

## NAUTICAL SCIENCE (Updated June 2009)

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### APPENDICES

## 1. PURPOSE OF THE SUBJECT ASSESSMENT GUIDELINES

This document provides guidelines for assessment in the National Curriculum Statement Grades 10 – 12 (General). The guidelines must be read in conjunction with *The National Senior Certificate: A Qualification at Level 4 on the National Qualifications Framework (NQF)* and the Nautical Science Subject Statement. The Subject Assessment Guidelines will be used for Grades 10, 11 and 12 for the years 2006 to 2010.

Section 2 of the document provides guidelines on assessment in the National Curriculum Statement. Section 3 provides assessment guidelines that are particular to each subject.

The Department of Education will also regularly publish examples of good assessment tasks, examination paper. The first examples will be published on the Department of Education website in October 2005.

Together, these documents assist teachers in their teaching of the National Curriculum Statement. The Department of Education encourages teachers to use these guidelines as they prepare to teach the National Curriculum Statement. Teachers should also use every available opportunity to hone their assessment skills. These skills relate both to the setting and marking of assessment tasks.

## 2. ASSESSMENT IN THE NATIONAL CURRICULUM STATEMENT

### 2.1 Introduction

Assessment in the National Curriculum Statement is an integral part of teaching and learning. For this reason, assessment should be part of every lesson and teachers should plan assessment activities to complement learning activities. In addition, teachers should plan a formal year-long Programme of Assessment. Together the informal daily assessment and the formal Programme of Assessment should be used to monitor learner progress through the school year.

Continuous assessment through informal daily assessment and the formal Programme of Assessment should be used to:

- develop learners' knowledge, skills and values
- assess learners' strengths and weaknesses
- provide additional support to learners
- revisit or revise certain sections of the curriculum and
- motivate and encourage learners.

In Grades 10 and 11 all assessment of the National Curriculum Statement is internal. In Grade 12 the formal Programme of Assessment which counts 25% is internally set and marked and externally moderated. The remaining 75% of the final mark for certification in Grade 12 is externally set, marked and moderated. In Life Orientation however, all assessment is internal and makes up 100% of the final mark for promotion and certification.

## **2.2 Continuous assessment**

Continuous assessment involves assessment activities that are undertaken throughout the year, using various kinds of assessment forms, methods and tools. In Grades 10-12 continuous assessment comprises two different but related activities: informal daily assessment and a formal Programme of Assessment.

### **2.2.1 Daily assessment**

Learner progress should be monitored during learning activities. This informal daily monitoring of progress can be done through question and answer sessions; short assessment tasks completed during the lesson by individuals, pairs or groups or homework exercises. Teachers' lesson planning should consider which assessment tasks will be used to informally assess learner progress.

Individual learners, groups of learners or teachers can mark these assessment tasks. Self-assessment, peer assessment and group assessment actively involves learners in assessment. This is important as it allows learners to learn from and reflect on their own performance.

The results of the informal daily assessment tasks are not formally recorded unless the teacher wishes to do so. In such instances, a simple checklist may be used to record this assessment. However, teachers may use the learners' performance in these assessment tasks to provide verbal or written feedback to learners, the School Management Team and parents. This is particularly important if barriers to learning or poor levels of participation are encountered.

The results of these assessment tasks are not taken into account for promotion and certification purposes.

### **2.2.2 Programme of Assessment**

In addition to daily assessment, teachers should develop a year-long formal Programme of Assessment for each subject and grade. In Grades 10 and 11 the Programme of Assessment consists of tasks undertaken during the school year and an end-of-year examination. The marks allocated to assessment tasks completed during the school year will be 25%, and the end-of-year examination mark will be 75% of the total mark.

In Grade 12, the Programme of Assessment consists of tasks undertaken during the school year and counts 25% of the final Grade 12 mark. The other 75% is made up of externally set assessment tasks.

The marks achieved in each assessment task in the formal Programme of Assessment must be recorded and included in formal reports to parents and School Management Teams. These marks will determine if the learners in Grades 10 and 11 are promoted. In Grade 12, these marks will be submitted as the internal continuous assessment mark. Section 3 of this document provides details on the weighting of the tasks for promotion purposes.

### 2.2.2.1 Number and forms of assessment required for Programme of Assessment in Grades 10 and 11

The requirements for the formal Programme of Assessment for Grades 10 and 11 are summarised in the table below. If a teacher wishes to add to the number of assessment tasks, he or she must motivate the changes to the head of department and the principal of the school. The teacher must provide the Programme of Assessment to the subject head and School Management Team before the start of the school year. This will be used to draw up a school assessment plan for each of the subjects in each grade. The proposed school assessment plan should be provided to learners and parents in the first week of the first term.

#### Number of assessment tasks which make up the Programme of Assessment by subject in Grades 10 and 11

| Subjects                | Term 1 | Term 2 | Term 3 | Term 4 | Total |
|-------------------------|--------|--------|--------|--------|-------|
| Language 1              | 3      | 4*     | 3      | 2*     | 12    |
| Language 2              | 3      | 4*     | 3      | 2*     | 12    |
| Life Orientation        | 2      | 2      | 2      | 2      | 8     |
| Maths or Maths Literacy | 2      | 2*     | 2      | 2*     | 8     |
| Subject choice 1        | 2      | 2*     | 2      | 1*     | 7     |
| Subject choice 2        | 2      | 2*     | 2      | 1*     | 7     |
| Subject choice 3        | 2      | 2*     | 2      | 1*     | 7     |
| Total                   | 16     | 18     | 16     | 11     | 61    |

\* One of these tasks must be an examination

\*\* NOTE: If one or two of the subjects chosen for subject choices 1, 2 or 3 include a Language, the number of tasks indicated for Languages 1 and 2 at Home Language (HL) and First Additional Language (FAL) are still applicable. Learners who opt for a Second Additional Language are required to complete the same number of tasks as FAL candidates.

