

Secondary 3NA 2023

Science Streaming Talk

Syllabus 5105 Science (Physics, Chemistry)
Syllabus 5107 Science (Chemistry, Biology)
Syllabus 5086 Science (Physics, Chemistry)
Syllabus 5088 Science (Chemistry, Biology)

5105, 5107 Science (Phy, Chem, Bio)

Structure of the 'N' level Science (Phy/Chem/Bio) paper

Duration: 1h 15mins (50 marks) for each Science:

- 20 marks of Multiple Choice Questions (20%)
- 30 marks of Structured Questions (30%)
 - Section A: 14 marks
 - Section B: 16 marks (choose 2 out of 3 questions)

5076 Science (Physics, Chemistry)

5078 Science (Chemistry, Biology)

Structure of the 'O' Level Sci (Phy, Chem) / Sci (Chem, Bio) Papers

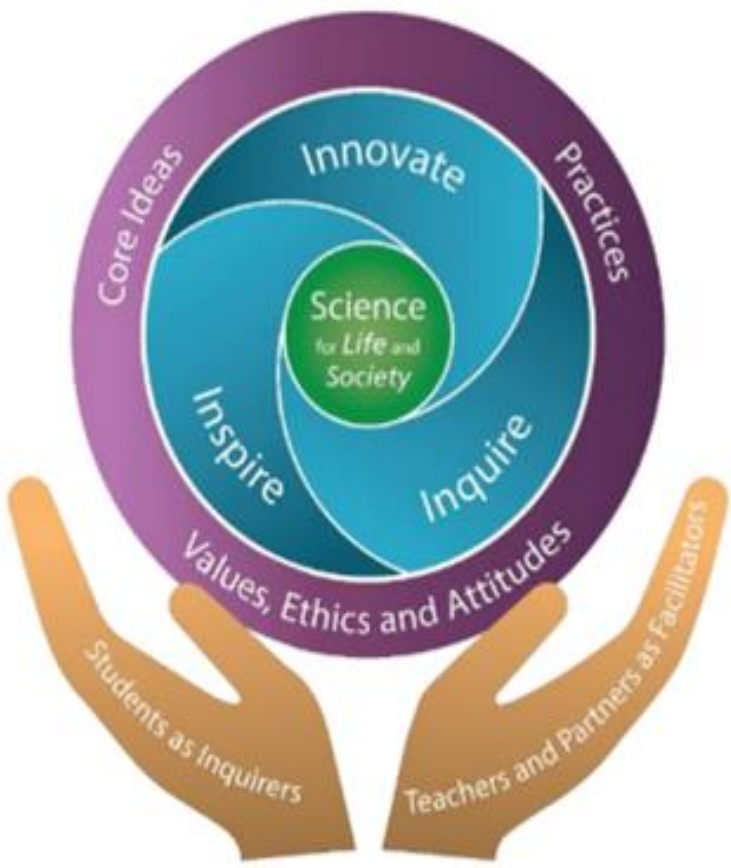
Duration: 1h + 1h 15mins + 1h 15mins + 1h 30mins

- P1: 40 marks of Multiple Choice Questions (20%)
- P2: 65 marks of Phy Structured Questions (32.5%)
- P3: 65 marks of Chem Structured Questions (32.5%)
- P4: 65 marks of Bio Structured Questions (32.5%)
- P5: 30 marks of Practical (15%)

Lower Secondary Science

1. The Scientific Endeavour and Lab Knowledge
2. Exploring Diversity of Matter by Its Physical Properties
3. Exploring Diversity of Matter by its Chemical Composition
4. Exploring Diversity of Matter Using Separation Techniques
5. Ray Model of Light
6. Model of Cells – The Basic Units of Life
7. Model of Matter – The Particulate Nature of Matter
8. Model of Matter – Atoms and Molecules
9. Application of Forces and Transfer of Energy
10. Transfer of Heat Energy and its Effects
11. Chemical Changes
12. Interactions within Ecosystems
13. Electrical Systems
14. Human Digestive System
15. Transport Systems in Living Things
16. Human Sexual Reproductive System

Aims of 2023 USS (E/NA) Syllabuses



Develop in students the knowledge, skills, values and attitudes relevant to the practices of Science, enabling them to:

- Deepen their interest in **Science for future learning and work**.
- Become **scientific literate** citizens who can **innovate** and seize opportunities in the 21st century.
- **Appreciate practical applications** of Science in the real world.

