ASA DIRECTOR

ASA Milestone



We believe that **every student has their own milestones to achieve**. Through this program, we strive to reach greater milestones together—empowering students to turn their findings, ideas, and efforts into meaningful contributions that address the challenges of today and shape a better future.

At ASA, students engage directly in the scientific process. They learn to recognize real-world issues, design experimental approaches, trial early-stage prototypes, and use laboratory or computational tools to investigate their ideas. Their work is exploratory and focuses on building research skills rather than producing finished outcomes. Through this process, **students gain confidence, curiosity, and practical experience that supports their readiness for university-level study.**

100+

research prototypes
interdisciplinary research

10+

**publications &
conferences**

- **50+ Technology Innovation**
- **30+ Computing System**
- **20+ Novel Scientific Study**

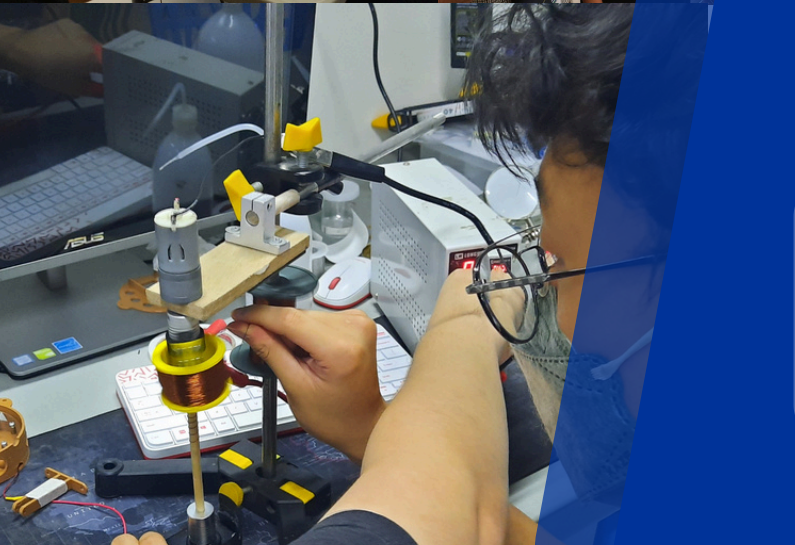
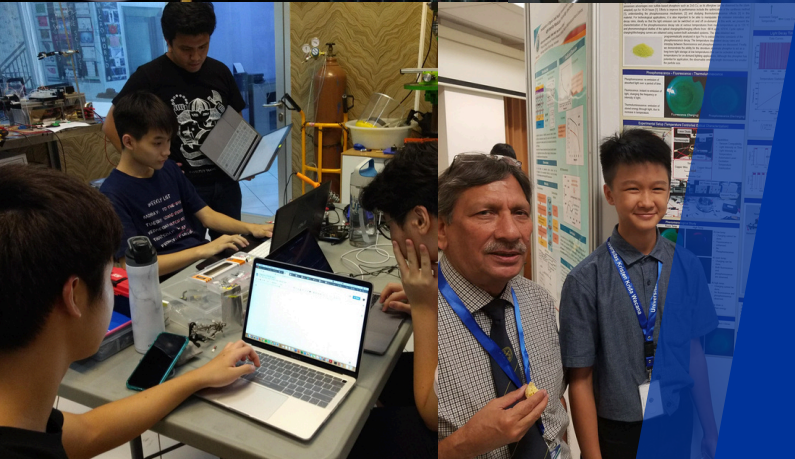
- **Q1 International Scientific Publication**
- **Q2/Q3 International Scientific Publication**
- **Conference Proceedings**



The Beginning: ASA Development at SPH LV

In **2018**, ASA was incubated at SPH LV with the intention to build a program which allowed students to:

- Explore their passion
- Identify their university direction
- Discover their sense of purpose
- Gain advanced skills in research and broadened their thinking capacity
- Enhance their portfolio and scholarship potentials



In the first year, we had a **student published an international scientific journal** and won awards at international conferences! **He is now at MIT pursuing Ph.D. in Computer Science.**



What We Witnessed:

Through ASA, we discovered that students:

- Found their passion and clearer direction of what their university direction.
- Developed deeper sense of purpose for their learning.
- Became highly drawn to complex and advanced knowledge and skills.
- Produced meaningful research experiences
- Improved their potential for scholarship or top unis enrollment.

ASA has been in development for the last 7 years. Each year, we grow our capacity, build new mentor network, and improve the research process. **More than 100 student success stories have been written.**



ASA for All SPH Campus

Significant effort, funding, and dedication have been invested in building ASA with **the intention that once the program was well established** at SPH Lippo Village, it could **expand to other SPH campuses**.

Today, we are **ready** for that next step.

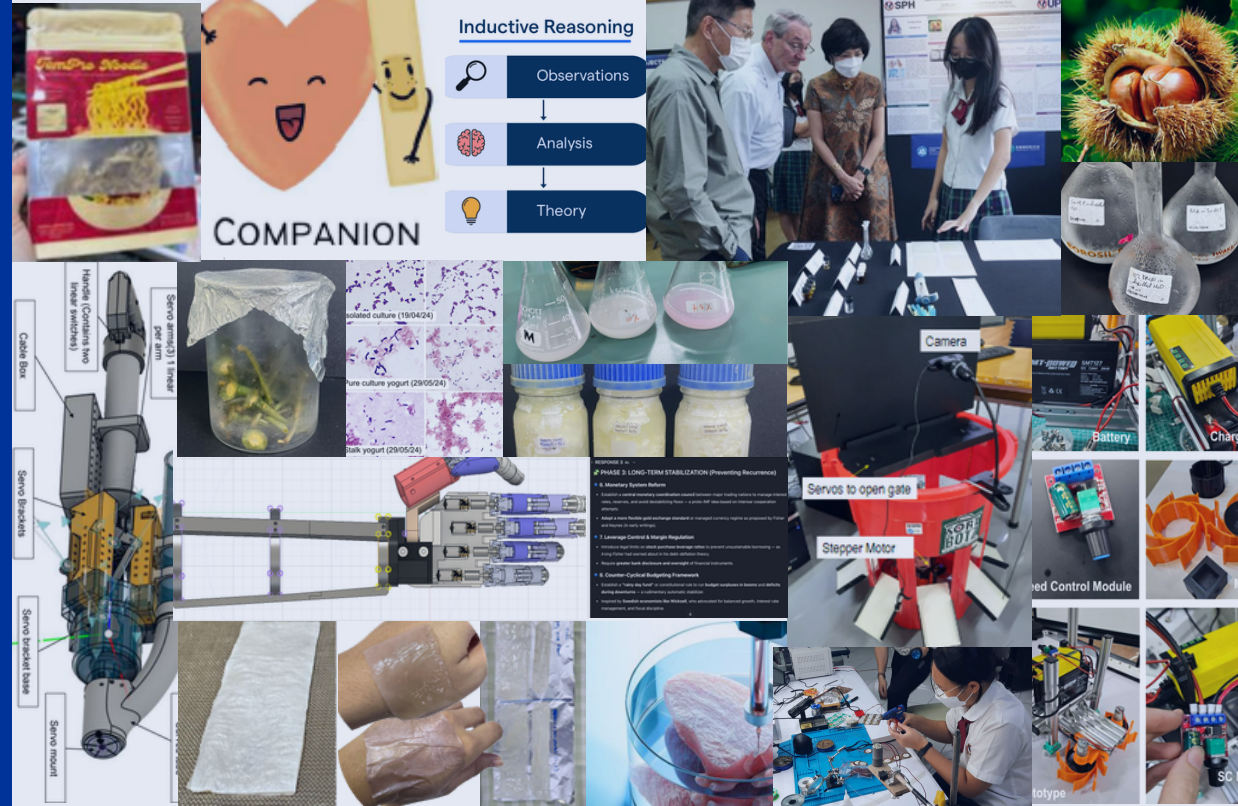


APPLIED
SCIENCE
ACADEMY

Introducing: ASA-NEO

A refined and expanded research program designed to provide:

- **Stronger and more detailed** research mentorship
- More **structured** research pathways
- **Broader field of research** opportunities
- Available to both **SPH LV and SPH KV** in 2026-2027, and to other SPH campuses in the following years.



ASA-DEV to ASA-NEO

ASA-NEO builds on everything learned during the development phase, further providing **significant improvements.**

	ASA	ASA-NEO
Mentor	Part-time mentor	Additional full-time & dedicated mentor (technical research, manuscript writing)
Research Field	Biotechnology, Computer Science, Engineering	All previous fields + New field in AI (Agentic AI, etc.)
Branch	Only in SPH-LV	Available in SPH-LV, SPH-KV, & others coming soon
Dedicated System	None	ASA Dedicated System (Project & Data Tracking , Documentation and Portfolio Database)
Networking after ASA	None	ASA Alumni Society



SPH



APPLIED
SCIENCE
ACADEMY

**GETTING A
HEADSTART
SCIENCE
SPECIALISATION
WITH ASA**



Start

EARLY CAREER

**journey with
future-ready skills
and experiences
for university and
beyond**

- Clarify university direction
- Discover strong sense of purpose
- Gain exposure to global challenges





Earn opportunities for RESEARCH PUBLICATIONS, certificates, and other academic recognitions

- Guided support for research publication, from data collection to manuscript writing
- Receive a certificate of excellence
- *Conference, competition, and publication fees are not included*





Create a powerful

**SCIENTIFIC
PORTFOLIO**

that elevates
your college
applications

- Join conferences and competitions
- Strengthen core academic skills
- Write a stronger personal essay



ASA BENEFITS





Build

PROFESSIONAL NETWORK

with fellow ASA alumni, researchers, mentors, and peers in science and engineering

- Collaborate with university & research institution teams
- Explore careers in STEM-related field



ASA BENEFITS



ASA BENEFITS



Develop

**SPECIALIZED
SKILLSETS**

**and knowledge at a
pre-college or early
college level**

- Learn to write and publish scientific reports
- Gain practical experience in developing systems and apps





