NORTHBROOKS SECONDARY SCHOOL
SOARING YET ROOTED

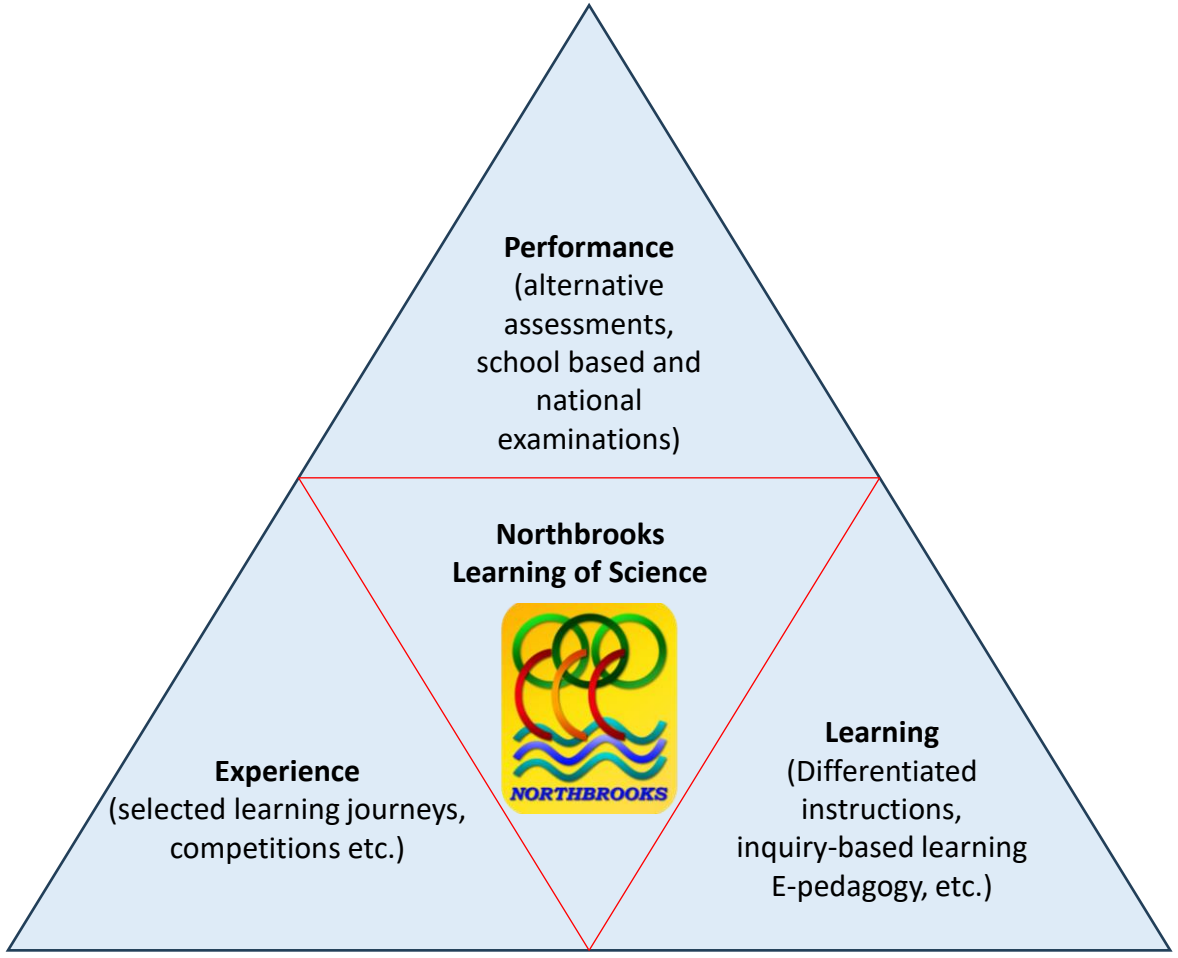
Sec 2 Subject Information:

