ICSE

YEAR 2027

INDIAN CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

SCIENCE (52)

BIOLOGY

February 2025

Council for the Indian School Certificate Examinations (CISCE)

MISSION STATEMENT

The Council for the Indian School Certificate Examinations is committed to serving the nation's children, through high quality educational endeavours, empowering them to contribute towards a humane, just and pluralistic society, promoting introspective living, by creating exciting learning opportunities, with a commitment to excellence.

ETHOS OF CISCE

- Trust and fair play.
- Minimum monitoring.
- Allowing schools to evolve their own niche.
- Catering to the needs of the children.
- Giving freedom to experiment with new ideas and practices.
- Diversity and plurality - the basic strength for evolution of ideas.
- Schools to motivate pupils towards the cultivation of:
  Excellence - The Indian and Global experience.
  Values - Spiritual and cultural - to be the bedrock of the educational experience.
- Schools to have an 'Indian Ethos', strong roots in the national psyche and be sensitive to national aspirations.

SCIENCE (52)

BIOLOGY

SCIENCE Paper - 3

Aims:

1. To acquire the knowledge of the economic importance of plants and animals.
2. To develop an understanding of the inter-relationship between sustainability and environmental adaptations.
3. To develop an understanding of the interdependence of plants and animals so as to enable pupils to acquire a clearer comprehension of the significance of life and its importance in human welfare.
4. To understand the capacities and limitations of all the biological and economic activities so as to be able to use them for a better quality of life.
5. To acquire the ability to observe, experiment, hypothesize, infer, handle equipment accurately and make correct recordings.

CLASS IX

*There will be one paper of **two hours** duration of 80 marks and Internal Assessment of Practical Work carrying 20 marks.*

1. Basic Biology

(i) The cell, a unit of life, protoplasm, basic difference between prokaryotic and eukaryotic cell; differences between an animal and a plant cell.

- *A basic understanding of the cell theory, structure of plant and animal cell with functions of various cell organelles. (Protoplasm, Cytoplasm, Cell Wall, Cell Membrane, Nucleus, Nucleolus, Mitochondria, Endoplasmic Reticulum, Ribosome, Golgi bodies, Plastids, Lysosomes, Centrosome and Vacuole).*
- *Major differences between a prokaryotic and eukaryotic cell.*
- *Differences between a plant cell and an animal cell should be mainly discussed with respect to cell wall, centrosome, vacuoles and plastids.*

(ii) Tissues: Types of plant and animal tissues.

- *A brief understanding of their location, basic structure and functions with examples.*
- *A brief understanding of their role in different physiological processes in plants and animals.*

2. Flowering Plants

(i) Flower: Structure of a bisexual flower, functions of various parts.

- *A brief introduction to complete and incomplete flowers.*
- *Essential and non-essential whorls of a bisexual flower; their various parts and functions.*
- *Inflorescence and placentation (meaning only)*

(Charts or actual specimens may be used to help enhance clarity of concepts.)

(ii) Pollination: self and cross-pollination.

- *Explanation, advantages and disadvantages of self and cross-pollination.*
- *Agents of pollination and the characteristic features of flowers*

pollinated by various agents such as insects, wind, and water.

- *A brief idea as to how nature favours cross pollination.*

(ii) Fertilisation.

- *Events taking place between pollination and fertilisation leading to the formation of zygote in the embryo sac.*
- *A brief explanation of the terms double fertilization and triple fusion.*
- *Fruit and Seed - definition and significance.*

3. Plant Physiology

(i) Structure of dicot and monocot seeds, Germination of seeds, types, and conditions for seed germination.

- *Structure and germination of Bean seed and Maize grain.*
- *Differences between monocot and dicot seeds.*
- *Differences between hypogeal and epigeal germination.*
- *Conditions for seed germination - To be explained and supported by experiments.*

(ii) Respiration in plants: outline of the process, gaseous exchange.

- *A brief outline of the process mentioning the terms Glycolysis, Krebs cycle and their significance.*
- *A reference to be made to aerobic and anaerobic respiration with chemical equations in each case.*
- *Experiments on gaseous exchange and on heat production.*

4. Diversity in living organisms

(i) A brief outline of the five Kingdom classification.