Receive a

RECOMMENDATION LETTER

from the ASA
Director upon
request

- Provided based on proven effort and dedication during ASA research
- Significantly strengthen your college applications

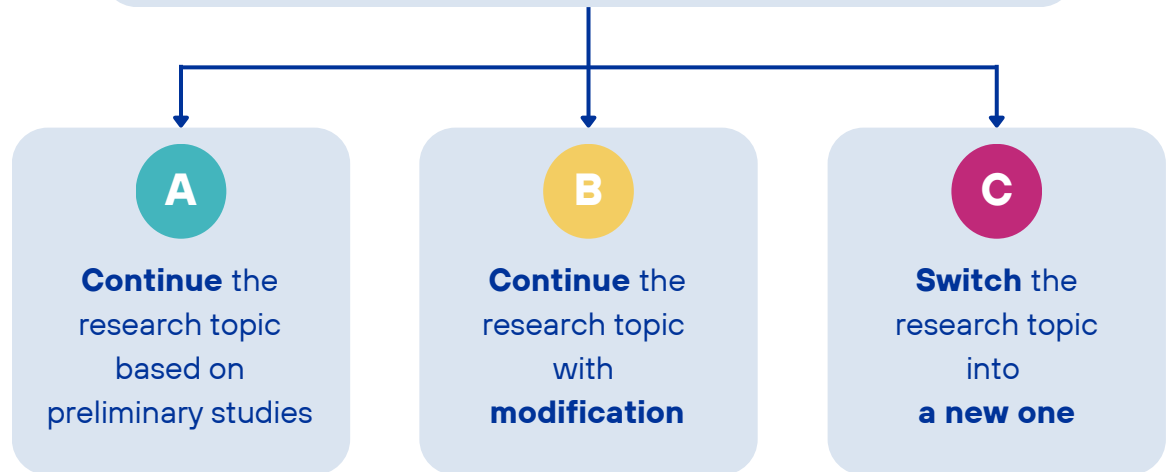


In Research Project: What to Expect?



RESEARCH
PROJECT

During the research, it is to be expected for some **changes or modifications** happen along the way. Depending on the **preliminary** literature review and early prototyping or experiment, the student will:



Research Field & Topic

RESEARCH
PROJECT



MATERIALS

Biomaterials, Polymer, Nanomaterials, Cryogenics, Building Material, Optics & Meta Material, & Quantum



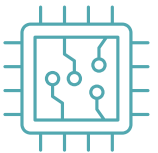
ENVIRONMENT

Renewable Energy, Plastic Waste Pollution, Geospatial Science & Agriculture, Clean Water, Water Upcycling, Electronic Waste, Air Pollution, & Noise Pollution



LIFE SCIENCE

Biotechnology*, Health and Pharmacy, Physics, Disability & Accessibility, Chemistry, Math. **DNA Technology, Cell Culture & In vivo research are not applicable.*



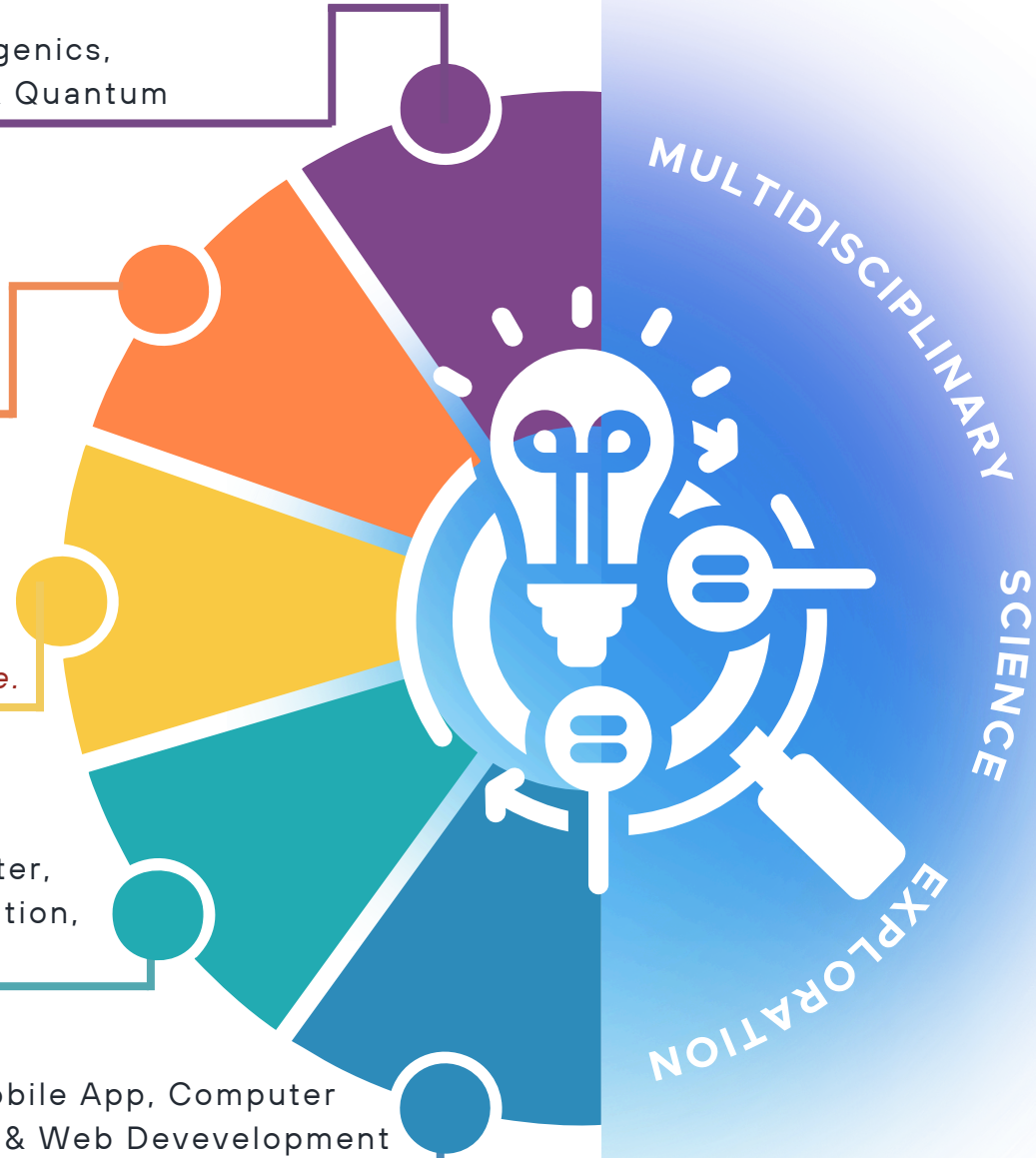
ELECTRONICS

Renewable Energy, Plastic Waste Pollution, Geospatial Science & Agriculture, Clean Water, Water Upcycling, Electronic Waste, Air Pollution, & Noise Pollution



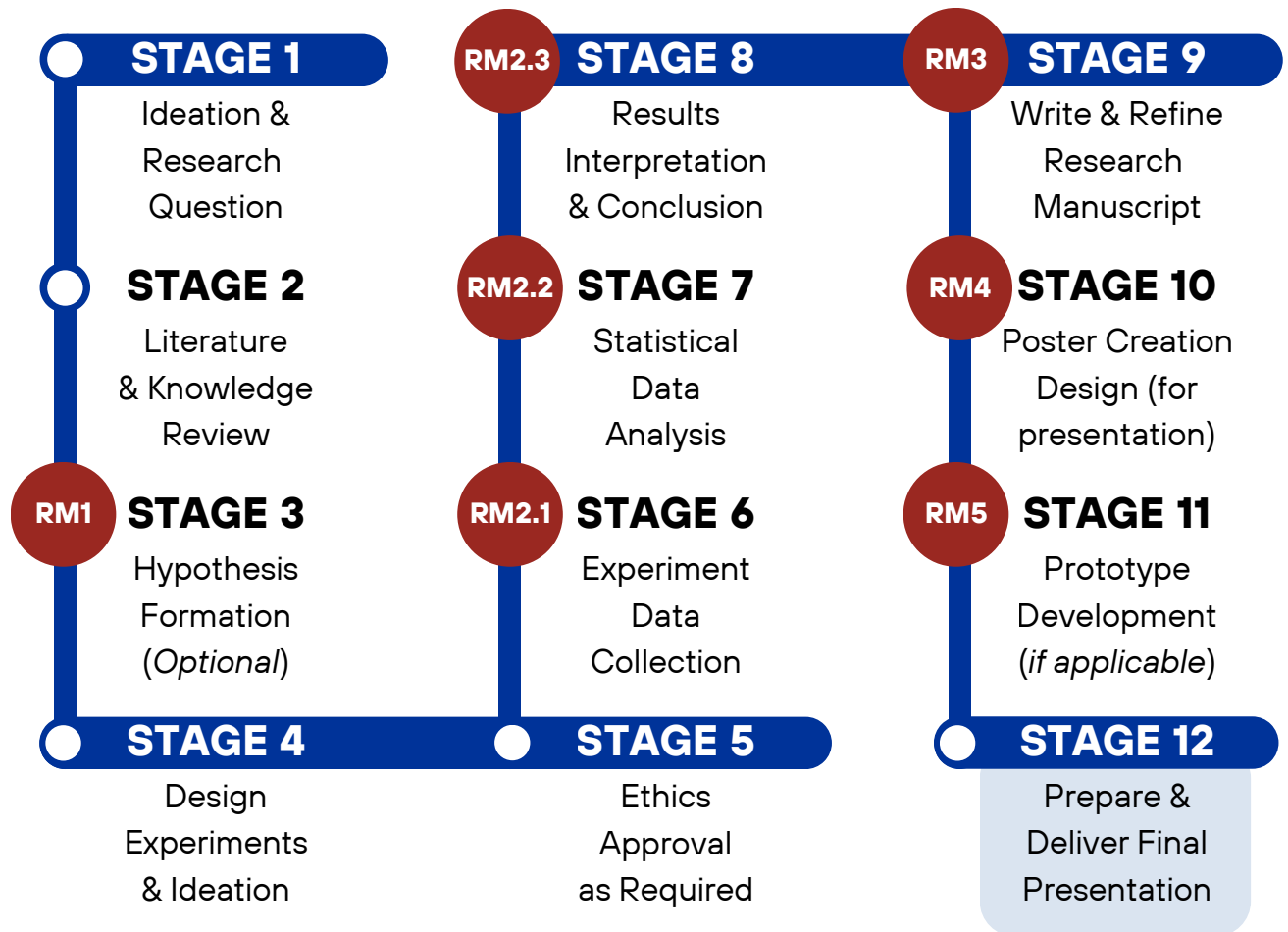
PROGRAMMING

Computer Vision, Machine Learning & AI, Mobile App, Computer System, IoT, Data Science, Edge Computing & Web Devevelopment



Research Process

RM = Research Milestone → Report & Presentation



Publication & Conference

ASA
MILESTONE

Research Publication

We believe that every student has their own milestones to achieve. Through this program, we strive to reach greater milestones together—empowering students to turn their findings, ideas, and efforts into meaningful contributions that address the challenges of today and shape a better future.