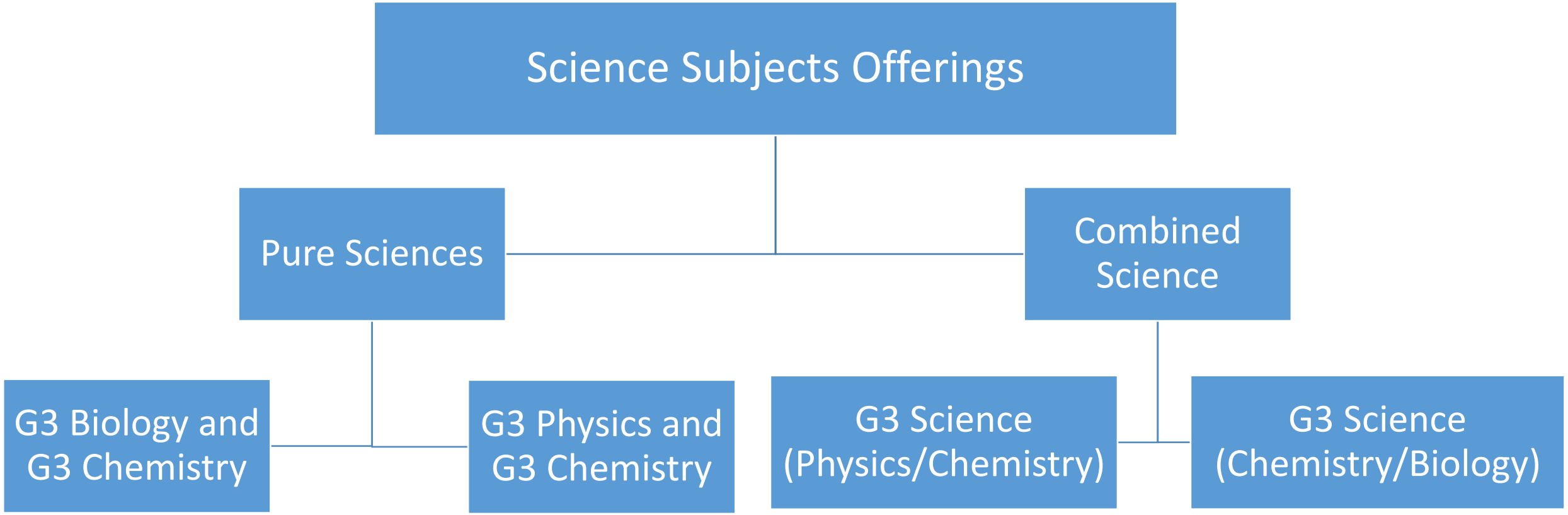
Science

(G3)

Science offerings at G3 Science:

- G3 Physics and G3 Chemistry
- G3 Biology and G3 Chemistry
- G3 Science (Physics/Chemistry)
- G3 Science (Chemistry/Biology)




Science Subjects Offerings
Pure Sciences
Combined Science
G3 Biology and G3 Chemistry
G3 Physics and G3 Chemistry
G3 Science (Physics/Chemistry)
G3 Science (Chemistry/Biology)

Physics / Science (Physics)

Overview

- provides students with a coherent understanding and appreciating practical applications of physics in the real world

- develops students' investigative and problem-solving skills, effective communication of theoretical concepts and appreciation of the contribution physics makes to our understanding of the physical world

Section
I. Measurement
I. Newtonian Mechanics
III. Thermal Physics
IV. Waves
V. Electricity & Magnetism
VI. Radioactivity

Physics / Science (Physics)

Syllabuses and Topics

Sections	Topics	G3 Physics	G3 Science (Physics)
Measurement	Physical Quantities, Units and Measurements	✓	✓
Newtonian Mechanics	Kinematics	✓	✓
	Dynamics	✓	✓
	Turning Effects of Forces	✓	✓
	Pressure	✓	✓
	Energy	✓	✓
Thermal Physics	Kinetic Particle Model of Matter	✓	✓
	Thermal Processes	✓	✓
	Thermal Properties of Matter	✓	
Waves	General Wave Properties	✓	✓
	Electromagnetic Spectrum	✓	✓
	Light	✓	✓
Electricity & Magnetism	Static Electricity	✓	✓
	Current of Electricity	✓	✓
	D.C. Circuits	✓	✓
	Practical Electricity	✓	✓
	Magnetism and Electromagnetism	✓	✓
	Electromagnetic Induction	✓	
Radioactivity	Radioactivity	✓	✓

Biology / Science (Biology)

Overview

- enables students to deepen their interest in biology for future learning and work

- develops a way of thinking to understand how living organisms work to sustain life and use the disciplinary ideas in biology to approach, analyse and solve problems in biological systems

Section
Cells and Chemistry of Life
The Human Body – Maintaining Life
Living Together – Plants, Animals and Ecosystems
Continuity of Life

Biology / Science (Biology)

