education

Department:
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REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATES (VOCATIONAL)

ASSESSMENT GUIDELINES

PHYSICAL SCIENCE

NQF Level 3

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PHYSICAL SCIENCE – LEVEL 3

CONTENTS

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's 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 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. These 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. Using rubrics is a different way of assessing 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 be simply a total of ticks for right answers. Rubrics should explain the competence level descriptors for the skills, knowledge, values and attitudes (SKVAs) that 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 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 will 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 two control tests. • One exam paper (mid-year). • One mark consisting two assignment – research tasks • ISAT • One mark consisting of four practical tasks	10 20 20 10 40 100	• Theoretical examination consisting of 2 papers: Paper 1 Paper 2	200 200 400 ÷ 4

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 prepared memoranda.

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 using appropriate resources.
  - Communicate and present collected information and conclusions with relevant scientific references; presented in a practical report or presentation.

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

COMPONENT	SUBJECT OUTCOME	SUGGESTED ASSIGNMENT OR RESEARCH TASK
Physics (Select any 1)	• 2.4	• Inertia and its applications in real life and industry.
	• 2.5	• Research the mechanical advantage of an inclined plane by pulling an object up a ramp instead of lifting it vertically. Give examples where this principle is applied in industry or every day life.
	• 3.2	• Research one of the following lens applications and give examples in industry or every day life: corrective lenses, lenses in telescopes or lenses in microscopes.
	• 4.1	• Research the different applications of electromagnets in industry – refer to at least two different applications.
	• 4.2	• Research the different types of capacitors in industry and their applications – refer to at least two different applications.
Chemistry (Compulsory)	• 7	• Identify and critically evaluate the impact of air pollution, hazardous gases and methods of preventing pollution in related industries.

2.3 Assessment of practical tasks

In Physical Science, students are assessed during the performance of the task and on the report of the task. Criteria and outcomes for practical tasks are specified in SO 1.2.

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)	• 2.2	• Proof that 3 non-parallel forces are in equilibrium using a "force board" and three hanging mass pieces.
	• 2.4	• Investigate the relationship between mass and acceleration. (Newton 2nd Law)
	• 4.3	• Investigate the relationship between potential difference and electrical current at constant temperature in a electrical circuit. (Ohm's Law)
Chemistry (2 tasks)	• 5.1	• Investigate if a spring or elastic obeys Hooke's Law
	• 5.2	• Research and classify materials as polar or non-polar with reference to water; also classify solvents as polar or non-polar.
	• 5.4	• Investigate the relationship between volume and pressure at constant temperature. (Boyle's Law)

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 at least should 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 PoE must include at least:

- A contents page
- A declaration stating authenticity
- 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 a task cannot be contained as evidence in the PoE, its exact location must be recorded and it must be readily available for moderation purposes.

The following is a guide to the number of internal assessment units for Physical Sciences:

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 3

3 INTERNAL ASSESSMENT OF SUBJECT OUTCOMES IN PHYSICAL SCIENCE - LEVEL 3

Topic 1: Measurements

SUBJECT OUTCOME	
1.1 Identify and apply the metric system.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Correct SI symbols and units to be used in problem solving and content.	• Identify and use SI symbols and units correctly as applied in this level.
• Length, volume (including cm^3, dm^3), volt and ampere, time, mass and weight to be measured correctly.	• Measure length, volume (including cm^3, dm^3), volt and ampere, time, mass and weight.
ASSESSMENT TASKS OR ACTIVITIES	
• Integrated assessment with practical**.** • Worksheet: find info of measurement, units and symbols on containers and measuring instruments.	