Two of the assessment tasks for each subject except Life Orientation must be examinations. In Grades 10 and 11 these examinations should be administered in mid-year and November. These examinations should take account of the requirements set out in Section 3 of this document. They should be carefully designed and weighted to cover all the Learning Outcomes of the subject.

Two of the assessment tasks for all subjects should be tests written under controlled conditions at a specified time. These tests may form one of a series of teaching and learning activities. They may require learners to use a variety of written and other resources during the assessment task. The tests should be written in the first and third terms of the year.

The remainder of the assessment tasks should not be tests or examinations. They should be carefully designed tasks, which give learners opportunities to research and explore the subject in exciting and varied ways. Examples of assessment forms are debates, presentations, projects, simulations, literary essays, written reports, practical tasks, performances, exhibitions and research projects. The most appropriate forms of assessment for each subject are set out in Section 3. Care should be taken to ensure that learners cover a variety of assessment forms in the three grades.

The weighting of the tasks for each subject is set out in Section 3.

### 2.2.2.2 Number and forms of assessment required for Programme of Assessment in Grade 12

In Grade 12 all subjects include an internal assessment component, which contributes 25% to the final assessment mark. The requirements of the internal Programme of Assessment for Grades 12 are summarised in the table below. If a teacher wishes to add to the number of assessment tasks, she or he must motivate the changes to the head of department and the principal of the school. Permission for this change should be obtained from the district office.

The teacher must provide the Programme of Assessment to the subject head and School Management Team before the start of the school year. This will be used to draw up a school assessment plan for each of the subjects in each grade. The proposed school assessment plan should be provided to learners and parents in the first week of the first term.

#### Number of assessment tasks which make up the Programme of Assessment by subject in Grade 12

| Subjects               | Term 1 | Term 2 | Term 3 | Term 4 | Total |
|------------------------|--------|--------|--------|--------|-------|
| Language 1             | 4      | 4*     | 3*     |        | 11    |
| Language 2             | 4      | 4*     | 3*     |        | 11    |
| Life Orientation       | 3      | 3      | 2      |        | 8     |
| Maths / Maths Literacy | 3      | 2*     | 2*     |        | 7     |
| Subject choice 1*      | 2      | 2*     | 2/3*   |        | 6/7   |
| Subject choice 2 *     | 2      | 2*     | 2/3*   |        | 6/7   |
| Subject choice 3*      | 2      | 2*     | 2/3*   |        | 6/7   |
| Total                  | 20     | 19     | 19     | 0      | 58    |

\* One of these tasks must be an examination

\*\* NOTE: If one or two of the subjects chosen for subject choices 1, 2 or 3 include a Language, the number of tasks indicated for Languages 1 and 2 at Home Language (HL) and First Additional Language (FAL) are still applicable. Learners who opt for a Second Additional Language are required to complete the same number of tasks as FAL candidates.

# The number of internal tasks per subject differs from 6 to 7 as specified in Section 3 of this document.

Two of the assessment tasks for each subject except Life Orientation must be examinations. In Grade 12 these examinations should be administered in mid-year and September. These examinations should conform to the requirements set out in Section 3 of this document. They should be carefully designed and weighted to cover all the Learning Outcomes of the subject.

Two of the assessment tasks for all subjects should be tests written under controlled conditions at a specified time. These tests may form one of a series of teaching and learning activities. They may require learners to use a variety of written and other resources during the assessment task. The tests should be written in the first and third terms of the year.

The remainder of the assessment tasks should not be tests or examinations. They should be carefully designed tasks, which give learners opportunities to research and explore the subject in exciting and focused ways. Examples of assessment forms are debates, presentations, projects, simulations, assignments, case studies, essays, practical tasks, performances, exhibitions and research projects. The most appropriate forms of assessment for each subject are set out in Section 3.

### 2.3 External assessment in Grade 12

External assessment is only applicable to Grade 12 where the final end-of-year examination is externally set and moderated. This makes up 75% of the final mark for Grade 12.

In some subjects the external assessment includes practical or performance tasks that are externally set, internally assessed and externally moderated. These performance tasks account for one third of the end-of-year external examination mark in Grade 12 (that is 25% of the final mark). Details of these tasks are provided in Section 3.

The external examinations are set externally, administered at schools under conditions specified in the National policy on the conduct, administration and management of the assessment of the National Senior Certificate: A qualification at Level 4 on the National Qualifications Framework (NQF) and marked externally.

Guidelines for the external examinations are provided in Section 3.

### 2.4 Recording and reporting on the Programme of Assessment

The Programme of Assessment should be recorded in the teacher's portfolio of assessment. The following should be included in the teacher's portfolio:

- a contents page;
- the formal Programme of Assessment;
- the requirements of each of the assessment tasks;
- the tools used for assessment for each task; and
- recording sheets for each class.

The learners should also maintain a portfolio of the assessment tasks that make up the Programme of Assessment. The learner's portfolio must consist of:

- a contents page;
- all of the assessment tasks that make up the Programme of Assessment for each grade (including tests and examinations);
- the tools used for assessment for each task; and
- a record of marks achieved for each of the tasks.

However, if the products of the tasks are objects which do not fit into the portfolio or are in learners' exercise books then they should not be placed in the portfolio but be kept for moderation purposes.