Q1 International Scientific Publication



The screenshot shows the top portion of a Scientific Reports article. At the top, it says "scientific reports" with navigation links for "Explore content", "About the journal", and "Publish with us". Below this is a breadcrumb trail: "nature > scientific reports > articles > article". The article title is "In-vitro and in-silico analyses of the thrombolytic potential of green kiwifruit". The authors listed are Reinhard Pinontoan, Jonathan Suciono Purnomo, Elvina Bella Avissa, Jessica Pricilla Tanojo, Moses Djuan, Valerie Vidian, Ariela Samantha, Juandy Jo, and Edén Steven. The article is from Scientific Reports, volume 14, article number 13799 (2024). It has 1607 accesses and 1 Altmetric.

Q2/Q3 International Scientific Publication



The screenshot shows the top portion of a World Scientific Connect article. It includes navigation links for "Subject", "Journals", "Books", "Resources For Partners", "Open Access", "About Us", and "Help". The article title is "Light storage and thermal-assisted switching of SrAl₂O₄:Eu²⁺, Dy³⁺". The authors listed are J. K. Adhinarta, E. Joblilong, M. Shiddiq, H. P. Uranus, and E. Steven. The article is from the Journal of Nonlinear Optical Physics & Materials, volume 28, number 04, article number 1950042 (2019). It is cited by 1 source (Crossref).

Conference Proceedings



Optimising Plastic Waste Management: YOLO-NAS-Based Robotic Sorting and Mobile App Prototypes for Adaptive Model Training

Vihaan Jain, Aria Amadeus, and Edén Steven
2024, 2nd International Conference on Technology Innovation and Its Applications (ICTIIA)



AI-Powered Badminton Shot Classification

Michael Arsen Salim, Winly Williamdy, and Edén Steven
2024, 2nd International Conference on Technology Innovation and Its Applications (ICTIIA)



Enhancement of Atmospheric Water Harvesting via Salt-Infused Sponges and Peltier Devices

Jaewoong Lee, Eric Joblilong, Darren Manua, Edén Steven
Environmental Science Proceedings, 5, (2023). <https://doi.org/10.3390/ECWS-7-14176>. The 7th International Electronic Conference on Water Sciences



Comparative Analysis of Photodegradation of Ibuprofen and Clotrimazole Water Pollutant using UVC Rays in presence and absence of ZnO Photocatalyst

Shania Pesik, Eric Joblilong, and Edén Steven
Environmental Science Proceedings, 5, (2023). <https://doi.org/10.3390/ECWS-7-14176>. The 7th International Electronic Conference on Water Sciences



Implementation of A* Shortest Path Finding Algorithm in a Transport Robot with Robust Turning Mechanism

Jin Wan Kim, Ezekhiel Taniara, Nathanael Timothy, Aria Amadeus Salim, and Edén Steven
2022, 1st International Conference on Technology Innovation and Its Applications (ICTIIA)



Voice Assisted Guide for the Blind using QR Codes and Wearable Smartphones

Reuben A. Santoso, D. H. Hareva, D. Sentausa, and Edén Steven
2022, 1st International Conference on Technology Innovation and Its Applications (ICTIIA)



Companion: Mental Health Mobile Applications for Students

Olivia O. Lim, D. H. Hareva, E. Steven, D. Sentausa, and Frensent A. Abineno
2022, 1st International Conference on Technology Innovation and Its Applications (ICTIIA)



Portable Image Analyzer for Indicators with OpenCV

Phoebe Bintoro, Nathanael Timothy, A. Salim, and Edén Steven
2022, 1st International Conference on Technology Innovation and Its Applications (ICTIIA)



Improving Energy Expenditure Efficiency in Tennis Through Robotic Ball Recovery and Delivery System

Marcell S. Wang, Aria A. Salim, Ezekhiel Taniara, Wahyu Sombo, Jason S., and Edén Steven
2024, The Engineering of Sport 15, Sole high school student invited as Oral Presenter

Research Prototype

ASA
MILESTONE

Medical Device and Biomedical Technology

Students in this category explore early-stage ideas that aim to improve medical tools and healthcare technologies. Their work focuses on **concept development and preliminary testing**, such as experimenting with biomaterials for faster blood clotting, prototype designs for low-cost lab equipment, and early models for AI-based health monitoring.

Their purpose is to understand whether these ideas could eventually lead to **more accessible and effective medical support solutions**, especially in real-world scenarios where cost or access is a barrier. While their findings are still exploratory and not yet validated through large-scale research, **the projects demonstrate strong potential** for future development and lay the foundation for deeper scientific investigation in university-level study.

Key innovation:

- Developing biomaterial-based coagulation surface to enhance blood clotting for medical and emergency use.
- Biodegradable wound dressing for faster recovery.
- Medical-grade biomaterials for surgical reconstruction & training models.

Student Researcher:



Brian Prasodjo
Gr.10



Tatyara Gomargana
Gr.10



Adelyne Pandji
Gr.10



Blood clotting, wound dressing pad, bio-ink for 3D printing all made from biodegradable materials.

Research Prototype

ASA
MILESTONE

Natural Medicine and Pharmaceutical Research

This research group responds to the rising global interest in **natural treatments**, especially for chronic diseases like diabetes, inflammation-related illnesses, and skin aging. Students are motivated by the concern that many modern medical treatments are expensive, synthetic, and sometimes inaccessible, particularly in Indonesia.

Their purpose is to explore **plant-based and environmentally responsible solutions by studying bioactive compounds found in native plants and everyday natural resources such as coffee grounds**. They aim to provide alternatives that are safer, sustainable, and culturally relevant. Their work demonstrates strong potential for **future herbal pharmaceutical development, eco-friendly skincare, natural therapeutics, and cosmeceutical industries, showing that nature-based science can support better public health outcomes**.

Key innovation:

- Testing Indonesian plant extract as natural anti-inflammatory treatment.
- Exploring herbal diabetes treatment alternatives.
- Developing eco-friendly natural sunscreen using coffee waste.

Student Researcher:



Rochella Winslow
Gr.11



Marvelyn Jessie
Gr.10



Chavia Tjung
Gr.10



Hanbee Park
Gr.10



Nicolyn Alianna
Gr.10



Ye Won Kim
Gr.10

Anti-inflammatory properties of Sarangan leaves, antidiabetic activity of Tungurut leaves, sunscreen from coffee grounds.



Research Prototype

ASA
MILESTONE

Sports Engineering, Analytics and AI

Students address challenges around accessibility to scientific sports training, understanding movement mechanics, and leveraging AI to assist performance tracking and physical engagement. Their purpose is to **create technologies that enhance training precision, support athletes, and automate laborious tasks.**

They are **motivated by concerns that athletes often lack real-time feedback tools and efficient practice systems**, especially in community or school environments. The potential of this research lies in creating AI-supported athletic performance analysis, robotic assistance, and sensor-based training, **contributing to more scientific and equitable sports development.**

Key innovation:

- Robotic training tools improving efficiency and performance by developing a robot that stores balls, tracks player location
- Real-time performance feedback for athletes.

Student Researcher:



Elizabeth Elaine
Gr.11



Michael Salim
Gr.11



Marcell Wang
Gr.11



AI tennis ball distributor, badminton shuttle collector, AI player pattern analysis, predictive AI badminton / training tools

Research Prototype

ASA
MILESTONE

Robotics and AI

Students explore how **technology and intelligent systems** might help solve real-world problems in the future. Their projects involve early prototypes and initial testing, such as building robots that navigate spaces on their own, designing more affordable prosthetic devices, or experimenting with new ways to digitally map environments. These projects are still in the exploration and proof-of-concept stage, and results are not yet final or fully validated.

However, **through hands-on experimentation, students learn to combine programming, engineering, algorithms, and mechanical design to tackle meaningful challenges.** Their work shows thoughtful potential for future development while building important skills in problem-solving, creativity, and perseverance—skills that will support them in university research and beyond.

Key innovation:

- Created an early-stage robotic transport vehicle to navigate shortest route for autonomous navigation.
- Designed a cost-efficient robotic prosthetic hand for a more accessible alternative for amputees in Indonesia.
- Developed a prototype robot car to create detailed 3D environment reconstructions in a remote inspections and planning.