SUBJECT OUTCOME	
1.2 Conduct scientific investigations to collect, represent and interpret data.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Scientific investigation is planned and conducted using the correct apparatus. • Data is collected systematically and accurately and the variables are controlled. • Measurements and/or observations are recorded in tables.	• Plan and conduct a scientific investigation to collect data systematically with regard to accuracy, reliability and the need to control variables.
• Patterns and trends in the information collected identified using graphs and calculations and linked to existing scientific knowledge to help draw conclusions.	• Seek patterns and trends in the information collected and link it to existing scientific knowledge to help draw conclusions.
• Collected information and conclusions communicated and presented in a practical report with relevant scientific arguments.	• Present collected information and conclusions with relevant scientific arguments.
ASSESSMENT TASKS OR ACTIVITIES	
Practical assignment: integrated with topics. Examine and use appropriate questions to obtain information, interpret needs, clarify and examine meaning.	

Topic 2: Mechanics

SUBJECT OUTCOME	
2.1 State, explain and interpret principles of horizontal motion.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• More complex problems using linear equations of motion are analysed and calculated. (e.g. spot a speed trap or pedestrian and slow down after seconds; two vehicles with different types of motion one try to catch other) *Range: linear equations of motion are* $v_f = v_i + a\,\Delta t$, $s = v_i\,\Delta t + \frac{1}{2}\,a\Delta t^2$, $v_f^2 = v_i^2 + 2as$	Analyse and calculate more complex problems - using linear equations of motion. *Range: linear equations of motion are* $v_f = v_i + a\,\Delta t$, $s = v_i\,\Delta t + \frac{1}{2}\,a\Delta t^2$, $v_f^2 = v_i^2 + 2as$
• Graphs of motion are analysed and interpreted, especially: types of motion (± acceleration, constant velocity), direction of motion and turning point. *Range: graphs of motion include s-t, v-t and a-t graphs*.	Analyse and interpret graphs of motion: types of motion, direction of motion and turning point. *Range: graphs of motion include displacement-time, velocity-time and acceleration-time graphs*.
• Gradient of s-t (to determine v) and v-t graphs (to determine a) are calculated and interpreted.	• Calculate and interpret gradient of s-t (to determine v) and v-t graphs (to determine acceleration)

• Area of v-t graphs are calculated to find displacement and distance.	• Calculate area of v-t graphs to find displacement and distance.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet interpreting s-t, v-t and a-t graphs; calculating a and s from a v-t graph. • Case studies e.g. evaluate research done by students – performances from different vehicles compared using graph analyses • Class test	

SUBJECT OUTCOME	
2.2 Describe, analyse and apply principles of concurrent forces.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Force identified as a vector having magnitude and direction.	• Identify force as a vector.
• Vector diagrams of two forces are constructed and the relationship between the resultant and angle between forces is determined (range 0^0 -180^0).	• Construct vector diagrams of two forces to determine the relationship between the resultant and angle between forces (range 0^0 -180^0).
• Resultant of two forces acting simultaneously on a body determined by construction (on scale) or calculation.	• Determine the resultant of two forces acting simultaneously on a body.
• Horizontal and vertical components of a force determined by calculation or by construction.	• Determine components of a force by calculation or by construction.
• System of masses or object in equilibrium is identified.	• Identify an object or system of masses in equilibrium.
• A labeled force (free-body) diagram of non-parallel forces in equilibrium is drawn. • A vector diagram of 3 non-parallel forces in equilibrium is constructed to find unknown force mathematically or by construction. *Range: systems to include mass in suspension on ropes or cables, mass on an inclined plane, object with frictional force acting on it.*	• Draw a labeled force diagram (free-body diagram) and vector diagram of 3 non-parallel forces in equilibrium and find unknown force by construction or mathematically. *Range: systems to include mass in suspension on ropes or cables, mass on an inclined plane, object with frictional force acting on it.*
• Equilibrant is defined, identified and calculated	• Define, identify and calculate the equilibrant of a system.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet finding the tension in cables, beams or frictional forces. • Student practical: Use a “force board” with three hanging mass pieces to proof 3 non-parallel forces to be in equilibrium using vector diagrams. • Case studies of every day objects or masses in suspension. • Class test	

SUBJECT OUTCOME	
2.3 Describe, analyse and apply principles of non-concurrent forces.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Concurrent and non-concurrent forces are identified and force application compared. • Difference between parallel and non-parallel non-concurrent forces is identified.	• Distinguish between applied forces: concurrent and non-concurrent forces; parallel and non-parallel non-concurrent forces.
• 1^{st} condition for equilibrium with parallel forces: sum of forces in one-direction equals to the sum of forces in the opposite direction, is stated and calculated. • 2^{nd} condition for equilibrium with parallel forces: sum of clockwise torques equals the sum of the clockwise torques about any point or axis of rotation, is stated and applied.	• State and apply the two conditions for equilibrium with parallel forces.

