Secondary 3E 2023

Science Streaming Talk

Syllabus 6091 Physics
Syllabus 6092 Chemistry
Syllabus 6093 Biology
Syllabus 5086 Science (Physics, Chemistry)
Syllabus 5088 Science (Chemistry, Biology)

6091 Physics; 6092 Chemistry; 6093 Biology

Structure of the ‘O’ Level Phy / Chem / Bio Papers

Duration: 1h + 1h 45min + 1h 50min

for each Science:

- P1: 40 marks of Multiple Choice Questions (30%)
- P2: 80 marks of Structured Questions (50%)
- P3: 40 marks of Practical (20%)

5086 Science (Physics, Chemistry)
5088 Science (Chemistry, Biology)

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

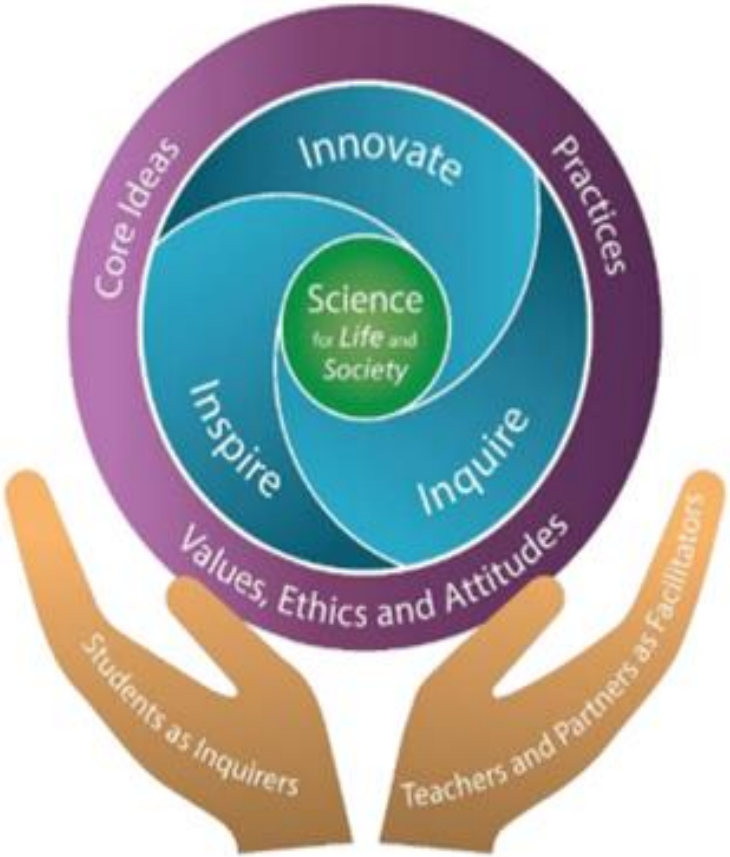
Duration: 1h + 1h 15min + 1h 15min + 1h 30min

- 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

Chemistry / 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.

Chemistry / Science (Chemistry)

Topics in Chemistry that you will learn:

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

Briefly covered in Sec 1 and 2

Chemistry / Science (Chemistry)

9) Chemical Energetics
10) Rate of Reactions
11) Organic Chemistry
12) Maintaining Air Quality

Chemistry School Assessment

- Continuous Assessment
  - Experiment Design, Practical, Research Project

- End-of-Year Examination

Physics /
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

USS (E/NA)
Zonal Engagement

Physics Topics

1) Physical Quantities, Units and Measurement
2) Kinematics
3) Dynamics
4) Turning Effects of Forces
5) Pressure
6) Energy
7) Kinetic Particle Model of Matter
8) Thermal Processes
9) Thermal Properties of Matter
10) General Wave Properties
11) Electromagnetic Spectrum
12) Light
13) Static Electricity
14) Current of Electricity

Some briefly covered in Sec 1 & 2

Physics Topics

15) D.C. Circuits
16) Practical Electricity
17) Magnetism
18) Electromagnetism
19) Electromagnetic Induction
20) Radioactivity