- *Main characteristics of each kingdom with suitable examples:*
  - *Monera, Protista, Fungi.*
  - *Plantae - Thallophyta, Bryophyta, Pteridophyta and Spermatophyta.*
- *Animalia - non-chordates from Porifera to Echinodermata and Chordates - all five Classes.*

(ii) Economic importance of Bacteria.

(a) Useful role of bacteria:

- *Medicine: antibiotics, serums and vaccines*
- *Agriculture: nitrogen cycle (role of nitrogen fixing, nitrifying and denitrifying bacteria)*
- *Industry -curing of tea, tanning of leather.*

(b) Harmful role of bacteria - spoilage of food, diseases in plants and animals, bio-weapons.

(iii) Economic importance of Fungi.

A brief idea of the useful role of Fungi in breweries, bakeries, cheese processing, and mushroom cultivation. (Processes of manufacture are not required).

5. Human Anatomy and Physiology

(a) Nutrition:

(i) Classes of food; balanced diet. Malnutrition and deficiency diseases.

- *Functions of carbohydrates, fats, proteins, mineral salts (calcium, iodine, iron and sodium), vitamins and water in proper functioning of the body.*
- *Sources of vitamins, their functions and deficiency diseases.*
- *Meaning and importance of a 'Balanced Diet'.*
- *Role of cellulose in our diet.*
- *Causes, symptoms and prevention of Kwashiorkor and Marasmus.*

(ii) The structure of a tooth, different types of teeth.

- *Structure of a tooth to be discussed with the help of a diagram.*
- *Functions of different types of teeth.*
- *Dental formula of an adult.*

(iii) Digestive System: Organs, digestive glands and their functions (including enzymes and their functions in digestion, absorption and assimilation of digested food).

- *Organs and glands of the digestive system and their functions with reference to digestion, absorption and assimilation.*
- *brief idea of peristalsis.*

(b) Skeleton - Movement and Locomotion.

- Functions of human skeleton
- Axial and Appendicular Skeleton
- Types of joints with reference to their location*:*
  - *immovable joints*
  - *slightly movable joints*
  - *freely movable (hinge joint, ball and socket joint, gliding joint, pivot joint*.)

(c) Structure and functions of skin.

- *Various parts of the skin and their functions.*
- *Special derivatives of the skin with reference to sweat glands, sebaceous glands, hair, nails and mammary glands.*
- *Heat regulation - vasodilation and vasoconstriction.*

(d) Respiratory System: Organs; mechanism of breathing; tissue respiration, heat production.

- *Structures of the respiratory system.*
- *Differences between anaerobic respiration in plants and in man.*
- *Role of diaphragm and intercostal muscles in breathing to provide a clear idea of the breathing process.*
- *Brief idea of gaseous transport and tissue respiration.*
- *Brief understanding of respiratory volumes.*
- *Effect of altitude on breathing; asphyxiation and hypoxia.*

6. Health and Hygiene

(i) A brief introduction to maintaining good health.

General idea of personal hygiene, public hygiene and sanitation.

(ii) A brief introduction to communicable, non-communicable, endemic, epidemic, pandemic and sporadic diseases; modes of transmission.

- *Meaning of each of the above with examples.*
- *Modes of transmission: air borne, water borne; vectors (housefly, mosquito, cockroach).*

(iii) Bacterial, Viral, Protozoan, Helminthic diseases:

- *Bacterial: Cholera, typhoid, tuberculosis.*
- *Viral: AIDS, Chicken pox, Hepatitis.*
- *Protozoan: Malaria, Amoebic Dysentery, Sleeping sickness.*
- *Helminthic: Ascariasis, Taeniasis, Filiariasis.*

(symptoms and measures to control the above diseases.)

(Scientific names of causative agents not required).

(iv) Aids to Health: Active and passive immunity.

- *Meaning of Active and passive immunity.*
- *An understanding of the use and action of the following – vaccination, immunization, antitoxin, serum, antiseptics, disinfectants, antibiotics.*
- *An idea of the local defense system and its merits, difference between antiseptics and disinfectants.*

(v) Health Organisations: Red Cross, WHO.

Major activities of the Red Cross and WHO.

7. Waste generation and management

(a) Sources of waste - domestic, industrial, agricultural, commercial and other establishments.