• A labelled force diagram of parallel forces is identified and used to solve problems. • The centre of gravity and the use of plumb line to determine the centre of gravity is identified and described.	• Identify and draw a labelled force diagram of parallel forces to solve problems using the centre gravity.
• A labelled force diagram of non- parallel forces is identified and constructed to solve problems.	• Identify and draw a labelled force diagram of non-parallel forces to solve problems.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet: use 1st and 2nd condition for equilibrium of parallel forces in problem solving to identify forces and distance from specified point. • Student activity: Students can experiment finding centre of gravity, magnitude of forces etc. on a beam with varied mass pieces. • Case studies e.g. hanging signs, bridges etc. • Class test	

SUBJECT OUTCOME	
2.4 State, explain, analyse and apply principles of Newton's 1st and 2nd laws of motion.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• All forces applied on mass are identified to determine if they are balanced or not • Net force is determined as the non zero unbalanced force	• Identify if forces applied on mass are balanced or not; and determine the net force.
• Inertia is defined and identified using examples.	• Define inertia and give examples.
• Newton's 1st law of motion is defined and identified and applied in examples	• Define Newton's 1st law of motion and relate to examples.
• Newton's 2nd law of motion is defined, • The relationship between F_{net} and m, m and a, F_{net} and a is identified and described.	• Define and apply Newton's 2nd law of motion.
• A scientific investigation to investigate the proportionality between m and a is planned and conducted.	• Plan and conduct a scientific investigation to investigate the proportionality between mass and acceleration.
• Newton's 2nd law is applied on systems in horizontal motion; push or pull one mass *Range: Systems include one mass that is pushed or pulled and 2 masses on horizontal surface connected with string,* • Newton's 2nd law is applied on systems in vertical motion. *Range: Systems include one mass lifted vertically and more than one mass systems: 1 object on table connected to 1 mass piece hanging; and two masses connected over a pulley.*	• Solve problems using Newton's 2nd law on systems containing one and more than one objects for horizontal and vertical motion.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet: drawing force diagrams to determine if Newton's 1st or 2nd Law is applicable; and calculate force and acceleration. • Student practical: A scientific investigation to investigate the proportionality between m and a is planned and conducted. • Case studies: Identify inertia in every day situations ; finding the tension in a cable lifting an object; finding the tension of a cable in a lift when the lift is ascending and descending. • Class test	

SUBJECT OUTCOME	
2.5 Describe, analyse and apply principles of simple machines and mechanical advantage.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Mechanical advantage of an inclined plane is described and identified in examples. • Mechanical advantage of an inclined plane is calculated.	• Describe, identify and calculate the mechanical advantage of an inclined plane.
• Mechanical advantage of screws is described and identified in examples.	• Identify and describe the mechanical advantage of screws and give examples.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet to determine • Student Research: Students can experimentally determine the mechanical advantage of pushing/ pulling a box up a ramp of a certain length and height; the force needed can be measured using a spring balance; find the relation between the mechanical advantage and pitch of a screw. • Case studies: application of mechanical advantage in everyday life or industry.	

