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NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

PHYSICAL SCIENCE

NQF LEVEL 2

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SECTION A: PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides the lecturer with guidelines to develop and implement a coherent, integrated assessment system for Physical Science in the National Certificates (Vocational). It must be read with the *National Policy Regarding Further Education and Training Programmes: Approval of the Documents, Policy for the National Certificates (Vocational) Qualifications at Levels 2 to 4 on the National Qualifications Framework (NQF)*. This assessment guideline will be used for National Qualifications Framework Levels 2-4.

This document explains the requirements for the internal and external subject assessment. The lecturer must use this document with the *Subject Guidelines: Physical Science* to prepare for and deliver Physical Science. Lecturers are encouraged to use a variety of resources and apply a range of assessment skills in the setting, marking and recording of assessment tasks.

SECTION B: ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

1 ASSESSMENT IN THE NATIONAL CERTIFICATES (VOCATIONAL)

Assessment in the National Certificates (Vocational) is underpinned by the objectives of the National Qualifications Framework (NQF). These objectives are to:

- Create an integrated national framework for learning achievements.
- Facilitate access to and progression within education, training and career paths.
- Enhance the quality of education and training.
- Redress unfair discrimination and past imbalances and thereby accelerate employment opportunities.
- Contribute to the holistic development of the student by addressing:
  - social adjustment and responsibility;
  - moral accountability and ethical work orientation;
  - economic participation; and
  - nation-building.

The principles that drive these objectives are:

- ***Integration***

To adopt a unified approach to education and training that will strengthen the human resources development capacity of the nation.

- ***Relevance***

To be dynamic and responsive to national development needs.

- ***Credibility***

To demonstrate national and international value and recognition of qualification and acquired competencies and skills.

- ***Coherence***

To work within a consistent framework of principles and certification.

- ***Flexibility***

To allow for creativity and resourcefulness when achieving Learning Outcomes, to cater for different learning styles and use a range of assessment methods, instruments and techniques.

- ***Participation***

To enable stakeholders to participate in setting standards and co-ordinating the achievement of the qualification.

- ***Access***

To address barriers to learning at each level to facilitate students' progress.

- ***Progression***

To ensure that the qualification framework permits individuals to move through the levels of the national qualification via different, appropriate combinations of the components of the delivery system.

- ***Portability***

To enable students to transfer credits of qualifications from one learning institution and/or employer to another institution or employer.

- ***Articulation***

To allow for vertical and horizontal mobility in the education system when accredited pre-requisites have been successfully completed.

- ***Recognition of Prior Learning***

To grant credits for a unit of learning following an assessment or if a student possesses the capabilities specified in the outcomes statement.

- ***Validity of assessments***

To ensure assessment covers a broad range of knowledge, skills, values and attitudes (SKVAs) needed to demonstrate applied competency. This is achieved through:

  - clearly stating the outcome to be assessed;
  - selecting the appropriate or suitable evidence;
  - matching the evidence with a compatible or appropriate method of assessment; and
  - selecting and constructing an instrument(s) of assessment.

- ***Reliability***

To assure assessment practices are consistent so that the same result or judgment is arrived at if the assessment is replicated in the same context. This demands consistency in the interpretation of evidence; therefore, careful monitoring of assessment is vital.

- ***Fairness and transparency***

To verify that no assessment process or method(s) hinders or unfairly advantages any student. The following could constitute unfairness in assessment:

  - Inequality of opportunities, resources or teaching and learning approaches
  - Bias based on ethnicity, race, gender, age, disability or social class
  - Lack of clarity regarding Learning Outcome being assessed
  - Comparison of students' work with other students, based on learning styles and language

- ***Practicability and cost-effectiveness***

To integrate assessment practices within an outcomes-based education and training system and strive for cost and time-effective assessment.

2 ASSESSMENT FRAMEWORK FOR VOCATIONAL QUALIFICATIONS

The assessment structure for the National Certificates (Vocational) qualification is as follows:

2.1 Internal continuous assessment (ICASS)

Knowledge, skills, values and attitudes (SKVAs) are assessed throughout the year using assessment instruments such as projects, tests, assignments, investigations, role-play and case studies. The internal continuous assessment (ICASS) practical component is undertaken in a laboratory or simulated laboratory. This component is moderated internally and externally quality assured by Umalusi. All internal continuous assessment (ICASS) evidence is kept in a Portfolio of Evidence (PoE) and must be readily available for monitoring, moderation and verification purposes.

2.2 External summative assessment (ESASS)

The external summative assessment is a set of written papers set to the requirements of the Subject Learning Outcomes. The Department of Education administers the theoretical component according to relevant assessment policies.

A compulsory component of external summative assessment (ESASS) is the **integrated summative assessment task (ISAT).** This assessment task draws on the students' cumulative learning throughout the year. The task requires integrated application of competence and is executed under strict assessment conditions. The task should take place in a laboratory, simulated laboratory or workplace. The integrated summative assessment task (ISAT) is the most significant test of students' ability to apply their acquired knowledge.

The integrated assessment approach allows students to be assessed in more than one subject with the same integrated summative assessment task (ISAT).

External summative assessments will be conducted annually between October and December, with provision made for supplementary sittings.

3 MODERATION OF ASSESSMENT

3.1 Internal moderation

Assessment must be moderated according to the internal moderation policy of the Further Education and Training (FET) college. Internal college moderation is a continuous process. The moderator's involvement starts with the planning of assessment methods and instruments and follows with continuous collaboration with and support to the assessors. Internal moderation creates common understanding of Assessment Standards and maintains these across vocational programmes.

3.2 External moderation

External moderation is conducted by the Department of Education, Umalusi and, where relevant, an Education and Training Quality Assurance (ETQA) body according to South African Qualifications Authority (SAQA) and Umalusi standards and requirements.

The external moderator:

- monitors and evaluates the standard of all summative assessments;
- maintains standards by exercising appropriate influence and control over assessors;
- ensures proper procedures are followed;
- ensures summative integrated assessments are correctly administered;
- observes a minimum sample of ten (10) to twenty-five (25) percent of summative assessments;
- gives written feedback to the relevant quality assuror; and
- moderates in case of a dispute between an assessor and a student.

Policy on inclusive education requires that assessment procedures for students who experience barriers to learning be customised and supported to enable these students to achieve their maximum potential.

4 PERIOD OF VALIDITY OF INTERNAL CONTINUOUS ASSESSMENT (ICASS)

The period of validity of the internal continuous assessment mark is determined by the *National Policy on the Conduct, Administration and Management of the Assessment of the National Certificates (Vocational).*

The internal continuous assessment (ICASS) must be re-submitted with each examination enrolment for which it constitutes a component.