- *Domestic waste: paper, glass, plastic, rags, kitchen waste, etc.*
- *Industrial: mining operations, cement factories, oil refineries, construction units.*
- *Agricultural: plant remains, animal waste, processing waste.*
- *Municipal sewage: Sewage, degradable and non-degradable waste from offices, etc.*
- *e-waste: brief idea about e-waste.*

(b) Methods of safe disposal of waste.

- *Segregation, dumping, composting, drainage, treatment of effluents before discharge, incineration, use of scrubbers and electrostatic precipitators.*
- *Segregation of domestic waste into biodegradable and non-biodegradable by households: garden waste to be converted to compost; sewage treatment plants.*

INTERNAL ASSESSMENT OF PRACTICAL WORK

The practical work is designed to test the ability of the candidates to make accurate observations from specimens of plants and animals.

PLANT LIFE

(i) The examination of an onion peel under the microscope to study various parts of the cell.

(ii) A cross-pollinated flower to be examined and identified and the parts to be studied and labelled e.g. Hibiscus.

(iii) Specimens of germinating seeds with plumule and radicle (the bean seed and maize grain) for examination, identification, drawing and labelling the parts.

ANIMAL LIFE

(i) The examination of a human cheek cell under the microscope to study various parts of the cell.

(ii) Identification of sugar, starch, protein and fat. through conduct of relevant tests.

(iii) Examination and identification of specimens belonging to the following groups of animals:

Non-Chordata - Porifera, Coelenterata, Platyhelminthes, Nemathelminthes Annelida, Arthropoda. Mollusca and Echinodermata.

Chordata- Pisces, Amphibia, Reptilia, Aves, Mammalia.

Identification of the structure of the following organs through specimens/models and charts: Lung and skin.

(iv) Experiments to show the mechanism of breathing.

Bell jar experiment should be discussed. Comparison should be made with the human lungs and respiratory tract to show the mechanism of breathing.

(v) Visit a few establishments in the locality such as motor repair workshops, kilns, pottery making units, fish and vegetable markets, restaurants, dyeing units. Find out the types of wastes and methods prevalent for their disposal. On the basis of the information collected prepare a report, suggest measures to improve the environmental conditions.

(vi) Visit a water treatment plant, sewage treatment plant or garbage dumping or vermicomposting sites in the locality and study their working.

CLASS X

*There will be one paper of **two hours** duration of 80 marks and Internal Assessment of practical work carrying 20 marks.*

1. Basic Biology

(i) Cell Cycle and Cell Division.

Cell cycle – Interphase (G_1, S, G_2) and Mitotic phase.

Cell Division:

- *Mitosis and its stages.*
- *A basic understanding of Meiosis as a reduction division (stages not required).*
- *A brief idea of homologous chromosomes and crossing over leading to variations.*
- *Significance and major differences between mitotic and meiotic division.*

(ii) Structure of chromosome.

Basic structure of chromosome with elementary understanding of terms such as chromatin, chromatid, gene structure of DNA and centromere.

(iii) Genetics: Mendel's laws of inheritance and sex-linked inheritance of diseases.

- *The three laws of Mendel.*
- *Monohybrid cross – phenotype and genotype.*
- *Dihybrid cross – Only phenotype.*
- *The following terms to be covered: gene, allele, heterozygous, homozygous, dominant, recessive, mutation, variation, phenotype, genotype.*
- *Sex determination in human beings.*

  Sex linked inheritance of diseases to include only X-linked like haemophilia and colour blindness.

2. Plant Physiology

(i) Absorption by roots, imbibition, diffusion and osmosis; osmotic pressure, root pressure; turgidity and flaccidity; plasmolysis and deplasmolysis; the absorption of water and minerals; active and passive transport (in brief); The rise of water up to the xylem; Forces responsible for ascent of sap.

- *Understanding of the processes related to absorption of water by the roots.*
- *Characteristics of roots, which make them suitable for absorbing water.*
- *Structure of a single full-grown root hair.*
- *A general idea of Cohesive, Adhesive forces and transpirational pull.*
- *Experiments to show the conduction of water through the xylem.*

(ii) Transpiration - process and significance. Ganong's potometer and its limitations. The factors affecting rate of transpiration. Experiments on transpiration. A brief idea of guttation and bleeding.

- *Concept of transpiration and its importance to plants*
- *Experiments related to transpiration:*

  (a) Loss in weight of a potted plant or a leafy shoot in a test tube as a result of transpiration.