Teachers must report regularly and timeously to learners and parents on the progress of learners. Schools will determine the reporting mechanism but it could include written reports, parent-teacher interviews and parents' days. Schools are required to give feedback to parents on the Programme of Assessment using a formal reporting tool. This reporting must use the following seven-point scale.

| RATING CODE | RATING                  | MARKS<br>% |
|-------------|-------------------------|------------|
| 7           | Outstanding achievement | 80 – 100   |
| 6           | Meritorious achievement | 70 – 79    |
| 5           | Substantial achievement | 60 – 69    |
| 4           | Adequate achievement    | 50 – 59    |
| 3           | Moderate achievement    | 40 – 49    |
| 2           | Elementary achievement  | 30 – 39    |
| 1           | Not achieved            | 0 – 29     |

## 2.5 Moderation of the assessment tasks in the Programme of Assessment

Moderation of the assessment tasks should take place at three levels.

| LEVEL                     | MODERATION REQUIREMENTS   |
|---------------------------|---|
| School                    | The Programme of Assessment should be submitted to the subject head and School Management Team before the start of the academic year for moderation purposes. Each task which is to be used as part of the Programme of Assessment should be submitted to the subject head for moderation before learners attempt the task. The teacher and learner portfolios should be moderated twice a year by the head of the subject or her/his delegate. |
| Cluster/ district/ region | Teacher portfolios and a sample of learner portfolios must be moderated twice during the first three terms.   |
| Provincial/ national      | Teacher portfolios and a sample of learner portfolios must be moderated once a year.  |

## SECTION 3

### 3 ASSESSMENT OF NAUTICAL SCIENCE IN GRADES 10 – 12

#### 3.1 Introduction

Assessment in Nautical Science in Grades 10 – 12 forms an integral part of the teaching and learning process. The purpose of assessment is to monitor progress and provide feedback, diagnose barriers to learning, guide the selection of learning materials, guide and support learning and provide evidence to support the promotion of learners to the next grade. It helps learners to measure their progress and take control of their learning. It helps teachers to find out how teaching and learning activities and processes are contributing to progress towards the achievement of the Nautical Science Learning Outcomes.

In Nautical Science, the process of identifying, gathering and interpreting information about learner achievement consists of practical work, written tasks, tests, examinations, research and any other tasks relating to Nautical Science. The evidence for internal assessment is collected in the portfolio. Teachers should use a variety of assessment activities, methods, tools and forms to assess the practical and theoretical aspects of Nautical Science.

The teacher must establish the purpose of each assessment task so that assessment is transparent and open. For assessment to be fair and appropriate, the assessment activity must match the method of assessment and the assessment must cover work with which learners have engaged. A particular method and instrument should give learners ample opportunities to demonstrate the attainment of one or more of the Learning Outcomes. This will only be possible if the chosen activities and instruments are appropriate for the target group and Learning Outcomes being assessed.

#### **Suggested weighting of Learning Outcomes in Nautical Science:**

Navigation is the most important aspect of nautical Science and has the largest amount of content. The concepts and skills are the most difficult to master and hence requires the greatest amount of time to teach. Seamanship is the next most important aspect and has considerable content. The concepts and skills are easier to master and take less time to teach. Meteorology and communication are equally important but slightly less so than navigation and seamanship. The content for both is considerably less than navigation and seamanship. The concepts and skills involved with meteorology are more difficult to master than communication and takes slightly longer to teach.

| LEARNING OUTCOMES   | GRADES 10 -12 |
|---------------------|---------------|
| LO1: Navigation     | 50%           |
| LO2: Seamanship     | 30%           |
| LO3: Meteorology    | 10%           |
| LO4: Communications | 10%           |
| <b>TOTAL</b>        | <b>100%</b>   |

### 3.2 Daily assessment Grades 10, 11 and 12

In Nautical Science daily assessment is the informal monitoring of learners' progress. This is done through observation, discussions, learner-teacher conferences, informal classroom interactions and homework. The activities provide learners with opportunities to develop the skills, knowledge and values required to complete the tasks in the Programme of Assessment. These assessment activities should be reflected in the teachers' Work Schedule and lesson planning and should not be seen as separate from the learning activities taking place in the classroom. Informal daily assessment does not have to be recorded and is not taken into account for promotion or certification purposes, but the Nautical Science teacher could keep notes on the development of learners' knowledge, skills and values, learners' strengths and weaknesses and additional support required and provided during these activities.

In addition to tests and examinations, assessment activities may include opportunities for:

- source-based activities – finding, selecting, reading, comprehending, analysing, interpreting, using and applying information from a wide range of sources
- map reading, labelling of maps
- reading charts, plotting charts
- planning voyages
- formulaic calculations
- analysing graphics, tables and other forms of data
- discussions
- debates
- research
- interviews
- composing letters and articles on topical issues
- presentations
- excursions (including visits to work places)
- drawings, sketching and design tasks
- designing maritime related games
- model-building of ships and harbours
- simulations
- scenario planning
- case studies and
- role-play.

Tools that may be used to assess the tasks include:

- Rubrics
- Checklists
- Memoranda
- Observation sheets

### 3.3 Programme of assessment in Grades 10 and 11

The Programme of Assessment for Nautical Science in Grades 10 and 11 comprises seven (7) tasks, which are internally assessed. The five tasks, which are completed during the school year, make up 25% of the total mark of Nautical Science. The end-of-year examination makes up the remaining 75%

| PROGRAMME OF ASSESSMENT (400 marks)   |  |
|---|--|
| ASSESSMENT TASKS  | END –OF-YEAR ASSESSMENT  |
| <b>25% (100 marks)</b>  | <b>75% (300 marks)</b>   |
| <ul style="list-style-type: none"> <li>• 2 tests</li> <li>• 1 exam (mid year)</li> <li>• 3 other tasks</li> </ul> | <ul style="list-style-type: none"> <li>• 2 written exams LO 1 – 4               <ul style="list-style-type: none"> <li>• Paper 1 – 150 marks</li> <li>• Paper 2 - 150 marks</li> </ul> </li> </ul> |