5 ASSESSOR REQUIREMENTS

Assessors must be subject specialists and should ideally be declared competent against the standards set by the ETDP SETA. If the lecturer conducting the assessments has not been declared a competent assessor, an assessor who has been declared competent may be appointed to oversee the assessment process to ensure the quality and integrity of assessments.

6 TYPES OF ASSESSMENT

Assessment benefits the student and the lecturer. It informs students about their progress and helps lecturers make informed decisions at different stages of the learning process. Depending on the intended purpose, different types of assessment can be used.

6.1 Baseline assessment

At the beginning of a level or learning experience, baseline assessment establishes the knowledge, skills, values and attitudes (SKVAs) that students bring to the classroom. This knowledge assists lecturers to plan learning programmes and learning activities.

6.2 Diagnostic assessment

This assessment diagnoses the nature and causes of learning barriers experienced by specific students. It is followed by guidance, appropriate support and intervention strategies. This type of assessment is useful to make referrals for students requiring specialist help.

6.3 Formative assessment

This assessment monitors and supports teaching and learning. It determines student strengths and weaknesses and provides feedback on progress. It determines if a student is ready for summative assessment.

6.4 Summative assessment

This type of assessment gives an overall picture of student progress at a given time. It determines whether the student is sufficiently competent to progress to the next level.

7 PLANNING ASSESSMENT

An assessment plan should cover three main processes:

7.1 Collecting evidence

The assessment plan indicates which Subject Outcomes and Assessment Standards will be assessed, what assessment method or activity will be used and when this assessment will be conducted.

7.2 Recording

Recording refers to the assessment instruments or tools with which the assessment will be captured or recorded. Therefore, appropriate assessment instruments must be developed or adapted.

7.3 Reporting

All the evidence is put together in a report to deliver a decision for the subject.

8 METHODS OF ASSESSMENT

Methods of assessment refer to who carries out the assessment and includes lecturer assessment, self-assessment, peer assessment and group assessment.

LECTURER ASSESSMENT	The lecturer assesses students' performance against given criteria in different contexts, such as individual work, group work, etc.
SELF-ASSESSMENT	Students assess their own performance against given criteria in different contexts, such as individual work, group work, etc.
PEER ASSESSMENT	Students assess another student or group of students' performance against given criteria in different contexts, such as individual work, group work, etc.
GROUP ASSESSMENT	Students assess the individual performance of other students within a group or the overall performance of a group of students against given criteria.

9 INSTRUMENTS AND TOOLS FOR COLLECTING EVIDENCE

All evidence collected for assessment purposes is kept or recorded in the student's Portfolio of Evidence (PoE).

The following table summarises a variety of methods and instruments for collecting evidence. A method and instrument is chosen to give students ample opportunity to demonstrate the Subject Outcome has been attained. This will only be possible if the chosen methods and instruments are appropriate for the target group and the Specific Outcome being assessed.

	METHODS FOR COLLECTING EVIDENCE		
	Observation-based (Less structured)	**Task-based** (Structured)	**Test-based** (More structured)
Assessment instruments	• Observation • Class questions • Lecturer, student, parent discussions	• Assignments or tasks • Projects • Investigations or research • Case studies • Practical exercises • Demonstrations • Role-play • Interviews	• Examinations • Class tests • Practical examinations • Oral tests • Open-book tests
Assessment tools	• Observation sheets • Lecturer's notes • Comments	• Checklists • Rating scales • Rubrics	• Marks (e.g. %) • Rating scales (1-4)
Evidence	• Focus on individual students • Subjective evidence based on lecturer observations and impressions	**Open middle**: Students produce the same evidence but in different ways. **Open end**: Students use same process to achieve different results.	Students answer the same questions in the same way, within the same time.

10 TOOLS FOR ASSESSING STUDENT PERFORMANCE

Rating scales are marking systems where a symbol (such as 1 to 4) or a mark (such as 5/10 or 50%) is defined in detail. The detail is as important as the coded score. Traditional marking, assessment and evaluation mostly used rating scales without details such as what was right or wrong.

Task lists and **checklists** show the student what needs to be done. They consist of short statements describing the expected performance in a particular task. The statements on the checklist can be ticked off when the student has adequately achieved the criterion. Checklists and task lists are useful in peer or group assessment activities.

Rubrics are a hierarchy (graded levels) of criteria with benchmarks that describe the minimum level of acceptable performance or achievement for each criterion. It is a different way of assessment and cannot be compared to tests. Each criterion described in the rubric must be assessed separately. Mainly, two types of rubrics, namely holistic and analytical, are used.

11 SELECTING AND/OR DESIGNING RECORDING AND REPORTING SYSTEMS

The selection or design of recording and reporting systems depends on the purpose of recording and reporting student achievement. **Why** particular information is recorded and **how** it is recorded an essential basis for selection of the instrument.

Computer-based systems, for example spreadsheets, are cost and time effective. The recording system should be user-friendly and information should be easily accessed and retrieved.

12 COMPETENCE DESCRIPTIONS

All assessment should award marks to evaluate specific assessment tasks. However, marks should be awarded against rubrics and not simply be a total of ticks for right answers. Rubrics should explain the competence level descriptors for the skills, knowledge, values and attitudes (SKVAs) a student must demonstrate to achieve each level of the rating scale.

When lecturers or assessors prepare an assessment task or question, they must ensure that the task or question addresses an aspect of a Subject Outcome. The relevant Assessment Standard must be used to create the rubric to assess the task or question. The descriptions must clearly indicate the minimum level of attainment for each category on the rating scale.

13 STRATEGIES FOR COLLECTING EVIDENCE

A number of different assessment instruments may be used to collect and record evidence. Examples of instruments that can be (adapted and) used in the classroom include:

13.1 Record sheets

The lecturer observes students working in a group. These observations are recorded in a summary table at the end of each project. The lecturer can design a record sheet to observe students' interactive and problem-solving skills, attitudes towards group work and involvement in a group activity.

13.2 Checklists

Checklists should have clear categories to ensure that the objectives are effectively met. The categories should describe how the activities are evaluated and against what criteria they are evaluated. Space for comments is essential.

SECTION C: ASSESSMENT IN PHYSICAL SCIENCE

1 SCHEDULE OF ASSESSMENT

At NQF levels 2, 3 and 4, lecturers will conduct assessments as well as develop a schedule of formal assessments that will be undertaken in the year. All three levels also have an external examination that accounts for 50 % of the total mark. The marks allocated to assessment tasks completed during the year, kept or recorded in a Portfolio of Evidence (PoE) account for the other 50 %.

