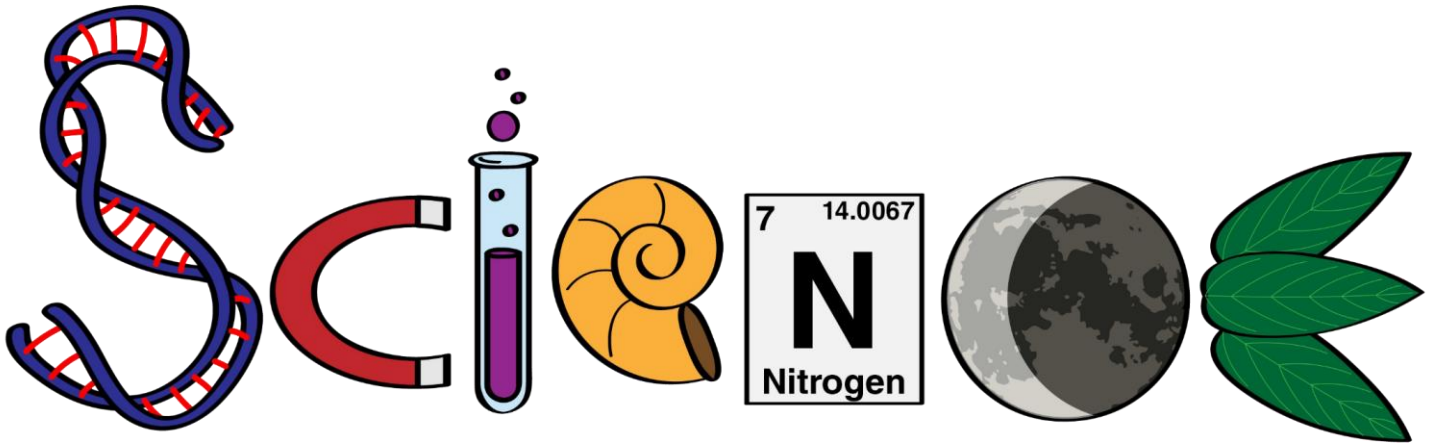
JURONG SECONDARY SCHOOL

LOYALTY • INDUSTRY • SINCERITY • LOVE



is all around us

Understanding the demands of Upper Secondary Science

2024 SEC 2 MTP & SUBJECT OPTIONS TALK

Importance of Science

How will low-lying Singapore's built environment survive rising seas?

Singapore's response to climate change is more adaptation than prevention. So how will the vulnerable city-state protect its most valuable assets—its buildings—from rising sea levels?

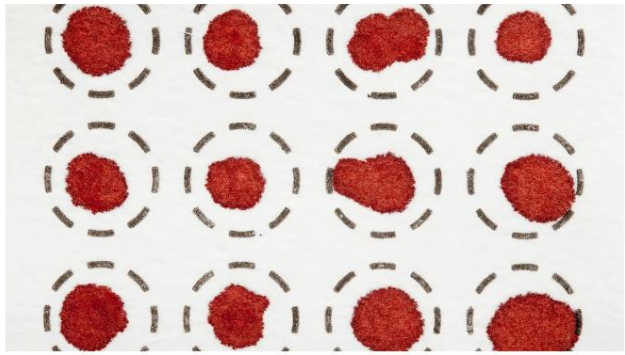
https://www.eco-business.com/news/how-will-low-lying-singapores-built-environment-survive-rising-seas/

Detecting cancer in minutes possible with just a drop of dried blood and new test, study hints