Student Researcher:



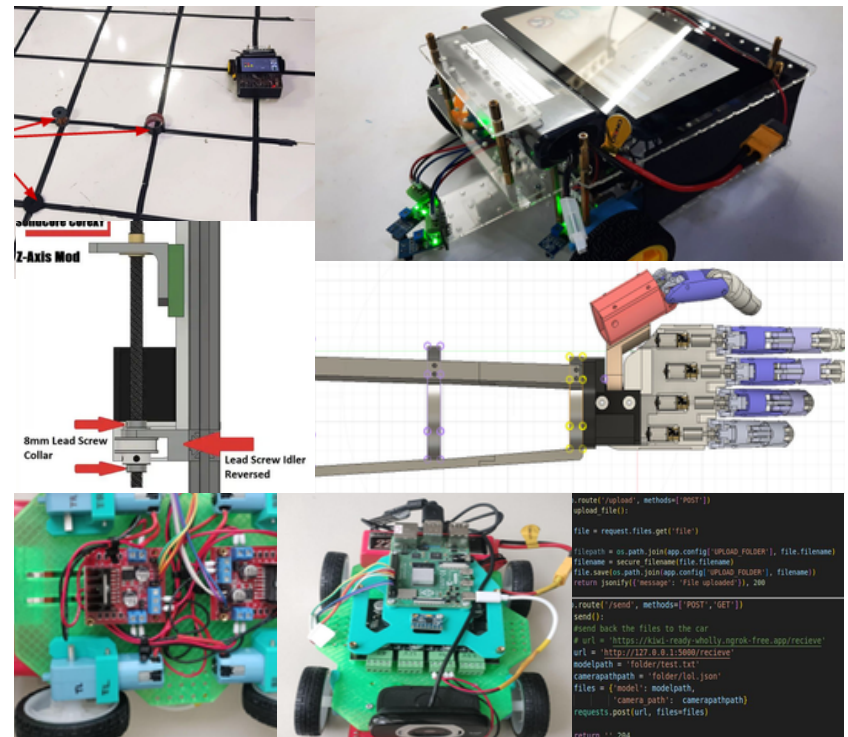
Jin Wan Kim
Gr.10



Ethan Saputra
Gr.10



Jonah Santoso
Gr.11



Development of transport robotic vehicle, build a programmed prosthetic arm, and develop mini robot for 3D environment mapping.

Research Prototype

ASA
MILESTONE

Farming Technology and Food Sustainability

In response to global issues related to **food security and agricultural efficiency**, students research early-stage ideas to improve access to nutrition and reduce waste. Their projects include the development of experimental plant-based meat substitutes and monitoring tools for microalgae cultivation.

Their work **explores whether these concepts could one day support more stable food system or contribute to sustainable food production**. While results are still limited and exploratory, these projects show meaningful potential pathways for addressing hunger, sustainability, and food resilience with science-based innovation.

Key innovation:

- Developing robots for sustainable planting mechanism to reduce waste.
- Turning agricultural waste into probiotic food.
- Developing nutrient-enriched instant rice and proteinous noodle for food security.

Student Researcher:



Zacharias Chandra
Gr.10



Jason July
Gr.10

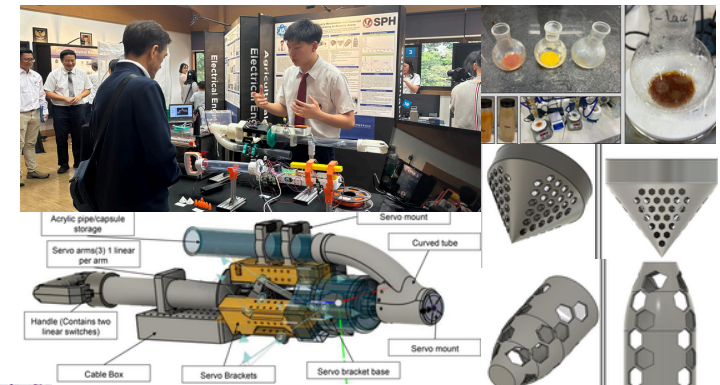


Kaylie Pangestoe
Gr.10



Joel Sufianto
Gr.10

3D-printed seed capsule dispenser, chili stalk fermentation and healthy instant meal.



Research Prototype

ASA
MILESTONE

Environmental and Renewable Energy

Students here are motivated by pressing global concerns related to pollution, waste management, energy shortages, and the search for clean alternatives to fossil fuels. They aim to **design practical engineering solutions that transform waste into usable resources, reduce carbon emissions, and develop new forms of renewable energy** such as triboelectric filters, sand-based heat batteries, and piezoelectric paper.

Their worries revolve around the **environmental crisis caused by human consumption and lack of sustainable technology adoption**. Their research demonstrates powerful potential to create scalable and eco-friendly technologies that can support greener cities, cleaner air, sustainable resource cycles, and future environmental engineering breakthroughs.

Key innovation:

- Utilizing spent coffee grounds to remove heavy metals from polluted water and using vibrating plastic waste to reduce air pollution.
- Harvest energy from vibration of footstep, raindrops and writing activity for renewable power generation.
- AI & mechanical solution for efficient waste sorting and recycling.

Student Researcher:



Amelie Hartanto
Gr.10



Yuchan Nam
Gr.10



Kayleen Soetirto
Gr.11



Mateo Winata
Gr.10



Yumin Nam
Gr.10

Water purification and air filtration using upcycled waste, energy harvesting using piezoelectric materials, and automatic trash sorter.



Research Prototype

ASA
MILESTONE

Psychology, Politics, and Policies

Students working in psychology, policy, and civic-related topics are **motivated by thoughtful questions about how science can help society make better decisions**. In psychology, they explore how multilingual experiences may influence thinking and behavior. In policy-focused work, they investigate how data and technology can support communities in understanding issues like air quality and climate change.

Their research is still in early stages and results are not final, but their ideas show meaningful potential and reflect genuine care for the future. These projects mark **the beginning of important conversations about how science, human behavior, and policy connect to build a more informed and responsible community**.

Key innovation:

- Creating a scheduling application to support students in managing academic workload more effectively based on ones' psychology profiling.
- Creating a mental-health support application designed to give students a safe and accessible space to express their feelings and receive guidance from qualified professionals.
- Investigating how AI can understand and analyze public policy topics by evaluating its reasoning accuracy and similarity to human logic.

Student Researcher:



Nadia Tjiptadjaja
Gr.10

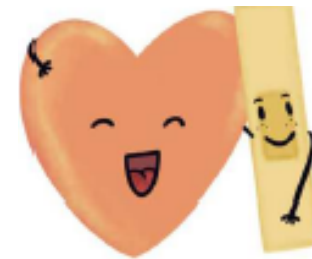


Olivia Lim
Gr.10



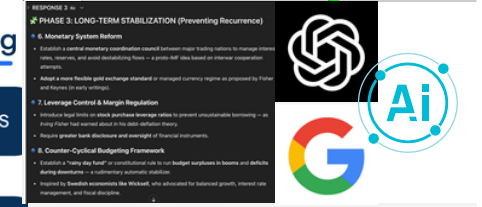
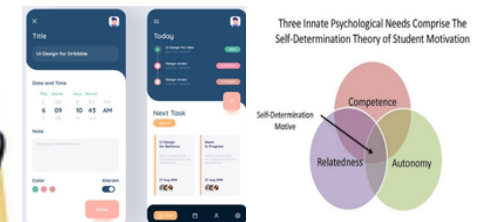
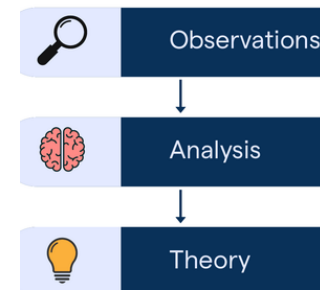
Mason Gunawan
Gr.11

Psychology-based profiling for adaptive study schedule, mental health mobile applications for students, and teaching AI to think in understanding policies.



COMPANION

Inductive Reasoning



- Evaluation of Gemini vs. ChatGPT
 - ChatGPT offered more complete responses, were more coordinated and similar, and were quite practical, effective.
 - Gemini offered less complete responses (no reform), were varied and different (leading to ineffectiveness), and only some were practical, effective.
- Conclusion of general AI effectiveness
 - Will apply relevant theory + Can address all relevant stakeholders + Suggests policies that can actually apply to the real world + Other suggestions are generally quite practical
 - Though, needs to add much more practical quantitative data & projections, currently unquantifiable & unable to be assessed
 - Could be useful in crisis situations where policymakers have to come up with fast solutions



SPH



**APPLIED
SCIENCE
ACADEMY**

HOW TO APPLY?

Application Process

APPLICATION PROCESS
& REQUIREMENTS

Fill the registration form and submit all required documents

- Applicants have to fill in the registration form from ASA website (scienceacademy.sph.ac.id).
- Applicants should submit all the required documents (motivation letter, presentation slides, and most recent report card) as explained in the ASA registration page.

All applications will be in review (Phase 1 Selection)

1-on-1 online interview (Phase 2 Selection)

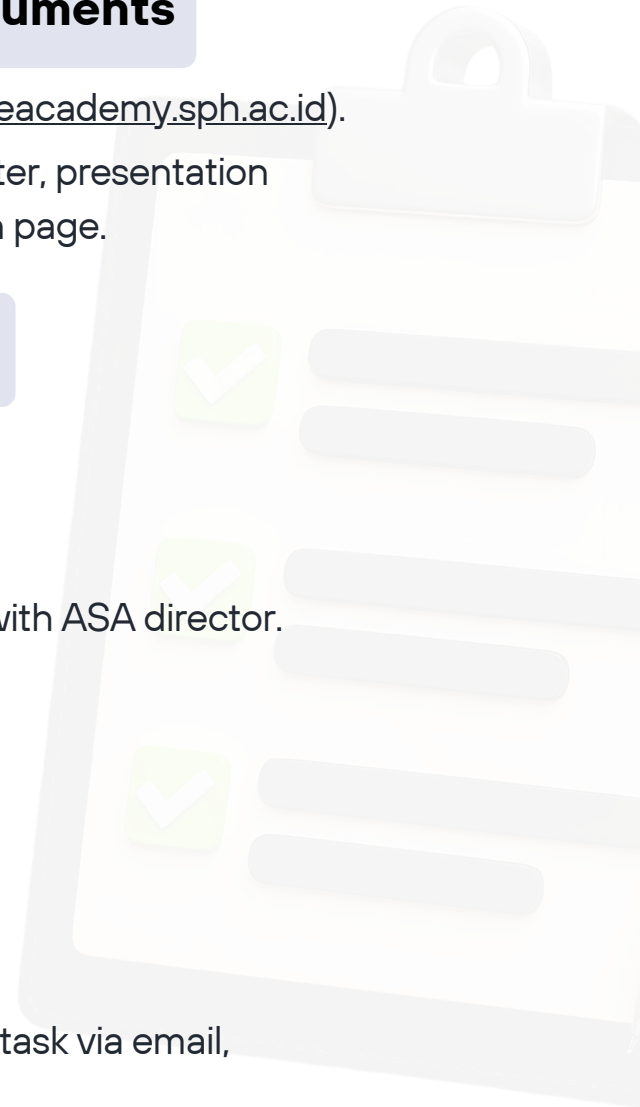
Selected applicants will be notified via email to attend an online interview with ASA director.