Syllabuses and Topics

Sections	Topics	G3 Biology	G3 Science (Biology)
Cells and Chemistry of Life	Cell Structure and Organisation	✓	✓
	Movement of Substances	✓	✓
	Biological Molecules	✓	✓
The Human Body – Maintaining Life	Nutrition in Humans	✓	✓
	Transport in Humans	✓	✓
	Respiration in Humans	✓	✓
	Excretion in Humans	✓	
	Homeostasis, Co-ordination and Response in Humans	✓	
	Infectious Diseases in Humans	✓	✓
Living Together – Plants, Animals and Ecosystems	Nutrition and Transport in Flowering Plants	✓	✓
	Organisms and Their Environment	✓	✓
Continuity of Life	Molecular Genetics	✓	✓
	Reproduction (in Humans*) **Topic name of Express Science (Biology)*	✓	✓
	Inheritance	✓	✓

Chemistry / Science (Chemistry)

Overview

- enables students to appreciate practical applications of chemistry in the real world,

- develops in students a way of thinking to approach, analyse and solve problems by explaining macroscopic characteristics and changes in chemical systems

Section
Matter – Structures and Properties
Chemical Reactions
Chemistry in a Sustainable World

Chemistry / Science (Chemistry)

Syllabuses and Topics

Sections	Topics
Matter – Structures and Properties	Experimental Chemistry
	The Particulate Nature of Matter
	Chemical Bonding and Structure
Chemical Reactions	Chemical Calculations
	Acid-Base Chemistry
	Qualitative Analysis
	Redox Chemistry
	Patterns in the Periodic Table
	Chemical Energetics
	Rate of Reactions
Chemistry in a Sustainable World	Organic Chemistry
	Maintaining Air Quality

Note: While the topics covered are the same for G3 Chemistry and G3 Science(Chemistry), there is a reduction in the Learning Outcomes within certain topics for G3 Science(Chemistry).

G3 Biology/Chemistry/Physics
Assessment Objectives

Theory Papers (Papers 1 and 2)

A Knowledge with Understanding, approximately 45% of the marks.

B Handling Information and Solving Problems, approximately 55% of the marks.

Practical (Paper 3)

C Experimental Skills and Investigations, 100% of the marks.

Paper 3 will assess appropriate aspects of objectives C1 to C6 in the following skill areas

- Planning (P)
- Manipulation, measurement and observation (MMO)
- Presentation of data and observations (PDO)
- Analysis, conclusions and evaluation (ACE)

The assessment of Planning (P) will have a weighting of 15%. The assessment of skill areas MMO, PDO and ACE will have a weighting of 85%.

G3 Biology/Chemistry/Physics
Assessment Objectives

Candidates are required to enter for **ALL** three Papers for **each** Pure Science subject.

Paper	Type of Paper	Duration	Marks	Weighting
1	Multiple Choice	1 h	40	30%
2	Structured and Free Response	1 h 45 min	80	50%
3	Practical	1 hr 50 min	40	20%

G3 Science (Chem/Bio) or (Phy/Chem)
Assessment Objectives

Theory Papers (Papers 1, 2, 3 and 4)

A Knowledge with Understanding, approximately 50% of the marks with approximately 20% allocated to recall.

B Handling Information and Solving Problems, approximately 50% of the marks.

Practical Assessment (Paper 5)

Paper 5 is designed to test appropriate skills in **C**, Experimental Skills and Investigations.

In one or more of the questions in Paper 5, candidates will be expected to suggest a modification or an extension, which does not need to be executed. Depending on the context in which the modification / extension element is set, the number of marks associated with this element will be in the range of 10% to 20% of the total marks available for the practical test.

G3 Science (Bio/Chem) or (Chem/Phy)

Assessment Objectives

Candidates are required to enter for Paper 1, Paper 5 and two of Papers 2, 3 and 4, depending on the combination of Science offered.

Paper	Type of Paper	Duration	Marks	Weighting
1	Multiple Choice	1 h	40	20.0%
2	Structured and Free Response (Physics)	1 h 15 min	65	32.5%
3	Structured and Free Response (Chemistry)	1 h 15 min	65	32.5%
4	Structured and Free Response (Biology)	1 h 15 min	65	32.5%
5	Practical Test	1 h 30 min	30	15.0%

Frequently Asked Questions

Q1: What are the differences between Pure Sciences or Combined Science?

Q2: Are G3 Biology/Physics/Chemistry compulsory subjects for admission into Junior Colleges?