Topic 3: Waves, Sound and Light

SUBJECT OUTCOME	
3.1 Describe, analyse and apply principles of longitudinal waves in every day life.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Production and propagation of longitudinal waves in various media are described.	• Describe the production and propagation of longitudinal waves in various media.
• Examples of longitudinal waves are identified • The differences between sound and radio waves are identified.	• Identify examples of longitudinal waves and differentiate between sound and radio waves.
• Wave speed, wavelength, frequency and amplitude are described and calculated.	• Describe and calculate wave speed, wavelength, frequency, amplitude.
• Intensity and loudness; pitch and tone: terminology to be defined and compared.	• Differentiate between intensity and loudness; pitch and tone.
• Effect of Interference in sound is described and identified in examples • Effect of reflection in sound is described and identified in examples (echoes, sonar etc).	• Describe interference and reflection in sound and give examples.
• Resonance in musical instruments identified and described. • Resonance in structures (building and bridges) identified and described.	• Identify and describe resonance in musical instruments and structures (building and bridges).
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet • Activity: Students can experiment using a speaker system to investigate the interference effect	

SUBJECT OUTCOME	
3.2 Identify and critically evaluate the impact of geometrical optics on the human development.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Diagram is constructed, labelled and interpreted to find the image produced by convex (converging) lens. • Diagram is constructed, labelled and interpreted to find the image produced by concave (diverging) lens.	• Construct and interpret image formed by converging (convex) and diverging (concave) lenses.
• Knowledge of converging and diverging lenses to be applied in spectacles and the correction of lens defects	• Apply knowledge of convergence and divergence to spectacles and the correction of lens defects in eye and

in eye. • Lenses used in telescopes (SALT), microscopes and cameras to be identified.	its use in telescopes, microscopes and cameras.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet: drawing and measuring the focal distance and image formed with lenses. • Student Activity: Students experiment with lenses, the focal point to measure the image formed. • Research: Do research on corrective lenses, lenses in telescopes; microscopes and cameras.	

Topic 4: Electricity and Magnetism

SUBJECT OUTCOME	
4.1 State, analyse and apply principles of static electricity (electrostatics).	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Coulomb's Law is defined and applied to calculate the force between charges.	• Define Coulomb's Law and apply the law to calculate the force between charges.
• Electric field around single charges and groups of charges (2 similar, 2 opposite, between parallel plates) and Faraday case identified and drawn.	• Identify and draw the electric field around single charges, pair of charges and a Faraday case.
• Electric field strength around a charge and between parallel plates is calculated.	• Calculate electric field strength around a charge and between parallel plates.
• Electrical potential energy and electrical potential is defined and calculated.	• Define and apply electrical potential energy and electrical potential.
• Capacitance is defined • Physics of parallel plate capacitor described.	• Define capacitance, and apply the principle to the parallel plate capacitor
• The relation between charge, potential difference and capacitance is described.	• Identify and apply the relation between charge, potential difference and capacitance.
• The capacitor is described and identified as a circuit device • Application of capacitor in electrical circuit is identified	• Describe, identify and apply the capacitor as a circuit device.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet on calculations: Coulomb's law, electric field, and electrical potential energy; Draw electrical fields around single charges, net field around two similar and two opposite charges, field between parallel plates. • Research: The use of capacitors in industry. • Class test	

SUBJECT OUTCOME	
4.2 State, analyse and apply principles in electromagnetism.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Diagrams of the magnetic field associated with current in long straight current carrying conductor identified using the right-hand thumb rule and sketched. • Diagrams of the magnetic field associated with current in a solenoid identified using the right-hand thumb rule and sketched.	• Identify and draw diagrams of the magnetic field associated with current in long straight current carrying conductor and in a solenoid.
• Use of magnetic field in electromagnets identified. • Examples of electromagnets identified and described (e.g. in electromagnets, lifting magnets, electrical bell, magnetic relay and magnetic separator etc)	• Identify and describe the use of magnetic field and its application in electromagnets.
• Effect of the magnetic field on a charged particle in motion is identified using Fleming's Left hand rule. • The effect of the magnetic field on moving charges is identified in television tubes e.g. control of television	• Identify the effect of the magnetic field on a charged particle in motion.