  (b) Use of cobalt chloride paper to demonstrate unequal rate of transpiration in a dorsiventral leaf.
- *Mechanism of stomatal transpiration on the basis of potassium ion exchange theory.*
- *Adaptations in plants to reduce transpiration.*
- *A brief idea of guttation and bleeding.*

(iii) Photosynthesis: The process and its importance to life in general; experiments to show the necessity of light, carbon dioxide, chlorophyll, formation of starch and release of oxygen; carbon cycle.

- *The process and significance of Photosynthesis.*
- *The internal structure of chloroplast to be explained to give an idea of the site of light and dark reactions.*
- *Opening and closing of stomata based on potassium ion exchange theory.*
- *Overall balanced chemical equation to represent photosynthesis.*
- *Introduction of the terms "photochemical" for light phase and "biosynthetic" for dark phases.*
- *Light reaction - activation of chlorophyll followed by photolysis of water, release of O_2, formation of ATP (photophosphorylation) and NADPH.*
- *Dark reaction - only combination of hydrogen released by NADP with CO_2 to form glucose. (detailed equations are not required).*
- *Adaptations in plants for photosynthesis.*
- *Experiments with regard to the factors essential for photosynthesis; emphasis on destarching and the steps involved in starch test.*
- *A diagrammatic representation of "carbon cycle".*

(iv) Chemical coordination in Plants: A general study of plant growth regulators; Tropic movements in plants.

- *A brief idea of the physiological effects of Auxins, Gibberellins, Cytokinins, Abscisic acid and Ethylene in regulating the growth of plants.*
- *A basic understanding of the tropic movements in plants with reference to – Phototropism, Geotropism, Hydrotropism, Thigmotropism and Chemotropism (supported with suitable examples).*

3. Human Anatomy and Physiology

(i) Circulatory System: Blood and lymph, the structure and working of the heart, blood vessels, circulation of blood (only names of the main blood vessels entering and leaving the heart, liver and kidney will be required). Lymphatic system.

- *Composition of blood (structure and functions of RBC, WBC and platelets).*
- *Brief idea of tissue fluid and lymph.*
- *Increase in efficiency of mammalian red blood cells due to absence of certain organelles; reasons for the same.*
- *A brief idea of blood coagulation.*
- *Structure and working of the heart along with names of the main blood vessels entering and leaving the heart, the liver and the kidney.*
- *Concept of systole and diastole; concept of double circulation.*
- *Brief idea of pulse and blood pressure.*
- *Blood vessels: artery, vein and capillary to be explained with the help of diagrams to bring out the relationship between their structure and function.*
- *Brief idea of the lymphatic organs: spleen and tonsils.*
- *ABO blood group system, Rh factor.*
- *Significance of the hepatic portal system.*

(ii) Excretory System: A brief introduction to the excretory organs; parts of the urinary system; structure and function of the kidneys; blood vessels associated with kidneys; structure and function of nephron

- *A brief idea of different excretory organs in the human body.*
- *External and internal structure of the kidney;*
- *Parts of the urinary system along with the blood vessels entering and leaving the kidney; functions of various parts of the urinary system (emphasis on diagram with correct labelling). A general idea of the structure of a kidney tubule/ nephron.*

- *A brief idea of ultra-filtration (emphasis on the diagram of malpighian capsule); selective reabsorption and tubular secretion in relation to the composition of blood plasma and urine formed.*

(iii) Nervous system: Structure of Neuron; central, autonomous and peripheral nervous system (in brief); brain and spinal cord; reflex action and how it differs from voluntary action.

Sense organs – Eye: Structure, functions, defects and corrective measures: Ear: Parts and functions of the ear.

- *Parts of a neuron.*
- *Various parts of the external structure of the brain and its primary parts: Medulla Oblongata, Cerebrum, Cerebellum, Thalamus, Hypothalamus and Pons; their functions.*
- *Reference to the distribution of white and gray matter in Brain and Spinal cord.*
- *Voluntary and involuntary actions – meaning with examples.*
- *Diagrammatic explanation of the reflex arc, showing the pathway from receptor to effector.*
- *A brief idea of the peripheral and autonomic nervous system in regulating body activities.*
- *Differences between natural and acquired reflex.*
- *External and Internal structure and functions of the Eye and Ear and their various parts.*
- *A brief idea of stereoscopic vision, adaptation and accommodation of eye.*
- *Defects of the eye (*myopia, hyperopia hypermetropia, presbyopia, astigmatism and cataract) *and corrective measures (diagrams included for myopia and hyperopia only)*
- *The course of perception of sound in human ear.*
- *Role of ear in maintaining balance of the body.*

(iv) Endocrine System: General study of the following glands: Adrenal, Pancreas, Thyroid and Pituitary. Endocrine and Exocrine glands.