News By Emily Cooke published 2 days ago

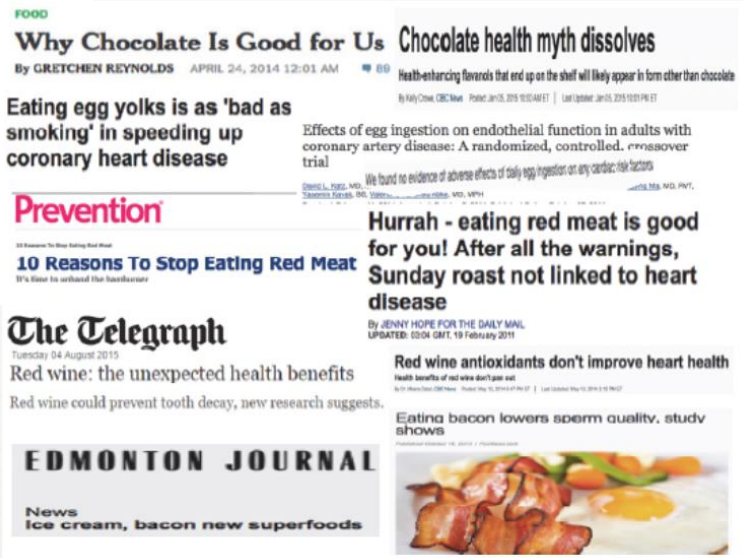
Early tests suggest that a new tool that requires only a single drop of blood could detect three of the deadliest forms of cancer.

Comments (1)



Less than 0.05 milliliters of dried blood could be used to detect gastric, colorectal and pancreatic cancer, early research suggests. (Image credit: marekuliasz via Getty Images)

https://www.livescience.com/health/cancer/detecting-cancer-in-minutes-possible-with-just-a-drop-of-dried-blood-and-new-test-study-hints



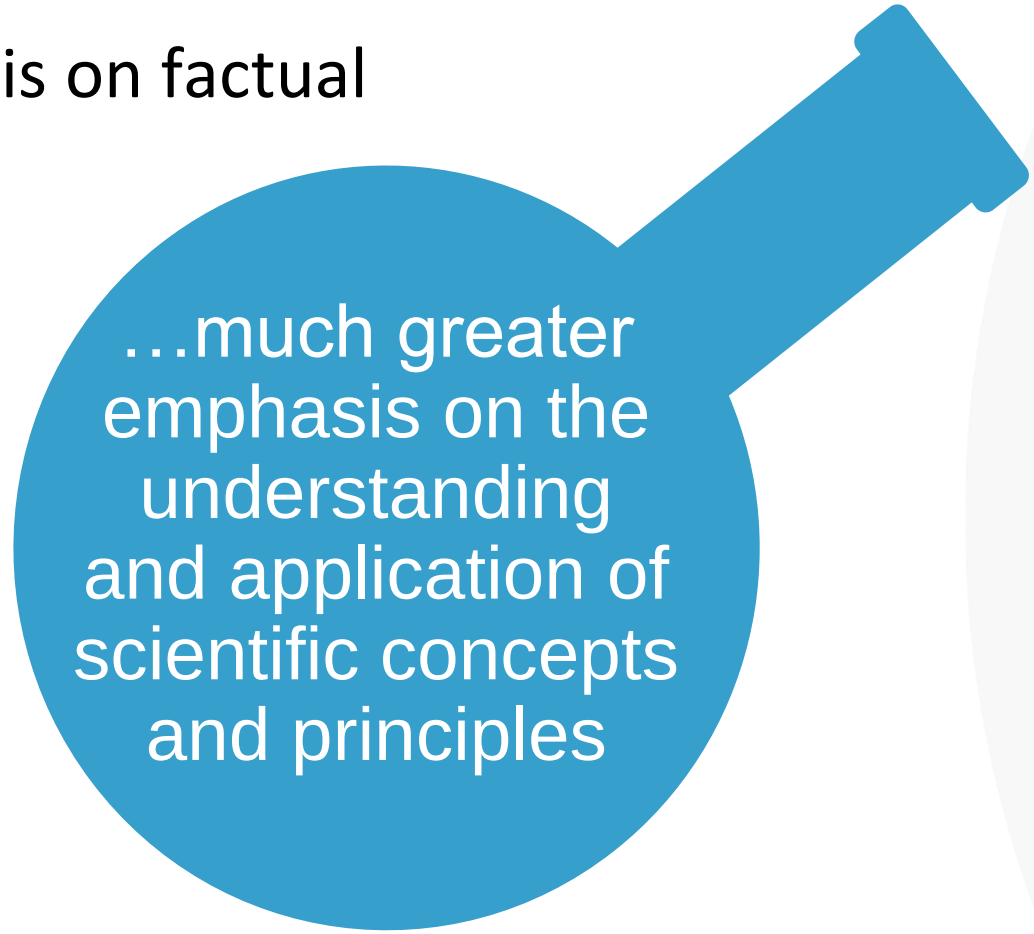
https://nap.nationalacademies.org/read/21798/chapter/4#18

Goals of Science Education

- Enthuse and nurture all students to be scientifically literate
- Provide strong fundamentals for students to pursue science related areas in learning and work
- Prepare individuals to navigate an increasingly complex and technologically advanced world, while also fostering a deeper appreciation for the wonders of the natural world.