Upper Secondary Science Syllabuses

Drawing reference from the Science Curriculum Framework and building on the Lower Secondary Science syllabuses to...

- 1) Strengthen understanding of interconnections of scientific concepts through Core Ideas
- 2) Engage students in the Practices of Science
- 3) Cultivate Values, Ethics and Attitudes

Science (Chemistry)

compulsory

Disciplinary Ideas for Chemistry

1

Matter is made up of a variety of chemical elements, each with characteristic properties, and the smallest particle that characterises a chemical element is an atom.

2

The **structure** of matter and its chemical and physical properties are determined by the arrangement of particles and electrostatic interactions between them.

3

Energy changes across and within systems usually occur during physical and chemical changes, when there is rearrangement of particles.

4

Energy plays a key role in influencing the rate and extent of physical and chemical changes.

5

Matter and **energy** are conserved in all physical and chemical changes.

Science (Chemistry)

Topics in Upper Sec Chemistry that you get to learn include:

- 1) Experimental Chemistry
- 2) Particulate Nature of Matter
- 3) Chemical Bonding and Structure
- 4) Chemical Calculations
- 5) Acid-Base Chemistry
- 6) Qualitative Analysis
- 7) Patterns in the Periodic Table
- 8) Organic Chemistry
- 9) Maintaining Air Quality



**Briefly covered in
Sec 1 & 2**

Science (Chemistry) School Based

Assessment

- Alternative Assessment Tasks
 - Group project work
 - Science practical
 - Poster, etc.
- End-of-Year Examination

Science (Physics)

Science (Physics)

The Upper Secondary Physics syllabus seeks to develop in students the understanding, skills, ethics and attitudes relevant to the Practices of Science, enabling them to



①

Become **scientifically literate** citizens who can innovate and seize opportunities in the 21st century



②

Appreciate **practical applications** of physics in the real world



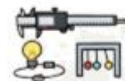
③

Appreciate that a small number of **basic principles and disciplinary ideas** can be applied to explain, analyse and solve problems in the physical world



④

Deepen their **interest** in physics for future learning and work



Science (Physics) Topics

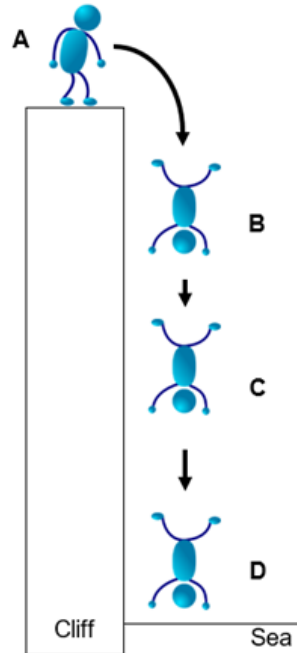
- 1) Physical Quantities, Units and Measurement
- 2) Kinematics
- 3) Force and Pressure
- 4) Dynamics
- 5) Energy
- 6) Kinetic Particle Model of Matter
- 7) Thermal Processes
- 8) General Wave Properties
- 9) Electromagnetic Spectrum
- 10) Electric Charge and Current of Electricity
- 11) D.C. Circuits
- 12) Practical Electricity
- 13) Radioactivity