The applicants will have opportunity to explain:

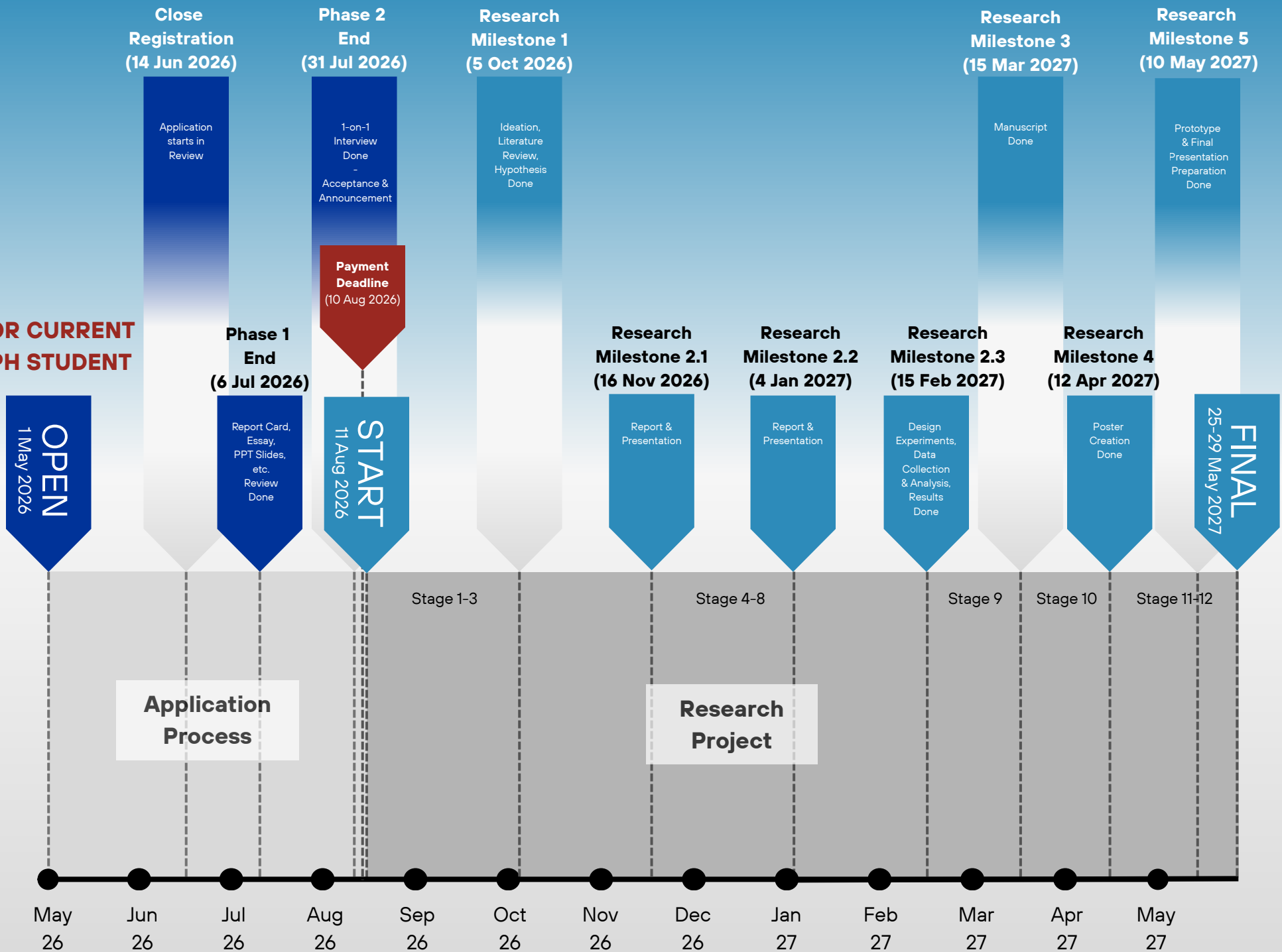
- The topics they wish to explore within the Academy.
- Their personal reasons for being interested in the chosen topics.
- Existing work or research conducted by others on their chosen topics.

Acceptance & start the research project

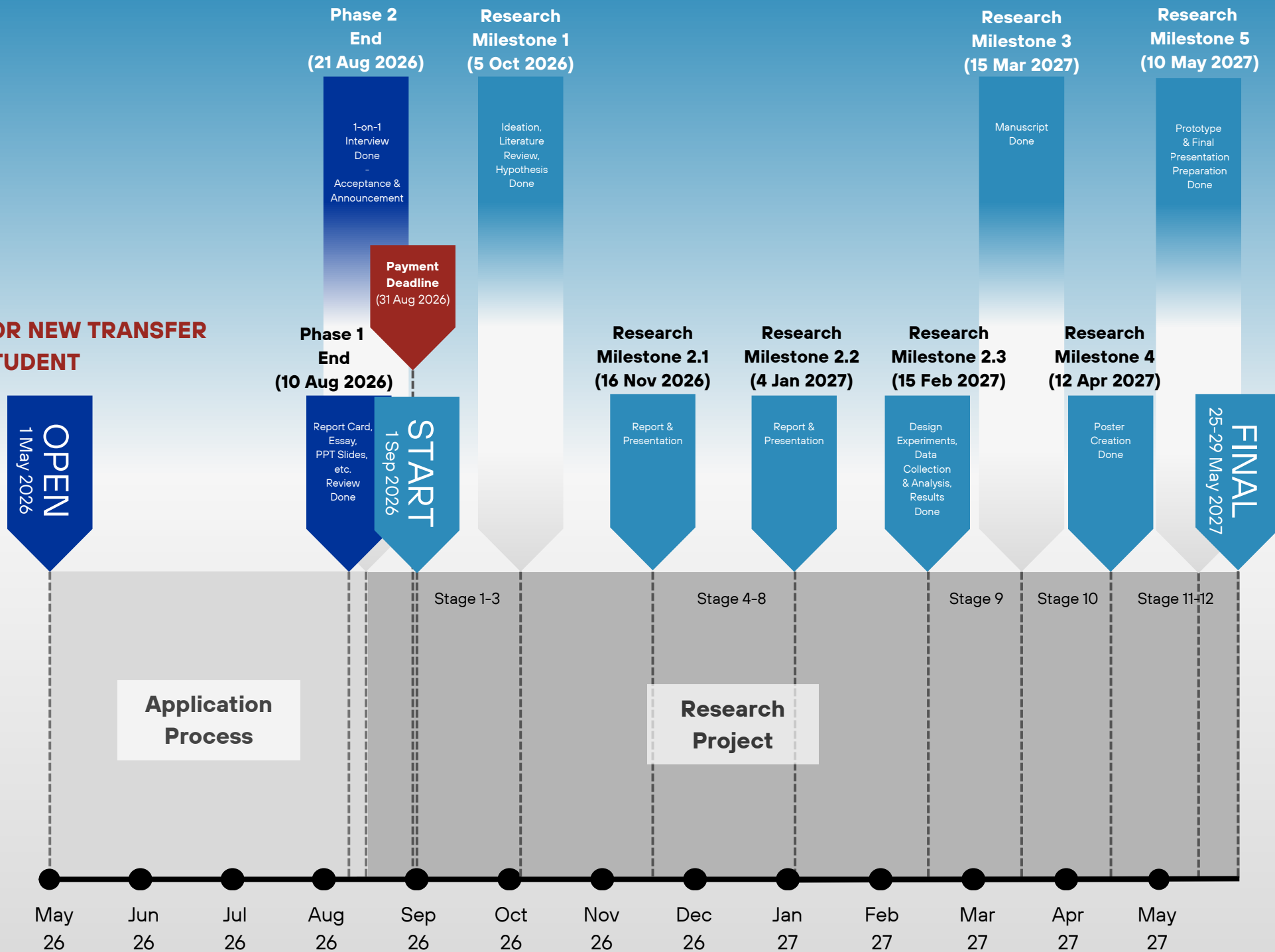
Final selected applicants will receive an acceptance letter and onboarding task via email, including their starting date.



**FOR CURRENT
SPH STUDENT**



FOR NEW TRANSFER STUDENT



Documents Required

1

Motivation Letter about the student's motivation in joining the research program (1-2 pages)

Presentation Slides of the students' **two** proposed research topics and fields (15 - 20 slides)

2

3

Report Card of the student (most recent semester)



Documents Required

APPLICATION PROCESS
& REQUIREMENTS

1

Motivation Letter about the student's motivation in joining the research program (1-2 pages)

ASA welcomes students at different stages of **readiness**.