The Science Syllabuses

less emphasis on factual materials…



builds on the foundations of Lower Secondary science

the need to develop skills that will be of long-term value

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	Science
CRITERIA, DESIRED DISPOSITIONS	A Science student should have: • a strong foundation in Science, and possess the spirit of scientific inquiry • the confidence to engage confidently in issues and questions that relate to the roles played by Science in daily life, society and the environment • the ability to discern, weigh alternatives and evaluate claims and ideas critically, based on logical scientific evidence and arguments
SKILLS & COMPETENCIES TO BE DEVELOPED	Science education plays a vital role in developing the 21st-century skills needed to thrive in an increasingly complex, interconnected, and rapidly changing world. Students will learn to: • analyze and evaluate complex problems through **critical thinking**. • **problem solve** issues through experimentation and research. • **communicate** their findings and ideas effectively through reports and presentations. • Collaborate and work in teams. • exercise **adaptability and flexibility** during challenges. • exercise **ethical awareness in** responsible conduct of research, ethical considerations in scientific inquiry, and the importance of ethical behavior in the scientific community. • cultivate a sense of **curiosity** and a **passion** for discovery.
POST-SECONDARY OPPORTUNITIES	Science education provides students with a diverse set of skills and competencies that are valuable not only in scientific careers but also in many other fields, including education, healthcare, technology, and environmental conservation.

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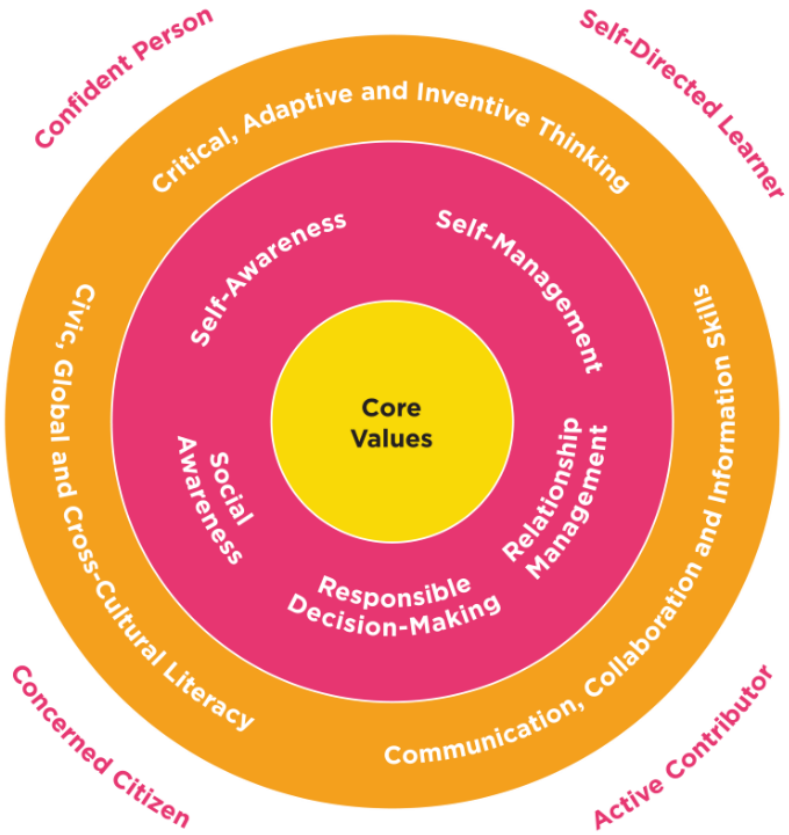
Skills, 21st Century Competencies and Student Outcomes



Skills, Values & Attitudes in Science

- Integrity
- Curiosity
- Objectivity
- Perseverance

- Data driven practice
- Communicate and Convince

- Observing, Predicting, Comparing, Classifying, Inferring, Analysing Evaluating, Verifying