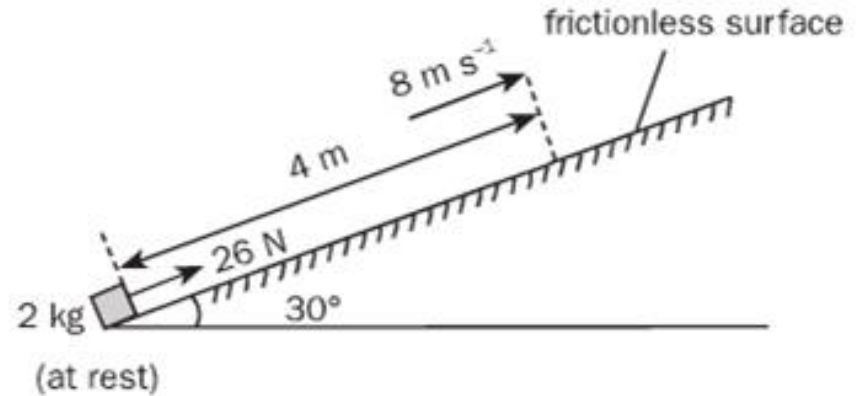
**Briefly covered in
Sec 1 & 2**

Science (Physics)

Lower Sec

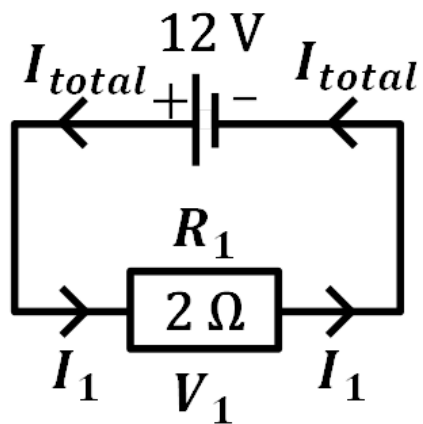


Upper Sec

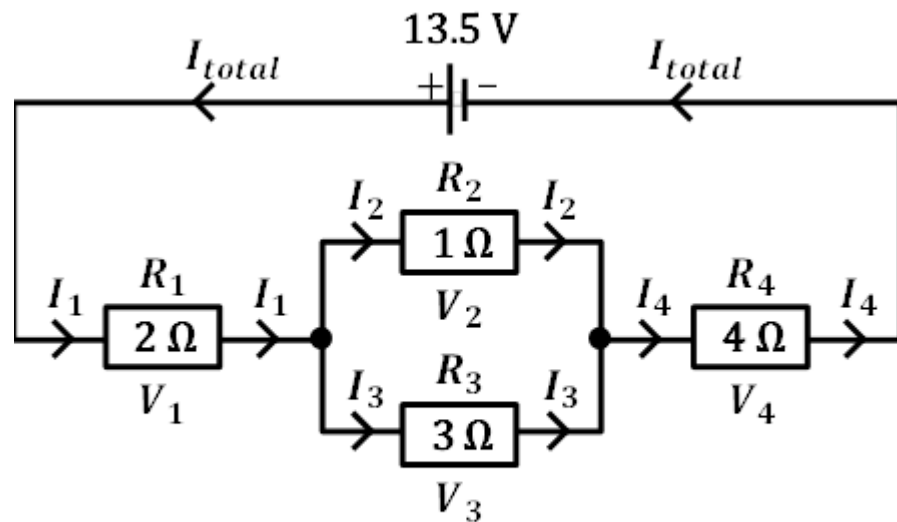


Science (Physics)

Lower Sec



Upper Sec



Science (Physics) School Based Assessment

- Continuous Assessment
 - Investigative Practical Assignment (Group)
 - Product Design (Group)
 - Research and Presentation (Group)
- End-of-Year Examination

Science (Physics)

You may want to choose Physics if you have:

- An Interest in lower secondary science (Physics)
- An Interest in numbers and algebra (Mathematics)
- An interest in the following career options:

Accelerator Operator, Applications Engineer, Data Analyst, Design Engineer, Physics Teacher, IT Consultant, Lab Technician, Laser Engineer, Optical Engineer, Research Associate, Software Developer, Systems Analyst, Technical Specialist, Web Developer, etc

Science (Biology)

Developing Understanding of Biology Disciplinary Ideas

- To allow students to have a **coherent view** and **conceptual framework** of scientific knowledge to facilitate **application** and **transfer of learning**
- Can be **revisited** across various topics, to make **connections** among discrete ideas