Science (Physics) Topics

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

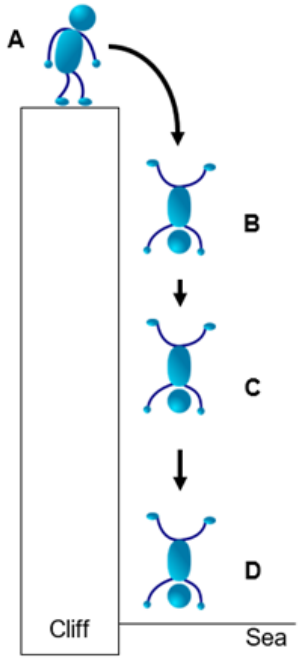
Some briefly covered in Sec 1 & 2

Science (Physics) Topics

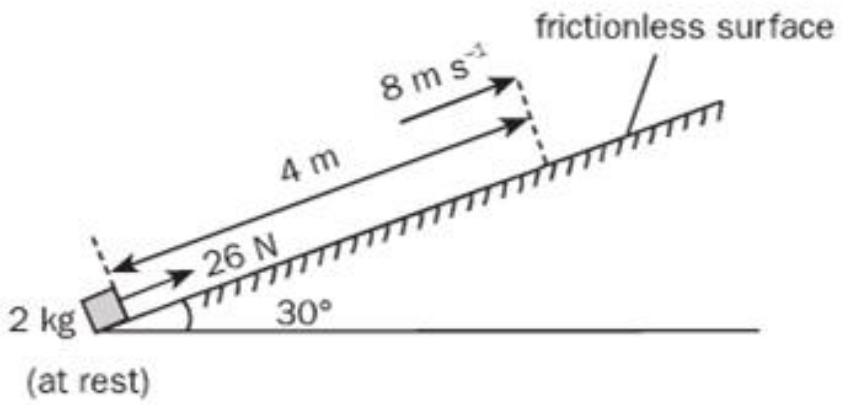
15) Magnetism and Electromagnetism
16) Radioactivity

Physics / Science (Physics)

Lower Sec

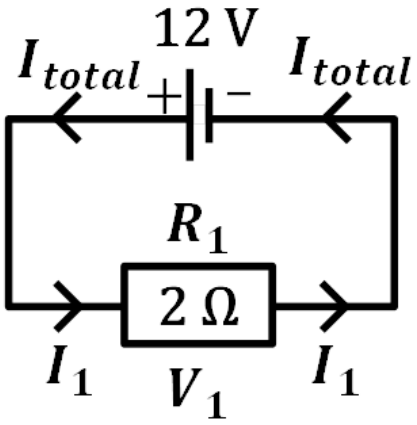


Upper Sec

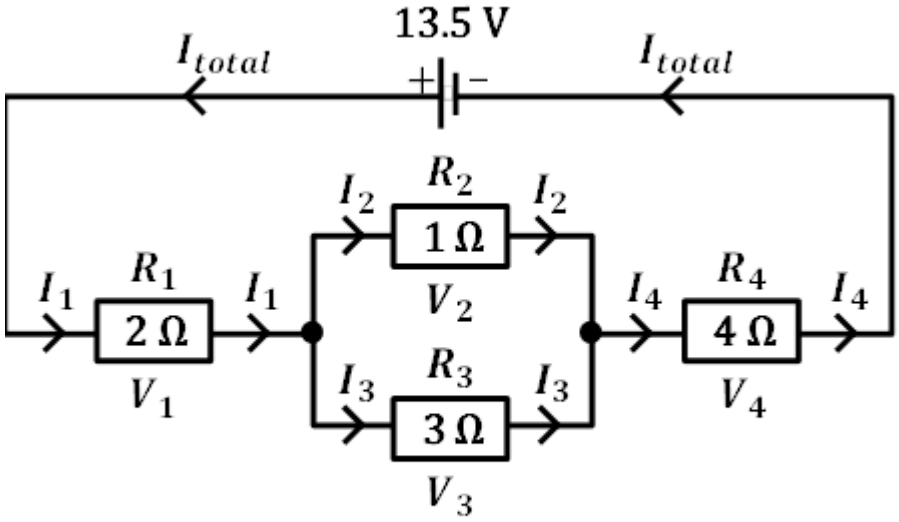


Physics / Science (Physics)