- Develop sound arguments
- Hypothesise
- Reason

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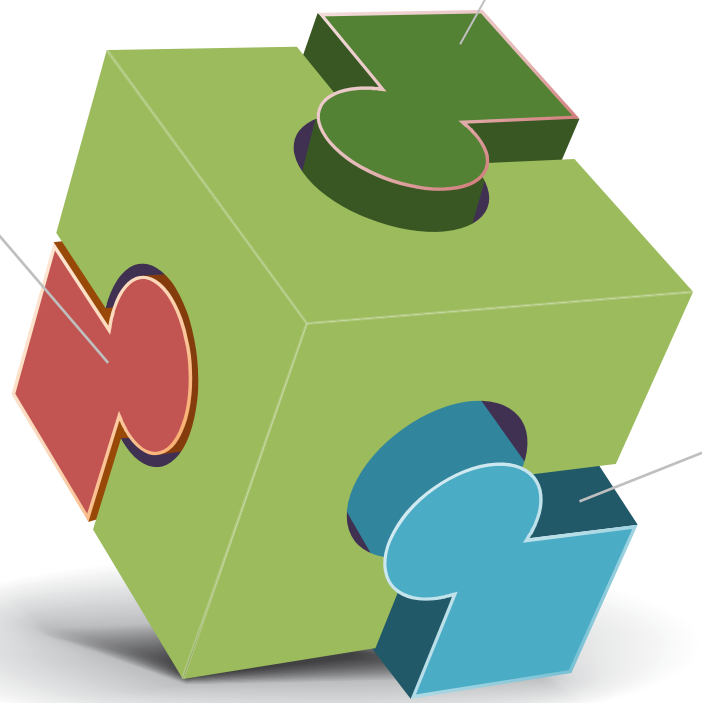
Differences between the Sciences

Chemistry

The study of the composition, structure, properties and change of matter… known as the 'central science' that bridges physics and biology



Biology

The study of life and living organisms… including their physical structure, function, growth and evolution

Physics

The study of matter & its motion through space & time… the concepts of energy & forces… how the universe behaves…

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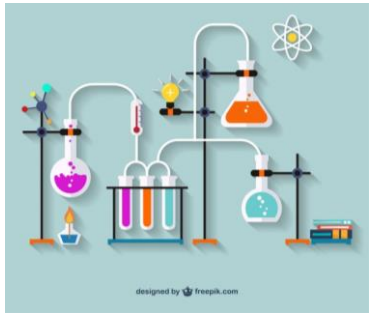
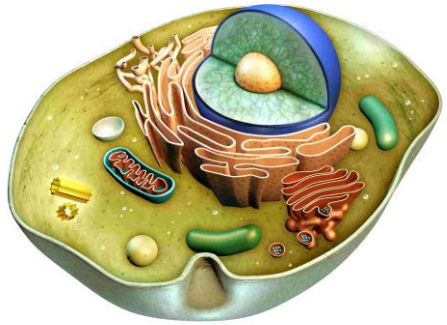
Topics covered in Lower Secondary Science

Chemistry



- Physical Properties
- Chemical Composition
- Separation Techniques
- Particulate Nature of Matter
- Atoms and Molecules
- Chemical changes

Biology



- Cells
- Ecosystems
- Human Digestive System
- Transport Systems in Living Things
- Human Sexual Reproduction System

Physics

- Light
- Forces, Pressure, Moments, Energy
- Transfer of Heat Energy
- Electrical Systems

Dispositions for the Sciences

Biology

- Strong language ability (at most 15% calculation questions)
- Ability to apply concepts of living organisms to address the broader question of how living organisms work to sustain life
- Shows interest in the human body and the natural world
- A flair for drawing diagrams of plants or animals

Physics

- Strong mathematical foundation (20 to 40% calculation questions)
- Able to think abstractly and apply laws and theories
- Shows interest in the interactions of the physical world

