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SCIENCE

is all around us

Understanding the demands and differences between Pure and Combined Science

Goals of Science Education

- Enthuse and nurture all students to be scientifically literate
- Provide strong fundamentals for students to pursue science related areas (STEM) 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.

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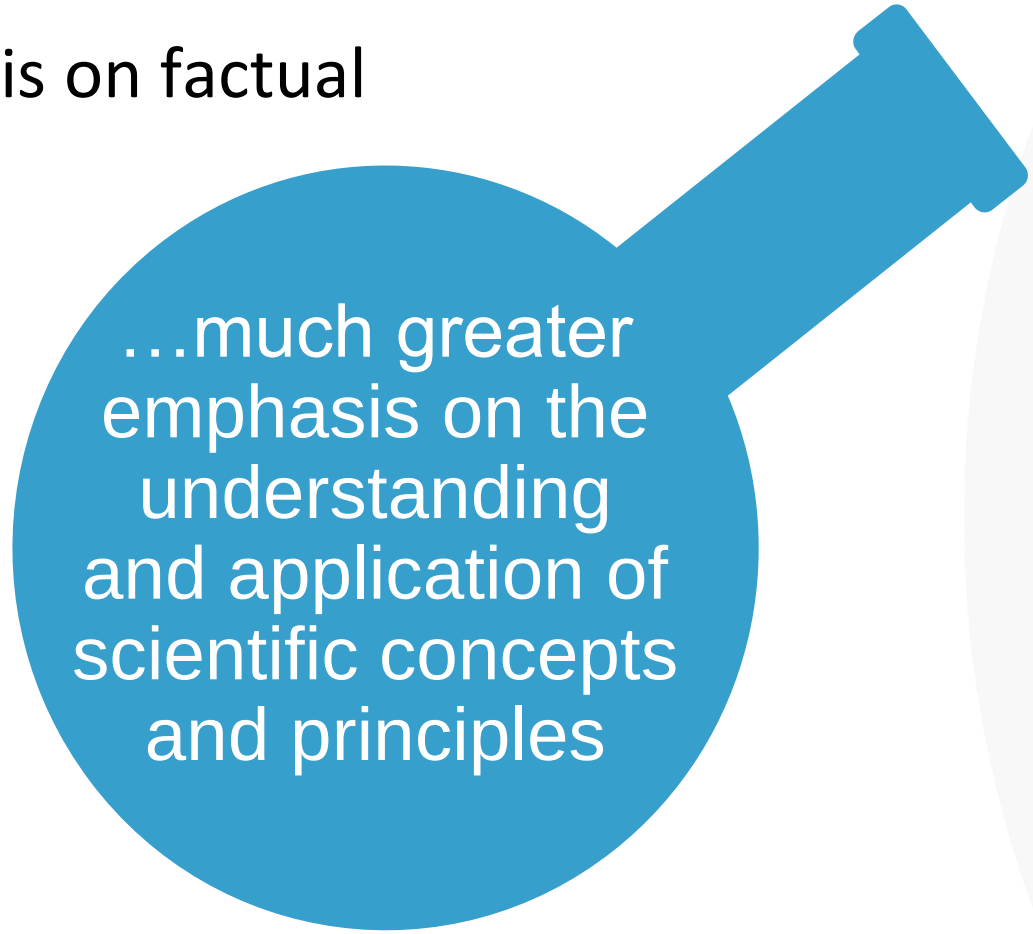
	Science
CRITERIA, DESIRED DISPOSITIONS	A Science student should have: • a strong foundation in Science, and possess the spirit of scientific inquiry • the confidence to engage confidently in issues and questions that relate to the roles played by Science in daily life, society and the environment • the ability to discern, weigh alternatives and evaluate claims and ideas critically, based on logical scientific evidence and arguments
SKILLS & COMPETENCIES TO BE DEVELOPED *(to refer to syllabus document & link to e21CCs)*	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.