Q3: Will doing G3 Science affect the courses my child can take in a Polytechnic?

Q4: Will my child not be able to qualify for admission to School of Medicine in NUS or NTU if he/she does not take triple and/or G3 Pure Sciences?

Q5: Should my child take Pure Sciences or Combined Science?

Q6: Can my child drop to Combined Science if he/she is not able to cope with the demand and rigour of Pure Sciences?

Q7: Can my child take triple science?

Q1: What are the differences between Pure and Combined Sciences?

A1:

- In terms of content coverage, **Pure** Sciences cover **more topics** and in **greater depth**.

- The scientific disciplines (Physics, Chemistry, and Biology) are assessed as three **separate** subjects for **Pure Sciences** while **two** of the scientific disciplines (e.g. Physics and Chemistry) are assessed together as **one** subject in **Combined Science**.

- The theory paper for **Pure** Sciences has a **higher** percentage of **Handling Information and Solving Problems** type of questions and **lower** percentage of **Knowledge with Understanding** type of questions when compared to Combined Science.

Examples of different types of Questions (Chemistry Discipline)

A2 The table shows information about the electrolysis of some substances.

Complete the table by filling in the missing information.

substance	electrodes used	product of reaction at positive electrode	product of reaction at negative electrode
concentrated aqueous copper(II) chloride	carbon		copper
dilute aqueous copper(II) sulfate	copper	copper(II) ions	
	platinum	chlorine	sodium

[3]

Source: 2018 GCE O Level Chemistry Paper 2

Topic: Electrolysis

- Part of Pure Chemistry Syllabus
- Demonstrate **Knowledge** with **Understanding** in relation to concepts of electrolysis

Examples of different types of Questions (Chemistry Discipline)

Topic: Atmosphere & Group Properties (Pure and Combined Chem Syllabus)

A5 Helium is a gas with many uses. It is needed for technical equipment, such as MRI scanners. MRI scanners are used in hospitals to produce detailed images of the body. Helium is also used to fill party balloons.

In 2016, a large underground deposit of helium was discovered in Tanzania. Scientists were delighted with the discovery because helium is a finite resource. Scientist cannot get helium back after it is released into the atmosphere.

The table shows some information about helium and some gases in dry air.

gas	density of pure gas at room temperature and pressure in g/dm^3	percentage volume composition of dry air
helium	0.17	0
nitrogen	1.17	
oxygen	1.33	
argon		<1

(a) Complete the last column of the table. [1]

- Demonstrate **Knowledge** with **Understanding** in relation to state the volume composition of gases in dry air

(b) (i) Suggest why helium cannot be recovered if it is released into the atmosphere. [1]

- Use **information** provided to draw **inference**

(ii) Calculate the density of pure argon at room temperature and pressure in g/dm^3. [1]

- **Recall & locate information** from a variety of sources
- **Apply information** into formula to **solve** problem

(iii) Some people think that the use of helium to fill party balloons should be discouraged.

Explain why they think this. [2]

- **Use information** to present **reasoned explanations** for phenomena

Source: 2018 GCE O Level Chemistry Paper 2

Q2: Are Pure Sciences compulsory subjects for admission into Junior Colleges?

A2:

- To be eligible for admission to a JC course, students must satisfy the following criteria:

  > L1R4 (excludes bonus points) ≤ 16

From 2028 JAE

L1R5 → L1R4

The qualifying threshold for JC eligibility will be revised from **L1R5 ≤ 20** to **L1R4 ≤ 16**

Component	Subjects	Now L1R5	2028 JAE L1R4
L1	English or Higher Mother Tongue	✓	✓
R1	Any 1 best-scoring subject from Humanities	✓	✓
R2	Any 1 best-scoring subject from Mathematics or Science	✓	✓
R3	Any 1 best-scoring subject from Humanities, Mathematics or Science	✓	✓
R4	Any 1 best-scoring subject	✓	✓
R5	Any 1 best-scoring subject	✓	

Q2: Are Pure Sciences compulsory subjects for admission into Junior Colleges?

- Under the A level curriculum, candidates can select subjects from three levels of study, Higher 1 (H1), Higher 2 (H2) and Higher 3 (H3). H2 level is broadly equivalent to A level, subjects at H1 level are of reduced breadth of content and subjects at H3 level are taken as extension of H2 level to allow more in-depth study and advanced content.

- To do a Science subject at H1 or H2 level, your child must have studied the subject either as **G3 (Science)** or **G3 Biology/Chemistry/Physics**.