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COURSE	EXPRESS	NORMAL (ACADEMIC)	NORMAL (TECHNICAL)
SUBJECTS OFFERED	*Science (Phy/ Chem) (O) *Science (Chem/ Bio) (O)	Science (Phy/ Chem) (NA) Science (Chem/ Bio) (NA)	Science (NT) *Science (Phy/ Chem) (NA) *Science (Chem/ Bio) (NA)
ASSESSMENT FORMAT	1. Multiple Choice 2. Structured 3. Practical	1. Multiple Choice 2. Structured	1. Multiple Choice 2. Structured

*offered to students who meet the criteria for taking up Subject-based Banding

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O-Level Combined Science – Scheme of Assessment

Paper	Combined Sciences	Time	Marks	Weighting
1	Multiple Choice	1h	40	30%
2	Structured & Free Response (Physics)	1h 15m	65	32.5%
3	Structured & Free Response (Chemistry)	1h 15m	65	32.5%
4	Structured & Free Response (Biology)	1h 15m	65	32.5%
5	Practical Test	1h 30m	30	15%

N(A)-Level Science – Scheme of Assessment

Paper	Combined Sciences	Time	Marks	Weighting
1	Multiple Choice (Physics)	1h 15m	20	20%
2	Structured (Physics)		30	30%
3	Multiple Choice (Chemistry)	1h 15m	20	20%
4	Structured (Chemistry)		30	30%
5	Multiple Choice (Biology)	1h 15m	20	20%
6	Structured (Biology)		30	30%

N(T)-Level Science – Scheme of Assessment

Paper	Type of Paper	Duration	Marks	Weighting
1	E-Examination Multiple choice, selected response, short-answer and structured	1h 15 min	50	50%
2	Short Answer and Structured	1h	50	50%

Science Assessment Weightage

Level	Subject	Code	SEAB website links
O	Combined Science	5086 / 5088	https://www.seab.gov.sg/home/examinations/gce-o-level/o-level-syllabuses-examined-for-school-candidates-2025
NA	Combined Science	5105 / 5107	https://www.seab.gov.sg/home/examinations/gce-n(a)-level/n(a)-level-syllabuses-examined-for-school-candidates-2025
NT	Science Syllabus T	5148	https://www.seab.gov.sg/home/examinations/gce-n(t)-level/n(t)-level-syllabuses-examined-for-school-candidates-2025

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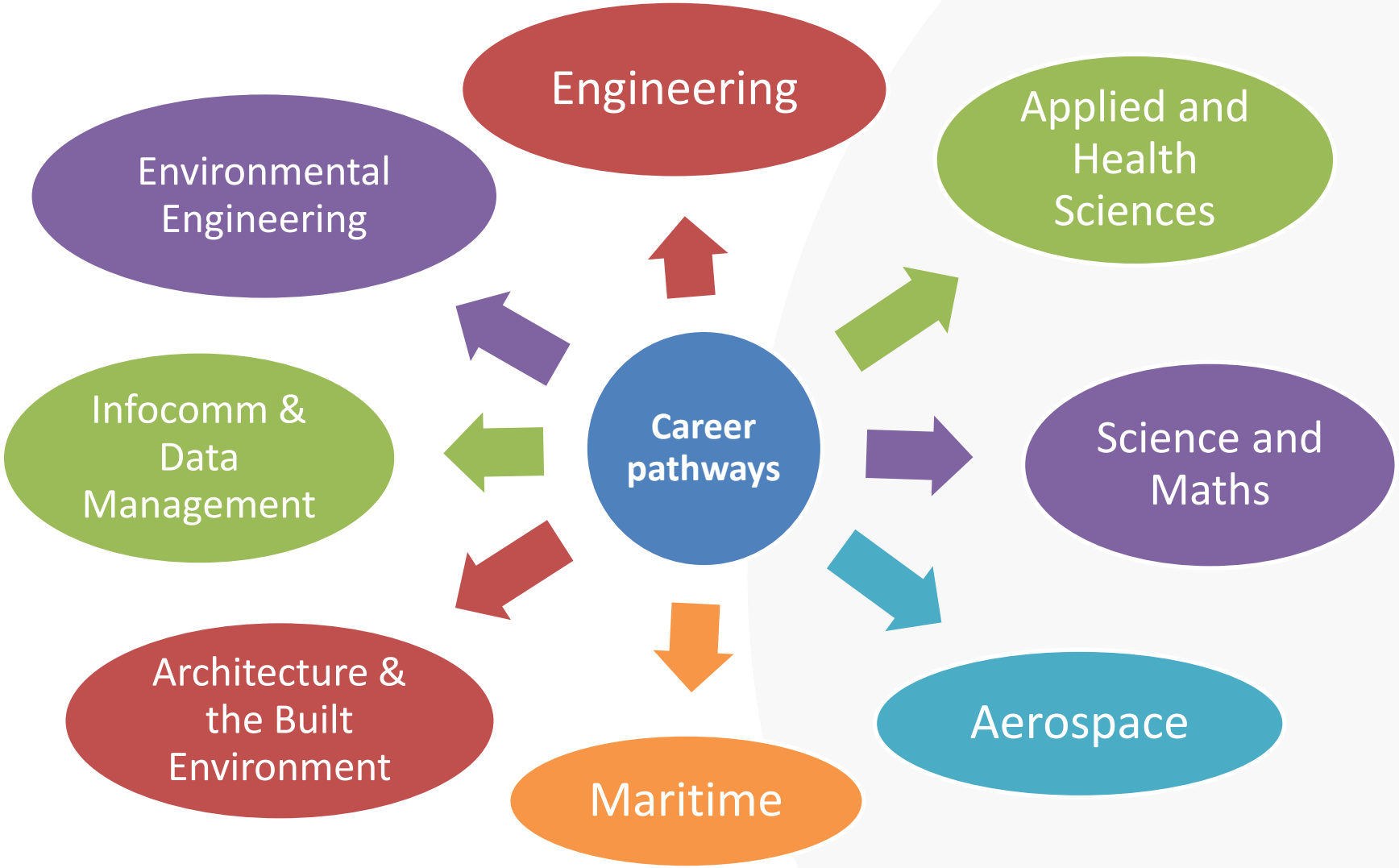
Value of Offering Science