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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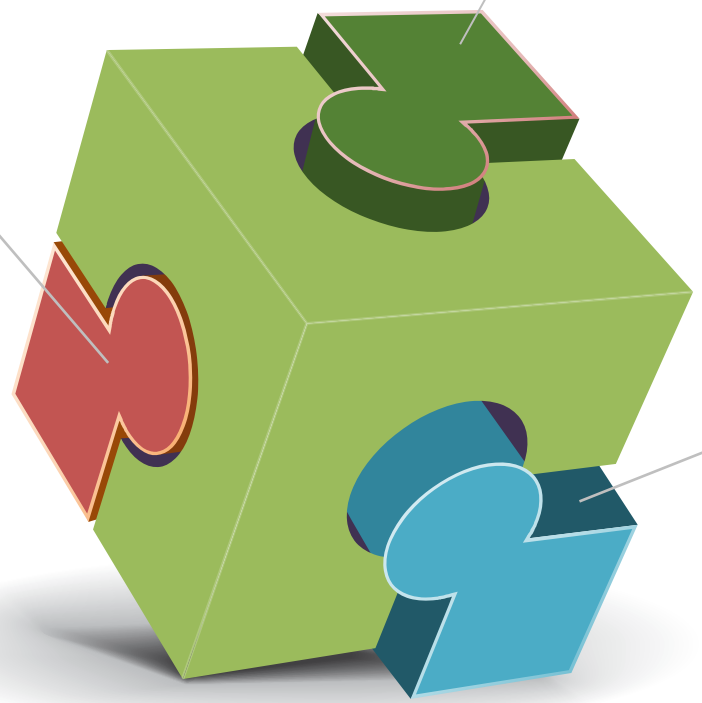
Differences between the Sciences

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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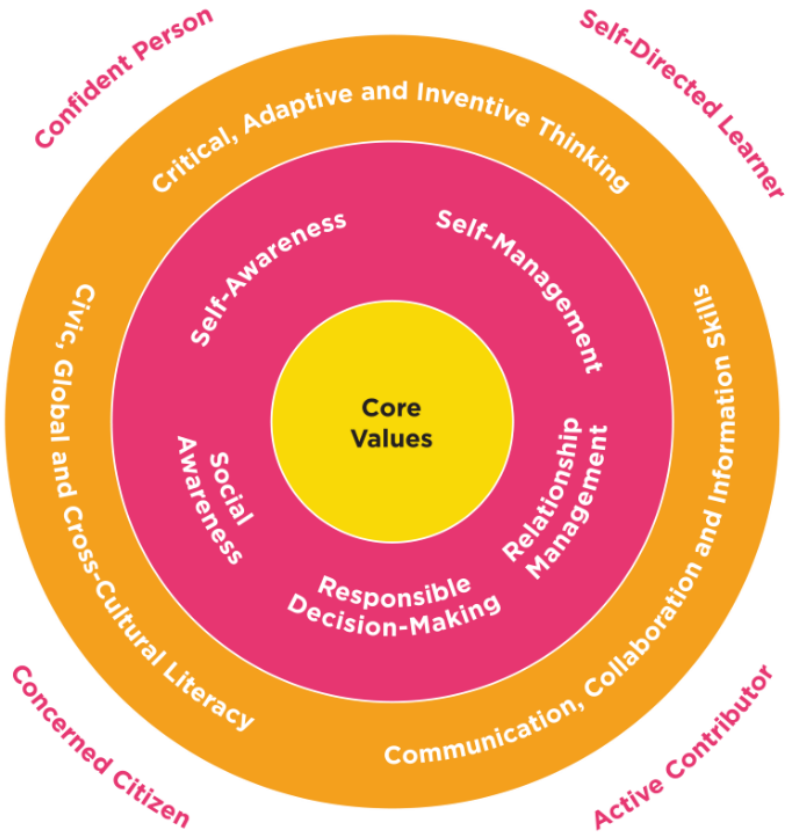
Skills, 21st Century Competencies and Student Outcomes