The Cell



Structure and Function



Energy



Systems



Homeostasis, Co-ordination
and Response



Heredity



Evolution



USS (E/NA)
Zonal Engagement

Science (Biology)

Topics

1. Cell Structure and Organisation
2. Movement of substances
3. Biological Molecules
4. Nutrition in Humans
5. Transport in Humans
6. Respiration in Humans
7. Infectious Diseases in Humans
8. Nutrition and Transport in Flowering Plants

**Some briefly
covered in Sec 1 & 2**

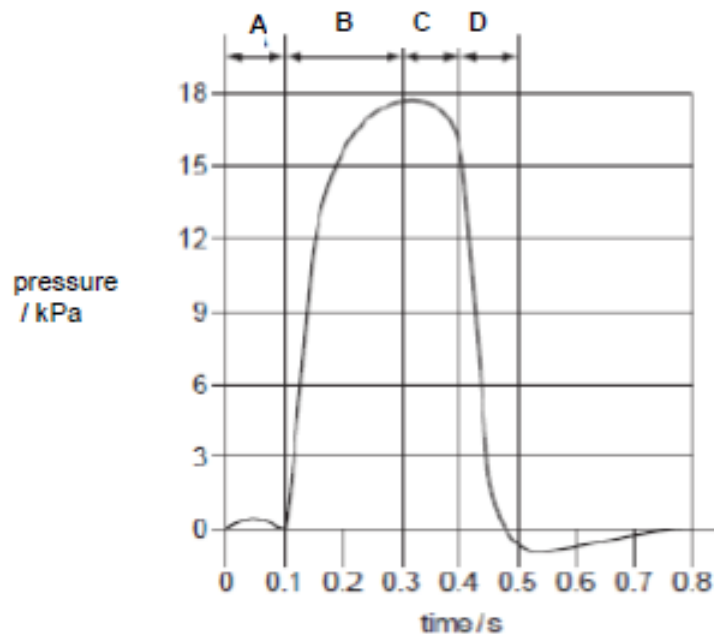
Science (Biology) School Based Assessment

- Continuous Assessment Tasks
 - Secondary 3
 - Case-based studies
 - Practical experiments
 - Identifying and Explaining Misconceptions
- End-of-Year Examination

Science (Biology)

11 The graph shows changes in the blood pressure in the left ventricle of the heart.

During which period is the left ventricle relaxing?



Science (Biology)

3 Fig. 3.1 shows some parts of an insect-pollinated flower and a wind-pollinated flower.

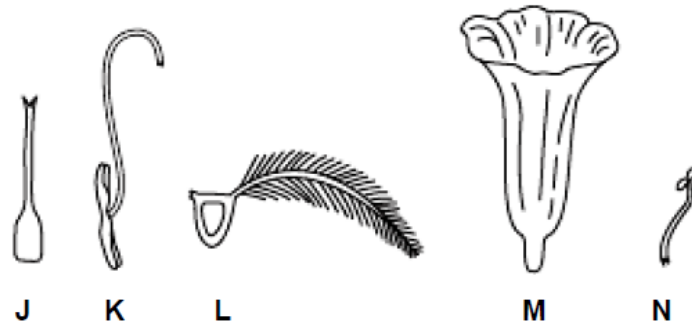


Fig. 3.1

(a) Using the letters J, K, L, M and N, list the parts that are from the insect-pollinated flower.

..... [1]

(b) In Table 3.1, name the parts labelled L and N and state their functions.

Table 3.1

part	name	function
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Science (Biology)

- (b) With reference to Fig. 5.1 and a named example, use the 'lock and key' hypothesis of enzyme action to explain how enzymes work to break down nutrients.

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..... [3]

- (c) Explain how increasing temperature affects the action of enzymes.

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..... [4]

Science (Biology)

You may want to choose Biology if you have:

- A genuine interest in how living things (plants and animals) work.
- An interest in reading, writing, understanding and recalling concepts.
- An interest in the following career options:
 - Healthcare, medicine, nursing, dentistry, forensics, psychology, physiology, physiotherapy, botany, zoology, pharmaceuticals, genetics etc.

Questions?

Feel free to email us if you need more information or advice:

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