The Portfolio of Evidence (PoE) and the external assessment include written evidence of practical and theory components. The practical assessment in Physical Science must, where necessary, be subjected to external moderation by Umalusi or an appropriate Education and Training Quality Assurance (ETQA) body, appointed by the Umalusi Council in terms of Section 28(2) of the *General and Further Education and Training Quality Assurance Act, 2001 (Act No. 58 of 2001).*

The subject consists of the following components that have to be assessed internally and externally:

INTERNAL CONTINUOUS ASSESSMENT (ICASS) (to be completed through the year)		**EXTERNAL SUMMATIVE ASSESSMENT (ESASS)** (to be completed at the end of the year)	
50% (100 marks) -presented in Portfolio of Evidence:		**50% (100 marks)**	
Tasks	**Value**	**Tasks**	**Value**
• One mark consisting of 2 control tests. • One exam paper (mid-year). • One mark consisting 2 assignment – research tasks • ISAT • One mark consisting of 4 practical tasks	10 20 20 10 40 100	• Theoretical examination consisting of 2 papers: Paper 1 Paper 2	 150 150 300/3

The following is an example of an assessment schedule to perform these tasks:

TASKS	**TERM 1**	**TERM 2**	**TERM 3**	**TERM 4**
• Two control tests	Test 1		Test 2	
• One midyear examination		Exam		
• Two research assignments that are industry related	Project		Project	
• Two practical tasks based on Physics	Practical	Practical		
• Two practical tasks based on Chemistry		Practical	Practical	
• Integrated summative assessment task				ISAT

2 RECORDING AND REPORTING

Physical Science, as is the case for all the other Vocational subjects, is assessed according to five levels of competence. The level descriptions are explained in the following table.

Scale of Achievement for the Vocational component

RATING CODE	RATING	MARKS %
5	Outstanding	80-100
4	Highly competent	70-79
3	Competent	50-69
2	Not yet competent	40-49
1	Not achieved	0-39

Annexure A contains example mark sheet on which all marks can be recorded.

2.1 Assessment of tests and examinations

Theory tests and examinations are marked according to a prepared memorandum.

2.2 Assessment of assignments

Two assignments one based on Physics and one on Chemistry are assessed for the year mark. The assignments should indicate the relationship of science content, related industry and the impact on the environment.

Assignments are assessed using holistic or analytical rubrics. **Annexure B** contains a marking grid for these skill areas.

Criteria for assignment tasks include, but are not limited to:

- Plan and conduct a scientific investigation to collect data systematically with regard to accuracy and reliability, using appropriate resources.
- Communicate and present collected information and conclusions with relevant scientific arguments; presented in a practical report or presentation.

Some examples of assignment topics include, but are not limited to:

COMPONENT	SUBJECT OUTCOME	SUGGESTED RESEARCH TASKS
Physics (Select any 1)	• 2.4	• Find examples of simple machines and mechanical advantage.
	• 4.1	• Determine the effect of the magnetic field and the need for magnetic shielding.
	• 4.2	• Investigate lightning, its effects on buildings and electrical apparatus and protection.
	• 4.3	• Explain the need of electricity and the effect of overloading a circuit.
	• 4.3	• Investigate and report on AC and DC and its use in industry and the danger when using current.
Chemistry (Compulsory)	• 7	• Report on water pollution, pollutants, reasons for water purification and methods of purification.

2.3 Assessment of practical tasks

In Physical Science, students are assessed during the performance of the task and on the practical report.

Criteria and outcomes for practical tasks include, but are not limited to:

- Plan and conduct a scientific investigation to collect data systematically with regard to accuracy and reliability: collect, assemble and use appropriate apparatus, make observations and record measurements in tables.
- Seek patterns and trends in the information collected and link it to existing scientific knowledge to help draw conclusions: analyse data using graphs, calculations etc., interpret results formulate and test hypothesis.
- Communicate and presenting collected information and conclusions with relevant scientific arguments: synthesise, evaluate and give conclusions. All written in a practical report.

These criteria are structured and assessed into seven skill areas for each practical assessment. These skills areas can be assessed with a rubric. **Annexure C** contains a marking grid for these skill areas.

The seven skill areas are:

1. Group work skills*
2. Manipulative or procedural skills – the way experiments are performed*
3. Write-up skills – the layout of a practical report
4. Observation and measuring skills
5. Recording skills – display of measurements
6. Interpretation skills – mathematical manipulation
7. Skills to interpret results and conclusion

* Skill areas 1 and 2 are assessed during practical assessment sessions.

Some examples of assessment tasks include, but are not limited to:

COMPONENT	SUBJECT OUTCOME	SUGGESTED PRACTICAL TASKS
Physics (Select any 2)	• 2.1	• Determine acceleration of trolley using ticker tape.
	• 2.2	• Determine "g" by means of a falling object.
	• 3.2	• Determine the refraction of a light ray using a glass or Perspex block.
	• 4.3	• Investigate the relationship between resistance and current in an electrical circuit.
Chemistry (2 tasks)	• 5.4	• Research and classify materials into macroscopic properties (any one property, using a variety of materials).
	• 6.2	• Separate mixtures by using a chemical and mechanical method (covers problem solving using knowledge of the properties of the materials in the mixture and correct separation of the materials).

2.4 Evidence of assessment

All evidence of assessment must be filed for moderating purposes. The college must standardise recording and moderation documentation.

The following should at least be included in the Lecturer's Assessment Portfolio:

- A contents page
- The formal schedule of assessment
- The requirements for each assessment task
- The tools used for each assessment task
- Recording instrument(s) for each assessment task
- A mark sheet and report for each assessment task

The student's Portfolio of Evidence (PoE) must at least include:

- A contents page
- A declaration stating authenticity (see **Annexure D**)
- A record of the marks (and comments) achieved for each tasks
- The assessment tasks according to the assessment schedule
- The assessment tools or instruments for the task

Where tasks cannot be contained as evidence in the Portfolio of Evidence (PoE), its exact location must be recorded and it must be readily available for moderation purposes.

The following units guide the number of internal assessment in Physical Sciences to be filed:

NUMBER OF UNITS	METHOD	ASSESSMENT	COVERAGE	
2	Test based	Formal written tests	One or more completed topics	
1		Internal written exam	All completed topics	
2	Task based	Research assignments	One based on Physics One based on Chemistry	Both related to industry
4	Task based and observation	Practical tasks	Two Physics tasks Two Chemistry tasks	Must cover the related Subject Outcomes

ASSESSMENT OF PHYSICAL SCIENCE

LEVEL 2

3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN PHYSICAL SCIENCE – LEVEL 2

Topic 1: Measurements and Scientific Investigation.