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

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

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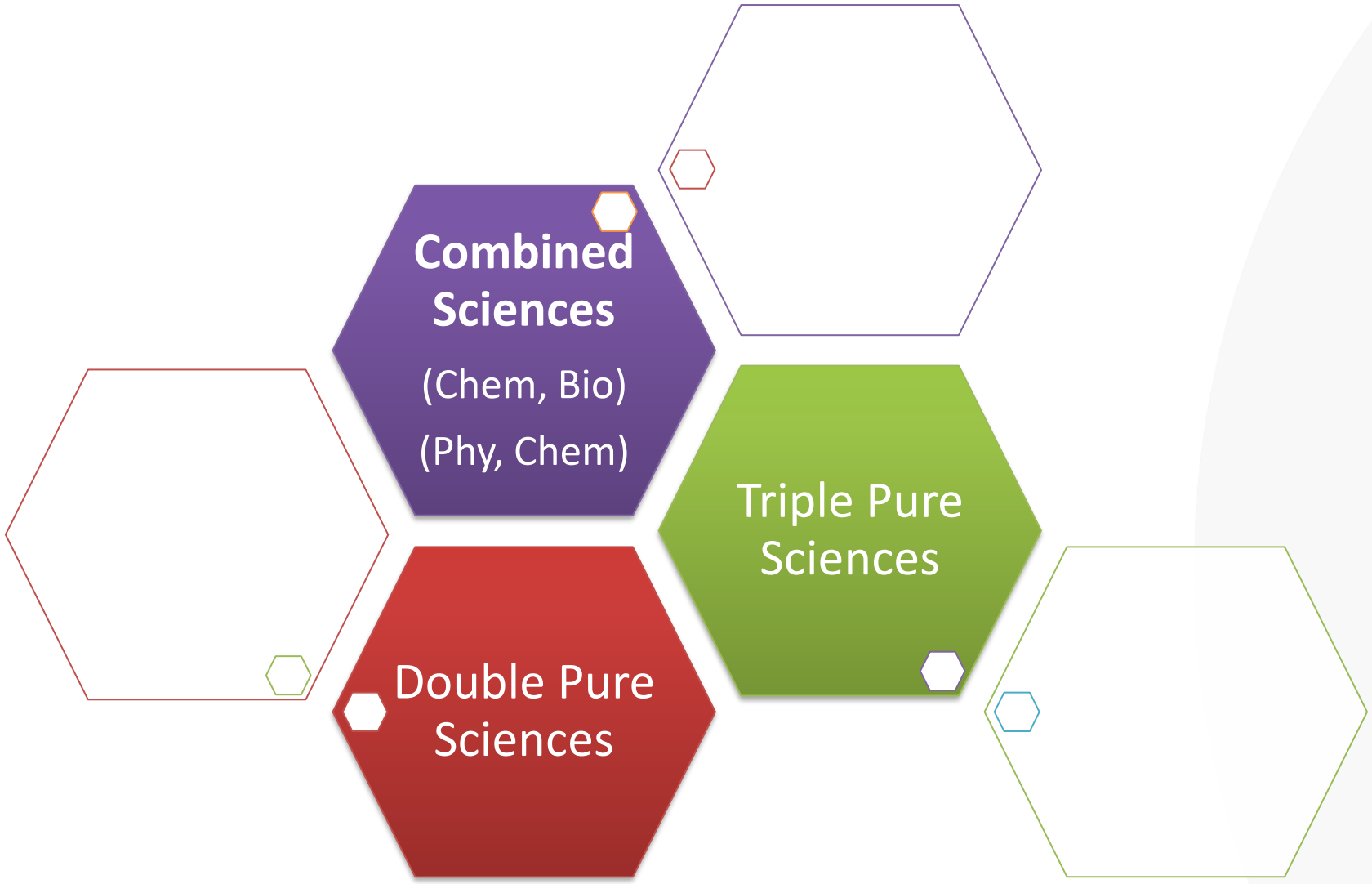