### Example of a Programme of Assessment for Grades 10:

| TERM 1  | TERM 2   | TERM 3  | TERM 4   |
|---|--|---|--|
| Task 1: Test<br>LO 1 Navigation<br>50 marks                       | Task 3: Research Task<br>Planning a voyage<br>50 marks   | Task 5: Test<br>LO 1,3,4<br>100 marks   | Task 7: Exam<br>Paper 1 LO<br>1 Practical<br>Navigation 150<br>marks |
| Task 2: Practical<br>Assignment:<br>Practical sailing<br>50 marks | Task 4: Midyear exam<br>Paper 1 LO 1 Practical<br>Navigation 150 marks<br>Paper 2 Theory LO 2<br>150 marks | Task 6: Practical<br>Assignment LO 3, LO 4<br>Meteorology/Communication<br>50 marks | Paper 2 Theory LO<br>2,3,4<br>150 marks                              |
| 100 marks   | 350 marks  | 150 marks   | 300 marks  |
| 600 marks divided by 6 = 100 marks                                |  |   |  |

### Example of a Programme of Assessment for Grades 11:

| TERM 1  | TERM 2   | TERM 3  | TERM 4   |
|---|--|---|--|
| Task 1: Test<br>LO 1 Navigation<br>50 marks                   | Task 3: Research Task<br>Tidal phenomena<br>50 marks   | Task 5: Test<br>LO 2 – 4<br>100 marks   | Task 7: Exam<br>Paper 1 LO<br>1 Practical<br>Navigation 150<br>marks |
| Task 2: Practical<br>Assignment:<br>Safety at sea<br>50 marks | Task 4: Midyear exam<br>Paper 1 LO 1 Practical<br>Navigation 150 marks<br>Paper 2 Theory LO 2,3,4<br>150 | Task 6: Practical<br>Assignment LO 3, LO 4<br>Meteorology and/or<br>Communication<br>50 marks | Paper 2 Theory LO<br>2,3,4<br>150 marks                              |
| 100 marks   | 350 marks  | 150 marks   | 300 marks  |
| 600 marks divided by 6 = 100 marks                            |  |   |  |

#### Tasks

In addition to two tests and two examinations in Grade 10 and 11 Programmes of Assessment, Nautical Science learners should also be assessed in three other tasks such as a practical sailing a small boat assignment, a meteorology and communication assignment and a research task. See Appendix A for ideas of research tasks and assignments.)

#### Tests

The suggested outline for tests is as follows:

- Minimum of 50 marks
- Duration: 1 hour
- Questions at different cognitive levels

Each task and examination must cater for a range of cognitive levels and abilities of learners. The following is used as a guide to compile tasks and examination questions encompassing the different cognitive levels: See Appendix B for Bloom's Taxonomy of Cognitive Levels

| COGNITIVE LEVEL                    | PERCENTAGE     | MARKS     |
|------------------------------------|----------------|-----------|
| Knowledge                          | 30             | 90        |
| Comprehension                      | 20             | 60        |
| Application                        | 30             | 90        |
| Analysis, evaluation and synthesis | 20             | 60        |
|                                    | 100 percentage | 300 marks |

### Examinations in Grades 10 and 11

The midyear and end-of-year examination papers should test the knowledge and skills covered in the four Nautical Science Learning Outcomes. The preparatory examinations need to be closely related to the final examination in terms of time allocation, layout of paper and mark allocations.

The examination mark, which is the raw score in June and September must be used for the calculation of the internal assessment mark for promotion purposes.

The following table suggests the outline for examinations in Grades 10 and 11

|   | MARKS Grade 10                                  |  |
|---|---|--|
|   | PAPER 1   | PAPER 2                                    |
| Time                                    | 3 hours   | 3 hours                                    |
| Marks                                   | 150 marks                                       | 150 marks                                  |
| Learning Outcomes                       | LO 1  | LO 2,3,4                                   |
| Questions<br>(All questions compulsory) | Practical chartwork and navigation calculations | Seamanship, meteorology and communications |
| TOTAL                                   | 150 marks                                       | 150 marks                                  |

|   | MARKS Grade 11                           |  |
|---|--|--|
|   | PAPER 1                                  | PAPER 2  |
| Time                                    | 3 hours                                  | 3 hours  |
| Marks                                   | 150 marks                                | 150 marks  |
| Learning Outcomes                       | LO 1                                     | LO 1,2,3,4:  |
| Questions<br>(All questions compulsory) | Practical chartwork and astro-navigation | Seamanship, meteorology, communications and sailings |
| TOTAL                                   | 150 marks                                | 150 marks  |

### 3.4 Assessment in Grade 12

In Grade 12, assessment consists of two components: a Programme of Assessment which makes up 25% of the totals mark for Nautical Science and external assessment which makes up the remaining 75%. The Programme of Assessment for Nautical Science comprises six (6) tasks, which are internally assessed. The external assessment component includes two written papers making up the remaining 75%. The external assessment tasks are externally set and moderated.

| GRADE 12 PROGRAMME OF ASSESSMENT (400 marks)  |   |
|---|---|
| ASSESSMENT TASKS  | END –OF-YEAR ASSESSMENT   |
| 25% (100 marks)   | EXAM PAPER 75% (300 marks)  |
| <ul style="list-style-type: none"> <li>• 2 tests</li> <li>• 2 exams (mid year and preliminary exam)</li> <li>• 2 other tasks</li> </ul> | <ul style="list-style-type: none"> <li>• Two Written examinations LO 1 – 4</li> </ul> |

### Grade 12

| TERM 1  | TERM 2   | TERM 3   | TERM 4   |
|---|--|--|--|
| Task 1: Test<br>LO 1 Navigation<br>50 marks                                 | Task 3: Research Task<br>Environmental Challenges<br>50 marks  | Task 5: Test<br>LO 2 – 4<br>50 marks   | Task 7: Exam<br>Paper 1 LO<br>1 Practical<br>Navigation 150<br>marks |
| Task 2: Practical<br>Assignment:<br>Astro navigation<br>problem<br>50 marks | Task 4: Midyear exam<br>Paper 1 LO 1 Practical<br>Navigation 150 marks<br>Paper 2 Theory LO 2,3,4<br>150 marks | Task 6: Preliminary<br>examination<br>Exam<br>Paper 1 LO 1 Practical<br>Navigation 150 marks<br>Paper 2 Theory LO 2,3,4<br>150 marks | Paper 2 Theory LO<br>2,3,4<br>150 marks                              |
| 100 marks   | 350 marks  | 350 marks  | 300 marks  |
| 800 marks divided by 8 = 100 marks  |  |  |  |

#### 3.4.1 Programme of Assessment for Grade 12

The Programme of Assessment for Nautical Science in Grade 12 comprises 6 tasks, which are internally assessed. Of the six tasks, two are examinations and two are tests.