SUBJECT OUTCOME	
Identify and apply the metric system.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Correct SI symbols and units are used in problem solving and content. • Length, volume (including cm^3, dm^3), volt and ampere, time, mass and weight are measured correctly.	• Identify and use SI symbols and units correctly. • Measure length, volume (including cm^3, dm^3), volt and ampere, time, mass and weight.
ASSESSMENT ACTIVITIES	
• Integrated assessment with practical • Worksheet on measurement • Research: Students find information on measurement, units and symbols on containers and power tools.	

SUBJECT OUTCOME	
Conduct scientific investigations and collect, represent and interpret data.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Scientific investigation is conducted and data are collected systematically and accurately. • Patterns and trends in the information collected are identified and linked to existing scientific knowledge to help draw conclusions. • Collected information and conclusions are presented with relevant scientific arguments.	• Conduct a scientific investigation and collect data systematically with regard to accuracy and reliability. • Seek patterns and trends in the information collected and link it to existing scientific knowledge to help draw conclusions. • Present collected information and conclusions with relevant scientific arguments.
ASSESSMENT ACTIVITIES	
• Practical assignments: Integrated with other topics	

Topic 2: Mechanics

SUBJECT OUTCOME	
Identify, describe and apply principles of motion in one dimension.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Motion is described and components of motion are defined and identified. *Range: Components of motion are position, displacement, distance, speed, velocity, average velocity, instantaneous velocity, uniform velocity and constant acceleration.* • Vector and scalar are defined and examples are identified. *Range: Vector and scalar examples are displacement and distance, speed and velocity, acceleration, mass and weight and force.* • Vectors are graphically represented using scale and indicating direction. • Resultant and equilibrant are defined. • Resultant and equilibrant of two vectors are determined by construction, i.e. vector diagram or constructing arrows in following sequence (showing magnitude and direction of each). *Range: Resultant of multiple vectors not acting on*	• Describe motion and identify and define the components of motion. *Range: Components of motion are position, displacement, distance, speed, velocity, average velocity, instantaneous velocity, uniform velocity and constant acceleration.* • Define and represent vector and scalar and identify examples. • Define resultant and equilibrant and determine resultant and equilibrant by construction. *Range: Resultant of multiple vectors not acting on one point and two vectors acting one point* • Apply the concept of relative motion. • Do calculations on components of motion. • Solve problems using linear equations of motion (horizontal). *Range: Linear equations of motion are $v_f = v_i + a\,\Delta t$, $s = v_i\,\Delta t + \frac{1}{2}\,a\Delta t^2$ and $v_f^2 = v_i^2 + 2as$*

one point and two vectors acting one point • Concept of relative motion is applied, i.e. motion quantities seen from two frames of reference. • Components of motion are calculated. • Linear equations of motion (horizontal) are used to solve problems. *Range: Linear equations of motion are $v_f = v_i + a\,\Delta t$, $s = v_i\,\Delta t + ½\,a\Delta t^2$ and $v_f^2 = v_i^2 + 2as$*	

ASSESSMENT ACTIVITIES

- Worksheet to determine resultant or equilibrant by construction
- Practical: Find acceleration of trolley (using a ticker timer).
- Research: Students compare performances of vehicles; calculate length of runways and off ramps needed.
- Class test

SUBJECT OUTCOME	
Identify and apply principles of force.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Force is defined and different types of force are described and examples are identified. *Range: Types of force can be gravitational, mechanical, elastic, frictional, etc.* • Action-reaction forces are identified and indicated represent in force diagrams. *Range: Action-reaction forces indicate forces in contact: frictional force, applied force, normal and gravitational force (on horizontal and incline plane)* *Forces not in contact: opposite poles of magnets, opposite charges and Newton's Law of Universal Gravitation* • Gravitational acceleration: g is defined. • Weight is described and calculated. • Mass (m) and weight (or $F_{gravitation}$) are differentiated.	• Define force, describe different types of force and identify examples. *Range: Types of force can be gravitational, mechanical, elastic, frictional, etc.* • Identify and draw diagrams indicating action-reaction forces. *Range: Action-reaction forces indicate forces in contact: frictional force, applied force, normal and gravitational force (on horizontal and incline plane)* *Forces not in contact: opposite poles of magnets, opposite charges and Newton's Law of Universal Gravitation* • Define gravitational acceleration: g. • Describe and calculate weight. • Differentiate between mass (m) and weight (or $F_{gravitation}$).

ASSESSMENT ACTIVITIES

- Worksheet: Draw all forces.
- Practical: Determine "g" on earth.
- Research: Students search for the value of "g" on the moon and Mars.

SUBJECT OUTCOME	
Identify, describe and apply principles of mechanical energy.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Mechanical energy, kinetic energy and gravitational potential energy are defined. • Kinetic energy ($E_K = ½mv^2$) and gravitational potential energy ($E_p = mgh$) are calculated. • Law of conservation of mechanical energy are defined. • Problems are solved using the conservation of mechanical energy ($E_{mechanical} = E_K + E_p$).	• Define mechanical energy, kinetic energy and gravitational potential energy. • Calculate kinetic energy ($E_K = ½mv^2$) and gravitational potential energy ($E_p = mgh$). • Define the law of conservation of mechanical energy. • Solve problems using the conservation of mechanical energy ($E_{mechanical} = E_K + E_p$).

ASSESSMENT ACTIVITIES

- Worksheet on energy
- Tests
- Case studies

SUBJECT OUTCOME	
Identify, describe and apply principles of simple machines and mechanical advantage in everyday contexts.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Functions of simple machines are described and examples are identified. *Range: Functions are transfer energy, multiply force in expense of velocity, multiply speed in expense of force and change direction of force.* • Six basic machines (levers, wheel and axle, pulley, inclined plane, screw and wedge) are identified with examples. • The law of simple machines is stated and used in calculations. • Mechanical advantage is defined: ▪ Ideal mechanical advantage (IMA) = distance effort F moves ÷ effort resistance F moves ▪ Actual mechanical advantage (AMA) = resistance force÷ effort force • % efficiency of machine is calculated as: % Efficiency = (AMA ÷ IMA) x100. • Mechanical advantage of levers is sketched and calculated. *Range: Levers considered are a) the fulcrum between the resistance force and effort force, b) the resistance force between the fulcrum and effort force and c) the effort force between the fulcrum and the resistance force.*	• Describe and identify the functions of simple machines. *Range: Functions are transfer energy, multiply force in expense of velocity, multiply speed in expense of force and change direction of force.* • State and identify examples of the six basic machines: lever, wheel and axle, pulley, inclined plane, screw and wedge. • State and use the law of simple machines in calculations. • Define mechanical advantage as: ▪ Ideal mechanical advantage (IMA) = distance effort F moves÷ effort resistance F moves ▪ Actual mechanical advantage (AMA) = resistance force÷ effort force • Calculate % efficiency of machine: % Efficiency = (AMA ÷ IMA) x100. • Draw diagram and calculate mechanical advantage of levers. *Range: Levers considered are a) the fulcrum between the resistance force and effort force, b) the resistance force between the fulcrum and effort force and c) the effort force between the fulcrum and the resistance force.*
ASSESSMENT ACTIVITIES	
• Worksheet • Practical: Determine the mechanical advantage in levers varying the fulcrum. • Research: Students identify working examples of the different levers in industry, e.g. car jacks and cranes.	