O-Level Pure Sciences – Scheme of Assessment

Paper	Pure Sciences	Duration	Marks	Weighting
1	Multiple Choice	1h	40	30%
2	Structured & Free Response	1h 45m	80	50%
3	Practical Assessment	1h 50m	40	20%

O-Level Combined Science – Scheme of Assessment

Paper	Combined Sciences	Duration	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%

Pure vs Combined Science

Details	Pure Sciences	Combined Sciences
Subject component	Standalone subject	Two science subjects combined into a single subject
Content coverage	**100%**	approximately **65%** of the corresponding pure science subject
Curriculum time per week	Each Pure Science subject 9 periods Double Pure = 18 periods Triple Pure = 27 periods	Each Combined Science subject 6 periods Combined Sciences = 12 periods

Scheme of Assessment

Details	Pure Sciences (for 1 subject)	Combined Sciences (for 1 component)	Sec 2 Science
MCQ	30% (of subject) 40 marks 1 hr	10% 20 marks 30 mins	30% 30 marks
Structured Qns	50% 80 marks 1 hr 45 mins	32.5% 65 marks 1 hr 15 mins	70% 70 marks 2 hr
Practical	20% 40 marks 1 hr 50 mins	7.5% 15 marks 45 mins	N.A.

Pure vs Combined Science – Assessment Weightings

Assessment Objectives	Pure Sciences	Combined Sciences
Knowledge	15%	20%
Understanding	30%	30%
Handling Information & Solving Problems	55%	50%

Pure vs Combined Science

Details	Pure Sciences	Combined Sciences
No. of Assessments at O-Level	Double Pure: 6 papers Triple Pure: 9 papers	4 papers
Assessment questions posed	• Tend to be tricky and indirect. Students need to unpack the meaning of the questions. • 1 Data-based question (10 – 12 marks) • About 5 to 30% calculations • Greater % of explanations	• Tend to be more straightforward than for Pure Science. • Simple data-infused question • About 10 to 40% calculations • Lesser % of explanations

Pure vs Combined Science

Details	Pure Sciences	Combined Sciences
Requirement of answers	• More marks allocated to each part question • Some calculation questions require 2 or 3 steps to solve	• Lesser marks allocated to each part question • Most calculation questions require 1 or 2 steps to solve

Pure vs Combined Science Practicals

Details	Pure Sciences	Combined Sciences
No. of questions	• 2 to 3 questions per subject	• 1 question per subject
Measurements	• decide on the appropriate decimal places and units	• informed on the appropriate decimal places and units
Table	• draw a table and decide on the measurements to take	• provided in the paper
Graph	• interpret the set of data and its respective axis	• guided on both axes
Planning	• write out a plan for an experiment	• none

O-Level Science Assessment Weightage

Level	Subject	Code	SEAB website links
O	Physics	6091	https://www.seab.gov.sg/home/examinations/gce-o-level/o-level-syllabuses-examined-for-school-candidates-2025
	Chemistry	6092	
	Biology	6093	
	Combined Science	5086 / 5088	