images.	
• Electromagnetic induction: current induced by changing field to be described. • Electromagnetic induction application in dynamo described. • Electromagnetic induction application in transformer described.	• Describe and apply electromagnetic induction to produce current by changing magnetic field and how it is applied in dynamos and transformers.
ASSESSMENT TASKS OR ACTIVITIES	
• Student activity: draw the magnetic field around a straight conductor and a solenoid. • Research: The use of electromagnets in industry; dynamo, transformers as applied in machines and used in industry. • Class test	

SUBJECT OUTCOME	
4.3 State, analyse and apply principles in electric circuits	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Ohm's Law defined and applied.	• Define and apply Ohm's Law.
• Proportionality between current and potential difference (Ohm's Law) is determined.	• Determine the proportionality between current and potential difference (Ohm's Law).
• Resistance, equivalent resistance and internal resistance described and calculated.	• Distinguish between resistance, equivalent resistance and internal resistance.
• Symbols used for electrical circuit identified. *Range: Symbols include cell, battery of cells (in series and parallel), capacitor, Voltmeter, Ammeter, Galvanometer, switch, fuse, ground and different types of resistors: globe, fixed resistor, and rheostat.*	• Identify symbols used for electrical circuit: *Range: Symbols include cell, battery of cells (in series and parallel), capacitor, Voltmeter, Ammeter, Galvanometer, switch, fuse, ground and different types of resistors: globe, fixed resistor, and rheostat.*
• Electrical circuits are analysed, and pd, emf, current, resistance in series and parallel networks calculated.	• Analyse and solve problems in electrical circuits calculating pd, emf, resistance in series and parallel networks.
• Purpose of a Wheatstone bridge described and where it is used is identified.	• Describe the purpose of a Wheatstone bridge.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet: problem solving of electrical circuits. • Student practical: Investigate the proportionality between potential difference and electrical current (Ohm's Law)	

Topic 5: Matter and Materials

SUBJECT OUTCOME	
5.1 State and apply mechanical properties of matter	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Mechanical properties of solids are described. *Range of mechanical properties is applied hardness, tensile strength, elasticity, plasticity, fracture and creep (descriptive), ductility and brittleness.*	• Describe mechanical properties of solids. *Range of mechanical properties is applied hardness, tensile strength, elasticity, plasticity, fracture and creep (descriptive), ductility and brittleness and brittleness.*
• Stress and strain, compression stress and shear stress described to differentiate between terminologies.	• Differentiate between stress and strain, compression stress and shear stress.
• Hooke's Law is defined, investigated and graphically interpreted.	• Define, investigate and interpret Hooke's Law.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet: Classify and identify different metals, metal structures such as beams, concrete according to properties. • Student practical: Investigate if a spring or elastic obeys Hooke's Law.	

SUBJECT OUTCOME	
5.2 State, analyse and apply principles of atomic combinations: molecular structure.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Group properties of the Periodic Table are used to find the number of valence electrons and valency number of an atom.	• Use group properties of the Periodic Table to find the number of valence electrons and valency number of an atom.
• Lewis diagrams and octet rule used to explain chemical bonds.	• Use and draw Lewis diagrams and octet rule to explain chemical bonds.
• Electro negativity of atoms defined and applied to explain the polarity of chemical bonds.	• Define electro negativity of atoms and apply it to explain the polarity of chemical bonds.
• Oxidation number of atoms in molecules calculated to explain their relative richness in electrons.	• Calculate oxidation number of atoms in molecules to explain their relative richness in electrons.
• Molecular shapes and examples identified. *Range: Molecular shapes are linear, angular, pyramidal, and tetrahedral.*	• Identify molecular shapes and examples. *Range: Molecular shapes are linear, angular, pyramidal, and tetrahedral.*
• Polarity described and polar and non-polar substances identified	• Identify polar and non-polar substances.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet drawing Lewis diagrams of bonding and predict molecular shapes. • Student practical: Students can find polar and non-polar substances by comparing it to water.	