Topic 3: Waves, Sound and Light

SUBJECT OUTCOME	
Identify, describe and apply principles of waves.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Vibration and oscillation are described as a periodic motion and examples are identified. • Period, frequency and amplitude are defined. • A wave is defined and different examples are identified (e.g. pulse sent along a rope, displacement of atoms from equilibrium position in elastic medium, change in gas pressure in explosions, earthquakes, water waves, AC). • The nature of waves is described as a disturbance that travels and not the medium or energy that is carried or transferred. • The two categories of waves, longitudinal and transversal, are distinguished and examples are identified. • Particle position on graphs is identified showing displacement to illustrate difference between longitudinal and transversal waves. • A displacement graph of a simple harmonic wave is constructed and labelled to interpret wavelength and amplitude. • Frequency, period, wave speed and wavelength of a transversal wave are calculated. • The effect of medium on wave speed is described.	• Identify and describe vibration and oscillation as a periodic motion. • Define period, frequency and amplitude. • Define a wave and identify different examples. • Describe the nature of waves. (A disturbance that travels and not the medium or energy that is carried or transferred.) • Distinguish between the two categories of waves, longitudinal and transversal, and identify examples. • Identify particle position on graphs showing displacement to illustrate difference between longitudinal and transversal waves. • Draw, label and interpret a displacement position graph of a simple harmonic wave showing wavelength and amplitude. • Calculate frequency, period and wave speed and wavelength of a transversal wave. • Describe the effect of medium on wave speed. • Distinguish between standing and moving waves and identify and describe superposition in standing waves.

• Standing and moving waves are described and distinguished. • Superposition in standing waves is identified and described.	
ASSESSMENT ACTIVITIES	
• Worksheet • Research: Identify waves in industry. • Test	

SUBJECT OUTCOME	
Identify, describe and apply principles of geometrical optics in everyday contexts.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Light is identified as a transversal wave. • Wave properties of light (reflection and refraction) are identified and described. • Reflection (angle of incidence, angle of reflection and normal) are identified and sketched. • Diagrams showing reflection using plane, concave and convex of mirrors and the type and size and distance of image formed are sketched. • Diagrams showing refraction (angle of the light ray in the two media and normal) are sketched and interpreted. *Range: Media can be air, glass, Perspex, water and oil.* • Diagrams showing total internal reflection are constructed and labelled with reference to fibre optics, endoscopes and telecommunications.	• Identify light as a transversal wave. • Identify and describe the wave properties of light: reflection and refraction. • Draw diagrams showing reflection, angle of incidence and angle of reflection using plane, concave and convex of mirrors and the type, size and distance of image formed. • Draw and interpret diagrams showing refraction (angle of the light ray in the two media and normal). *Range: Media can be air, glass, Perspex, water and oil.* • Draw and interpret diagrams showing total internal reflection.
ASSESSMENT ACTIVITIES	
• Worksheet • Practical: Draw and label incident and refracted rays using a Perspex block or glass block or prism. • Research: The use of mirrors in industry, e.g. in head lamps • Test	

Topic 4: Magnetism and Electricity

SUBJECT OUTCOME	
Identify, describe and apply principles of magnetism.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Diagrams showing magnetic fields of permanent magnets are sketched and labelled. • The effect that poles of permanent magnets exert on each other is described. • The earth's magnetic field and magnetic declination is described and compass direction is identified. • Induction of the earth's magnetic field is described referring to iron and steel used in building construction. • Magnetic phenomena by induction of the earth's magnetic field are applied on instruments, etc. • Magnetic shielding and its purpose are described.	• Draw and label diagrams showing magnetic field of permanent magnets. • Describe the effect that poles of permanent magnets have on each other. • Identify and describe the earth's magnetic field and declination and the working of a compass. • Apply magnetic phenomena by induction of the earth's magnetic field and refer to iron and steel used in building construction. • Describe magnetic shielding and its purpose.
ASSESSMENT ACTIVITIES	
• Worksheet: Draw and label diagrams of the magnetic fields of various magnets. • Assignment: Describe the effect of induction of earth's magnetic field on buildings and instruments and the purpose and function of shielding.	

SUBJECT OUTCOME	
Identify, describe and apply principles of electrostatics (static electricity).	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Two kinds of charges are identified. • Objects being charged are described as an electron transfer (deficiency: positive, excess: negative). • Law of conservation of charge is defined. • Distribution of charge over the surface of a conductor (spherical and non-spherical) is predicted. • Attraction between charged (same charge, opposite charge) and uncharged objects and of highly charged points are predicted. • Electrostatic induction is identified and described. • The principle of discharge on a charged rod using ions in a flame and ions in the atmosphere and atmospheric electricity and the use of a lightning conductor is described.	• Identify two kinds of charges and describe how an object becomes charged. • Define law of conservation of charge. • Identify and predict the distribution of charge over the surface of a conductor (spherical and non-spherical). • Identify and predict action between electric charges, the attraction between charged and uncharged objects and action of highly charged points. • Identify and describe electrostatic induction. • Apply the principle of discharge to a charged rod using ions in a flame and ions in the atmosphere and atmospheric electricity and the use of a lightning conductor.
ASSESSMENT ACTIVITIES	
• Worksheet • Assignment: Research discharge of ions in the atmosphere or atmospheric electricity and the use of lightning conductors. • Test	