##### *Tasks*

The remaining two tasks consist of different forms such as an assignment or a research task. The teacher can decide what type of assignments to use from the following list: Practical exercises, demonstrations, visual sessions, site excursions, presentations, interviews or case studies. See Appendix A for examples of research projects and assignments.

##### *Tests*

The suggested outline for tests is as follows:

- Minimum of 50 marks
- Duration: 1 hour
- Questions at different cognitive levels

Each test and examination must cater for a range of cognitive levels and abilities of learners. See Appendix B for Bloom's Taxonomy of cognitive levels

The following is used as a guide to compile tasks and examination questions encompassing the different cognitive levels:

| COGNITIVE LEVEL                    | PERCENTAGE | MARKS |
|------------------------------------|------------|-------|
| Knowledge                          | 30         | 90    |
| Comprehension                      | 20         | 60    |
| Application                        | 30         | 90    |
| Analysis, evaluation and synthesis | 20         | 60    |
| TOTAL                              | 100        | 300   |

### 3.4.2 Examinations in Grades 12

In Grade 12 the two three-hour mid year and preliminary examination papers should test the knowledge and skills covered in the four Nautical Science Learning Outcomes. The preparatory examinations need to be closely related to the final examination in terms of time allocation, layout of paper and mark allocations. The final examination may examine learners on material from Grade 10, 11 and 12. At least 30% of the examination paper should be drawn from the Grade 10 and 11 curriculum.

The examination mark, which is the raw score in June and September must be used for the calculation of the internal assessment mark for promotion purposes.

The following table suggests the outline for examinations in Grades 12.

|   | MARKS                                     |  |
|---|---|--|
|   | PAPER 1                                   | PAPER 2  |
| Time                                    | 3 hours                                   | 3 hours  |
| Marks                                   | 150 marks                                 | 150 marks  |
| Learning Outcomes                       | LO 1                                      | LO 1,2,3,4   |
| Questions<br>(All questions compulsory) | Practical navigation and astro-navigation | Seamanship, meteorology and communication and sailings |
| TOTAL                                   | 150 marks                                 | 150 marks  |

### 3.5 Promotion

For promotion and certification purposes learners should achieve at least a level 2 rating (elementary achievement: 30 – 39%) in Nautical Science. This is subject to the requirement that a learner must achieve at least a level 3 rating (Moderate Achievement: 40 – 49%) in at least one of the three choice subjects.

### 3.6 Moderation of assessment

Moderation ensures the validity of assessment instruments, the fairness of the assessment processes and the reliability of assessment decisions by all assessors according to agreed standards. Moderation standards must be transparent and thus set before teaching, learning and assessment begins.

All Grade 10 and 11 tasks are internally moderated within the school, while all Grade 12 tasks need to be internally and externally moderated. The subject head for Nautical Science or any other head of Department at the school will generally manage the process. The assessment of this task will be carried out using an assessment rubric.

### 3.6.1 Internal Moderation

As part of its school assessment policy, each school should have an internal moderation policy. Internal moderation must ensure that school-based assessment is consistent, accurate and well designed. Transparency in the methods used is of the utmost importance. Moderation methods will include face moderation, moderation of practical activities, moderation of products, script or portfolio moderation. Performance assessment work must be face moderated. Care must be taken in group work that the distribution of marks / rating codes can be correlated with that of the written work for the group.

### 3.6.2 External Moderation

As part of the national assessment policy, each province should have an external moderation policy. External moderation must ensure that school-based assessment is consistent, accurate and well designed. Criteria must be drawn up by the relevant moderators, prior to the commencement of moderation. Transparency in the methods used is of the utmost importance. Portfolios of those learners whose progression is questioned during the year, should be made available to the Curriculum Advisor/ District Officers.

### 3.6.3 Portfolios

Two types of portfolios are required:

**The educator's portfolio** contains the Learning Programme (Subject Framework, Work Schedule and Lesson Plans), all the instructions and assessment criteria, marking memoranda and rubrics pertaining to all the internal assessment tasks set for the learners as well as attendance registers, and interventions.

**The learner's portfolio** may be described as a purposeful, accumulated body of work produced by the learner, providing evidence of learning and growth, which supports an educator's assessment of the learner's progress towards or attainment of the required learning outcomes. The learner portfolio contains the evidence of the formal assessments that are used to calculate the learner's internal assessment mark e.g. research tasks, tests, examinations, assignments and projects. Informal assessment activities may be kept in the portfolio but should be separated from the formal assessment, which should be easy to locate in the portfolio for moderation purposes.

Learners' portfolios should be located in the most appropriate form for Nautical Science. The pieces of evidence may be stored in files, folders, boxes, binders, exercise books, notebooks or a combination of these.

It is important that the evidence collected is sufficient and reflects current competence. The learner and assessor may plan the portfolio jointly. The learner is responsible for submitting the evidence and the compilation of the portfolio. The portfolio must consist of a variety of assessment instruments and tools, e.g. assessment grid, rubrics, marking memoranda, checklists, rating scales etc Assessment methods and instruments must be selected according to competencies to be assessed.