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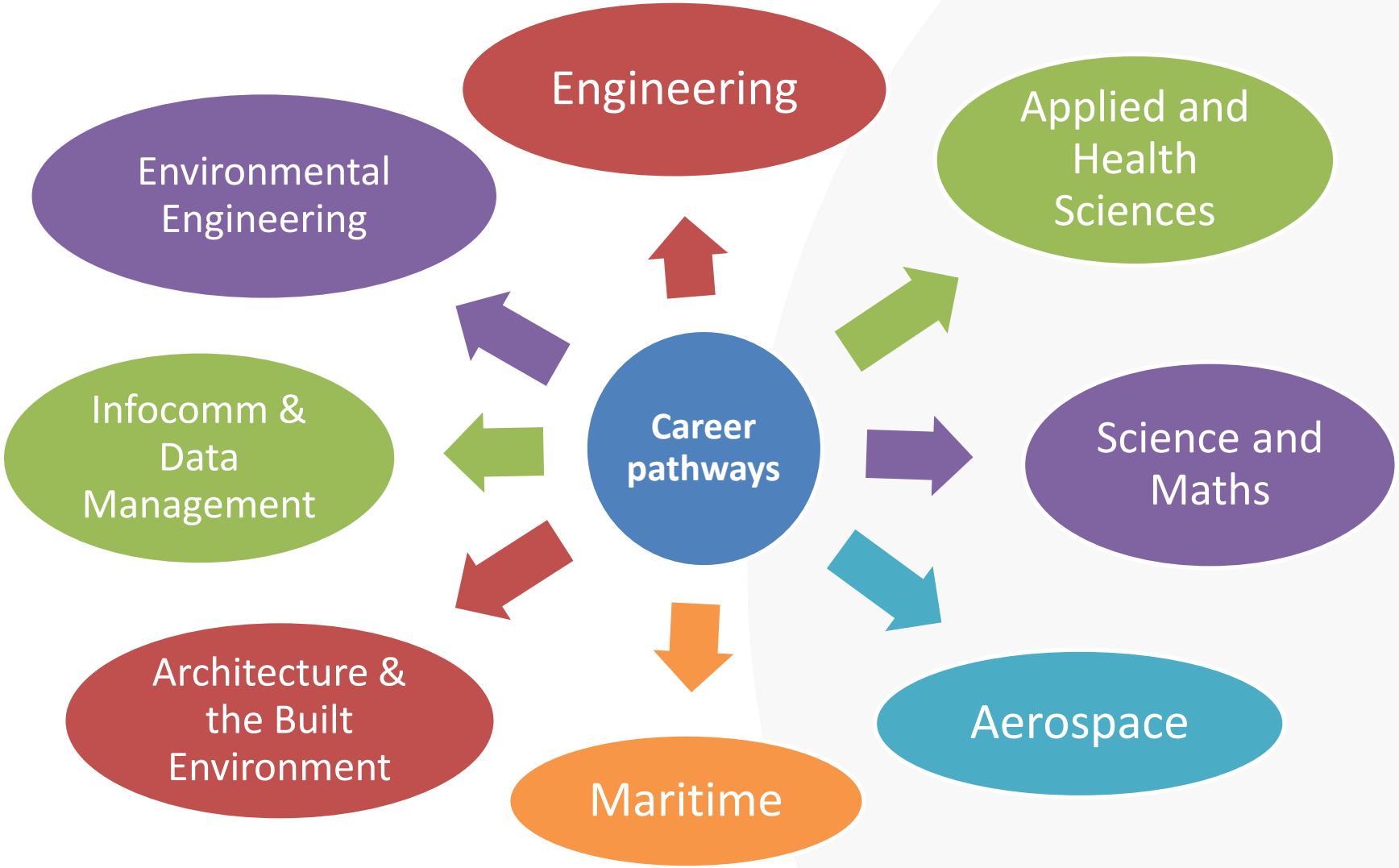
Value of Offering Science



Course Requirements (University)

Course	School	Course Requirements
Dentistry	NUS	H2 pass in Chemistry and either Biology or Physics.
Medicine	NUS	H2 pass in Chemistry and either Biology or Physics.
Biomedical Engineering	NUS	H2 pass in Mathematics or Further Mathematics and either Physics or Chemistry
Biological Sciences	NTU	H1 pass in Mathematics and H2 pass in Physics / Chemistry / Biology
Medicine	NTU	H2 pass in Chemistry and Physics / Biology
Bioengineering	NTU	H2 pass in Mathematics and Physics / Chemistry / Biology / Computing
Medicine	Cambridge	Chemistry and Physics / Mathematics / Biology
Dentistry	University of Melbourne	Chemistry or Biology

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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

Is taking Triple Pure Sciences necessary?