SUBJECT OUTCOME	
Identify, describe and apply properties of electricity in an electrical circuit.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Electrical current is defined and calculated in terms of rate of number of charges. • Two types of current (AC and DC) are identified and distinguished in terms of use, source, current flow, advantage and disadvantages of currents. • Resistance is described in terms of length, cross-sectional area and type of material and examples are identified. • The relationship between load (total resistance) and current are described and determined. • Electrical potential difference and emf are defined and described • Examples of AC and DC sources are identified with reference to batteries and cells to differentiate between them. • Potential increase to be calculated when cells are grouped (connected in series and parallel). • Division of potential difference in a series circuit is described and determined. • Reasons of electrical safety are described with reference to electrocution and fire hazard. • The need of earthing is described with reference to live and earth wiring and electrocution.	• Define and calculate electrical current. • Differentiate between the two types of current (AC and DC). • Describe and identify resistance in terms of length, cross-sectional area and type of material. • Determine and describe the relationship between load (total resistance) and current. • Define electrical potential difference (voltage) and emf and give examples of sources. • Determine potential change when cells are grouped and potential division in a series circuit. • Describe the reason for electrical safety and earthing.
ASSESSMENT ACTIVITIES	
• Practical: Investigate the relationship between R and I. • Assignment: Research AC and DC, safety, current and potential difference. • Test	

Topic 5: Matter and Materials

SUBJECT OUTCOME	
Identify, describe and classify matter according to different macroscopic properties.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Phases of matter (physical property of matter) are described and identified as gaseous, liquid and solid. • Phases of matter are distinguished in terms of kinetic energy, shape and volume. • Materials are classified and described using observation and research according to macroscopic properties. *Range: Macroscopic properties referred to are metals, semi-metals and non-metals, magnetic and non-magnetic materials, electrical conductors, semi-conductors and isolators, thermal conductors and isolators, relative density and acids and bases (and related pH).*	• Identify and describe the phases of matter (physical property of matter). • Distinguish between the phases of matter in terms of energy, shape and volume. • Classify and describe materials using observation and research according to macroscopic properties. *Range: Macroscopic properties referred to are metals, semi-metals and non-metals, magnetic and non-magnetic materials, electrical conductors, semi-conductors and isolators, thermal conductors and isolators, relative density and acids and bases (and related pH).*
ASSESSMENT ACTIVITIES	
• Practical: Identify and classify materials according to macroscopic properties. • Worksheet: Identify a possible substance from a list of properties.	

SUBJECT OUTCOME	
Identify and describe atoms as the basic building block.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• The orbit structure of the atom is identified and sketched showing the position (nucleus and orbit) of the protons, neutrons and electrons in shells. • Atomic number and atomic mass are identified and described. • Isotopes are defined with examples (hydrogen, carbon, uranium and others) and uses of isotopes are identified.	• Identify and sketch the orbit structure of the atom showing the position (nucleus and orbit) of the protons, neutrons and electrons in shells. • Differentiate between atomic number and atomic mass. • Define and identify an isotope and refer to common examples that are used.
ASSESSMENT ACTIVITIES	
• Worksheet • Assignment: Research the importance and use of isotopes in industry.	

SUBJECT OUTCOME	
Identify, describe and apply properties of the periodic table.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Arrangement of atoms in the periodic table according to atomic number is identified. • Group and period are identified and described. • Electron configuration of first 20 elements is given. • Electrons are arranged into core and valence electrons. • Names of groups (1, 2, 7, 0) and the transition metal group are identified. • The meaning of groups (similar chemical activity or activity trends) are described and interpreted. • The distribution of metals and non-metals is recognised.	• Recognise the arrangement of atoms in the periodic table according to atomic number. • Identify and describe group, period and periodicity. • Arrange electrons into core and valence electrons and write electron configuration of first 20 elements down. • State the names of groups (1, 2, 7, 0) and identify the transition metal group. • Describe and interpret the meaning of groups (similar chemical activity or activity trends.) • Recognise the distribution of metals and non-metals.
ASSESSMENT ACTIVITIES	
• Worksheet ; Test • Assignment: Identify properties and uses of elements in industry.	

SUBJECT OUTCOME	
Identify and describe particles.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Atoms, ions and molecules (simple and giant) are defined and identified. • Pure substances: elements and compounds are defined and examples are identified. (Refer to all three phases.) • Mixtures: heterogeneous and homogeneous (refer also to alloys) are defined and examples are identified (refer to all three phases). • Intermolecular bonding is defined and described and examples are identified. *Range: Intermolecular bonding refers to covalent, ionic and metallic bonding.* • Macroscopic properties are explained in terms of chemical bonding (microscopic properties). • Chemical formulae and names of substances generally used are written down.	• Identify and define atoms, ions and molecules (simple and giant). • Identify, define and give examples (in all three phases) of pure substances: elements and compounds. • Identify, define and give examples (using all three phases) of mixtures: heterogeneous and homogeneous (refer also to alloys). • Identify and describe intermolecular bonding referring to covalent, ionic and metallic bonding. • Explain macroscopic properties in terms of chemical bonding (microscopic properties). • Name and write chemical formulae of generally used substances.
ASSESSMENT ACTIVITIES	
• Worksheet ; Test	

Topic 6: Chemical Change

SUBJECT OUTCOME	
Identify, describe and apply principles of heat.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• The First Law of Thermodynamics is identified (principle of conservation of energy). • Temperature is defined. • Temperature is measured using thermometers (Kelvin and Celsius scales) and colours of heated objects. • Heat and heat transfer (conduction, convection and radiation) are described (see thermal conductors). • Heat capacity and specific heat are defined and calculated.	• State the First Law of Thermodynamics: principle of conservation of energy. • Define temperature and measure temperature using thermometers (Kelvin and Celsius scales) and colours of heated objects. • Describe heat and heat transfer (see thermal conductors). • Define and calculate heat capacity and specific heat.
ASSESSMENT ACTIVITIES	
• Worksheet ; Test • Practical: Find melting point and boiling point of water using thermometers.	

SUBJECT OUTCOME	
Differentiate between physical and chemical change.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Physical and chemical changes are defined and distinguished between and examples are identified. • Physical and chemical methods of separating mixtures (solids, liquids and gases) are identified and applied. *Range: Separation methods are manual, magnetic, filtration, fractional distillation, using a separating funnel, precipitation reactions and chromatography.*	• Identify and distinguish between physical and chemical changes and give examples. • Identify and apply physical and chemical methods of separating mixtures (solids, liquids and gases). *Range: Separation methods are manual, magnetic, filtration, fractional distillation, using a separating funnel, precipitation reactions and chromatography.*
ASSESSMENT ACTIVITIES	
• Practical: Separate mixtures using a chemical and mechanical method. • Worksheet: Identify the various separation methods used in the chemical industry.	