## APPENDIX A

### IDEAS FOR ASSIGNMENTS AND RESEARCH TASKS

|               |  |
|---------------|--|
| Grade 12 LO 2 | As a group, conduct research into the effects of pollution caused by ships on the environment of one of the following: oil, waste disposal, ballast water or dangerous cargo. Find out how the pollution is caused, the effect and possible preventative measures. Decide who the stakeholders are e.g. ship owner, ship's captain, environmental watch group, government official for the environment etc. Work out and present a role-play to the class of a debate or meeting between these role players where each presents their point of view.<br>Write a report on the debate and place in your portfolio |
| Grade 10 LO 2 | Draw up a poster to entice young school or university leavers to join the navy   |
| Grade 11 LO 2 | Design an interview for a ship's captain to explain on radio the responsibilities, training, advantages and disadvantages of a career at sea.<br>Either interview a real person or answer the questions yourself from information sourced from books or Internet.  |
| Grade 10 LO 2 | Design and build a model of a ship using recycled materials, clay, wood, cardboard or any suitable materials   |
| Grade 11 LO 2 | In a group plan a scenario of an emergency at sea. Act out the causes and procedures for dealing with the emergency.   |
| Grade 10 LO 1 | Plan a coastal voyage between two geographical points  |
| Grade 12 LO 3 | Write a weather report of a very bad tropical cyclone to be read on radio explaining the weather conditions and the effect they are likely to have on land and at sea  |
| Grade 10 LO 4 | Create a comparison table that identifies the strengths and weaknesses of the various methods of communicating at sea.   |
| Grade 12 LO 4 | You have to motivate to parliament for funds for the Global maritime Distress and Safety System. Write a speech explaining how the system works and why it is important.   |

**APPENDIX B**  
**BLOOM'S TAXONOMY**

The following cognitive levels should be taken into consideration when designing assessment tasks, tests and examinations to allow for differentiation.

| <b>LEVEL 1</b>  | <b>LEVEL 2</b>   | <b>LEVEL 3</b>  | <b>LEVEL 4</b>  | <b>LEVEL 5</b>   | <b>LEVEL 6</b>  |
|---|--|---|---|--|---|
| Knowledge   | Understanding  | Application   | Analysis  | Synthesis  | Evaluation  |
| define<br>describe<br>identify<br>label<br>locate<br>name<br>recognise<br>select<br>state | compare<br>define<br>describe<br>distinguish<br>explain<br>generalise<br>illustrate<br>infer<br>interpret<br>match<br>paraphrase<br>restate<br>select<br>summarise | adapt<br>compute<br>discover<br>draw<br>gather<br>graph<br>modify<br>operate<br>prepare<br>revise<br>show<br>solve<br>survey<br>use | categorise<br>classify<br>compare<br>contrast<br>decipher<br>deduce<br>differentiate<br>distinguish<br>explain<br>generalise<br>infer<br>predict<br>relate<br>solve | combine<br>compose<br>create<br>depict<br>design<br>develop<br>incorporate<br>integrate<br>invent<br>organise<br>plan<br>predict<br>produce<br>structure | appraise<br>critique<br>decide<br>evaluate<br>judge<br>justify<br>recommend |

## APPENDIX C RESEARCH PROJECTS

These may be done individually, in pairs or in groups not larger than four. They may include a practical and/or oral presentation, but must be accompanied by a written presentation.

Generic skills needed to be developed and assessed from Grades 10 to 12.

| <b>Cognitive/thinking skills<br/>Bloom's categories</b>                          | <b>Motor/Process skills</b>   | <b>Life skills</b>   |
|--|---|--|
| Knowledge<br>Comprehension<br>Application<br>Analysis<br>Synthesis<br>Evaluation | Follow instructions<br>Designing procedures/action plan<br>Access information from various sources<br>Observational skills<br>Writing skills<br>Drawing conclusions | Ability to work in groups<br>Ability to work independently<br>Creativity, initiative, interest, attitude<br>Managerial skills; ability to plan/organize/divide tasks/ time management<br>Communication skills: report back - oral skills |

To develop skills in doing projects and assignments, the teacher should develop learners from Grade 10 by guiding the process step by step. By the time learners are in Grade 12, they must be able to do projects independently due to the time factor.

When giving a project in Grade 10 and 11:

1. The educator gives the topic and negotiates the steps and time frames with the learners.
2. Brainstorm the topic together. Discuss the action plan and procedures - where and how to get information.
3. Collect information relevant to the topic. Use textbooks, encyclopaedias, interviews, magazines, newspapers, etc. Learners must understand and know terminology/content.
4. Divide the topic into smaller steps. Allocate tasks, timeframes and marks. Plan who will assess and develop the assessment instrument.

Projects should be a maximum of 2000 words (about 6 handwritten pages or 4 typed pages) for with 12 font, single-spaced, bound or stapled and should include:

- A front page
- Table of contents
- Text divided into paragraphs
- References of sources
- Pictures/ photos/ diagrams/ graphs

A standardised marking scheme would imply that when a particular skill is being assessed, all educators follow the same criteria, and standards would be more comparable.