SUBJECT OUTCOME	
5.3 State, analyse and explain change of state due to molecular forces	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Intermolecular bonding and intra-molecular forces described to distinguish between the terminologies	• Describe and distinguish between intermolecular bonding and intra-molecular forces
• Examples of intra-molecular forces: hydrogen and van der Waals' forces identified.	• Identify the types of intra-molecular forces: hydrogen and van der Waals' forces and illustrate with examples.
• Physical state of matter explained with reference to intra-molecular forces.	• Explain the physical state of matter with reference to intra-molecular forces and illustrate with examples.
• Boiling points of group 5, 6, 7- hydrides are used to differentiate between the strength of hydrogen and van der Waals' forces and the effect of mass on the boiling point.	• Use boiling point of group 5, 6, 7 hydrides to differentiate between the strength of hydrogen and van der Waals' forces and the effect of mass on the boiling point.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet: Use graph indicating boiling points of group 5, 6, 7 hydrides to illustrate strength of intra-molecular forces. • Research: Industrial application of intra molecular forces in paints, adhesives etc.	

SUBJECT OUTCOME	
5.4 Describe, analyse and apply properties of gases.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Properties of gaseous phase described. • Kinetic-molecular theory identified.	• Define the properties of gases and state the kinetic-molecular theory.
• Ideal gas defined and properties of an ideal gas stated.	• Define and list the properties of an ideal gas.
• Atmospheric pressure and gauge pressure described and differentiated.	• Describe and distinguish between the term atmospheric pressure and gauge pressure.
• The relationship between volume and pressure at	• Identify and apply the relationship between volume and

constant temperature (Boyle's law) is identified, graphically shown and used in calculations.	pressure at constant temperature (Boyle's Law).
• The relationship between volume and temperature at constant pressure (Charles's law) is identified, graphically shown and used in calculations.	• Identify and apply the relationship between volume and temperature at constant pressure (Charles's Law).
• The relationship between pressure and temperature at constant volume is identified, graphically shown and used in calculations.	• Identify and apply the relationship between pressure and temperature at constant volume.
• Combined gas laws and ideal gas equation used in calculations.	• Do calculations on the combined gas laws and ideal gas equation.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet on graphs and calculations of gases. • Student practical**:** Investigate the relationship between volume and pressure at constant temperature. (Boyle's law). • Research: Application of relationships on everyday life: Weather balloon, boiling point on Highveld or on mountains, pressure cooker, "the bends" and deep sea diving etc.	

SUBJECT OUTCOME	
5.5 Describe, analyse and apply principles heat and thermal properties of solids and liquids	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Expansion of solids (linear, area and volume) described and applied in examples.	• Describe and apply expansion of solids (refer to linear, area and volume expansion).
• Expansion of liquids and viscosity described and applied in examples with reference to water.	• Describe and apply expansion of liquids and viscosity.
• Latent heat defined, identified from graph and calculated.	• Define and calculate latent heat.
• Vapour pressure and boiling point to be described and differentiated.	• Describe and differentiate between vapour pressure and boiling point.
• Evaporation described as a cooling process and factors identified that have an effect (surface area, temperature, volatile liquids, air currents and air pressure).	• Describe evaporation as a cooling process and factors that have an effect (surface area, temperature, volatile liquids, air currents and air pressure).
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet • Research: Why in car cooling systems the change of state can cause blocks and radiators to burst. What is the effect of impurities such as alcohol in antifreeze?	

Topic 6: Chemical Change

SUBJECT OUTCOME	
6.1 Identify, analyse and apply energy changes.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Exothermic and endothermic reactions are described and sketched on graph. • Activation energy and enthalpy identified and calculated.	• Identify, draw and apply exothermic and endothermic reactions, activation energy and enthalpy.
ASSESSMENT TASKS OR ACTIVITIES	
Work sheet identify exothermic and endothermic reactions in terms of energy release; feeling hot or cold and Research identify examples such dissolving salt, burning ammonium dichromate (volcano) and photosynthesis. Discuss the energy value compared to reactant energy value.	