- *Differences between Endocrine and Exocrine glands.*
- *Exact location and shape of the endocrine glands in the human body.*
- *Hormones secreted by the following glands: Pancreas: insulin and glucagon; Thyroid: only thyroxin; Adrenal gland: Cortical hormones and adrenaline; Pituitary: growth hormone, tropic hormones, ADH and oxytocin.*
- *Effects of hypo secretion and hyper secretion of hormones.*
- *A brief idea of Feedback mechanism with reference to TSH.*

(v) The Reproductive System: Organs, fertilisation functions of placenta in the growth of the embryo Menstrual cycle.

- *Functions of Male and Female reproductive organs and male accessory glands. An idea of secondary sexual characters.*
- *Structure and functions of the various parts of the sperm and egg.*
- *Explanation of the terms: Fertilization, implantation, placenta, gestation and parturition.*
- *A brief idea of the role of placenta in nutrition, respiration and excretion of the embryo; its endocrinal function.*
- *Functions of Foetal membranes and amniotic fluid.*
- *Menstrual cycle outline of menstrual cycle.*
- *Role of Sex hormones: Testosterone, Oestrogen and Progesterone in reproduction.*
- *Identical and fraternal twins: meaning and differences only.*

4. Population

Population explosion in India; need for adopting control measures - population control.

- *Main reasons for the sharp rise in human population in India and in the world.*
- *A brief explanation of the terms: demography, population density, birth rate, death rate and growth rate of population.*
- *Problems faced due to population explosion: unemployment, over exploitation of natural resources, low per capita income, price rise, pollution, unequal distribution of wealth.*
- *Methods of population control: Surgical methods – Tubectomy and vasectomy.*

5. Human Evolution

Basic introduction to Human evolution and Theories of evolution: Lamarck's theory of inheritance; Darwin's theory of evolution by natural selection.

- *A brief idea of human ancestors – Australopithecus, Homo habilis, Homo erectus, Neanderthals, Cro-Magnon and Homo sapiens sapiens (Modern Man) with reference to the following characteristics:*
  - *Bipedalism*
  - *Increasing Cranial capacity*
  - *Reduction of size of canine teeth*
  - *Forehead and brow ridges*
  - *Development of chin*
  - *Reduction in body hair*
  - *Height and Posture*
- *Lamarck's theory of inheritance of acquired characteristics – with reference to use of organs (e.g.: neck and forelimbs of giraffe) and disuse of organs (e.g.: vestigial organs in humans like wisdom teeth, vermiform appendix, pinnae).*
- *Darwin's theory of Natural selection: Survival of the fittest - e.g. adaptation of peppered moth.*

6. Pollution

(i) Types and sources of pollution; major pollutants.

- *Air: Vehicular, industrial, burning garbage, brick kilns.*
- *Water: Household detergents, sewage, industrial waste, oil spills.*
- *Thermal pollution.*
- *Soil: Industrial waste, urban commercial and domestic waste, chemical fertilizers.*
- *Biomedical waste – used and discarded needles, syringes, soiled dressings etc.*
- *Radiation: X-rays; radioactive fallout from nuclear plants.*
- *Noise: Motor Vehicles, Industrial establishments, Construction Sites, Loudspeakers etc.*

(ii) Biodegradable and Non-biodegradable wastes

Biodegradable wastes: meaning and example; paper, vegetable peels, etc.

Non-biodegradable wastes: meaning and example; plastics, glass, Styrofoam etc. Pesticides like DDT etc.

(iii) Effects of pollution on climate, environment, human health and other organisms; control measures.