### Penalties

- While learners are encouraged to use the Internet as a resource tool, plagiarized work should earn a zero. This applies to materials plagiarized from books and other media.
- Late submission of work should be penalised at the rate of 10% of the marks per day unless permission is granted by the educator prior to the submission date or on the presentation of a doctor's certificate.

| <b>Exemplar of an Assessment of a Research Project using marks</b>  |        |                |
|---|--------|----------------|
| Candidate: _____ Assessor _____   |        |                |
| School _____ Date _____   |        |                |
| Assessment Criteria   | Rating | Possible total |
| <b>Content &amp; Topic:</b><br>Level of information – detailed relevant, informed<br>Variety of Sources – varied, bibliography<br>Topic – challenging, original |        | 20             |
| <b>Interpretation:</b><br>Creative and insightful use of the information that shows a good understanding of the topic   |        | 20             |
| <b>Use of Language:</b><br>Personalised, fluent, articulate, clear  |        | 20             |
| <b>Aims &amp; Conclusion:</b><br>Successfully addresses the objectives set out in the topic<br>Brings the essay to a successful conclusion                      |        | 20             |
| <b>Accuracy:</b><br>Of information and grammar  |        | 10             |
| <b>Presentation:</b><br>Neat, ordered lay out, type, effort, clarity, illustrations – useful, necessary   |        | 10             |
| <b>Total</b>  |        | <b>100</b>     |
| <b>Comments:</b>  |        |                |

#### Alternatively Levels of Achievement which could be converted into marks

| KEY | DESCRIPTION  |
|-----|--|
| 1   | Not Yet  |
| 2   | Very superficial, disorganised, lacking insight  |
| 3   | Completely descriptive, superficial, lacking in detail, missing the focus of the assignment        |
| 4   | Slightly more descriptive than critical and answered with understanding, analysis vague at places, |
| 5   | Good critical and concept analysis, focused work   |
| 6   | Excellent critical and concept analysis, stays very focused  |
| 7   | Beyond expectation   |

**APPENDIX D:  
EXAMPLES OF DAILY ASSESSMENT TASKS**

**Example 1**

Grade 11 Learning Outcome 1: Navigation: Sailings

You are the navigator aboard the MV SOUTHERN STAR which is busy loading cargo in Cape Town (33° 54' S 18° 25' E), bound for Baltimore (39° 16' N 76° 34' W). Your vessel is due to sail at 0700 B on 7 June and you hope to maintain a steady speed of 16 knots.

Determine:

- a. By Mercator sailing, the course you must steer and the distance you will cover between Cape Town and Baltimore. (12)
- b. Your estimated time of arrival in Baltimore in American zone time. (8)

| <u>Latitude</u> | <u>Meridional Parts</u> |
|-----------------|-------------------------|
| 33° 54'         | 2151.19                 |
| 39° 16'         | 2550.74                 |

**Memorandum**

|                |                  |                    |                        |
|----------------|------------------|--------------------|------------------------|
| Cape Town Lat: | 33° 54' S        | mp: 2151.19        | Long: 18° 25' E        |
| Baltimore Lat: | <u>39° 16' N</u> | mp: <u>2550.74</u> | Long: <u>76° 34' W</u> |
| D.Lat:         | 73° 10' N        | dmp: 4701.93       | D.Long: 94° 59' W      |
|                | 4390' N          |                    | 5699' W                |

|            |   |                         |
|------------|---|-------------------------|
| Tan course | = | D.long/dmp              |
|            | = | 5699/4701.93            |
|            | = | 1.212055475             |
| Course     | = | N 50.5° W (50° 28' 33") |
|            | = | 309.5° (T)              |

|          |   |                       |
|----------|---|-----------------------|
| Distance | = | D.lat/cos course      |
|          | = | 4390/cos 50° 28' 33"  |
|          | = | 6898.1 nautical miles |

(12)

|      |   |                            |
|------|---|----------------------------|
| Time | = | Distance/ speed            |
|      | = | 6898.1/16                  |
|      | = | 431.13 hours               |
|      | = | 17 days 23 hours 8 minutes |

|               |   |               |
|---------------|---|---------------|
| ETD Cape Town | = | 070700 B June |
| Zone (-2)     | = | <u>000200</u> |
| ETD (GMT)     | = | 070500 Z June |
| Sailing time  | = | <u>172308</u> |
| ETA (GMT)     | = | 250408 Z June |
| Zone (+5)     | = | <u>000500</u> |
| ETA Baltimore | = | 242308 R June |

(8)

**Method of assessment:** Teacher, peer or self assessment**Assessment tool:** Memorandum

**Example 2****Grade 11 Learning Outcome 2 Seamanship : Emergency procedures**

You are officer of the watch aboard MV STARLIGHT. You are sailing on a course of 270° (T) at a speed of 16 knots. There are a number of other vessels within 5 miles of you. The lookout reports “Man overboard starboard side”. List the actions you will carry out in the order of importance.

(11)

**Memorandum**

1. Put the helm hard over to starboard.
2. Launch a lifebuoy with automatic smoke/light generator over the starboard side.
3. Detail the bridge lookout and any other spare hand on the bridge to keep the lifebuoy in sight.
4. Mark your position on the chart.
5. Sound three short blasts on the ship’s siren.
6. Hoist flag OSCAR.
7. Reduce speed (to 5 knots).
8. Inform
  - The captain.
  - The engine room.
  - The ship’s company via the ship’s broadcast system.
9. Carry out a Williamson turn and steady up on 090° (T) (the reciprocal of your initial course).
10. Order the bosun to prepare the seaboat for launching.
11. Stop upwind of the man and launch the seaboat.

(11)

**Method of assessment:** Teacher, peer or self assessment

**Assessment tool:** Memorandum

**APPENDIX E**  
**EXAMPLE OF A FORMAL ASSESSMENT TASK**

**Grade 12: Astro Calculation and Plotting Task**

**Navigation : Sun-run-Mer Alt-run-Sun**

On 1 November in DR position  $46^{\circ} 00' S$   $56^{\circ} 24.0' E$ , you take an altitude of the lower limb of the sun at 0830 D. The sextant reads  $36^{\circ} 18.0'$ . The index error of the sextant is  $2.4'$  off the arc whilst the height of eye on the bridge is 9 metres. Your course is  $120^{\circ}$  (T) and your speed is 20 knots.

Determine the bearing and intercept of the sun and plot the resultant position line on the chart.