SUBJECT OUTCOME	
Identify, describe and apply principles of chemical reactions (electrolytes).	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Electrolytes are defined and examples are identified. • Hydrolysed salts are described and identified as sources of electrolyte. • Solubility of salts is measured by conductivity of solution. • Acids are identified as potential sources of electrolyte. • Displacement reactions (between electrolytes) are identified. • The effect of displacement reactions is identified and interpreted, e.g. precipitation and corrosion.	• Identify and describe electrolytes. • Describe hydrolysed salts as sources of electrolytes and determine the solubility of salts as measured by conductivity of solution. • Identify acids as potential sources of electrolyte. • Identify the interaction (displacement reactions) and effect of ions in aqueous solutions (e.g. corrosive).
ASSESSMENT ACTIVITIES	
• Worksheet: Record chemical reactions. • Test • Assignment: Displacement reactions used in industry	

SUBJECT OUTCOME	
Determine the quantitative aspects of change.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Atomic, molecular and formula mass are calculated. • Amount of substance in mole and gram is calculated. • Concentration of solutions to be calculated.	• Calculate atomic, molecular and formula mass. • Calculate amount of substance in mole and gram. • Calculate concentration of solutions.
ASSESSMENT ACTIVITIES	
• Worksheet • Test	

Topic 7: Chemical Systems and Industry

SUBJECT OUTCOME	
Identify and describe the impact of scientific knowledge of the hydrosphere on the quality of human, environmental and socio-economic development.	
ASSESSMENT STANDARDS	**LEARNING OUTCOMES**
• Water cycle, its physical changes and energy transfers are described. • The macroscopic properties of the three phases of water are identified and related to their microscopic structure. • Water pollution is defined and examples (industrial agricultural and human) are identified. • Types of impurity found in water are identified and the reason for purification (human and industrial) is described. • Water hardness is defined, its effects are described and water is classified according to hardness. • Water treatment and softening are defined and examples are identified.	• Describe the water cycle, its physical changes and energy transfers. • Identify and describe the macroscopic properties of the three phases of water related to their microscopic structure. • Define the term water pollution and give examples (also refer to industrial, agricultural and human pollution). • Classify water in terms of hardness and explain water hardness and describe its effects. • Describe the types of impurity found in water and the reason for purification (human and industrial). • Define water treatment and softening and give examples.
ASSESSMENT ACTIVITIES	
• Research water pollution, water hardness, impurities found in water and water treatment.	

4 SPECIFICATIONS FOR THE EXTERNAL ASSESSMENT IN PHYSICAL SCIENCE – LEVEL 2

4.1 Integrated summative assessment task (ISAT)

A compulsory component of the external assessment (ESASS) is the **integrated summative assessment task (ISAT)**. The integrated summative assessment task (ISAT) draws on the students' cumulative learning achieved throughout the year. The task requires **integrated application of competence** and is executed and recorded in compliance with assessment conditions.

Students achieve the competencies throughout the year but the competencies are assessed cumulatively in a single assessment or examination session at the end of the year.

The integrated summative assessment task (ISAT) is set by an externally appointed examiner and is conveyed to colleges in the first quarter of the year.

The integrated assessment approach enables students to be assessed in more than one subject with the same integrated summative assessment task (ISAT).

4.2 National Examination

A National Examination is conducted annually in October or November by means of a paper(s) set and moderated externally. The following distribution of cognitive application should be followed:

EXAMINATION GUIDELINES FOR PHYSICAL SCIENCES		
General remarks		
• Nature of paper : External • Number of papers : 2 papers • Duration : 2 hours • Total mark allocation : 150 each • Number of sections : 2 – A) Multiple choice and B) Structured questions • Compulsory sections : All		
WEIGHTED VALUES		
Knowledge and comprehension	Application	Analysis, synthesis and evaluation
60%	30%	10%

ANNEXURE A: MARK SHEET FOR CAPTURING STUDENT MARKS

Campus:	**INTERNAL CONTINUOUS ASSESSMENT**																		**FINAL EXAM: END OF YEAR**			**FINAL MARK**		ACHIEVEMENT RATING
Level:	**RESEARCH TASKS**				**PERFORMANCE TASKS**						**TESTS**				**EXAM**		**ISAT**	**ICASS**						
Name of Students ↓	**Physics**	**Chemistry**	**TOTAL**	**ICASS I = TOTAL ÷ 2**	**Physics prac 1**	**Physics prac 2**	**Chemistry Prac 1**	**Chemistry Prac 2**	**TOTAL**	**ICASS II = TOTAL÷ 2,5**	**Test 1**	**Test 2**	**TOTAL**	**ICASS III = TOTAL ÷ 10**	**MID YEAR EXAM**	**ICASS IV = TOTAL ÷5**	**ICASS V**	**A = ICASS =I+II+III+IV+V**	**Paper 1**	**Paper 2**	**B = EXAM = P1 +P2 ÷ 3**	**A+ B = FINAL TOTAL**	**Total÷ 2**	**According to scale**
Mark totals →	20	20	40	20	25	25	25	25	100	40	50	50	100	10	100	20	10	= 100	150	150	=100	200	%	5
1.																								
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ANNEXURE B: EXAMPLE OF AN ASSESSMENT RUBRIC FOR ASSIGNMENT OR RESEARCH TASK

CRITERIA	0	1	2	3	4
1. Planning and analysis (diagnosis)skills	• Shows no attempt to identify and collect information to analyse the given problem or need.	• Shows an attempt to identify and collect relevant information to analyse the given problem or need.	• Identifies the given problem correctly and collects relevant information to analyse the problem or need.	• Analyses the given problem correctly and shows evidence of using a range of information to understand the problem or need.	• Identifies the given problem correctly and uses a variety of investigated strategies to obtain relevant information to develop and design innovative ideas.
2. Interrelationship and effect between scientific knowledge, society, environment and industry	• Makes no attempt to consider the interrelationship.	• Demonstrates awareness of interrelationship.	• Demonstrates awareness and knowledge of interrelationship.	• Demonstrates knowledge of interrelationship and effect.	• Evaluates knowledge of interrelationship and effect and considers preventative measures.
3. Knowledge of content	• Makes no attempt to consider the content.	• Shows limited background knowledge on content used.	• Shows some knowledge of content and properties.	• Shows adequate knowledge of content and properties, concepts and principles.	• Shows sufficient knowledge of content and properties, concepts and principles to solve problems.
4. Communication	• Makes no attempt to use communication techniques.	• Gives scant attention to communication techniques and no information sources.	• Gives attention to communication techniques with some information sources.	• Gives attention to communication techniques with information sources and uses another type of communication.	• Gives attention to communication techniques with information sources and uses different types of communication.
5. Presentation of assignment	• Makes no attempt to compile presentation.	• Presents incomplete presentation which is poorly ordered and prepared.	• Completes presentation but it is poorly ordered and prepared.	• Completes presentation and it is well presented.	• Completes presentation with high level of innovation and creativity.