Lower Sec



Upper Sec



Physics School Based Assessment

- Continuous Assessment
  - Concept Map
  - Video Analysis
  - Practical Assessment
  - Application Test

- End-of-Year Examination

Physics / Science (Physics)

You may want to choose Physics is 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, High School Physics Teacher, IT Consultant, Lab Technician, Laser Engineer, Optical Engineer, Research Associate, Software Developer, Systems Analyst, Technical Specialist, Web Developer etc

Biology /
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

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) Homeostasis, Co-ordination and Response in Humans
8) Excretion in Humans
9) Infectious Diseases in Humans
10) Nutrition and Transport in Flowering Plants

Some briefly covered in Sec 1 & 2

Biology Topics

11) Organisms and their Environment
12) Molecular Genetics
13) Reproduction
14) Inheritance

Science (Biology) Topics

1) Cell Structure and Organisation
2) Movement of Substances
3) Biological Molecules
4) Nutrition in Humans
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6) Respiration in Humans
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Some briefly covered in Sec 1 & 2

Science (Biology) Topics

9) Organisms and their Environment
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Biology / Science (Biology)

2 Fig. 2.1 shows part of the mammalian placenta and the umbilical cord attached to a foetus.

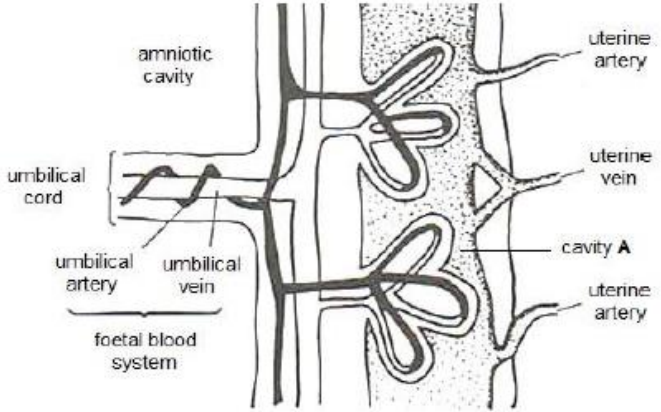

Fig. 2.1

(a) (i) Cavity A contains blood.

Suggest why it is advantageous to have this blood in a cavity rather than in a blood vessel.

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24 The diagrams show two sections through the eye of the same person.

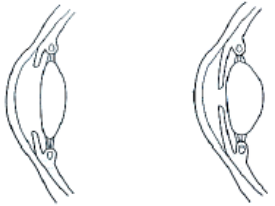


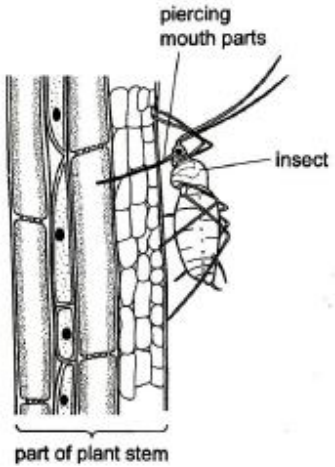
diagram 1 diagram 2

What happens to achieve the changes from the eye in diagram 1 to the eye in diagram 2?

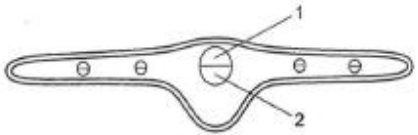
	ciliary muscles	circular muscles of iris	radial muscles of iris
A	contract	contract	relax
B	contract	relax	contract
C	relax	contract	relax
D	relax	relax	contract

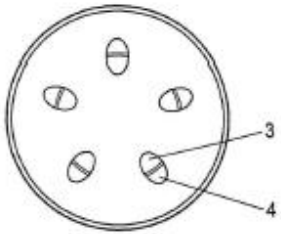
Biology / Science (Biology)

11 The diagram shows an insect using its piercing mouth parts to obtain sugars from a plant tissue.



Which numbered parts correspond to this plant tissue?





Biology / Science (Biology)

10 (b) Describe how excretory wastes such as urea is produced and removed from the body.

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Biology School Assessment

- Continuous assessment
  - Case-based studies
  - Practical experiments
  - Identifying and Explaining Misconceptions
- End-of-Year Examination

Biology / 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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