Some students may:

- New to research but eager to learn
- Still exploring their interests

Others may:

- Feel ready to explain their ideas in more depth
- Want to elaborate more on their research thinking

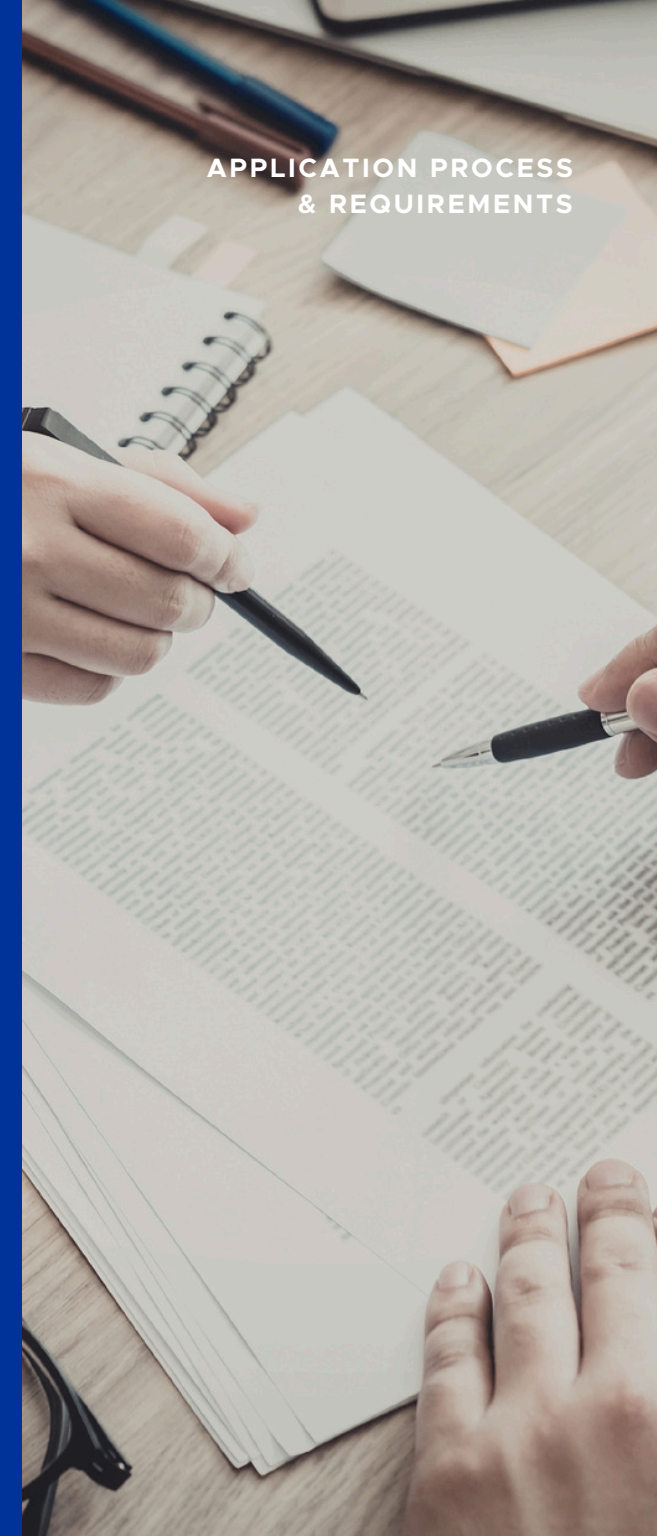
Both are **valued**.

What matters most is their genuine interest, thoughtful reflection, & willingness to grow.

What the student should explain in each paragraph:

1. Introduction & Interest in Research
2. Past Experience & Growth
3. Two Proposed Topics (Summary)
4. Personal Growth
5. Future Vision
6. Contribution to the Program
7. Conclusion

**Further details of each paragraph and format will be shown to the students in the ASA Registration Page.*



Documents Required

APPLICATION PROCESS
& REQUIREMENTS

Presentation Slides of the students' **two** proposed research topics and fields (15 - 20 slides)

2

What the student should explain in the Presentation Slides (15-20 slides, excl. Title):

1. Introduction & Research Interest (1-2 slides)
2. Two Proposed Research Topics, in which each topic will have:
 - a. Overview (1 slide)
 - b. Literature Review (2-3 slides)
 - c. Methodology (2-3 slides)
 - d. Real-world contribution (1-2 slides)

**Further details of each slide will be shown to the students in the ASA Registration Page.*

General Requirement

Each student must prepare a structured research proposal (**TWO TOPICS**) presentation that demonstrates:

- Clear research direction
- Feasibility within ASA Research Facilities & Academic/ Research Field
- Logical research planning
- Contribution value
- Follow safety and ethical standards

**Try your best, in the Academy the mentors will discuss your ideas and come up with the best path forward together.*

**** Use of AI for typesetting, searching and learning are allowed and should be declared. But you should fully do the thinking and decision making.**



Presentation Example

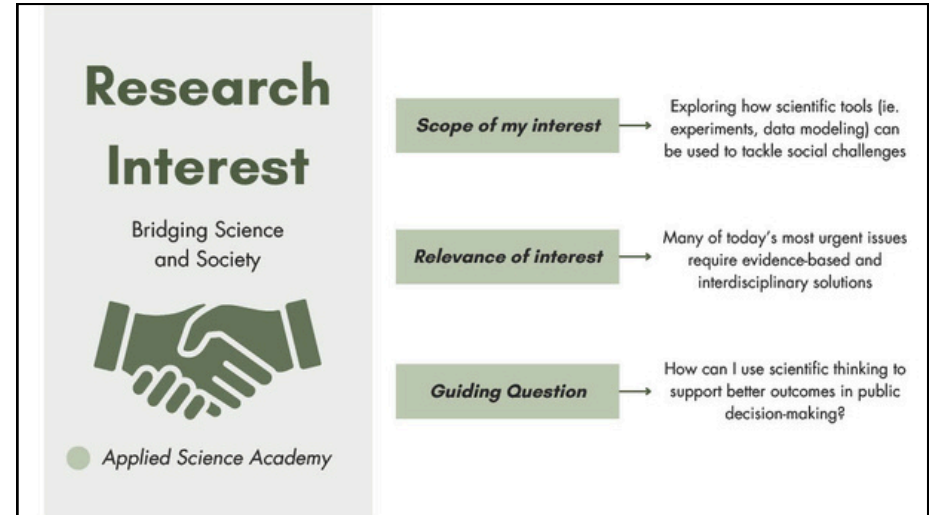
APPLICATION PROCESS
& REQUIREMENTS



**APPLIED SCIENCE
ACADEMY PROPOSAL**


██████████

22 July 2025



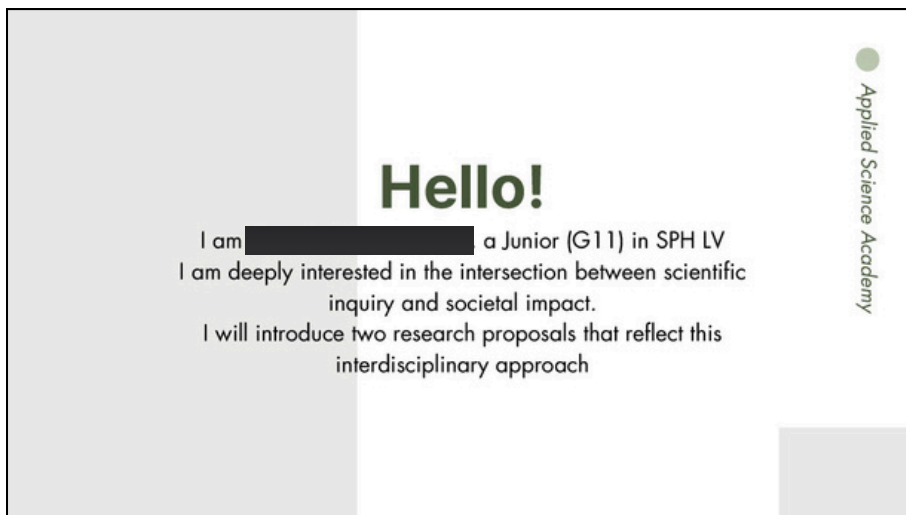
Research Interest

Bridging Science and Society



Applied Science Academy

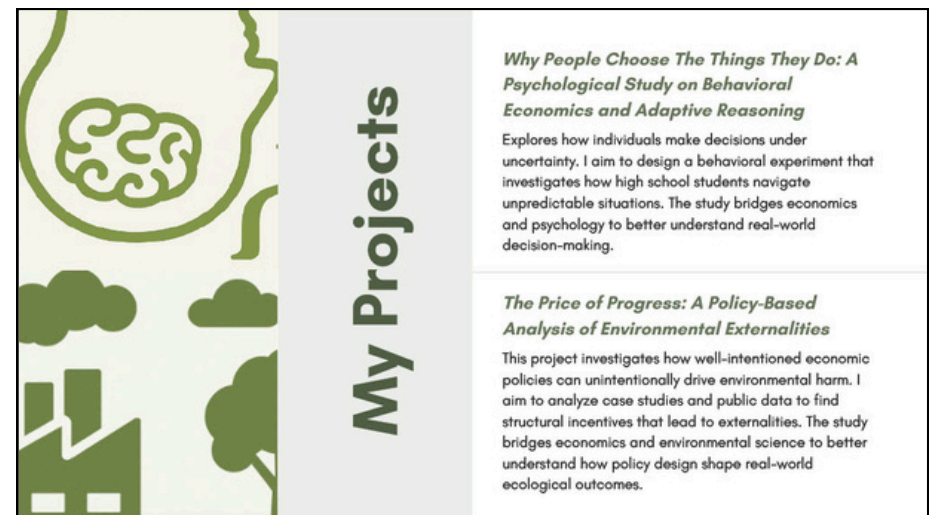
- Scope of my interest** → Exploring how scientific tools (i.e. experiments, data modeling) can be used to tackle social challenges
- Relevance of interest** → Many of today's most urgent issues require evidence-based and interdisciplinary solutions
- Guiding Question** → How can I use scientific thinking to support better outcomes in public decision-making?



Hello!

I am ██████████ a Junior (G11) in SPH LV
I am deeply interested in the intersection between scientific inquiry and societal impact.
I will introduce two research proposals that reflect this interdisciplinary approach

Applied Science Academy



My Projects

Why People Choose The Things They Do: A Psychological Study on Behavioral Economics and Adaptive Reasoning


Explores how individuals make decisions under uncertainty. I aim to design a behavioral experiment that investigates how high school students navigate unpredictable situations. The study bridges economics and psychology to better understand real-world decision-making.

The Price of Progress: A Policy-Based Analysis of Environmental Externalities

This project investigates how well-intentioned economic policies can unintentionally drive environmental harm. I aim to analyze case studies and public data to find structural incentives that lead to externalities. The study bridges economics and environmental science to better understand how policy design shape real-world ecological outcomes.