- Medicine and Dentistry require Chemistry and Biology **OR** Physics

- Aspiring JC students are strongly encouraged to take Double Pure Sciences and Double Humanities

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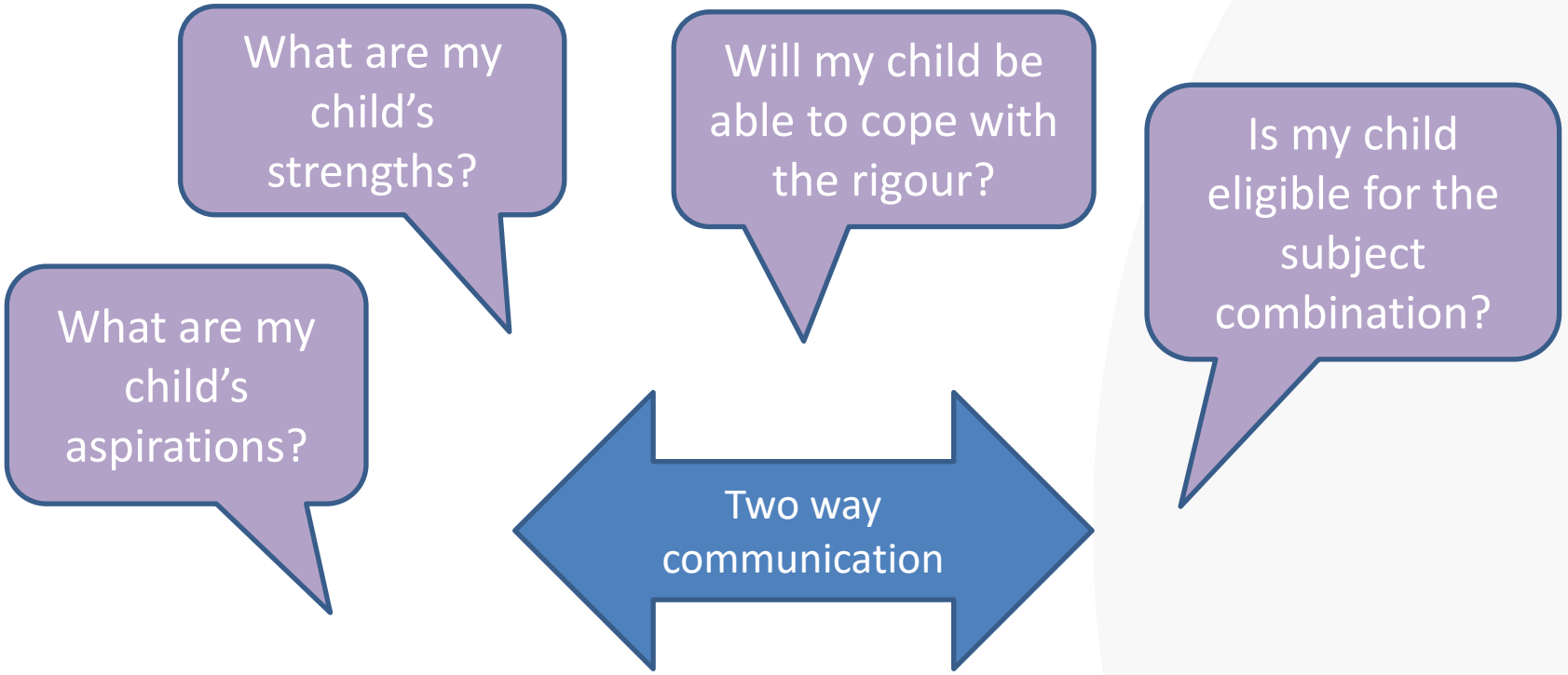
Key Considerations



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)