- *Brief explanation of: Greenhouse effect and Global warming, Acid rain, Ozone layer depletion.*
- *Measures to control pollution:*
  - *Use of unleaded petrol / CNG in automobiles*
  - *Switching of engines at traffic signal lights*
  - *Social forestry*
  - *Setting of sewage treatment plants*
  - *Ban on polythene and plastics*
  - *Organic farming*
  - *Euro Bharat vehicular standard.*

  (A brief idea of the above measures)
- *A brief mention of "Swachh Bharat Abhiyan"- A national campaign for Clean India.*

INTERNAL ASSESSMENT OF PRACTICAL WORK

The practical work is designed to test the ability of the candidates to make an accurate observation from specimens of plants and animals.

PLANT LIFE

(i) Observation of permanent slides of stages of mitosis.

(ii) Experiments demonstrating:

- Diffusion: using potassium permanganate in water.
- Osmosis: Thistle Funnel experiment and potato osmoscope.
- Absorption: using a small herbaceous plant.

(iii) Experiments on Transpiration:

- demonstration of the process using a Bell Jar.
- demonstration of unequal transpiration in a dorsiventral leaf using cobalt chloride paper.
- demonstration of uptake of water and the rate of transpiration using Ganong's potometer.

(iv) Experiments on Photosynthesis:

- to show the necessity of light, carbon dioxide and chlorophyll-for photosynthesis.
- to show the release of O_2 during photosynthesis using hydrilla / elodea.

ANIMAL LIFE

(i) Identification of the structures of the urinary system, heart and kidney (internal structure) and brain (external view) through models and charts

(ii) The identification of different types of blood cells under a microscope.

(iii) Identification of the internal structure of the Ear and Eye (Through models and charts).

(iv) Identification and location of selected endocrine glands: Adrenal, Pancreas, Thyroid and Pituitary glands with the help of a model or chart.

EVALUATION

The practical work/project work are to be evaluated by the subject teacher and by an External Examiner. (The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the relevant section/class**. For example, a teacher of Biology of Class VIII may be deputed to be an External Examiner for Class X, Biology projects.)

The Internal Examiner and the External Examiner will assess the practical work/project work independently.

Award of marks	**(20 Marks)**
Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on CISCE's CAREERS portal by the due date.

INTERNAL ASSESSMENT IN SCIENCE - GUIDELINES FOR MARKING WITH GRADES

Criteria	Preparation	Procedure/ Testing	Observation	Inference/ Results	Presentation
Grade I (4 marks)	Follows instructions (written, oral, diagrammatic) with understanding; modifies if needed. Familiarity with and safe use of apparatus, materials, techniques.	Analyses problem systematically. Recognises a number of variables and attempts to control them to build a logical plan of investigation.	Records data/observations without being given a format. Comments upon, recognises use of instruments, degree of accuracy. Recording is systematic.	Processes data without format. Recognises and comments upon sources of error. Can deal with unexpected results, suggesting modifications.	Presentation is accurate and good. Appropriate techniques are well used.
Grade II (3 marks)	Follows instructions to perform experiment with step-by-step operations. Awareness of safety. Familiarity with apparatus, materials and techniques.	Specifies sequence of operation; gives reasons for any change in procedure. Can deal with two variables, controlling one.	Makes relevant observations. No assistance is needed for recording format that is appropriate.	Processes data appropriately as per a given format. Draws qualitative conclusions consistent with required results.	Presentation is adequate. Appropriate techniques are used.
Grade III (2 marks)	Follows instructions to perform a single operation at a time. Safety awareness. Familiarity with apparatus & materials.	Develops simple experimental strategy. Trial and error modifications made to proceed with the experiment.	Detailed instructions needed to record observations. Format required to record results.	Processes data approximately with a detailed format provided. Draws observations qualitative conclusions as required.	Presentation is reasonable, but disorganised in some places. Overwriting; rough work is untidy.
Grade IV (1 mark)	Follows some instructions to perform a single practical operation. Casual about safety. Manages to use apparatus & materials.	Struggles through the experiment. Follows very obvious experimental strategy.	Format required to record observations/ readings but tends to make mistakes in recording.	Even when detailed format is provided, struggles or makes errors while processing data. Reaches conclusions with help.	Presentation is poor and disorganised but follows an acceptable sequence. Rough work missing or untidy.
Grade V (0 marks)	Not able to follow instructions or proceed with practical work without full assistance. Unaware of safety.	Cannot proceed with the experiment without help from time to time.	Even when format is given, recording is faulty or irrelevant.	Cannot process results, nor draw conclusions, even with considerable help.	Presentation unacceptable; disorganised, untidy/ poor. Rough work missing.