RECORDING SHEET (RUBRIC) FOR RESEARCH TASK

Assignment: _____ Total: Mark _____/ 20 ; Rating _____/ 5

Name of Candidate: _____ Campus: _____

Level: _____ Date: _____/_____/_____

CRITERIA ASSESSED:	PERFORMANCE					COMMENT
Criteria 1: Planning and analysis (diagnosis)skills	0	1	2	3	4	
Criteria 2: Interrelationship and effect between scientific knowledge, society, environment and industry	0	1	2	3	4	
Criteria 3: Knowledge of content	0	1	2	3	4	
Criteria 4: Communication	0	1	2	3	4	
Criteria 5: Presentation of assignment	0	1	2	3	4	
	TOTAL = ___/ 20					

STUDENT ACHIEVEMENT (Tick appropriate rating)	RATING CODE	RATING	MARKS
	5	Outstanding	16-20
	4	Highly competent	14-15
	3	Competent	10-13
	2	Not yet competent	8-9
	1	Not achieved	0-7

ANNEXURE C: RUBRIC FOR ASSESSMENT OF PRACTICAL TASKS.

SCORE → SKILL AREA ↓	0	1	2	3	4
ASSESSMENT DURING PERFORMANCE OF PRACTICAL TASK:					
1. Group work skills	• Shows no attempt to co-operate or work with the group.	• Assists in setting up of apparatus. • Assists in tidying up work area and apparatus after the practical.	• Assists in setting up of apparatus. • Assists in tidying up work area and apparatus after the practical. • Works effectively in the group.	• Assists in setting up of apparatus. • Assists in tidying up work area and apparatus after the practical. • Works effectively in the group. • Co-operates with group members. • Makes suggestions and accepts suggestions from group members.	
2. Procedural or manipulative skills	• Shows no attempt to execute practical.	• Selects and handles some apparatus. • Executes practical.	• Selects and handles apparatus correctly. • Performs practical in an organised way.	• Selects and handles apparatus correctly. • Performs practical in a methodical way. • Applies safety precautions.	
ASSESSMENT OF CONTENT OF PRACTICAL REPORT:					
3. Write up skills (holistic approach)	• Shows no attempt to present work.	• Presents own work. • Uses some suggested headings.	• Presents own work neatly. • Uses and underlines all headings clearly.	• Presents own work neatly and systematically. • Uses and underlines all headings clearly. • Presents graphs, calculations and diagrams (if required).	
4. Observation and measurement skills	• Shows no attempt to take or record measurements or make observations.	• Takes and records measurements using measuring instruments or observations are mentioned.	• Takes and records measurements using measuring instruments and observations are appropriate to practical. • Uses units.	• Takes and records measurements using measuring instruments correctly and observations are accurate and appropriate to practical. • Uses the correct units.	• Takes and records measurements using measuring instruments correctly and observations are accurate and appropriate to practical. • Uses the correct units. • Takes an adequate number of readings or observations.

5. Recording skills		• Shows no attempt to present data.	• Presents data.	• Presents data in tables. • Presents column headings.	• Presents data is neatly in tables. • Presents column headings with units.	• Presents data neatly in tables. • Presents column headings with correct units. • Numbers entries in the table.
6. Interpretation of data skills	Criterion for a written interpretation	• Shows no attempt to give a written explanation.	• Attempts a written explanation.	• Writes correct explanation. • Bases interpretation closely on results.	• Writes correct explanation. • Bases interpretation closely on results. • Gives interpretation in accordance to the relevant theory.	• Write correct explanation. • Bases interpretation closely on results. • Gives interpretation in accordance to the relevant theory. • Gives interpretation that addresses all relevant issues.
	Criterion for a graphical interpretation	• Shows no attempt to draw a graph.	• Draws a graph.	• Draws appropriate graph. • Gives graph a heading and labels the axes.	• Draws appropriate graph. • Gives graph correct heading and labels the axes. • Draws line of best fit through plotted area.	• Draws appropriate graph. • Gives graph a heading and labels the axes. • Draws line of best fit through plotted area. • Includes simple calculations, e.g. gradient or area.
	Criterion for a calculated interpretation	• Shows no attempt to select a formula.	• Selects a formula.	• Selects an appropriate formula. • Substitutes SI values.	• Selects an appropriate formula. • Substitutes SI values correctly. • Answers correctly, with units present.	• Selects an appropriate formula. • Substitutes SI values correctly. • Answers correctly, with units present. • Comments on validity of results and makes suggestions of experimental error.
7. Skill to interpret findings and conclusion		• Shows no attempt to give a conclusion.	• Gives conclusion that does not respond to the aim of the experiment.	• Gives conclusion that responds to the aim of the experiment. • Presents issues in practical.	• Gives conclusion that responds to the aim of the experiment. • Addresses issues in the practical. • Refers to errors or incorrect values.	• Gives conclusion that responds to the aim of the experiment. • Addresses all issues in the practical. • Refers to any errors or incorrect values. • Presents logical explanation(s).

RECORDING SHEET (RUBRIC) FOR PRACTICAL TASK

Practical Task: _____ Total: Mark _____/ 25 ; Rating _____/ 5

Name of Student: _____ Campus: _____

Level: _____ Date: _____

SKILLS AREA ASSESSED:	Score per skill					COMMENT
Skill area 1: Group work skills	0	1	2	3		
Skill area 2: Performing and procedural skills	0	1	2	3		
Skill area 3: Write up skills	0	1	2	3		
Skill area 4: Observation and measuring skills	0	1	2	3	4	
Skill area 5: Recording skills	0	1	2	3	4	
Skill area 6: Interpretation of data skills and analyse findings	0	1	2	3	4	
Skill area 7: Finding and presenting a conclusion	0	1	2	3	4	
	TOTAL = ___/ 25					

STUDENT ACHIEVEMENT (Tick appropriate rating)	RATING CODE	RATING	MARKS
	5	Outstanding	20-25
	4	Highly competent	17-19
	3	Competent	13-16
	2	Not yet competent	10-12
	1	Not achieved	0-9

ANNEXURE D: EXAMPLE OF A DECLARATION OF AUTHENTICITY

DECLARATION OF AUTHENTICITY

NAME OF THE COLLEGE: ……

NAME OF STUDENT: ……....

(FULL NAME(S) AND SURNAME)

EXAMINATION NUMBER: ……..

NAME OF LECTURER: ……...

COLLEGE STAMP

I hereby declare that the project submitted for assessment is my own, original work and has not been previously submitted for moderation.

_____ _____

SIGNATURE OF STUDENT **DATE**

As far as I know, the above declaration by the candidate is true and I accept that the work offered is his or her own.

_____ _____

SIGNATURE OF LECTURER **DATE**

3999