WHY PEOPLE CHOOSE THE THINGS THEY DO: A PSYCHOLOGICAL STUDY ON BEHAVIORAL ECONOMICS AND ADAPTIVE REASONING


Project #1



Methodology

Game-Based Experiment

- Create an interactive experiment to simulate uncertain decision making
- Rules and probabilities will change secretly between rounds to observe how participants adapt



What I Will Do


- Collect data on choices & adaptation time
- Analyze how traits influence adaptive decision-making
- Reflect on how this could inform behavioral design or policy tools

Research Interest: Why This Project Matters to Me?

Applied Science Academy

- Fascinated by why people make decisions that seem irrational (ie. overspending, avoiding long-term planning, etc.)
- Here's the question I got stuck on: "If people know something is harmful, why do they still do it? Or do they know, but choose to take the risk anyway?"


I believe this kind of thinking — combining psychology, experimentation, and policy relevance — reflects the spirit of the Applied Science Academy: using scientific tools to improve real lives.




My Contributions

Real World Context

- Kahneman and Tversky's experiments were conducted in controlled lab settings with static questions
- I want to test people during more dynamic and unpredictable contexts






Focus on Youth


- Most behavioral research focuses on adults in professional or consumer settings
- I'm interested in how students adapt. This could reveal meaningful patterns for how we design education systems

What Others Have Done


- Challenge the assumption that people are rational
- Decisions are made with bias and emotion
- First economic field to integrate psychological insights



Daniel Kahneman
Prospect Theory



Amos Tversky
Heuristics and Biases



Robert Axelrod
Game Theory (Prisoner's Dilemma)

Shown people fear losses more than they value gains. Revealed how people repeat predictable decision-making errors.

Shown how mental shortcuts (like the availability heuristic) lead to poor judgment under uncertainty.


Shown how people adjust their behavior over time during uncertain situations by learning from past outcomes and detecting patterns

My Contributions

Interactivity

- Traditional studies measure bias in isolated questions
- I study adaptation through games which change and are uncertain across many rounds of decision-making





Policy Relevance

- This research informs how we design policies.
- The goal does not stop at academics but designing systems like in schools which help people make better choices

Proposal 2 Example

THE PRICE OF PROGRESS: A POLICY-BASED ANALYSIS OF ENVIRONMENTAL EXTERNALITIES

Project #2

Methodology

Data and Policy Analysis

- Using data science to analyze real-world policies (i.e fossil fuel subsidies)
- Using public datasets to quantify harm
- Suggest policy reforms to minimize environmental harm

What I Will Do

- Conduct data analysis on real-world cases
- Identify gaps between goals and outcomes
- Propose policy redesign that align economic growth with environmental protection

Research Interest: Why This Project Matters to Me?

Applied Science Academy

- I wonder why, despite all the conferences and climate policies, humanity still fails to stop environmental harm
 - At first, I thought climate inaction was because of a lack of solutions or politicians just being ignorant
- I've come to realize that maybe the barrier is not political, but something more ingrained and structurally flawed.

That's why I'm interested in studying how policies meant to help people, especially in developing countries, can unintentionally cause long-term harm. This reflects the Academy's goal of using science to design better outcomes for people who need it the most

My Contributions

Data-Based Thinking

- Using data analysis to evaluate how real-world policies produce unintended environmental impacts
- The project becomes measurable in evidence rather than theory alone

Evidence-Driven

- Moving beyond emotional appeal and an oversimplified narrative of the environment
- Uses real policy outcomes to show how it's ingrained in the system, not just individual choice or lack of awareness

What Others Have Done

- Shifted the focus from pure science to policy
- Showed how economics are tied with the environment
- highlighted that well-meaning policies can still cause harm

Esteban Rossi-Hansberg
Pollution Haven

Showed how firms relocate polluting industries to countries with weaker environmental regulation especially developing nations with weak regulations

Nicholas Stern
Cost and Convenience

Showed that climate action should not only weigh the environmental urgency but the economic trade-offs that create inaction

Arun Agrawal
Environmental Governance

Showed how local institutions and decentralized decision-making systems worsen environmental outcomes when enforcement is weak

My Contributions

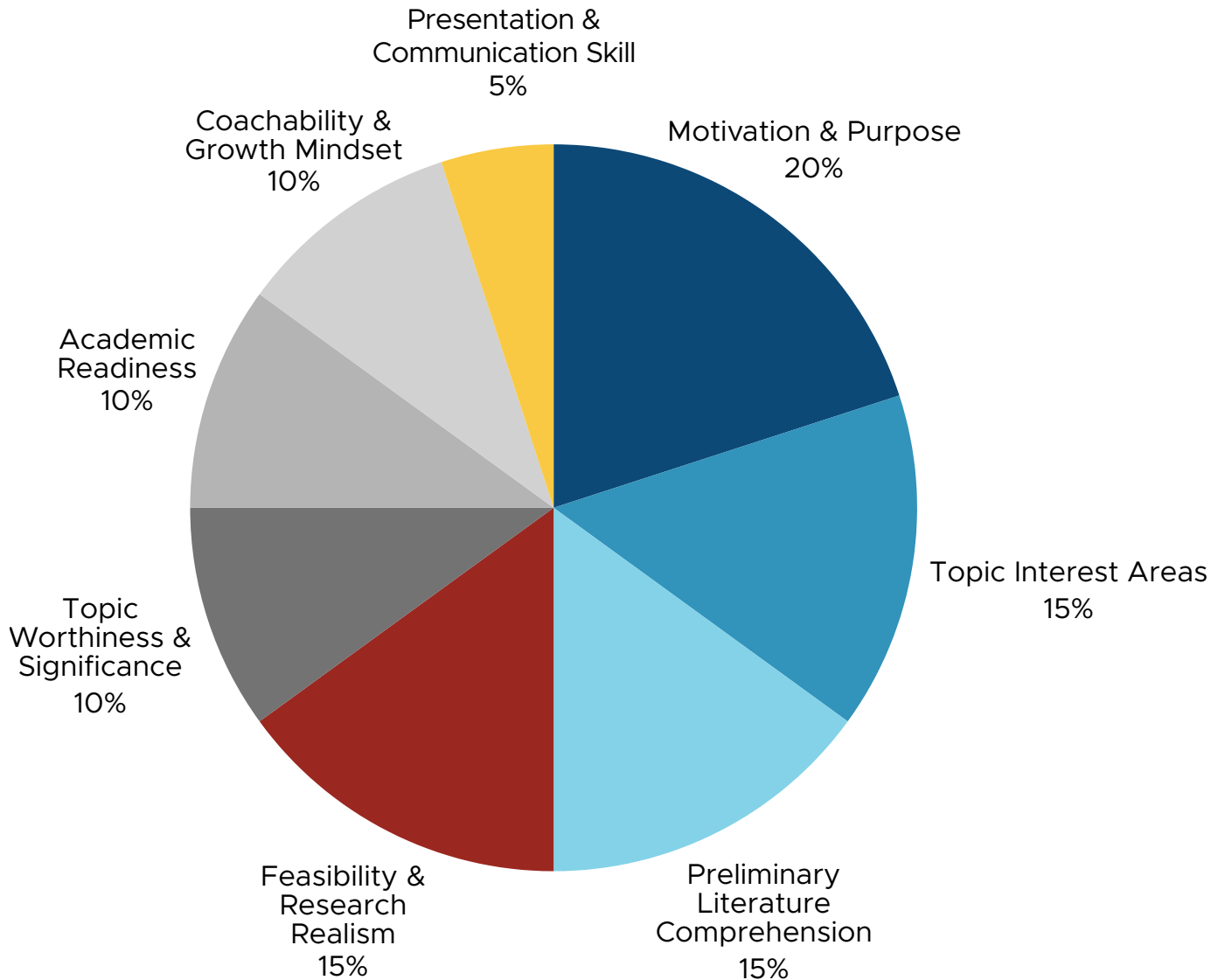
Focus on Developing Nations

- Traditional studies are mostly general and global environmental trends
- I highlight how this economic policies disproportionately harm developing nations such as Indonesia

Relevant Solutions

- Current climate talks only blame and criticize others for neglect or ignorance
- I don't just diagnose the problem but recommend reforms to balance economic growth and environmental protection

Evaluation Metrics



APPLICATION PROCESS
& REQUIREMENTS



ASA-NEO Program Fees

As with any high-quality program, there are costs associated with maintaining its standards.

With the launch of ASA-NEO in 2026–2027 academic year, ASA will be priced at **Rp.78,000,000/year or Rp.6,500,00/month.**

In partnership with SPH, there will be scholarship opportunities which will reduce the program fees. This is subject to the result from the Scholarship Committee. Limited scholarships are available.

ASA NEO
covers these
essential 10
items to
maximize the
learning
experience

WEEKLY 30 MINUTES ONLINE MENTORING SESSION
(ON-SITE LAB MEETING IS INCLUDED BASED ON NEED)

IN-LAB ACTIVITIES WHEN REQUIRED
(BASED ON AGREEMENT AND APPOINTMENT WITH MENTORS)

ALL MATERIALS AND TOOLS **REQUIRED FOR RESEARCH**

ACCESS TO SPH AND COLLABORATOR INSTITUTIONS **LABORATORIES**
(UPH, EMMERICH & OTHER KEY RESOURCES.)