While students' admission to JC is based on L1R4 results, **different JCs require different subject pre-requisites** for the subjects to be offered. It is good to find out the relevant information from the targeted JC directly.

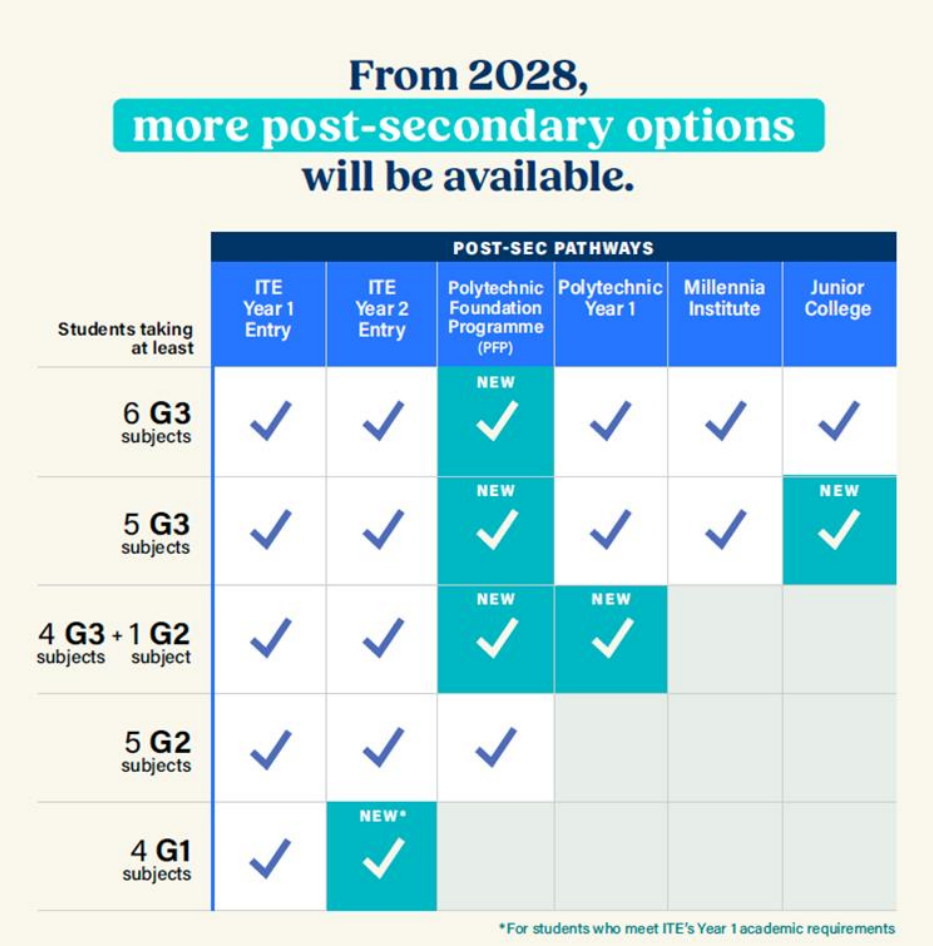
Q3: Will doing Combined Science affect the courses my child can take in a Polytechnic?

A3:

- With FSBB and removal of streams, the polytechnic admission has been revised with a minimum of four G3 subjects and one G2 subject (EL and MA must be G3).

- **Both Combined Science** and **Pure Science subjects** belong to the 2nd group of relevant subject for Applied Sciences, Built Environment, Engineering, Health Sciences, Information & Digital Technologies, Maritime Studies and most Business & Management and Media & Design courses.

- With Combined Science, your child can still choose from a wide range of courses, as long as he or she **meets the eligibility criteria** for the individual courses.



Polytechnic Year 1: Relevant Subjects (R1 & R2)

ELR2B2 (Require 5 G3 or 4 G3 + 1 G2 level subjects) / EL: English, R: Relevant Subject, B: Best Subject

Sample

	Group A Social Sciences	**Group B** Business	**Group C** Science / Engineering / ICT	**Group D** Design/Media
Example of courses	• Arts & Theatre Management • Law & Management • Mass Communication	• Accountancy • Food & Beverage Business • Hospitality & Tourism Management	• AI & Data Engineering • Biomedical Science • Food Science & Tech	• Animation, Games & Visual Effects • Landscape Design & Horticulture • Product Experience & Design
R1 at G3	Art, Geography, History, Literature	Elementary Mathematics OR Additional Mathematics (E or A Maths)		
R2 at G3	E or A Math Art Design & Technology Nutrition & Food Science Geography, History, Literature Higher MTL Music	Art Humanities Geography History Literature	Combined Science Biology Chemistry Physics Design & Technology Nutrition & Food Science	Art Combined Science Biology Chemistry Physics Design &Technology Nutrition & Food Science
B1, B2	Any Best 2 Subjects (1 can be at G2 level)			