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Course Requirements (Polytechnic)

Course	School	Course Requirements
Biomedical Science	Singapore Polytechnic	Any 1 Science ELR2B2 range: 3-7
Biomedical Science	Ngee Ann Polytechnic	Any 1 Science ELR2B2 range: 4-8
Chemical & Biomolecular Engineering	Ngee Ann Polytechnic	Any 1 Science ELR2B2 range: 4-8
Pharmaceutical Science	Nanyang Polytechnic	Any 1 Science ELR2B2 range: 5-10

Course Requirements (ITE)

Course	Course Requirements
• Electronics & Info-Comm Technology • Applied & Health Sciences • Design & Media • Engineering	Maths or Science

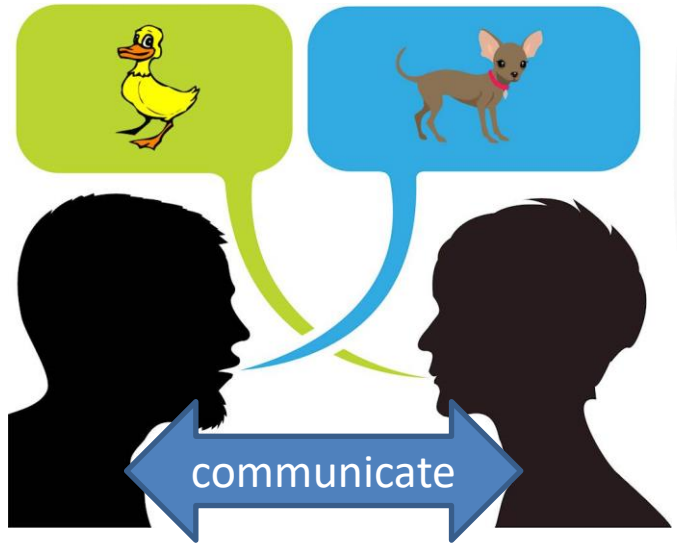
Key Considerations

What are my child's strengths?

Will my child be able to cope with the rigour?

Is my child eligible for the subject combination?

What are my child's aspirations?



Making an Informed Decision

- talk to seniors and/or FTs if they require additional clarification
- parents and students should discuss and come to an agreement if both parties have different aspirations
- work towards aspirations and desired subject combinations in Semester 2 (setting up positive routines and developing good habits, the importance of help seeking behaviours, etc)