DIRECT ACCESS TO MENTORS THROUGHOUT THE WEEK VIA WAG,
EMAIL OR RESEARCH MANAGEMENT SYSTEM

FULL RESEARCH MENTORSHIP (IDEATION, EXECUTION, ANALYSIS,
DOCUMENTATION, PUBLICATION / PRESENTATION)

TECHNICAL **TRAINING SESSIONS**

RESEARCH **MANUSCRIPT / SCIENTIFIC PORTFOLIO** CREATION

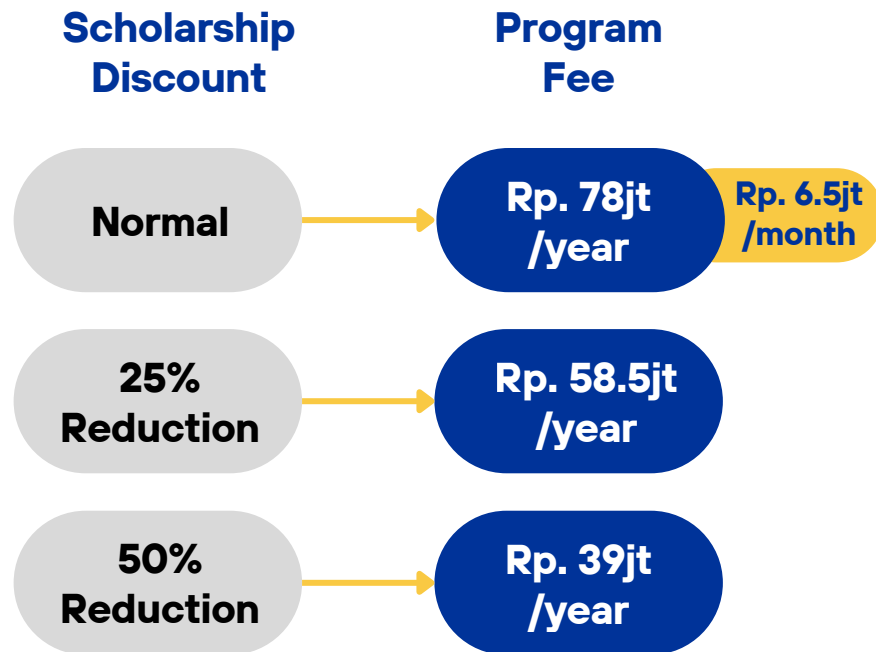
PRODUCT **PROTOTYPE** CREATION (IF APPLICABLE)

LETTER OF RECOMMENDATION FOR UNIVERSITY APPLICATION FROM
DR. EDEN STEVEN & APPOINTED MENTOR
(UPON REQUEST)

Partnership Benefit

Program Fee and Scholarship Scheme

Scholarships available for eligible students on need-based basis



Onboarding & Regulation

- 30-min **weekly** online meeting with the **dedicated** mentor.
- In-lab meeting with the mentor based on appointment.
 - Meeting notes are **MANDATORY** (Activity, To Do List, Results, etc.).
- If in-lab work is suggested by the mentor, student must **accommodate** their best.
- Main communication line will be **WhatsApp**.



- If there is **no update and/or no communication** during the research (meeting notes, report, and presentation) until **Research Milestone 1**, the student will get a **warning letter**. If the student continues to do so after a month, the student will be given a **2nd warning letter**. A **3rd warning letter** will be sent to the student if they have not improved within a month, resulting in the **exemption** of participating in the annual exhibition, **not eligible** to receive certificate and recommendation letter from Dr. Eden Steven.



Alumni Testimony

WHAT STUDENTS SAY ABOUT
THEIR EXPERIENCES IN ASA



Phoebe Bintoro

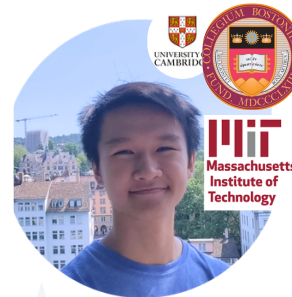
Natural Sciences at University of Cambridge

Recipient of Full Merit-Based Jardine Scholarship from the Jardine Foundation

"Since SPH ASA was one of the main reasons why I decided to move to SPH in 9th grade, it has given me the opportunity to explore my passions beyond what I learn in school. From my first year in 10th grade to my last in 12th grade, I have discovered a variety of problems, research questions, investigations, data, and skills that continuously enrich my knowledge in the sciences. In ASA, I came to see science and research not as a burden or requirement to merely enhance my portfolio, but rather a creative and intellectual outlet to change the world.

Although my projects are still minuscule compared to the various achievements of the experts in my fields of interest, engaging with my curiosity in ASA showed how contribution in the scientific world is incredibly substantial and encouraging.

Looking back, I can confidently and proudly say I do not regret my choice of joining ASA, because not only did I learn more about my interests, but I also made unforgettable memories with my peers, mentors, and supervisors, that I will cherish until the years to come."



Jason Ken Adhinarta

Computer Science & Maths at Boston College

Recipient of Gabelli Presidential Scholarship Program, Full Tuition Scholarship

Pursuing Ph.D. at MIT in Computer Science

"It is not an overstatement to say that my experiences working at the Applied Science Academy have shaped who I am today. I was fortunate to have contributed to various projects ranging from vacuum chamber control systems to AI vision tracking systems, all of which shoved me into the deep end of the pool—in a good way. My entire college application was centered upon my research/teaching activities at ASA.

As a STEM major, the expertise I gained through ASA allowed me to pursue college-level research as a first-semester freshman. If you play your cards right, you'll gain as much academic/industry experience through ASA as you will studying abroad as an undergraduate."

See more ASA Alumni testimonies on our webpage

Alumni Testimony

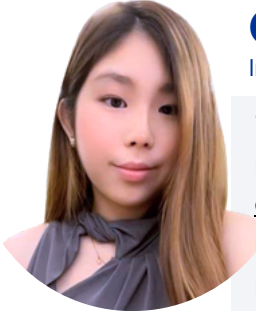
WHAT STUDENTS SAY ABOUT
THEIR EXPERIENCES IN ASA



Chae Yeon Hwang

Imperial College London, Bachelor of the Medical Biosciences

"My time at the Applied Science Academy at SPH has been an incredibly beneficial experience for me especially as I was continuing my passion in the biomedical sciences and my projects within ASA were highly related to this field. The program was a vital component of my decision to uptake this degree and pursue this career but I would also attribute much of my achievements thus far, including getting into the top university in London, to the privilege I had partaking in ASA and having the support I did to complete projects and learn wet-lab and scientific paper writing skills I wouldn't have until far later in university."



Shania Pesik

Biochemistry at King's College London

Recipient of Summer Internship at ETH Zurich, Amgen Scholars Program Awardee



"During my years in the Applied Science Academy (ASA), I was introduced to the scientific research world and gained invaluable laboratory experience that has shaped my academic journey. My mentor, Dr. Eden Steven, who is also the head of program, patiently taught me everything from scratch, pouring his passion for science into everyone around him. Through ASA, I completed two substantial research projects in biochemistry and environmental sciences, even publishing a proceeding paper, while the annual exhibitions helped me develop crucial scientific presentation skills. My time at ASA was not just educational—it was transformative, laying the foundation for what I hope will be a meaningful career in scientific research."



Jaewoong Lee

Chemistry at Dartmouth College

"If one were to distinguish my high school experience from others, I would undoubtedly choose the Applied Science Academy. It is undeniably a distinctive, groundbreaking, and unparalleled opportunity exclusively afforded to SPH students. I firmly believe that ASA represents one of SPH's most noteworthy merits, and for any students pursuing a STEM field, failing to capitalize on ASA would be a severe misjudgment. To me, ASA has become the root of virtually all science-related activities in high school. Its potential is endless, and the experience is flexible to accommodate whoever is undertaking it. Every determined ASA student receives meticulous guidance and mentorship from Mr. Eden and his esteemed colleagues, who diligently facilitate this extraordinary program."



FAQs

1 Who is this program for?

The program is open for Grade 10-11 students who have strong interest in Science, Engineering, Programming, Mathematics, Psychology, Business, and other fields where science and engineering principles are applicable.

2 What field of science is offered?

The Applied Science Academy is interdisciplinary, covering multiple scientific disciplines such as biology, chemistry, physics, psychology, and emerging fields in science, engineering, and AI.

Disclaimer: DNA Technology, Cell Culture & In vivo research, fuel combustion, nuclear energy, particle physics, high energy physics are not applicable. Consult with the program director before applying if you are unsure.

3 Who are the mentors?

The Applied Science Academy Director, Dr. Eden Steven, will supervise and actively engage in all student research projects. He will work in collaboration with UPH faculty and mentors from partner research institutions, bringing expertise in biotechnology, materials science, food technology, computer science, and other disciplines.

4 What is the benefit of the program?

- Learn new experimental and data analysis skills.
- Explore the ideal university major for the student early.
- Stronger application for university admission.
- Opportunity to participate in scientific conferences, challenges and competitions.
- Further enhance the IB experience for students interested in science and engineering.

5 What are the requirements needed?

The Science Academy is designed for students with a strong interest in science, demonstrated self-discipline, high self-motivation, eagerness to acquire new skills, and an excellent academic record.

6 Where does the program take place?

The activities will be carried out remotely or in-lab either at SPH, UPH, or other facilities as necessary. The students and mentors will plan their experiments and together decide on where to do certain part of experiment the best.

FAQs

7 How to join the program?

Student can apply through our website. Fill the registration form and submit a motivation letter, presentation slides of their 2 proposed research topics/fields, as well as most recent report card. Based on the quality of the submission, selected students will be shortlisted to go onto the next phase of the selection process, an interview with the ASA committee. Final decisions of the selections will follow.

8 When is this program conducted?

Students will conduct their experiment outside of class hours. Just like any other extracurricular activities, students are welcome to work on their projects after school, during lunch, or during weekend or holiday period. The research program has no fixed schedule, and it is up to the students and mentors to plan out their experiments accordingly. For example, during exam weeks, students are not expected to perform their experiments so they can focus on exam preparations.

9 Is there any score in the program that is put in the report card?

No, but the students are required to create scientific report and poster and present their findings in Annual ASA Science Exhibition session at the end of the school year.

10 Is there any fee for joining ASA?

For further information regarding the tuition fee, please contact our admissions team.

11 Is there any scholarship offered?

For further information regarding the scholarship, please contact our admissions team.

12 What students will get?

Students will gain a certificate of excellence, letters of recommendation upon request for university or scholarship applications, professional competencies, valuable networking opportunities, a strong scientific portfolio, and foundational preparation for their future careers.

13 Can I join ASA for multiple years?

Student can join ASA in grade 10 and 11, so 2 years maximum. However, the students must go through the complete application process again. Students in grades 12 can still participate ASA as alumni in ASA Alumni Society to enhance their organizational portfolio and networking.



SPH



**APPLIED
SCIENCE
ACADEMY**