SUBJECT OUTCOME	
6.2 Describe, analyse and apply quantitative aspects of change.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Chemical equations written down; reactants and products recognised. • Conservation of mass and energy identified.	• Write chemical equations down recognise reactants and products, conservation of mass and matter (atoms), conservation of energy.
• Chemical equations balanced.	• Balance chemical equations.
• Mole is defined and molar volume of gases calculated.	• Define mole and calculate molar volume of gases.
• Volume relationships in gaseous reactions are identified.	• Identify volume relationships in gaseous reactions.
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet: writing and balancing chemical equations; calculating mole and molar volume of gases • Student activity: Compare mass of reactants with mass of products after reaction is completed.	

SUBJECT OUTCOME	
6.3 Identify and apply types of chemical reactions.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Combination, decomposition and displacement chemical reactions identified and written down with reference to industrial gas manufacturing: *Range: combination reactions are metal + O_2, non-metal + O_2, metal + non-metal, metal oxide + H_2O, non-metal oxide + H_2O)* *Decomposition reactions are metal oxides, carbonates and nitrates decomposing in heat.* *Single-displacement reactions are halogen + halide, metallic salt + salt, metal + acid, metal + H_2O –activity series)*	• Identify and write down combination, decomposition and displacement reactions with reference to industrial gases (7): *Range: combination reactions are metal + O_2, non-metal + O_2, metal + non-metal, metal oxide + H_2O, non-metal oxide + H_2O)* *Decomposition reactions are metal oxides, carbonates, nitrates, chlorates and H_2O_2 decomposing in heat.* *Single-displacement reactions are halogen + halide, metallic salt + salt, metal + acid, metal + H_2O –activity series)*
ASSESSMENT TASKS OR ACTIVITIES	
• Work sheet in writing chemical reactions down; identify different types of reactions. • Research: Industrial application of reactions.	

Topic 7: Chemical systems and industry

SUBJECT OUTCOME	
7.1 Identify and critically evaluate the impact of scientific knowledge on the atmosphere and the quality of human, environmental and socio-economic development.	
ASSESSMENT STANDARD	**LEARNING OUTCOME**
• Industrial gases, their chemical properties and uses are identified (e.g. CO_2, O_2, H_2, CH_4, N_2, NH_3, acetylene).	• Identify industrial gases (e.g. CO_2, O_2, H_2, CH_4, N_2, NH_3, acetylene): the chemical properties and uses.
• Examples of gases emitted by industries rated as hazardous (NO, NO_2, SO_2, H_2S, Cl_2 etc) identified and the status of the gases explained.	• Identify examples of gases emitted by industries rated as hazardous (NO, NO_2, SO_2, H_2S etc) and explain the reason for the status of the gases.
• Air pollution described, types of air pollution identified and methods of prevention in industries and elsewhere described.	• Identify and describe air pollution and methods of prevention in industries and elsewhere.
ASSESSMENT TASKS OR ACTIVITIES	
Assignment: Research on air pollution, effects prevention and treatment.	

4 SPECIFICATIONS FOR EXTERNAL ASSESSMENT IN PHYSICAL SCIENCE - LEVEL 3

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 during 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 is suggested.

EXAMINATION GUIDELINES FOR PHYSICAL SCIENCES	
General remarks	
• Nature of paper	: External
• Number of papers	: 2 papers
• Duration	: 2 hours
• Total mark allocation	: 200 each
• Number of sections	: 2 – A) Multiple choice and B) Structured questions
• Compulsory sections	: All

WEIGHTED VALUES

LEVEL 3	KNOWLEDGE AND COMPREHENSION	APPLICATION	ANALYSIS, SYNTHESIS AND EVALUATION
	50%	40%	10%

ANNEXURE A: MARK SHEET FOR CAPTURING STUDENT MARKS

Campus: Level:	INTERNAL CONTINUOUS ASSESSMENT																		FINAL EXAM: END OF YEAR			FINAL MARK		ACHIEVEMENT RATING
Class:	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 ÷ 4	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	200	200	=100	200	%	5
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ANNEXURE B: EXAMPLE OF AN ASSESSMENT RUBRIC FOR ASSIGNMENT OR RESEARCH TASK

CRITERIA / SCORE → ↓	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**