Source Credit: JAE Website, https://www.moe.gov.sg/post-secondary/admissions/jae/polytechnics

Q4: Will my child not be able to qualify for admission to School of Medicine in NUS or NTU if he/she does not take triple and/or Pure Sciences?

A4:

- Based on MOE Policy, A level students must take four H2 content-based subjects or three H2 subjects and one H1 content-based subject, at least one content subject to be from a **contrasting discipline**.

- Generally, students require a **good H2 pass in Chemistry and H2 pass in either Biology or Physics** and meet other respective pre-requisites to qualify for admission to School of Medicine in NUS or NTU.

- To do a Science subject at H2 level, your child must have studied the subject either as **G3 Combined Science** or **G3 Pure Science**. Since **different JCs require different subject pre-requisites** for the subjects to be offered, it is good to find out the relevant information from the targeted JC directly.

Q4: Will my child not be able to qualify for admission to School of Medicine in NUS or NTU if he/she does not take triple and/or Pure Sciences?

- Triple science is not a requirement to qualify for admission to School of Medicine in NUS or NTU.
- Polytechnic students with **relevant accredited diplomas** and meet other admission criteria may qualify too.
- It is good to check the University website as the subject pre-requisites are subject to changes every year.

Subject Pre-requisites for other Science courses in Universities

Dentistry

> Good H2 pass in **Chemistry** and
> Good H2 pass in either Biology or Physics

Pharmacy

> A very good H2 pass in **Chemistry** and
> A very good H2 pass in either Biology or Physics or Mathematics

Most Engineering

> H2 Mathematics and
> H2 Physics and/or Chemistry

Nursing

Any two H2 passes in the following subjects: Biology, Chemistry, Computing, Physics and Mathematics

As Chemistry is a subject pre-requisite for most Science courses, the school offers it as a compulsory Pure Science or as the compulsory discipline of the Combined Science.

Q5: Should my child take Pure Sciences or Combined Science?

A5:

- When deciding if your child should take Pure Sciences or Combined Science, it is encouraged that your child should consider his/her
  - > **manageability** of Science, as well as other subjects
  - > **interest** towards the Sciences disciplines
  - > **preferences** of post-secondary courses or future pathways

Q6: Can my child drop to Combined Science if he/she is not able to cope with the demand and rigour of Pure Sciences?

A6:

- Your child is **strongly encouraged** to complete the two years curriculum of Pure Sciences, if he/she **chooses and meets the criteria** to be offered the subjects.

- The syllabus covered at Secondary 3, may **differ** for Combined Science and Pure Sciences. Hence, your child is required to make up for the syllabus missed, if he/she drops to Combined Science.

- Your child may only drop to Combined Science (at the end of Secondary 3) on a **case by case basis**, with special considerations.

Q7: Can my child take Triple Science?

A7:

- Before deciding on the subject combination, it is important to consider the **child's interests and strengths**. For students taking Triple Science, one of the impacts it would have would be students would have long curriculum hours due to the demands of the curriculum. This **would limit the opportunities** for students to be involved in other school-based programs.

- At the post-secondary level, the polytechnics and universities regularly review the course admission requirements, removing or reducing entry barriers where possible, and offer bridging modules for first-year students to plug their knowledge gaps in some instances.

Useful article on choosing subjects for secondary 3:
https://www.schoolbag.edu.sg/story/choosing-subjects-for-secondary-3-put-interest-before-popularity/

Examination Syllabus of G3 Sciences

G3 Science (Physics, Chemistry)
(Syllabus 5086)

G3 Science (Chemistry, Biology)
(Syllabus 5088)

https://go.gov.sg/2025syllabus-5086-5088

G3 Physics (Syllabus 6091)

https://go.gov.sg/2025syllabus-6091

G3 Chemistry (Syllabus 6092)

https://go.gov.sg/2025syllabus-6092

G3 Biology (Syllabus 6093)

https://go.gov.sg/2025syllabus-6093

Thank you.

You may email or contact us at **6752 4311**, if you have other queries.

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