At meridian passage of the sun later that day, another altitude of the sun's lower limb is taken with the sextant reading  $57^{\circ} 40.8'$ . The index error and height of eye remain the same.

Plot the course of the ship since 0830 D, calculate the DR position at meridian passage and plot it on the chart..

Determine the ship's latitude at meridian passage, transfer the 0830 position line and plot the resultant fix.

At 1530 D that afternoon, you take a third altitude of the sun's lower limb, with the sextant reading  $33^{\circ} 13.2'$ . Index error and height of eye remain unchanged.

Plot the ship's course from the midday fix, calculate the DR position of the ship at 1530 D and plot it on the chart.

Determine the bearing and intercept of the sun and plot the resultant position line on the chart. Transfer the midday position line and plot the ship's position at 1530 D.

Allocation of marks for plotting: 21

Allocation of marks for calculations : 75

**Memorandum**

Zone time = 0830 D

Zone (-4) = 0400

GMT = 0430 Z

GHA (0800) =  $244^{\circ} 06'$

Increment =  $7^{\circ} 30'$

GHA (0830) =  $251^{\circ} 36'$

Long (E) =  $56^{\circ} 24'$

LHA =  $308^{\circ} 00'$

Dec =  $S 14^{\circ} 25.3'$

'd' =  $+ 0.4'$  (0.8')

Dec =  $S 14^{\circ} 25.7'$

Sin Cal Alt =  $\cos 308^{\circ} \times \cos 46^{\circ} \times \cos 14^{\circ} 25' 42'' + \sin 46^{\circ} \times \sin 14^{\circ} 25' 42''$

= 0.59342263

Cal Alt =  $36^{\circ} 24' (36^{\circ} 24' 01'')$

Sext alt =  $36^{\circ} 18.0'$

A = 0.81 N

IE =  $+ 2.4'$

B = 0.33 S

Obs alt =  $36^{\circ} 20.4'$

C = 0.48 N

|               |   |                   |          |   |           |
|---------------|---|-------------------|----------|---|-----------|
| Dip           | = | <u>- 5.3'</u>     | Az       | = | N 71.6° E |
| App alt       | = | 36° 15.1'         | True brg | = | 071½° (T) |
| Total correct | = | <u>+ 14.9'</u>    |          |   |           |
| True alt      | = | 36° 30.0'         |          |   |           |
| Cal Alt       | = | <u>36° 24.0'</u>  |          |   |           |
| Intercept     | = | 6.0 miles towards |          |   |           |

|              |   |             |
|--------------|---|-------------|
| LMT mer pass | = | 1144        |
| Long (E)     | = | <u>0351</u> |
| GMT          | = | 0753 Z      |
| Zone (-4)    | = | <u>0400</u> |
| Zone time    | = | 1153 D      |

DR position at mer pass = 46° 32.5' S 57° 45' E

|               |   |                |     |   |               |
|---------------|---|----------------|-----|---|---------------|
| Sext alt      | = | 57° 40.8'      | Dec | = | S 14° 27.7'   |
| IE            | = | <u>+ 2.4'</u>  | 'd' | = | <u>+ 0.7'</u> |
| Obs alt       | = | 57° 43.2'      | Dec | = | S 14° 28.4'   |
| Dip           | = | <u>- 5.3'</u>  |     |   |               |
| App alt       | = | 57° 37.9'      |     |   |               |
| Total correct | = | <u>+ 15.5'</u> |     |   |               |
| True alt      | = | 57° 53.4'      |     |   |               |

|          |   |                  |
|----------|---|------------------|
| ZX       | = | 90° - 57° 53.4'  |
|          | = | 32° 06.6'        |
| Dec      | = | <u>14° 28.4'</u> |
| Latitude | = | 46° 35' S        |

Position at 1153 D = 46° 35' S 57° 58.5' E

DR position at 1530 D = 46° 11.8' S 59° 31.6' E

|           |   |             |
|-----------|---|-------------|
| Zone time | = | 1530 D      |
| Zone (-4) | = | <u>0400</u> |
| GMT       | = | 1130 Z      |

|            |   |                   |     |   |                      |
|------------|---|-------------------|-----|---|----------------------|
| GHA (0800) | = | 349° 06.1         | Dec | = | S 14° 30.9'          |
| Increment  | = | <u>7° 30'</u>     | 'd' | = | <u>+ 0.4'</u> (0.8') |
| GHA (0830) | = | 356° 36.1'        | Dec | = | S 14° 31.3'          |
| Long (E)   | = | <u>59° 31.6'</u>  |     |   |                      |
| LHA        | = | 416° 07.7'        |     |   |                      |
|            | = | <u>360° 00.0'</u> |     |   |                      |
|            | = | 56° 07.7'         |     |   |                      |

Sin Cal Alt = Cos 56° 07.7' x Cos 47° 11' 48" x Cos 14° 31' 18" + Sin 47° 11' 48" x  
 Sin 14° 31' 18"  
 = 0.550664217  
 Cal Alt = 33° 24.7' (33° 24' 45")

|          |   |               |   |   |               |
|----------|---|---------------|---|---|---------------|
| Sext alt | = | 33° 13.2'     | A | = | 0.72 N        |
| IE       | = | <u>+ 2.4'</u> | B | = | <u>0.31 S</u> |
| Obs alt  | = | 33° 15.6'     | C | = | 0.41 N        |

|               |   |                   |          |   |            |
|---------------|---|-------------------|----------|---|------------|
| Dip           | = | <u>- 5.3'</u>     | Az       | = | N 74.4° W  |
| App alt       | = | 33° 10.3'         | True brg | = | 285.6° (T) |
| Total correct | = | <u>+ 14.8'</u>    |          |   |            |
| True alt      | = | 33° 25.1'         |          |   |            |
| Cal Alt       | = | <u>33° 24.7'</u>  |          |   |            |
| Intercept     | = | 0.4 miles towards |          |   |            |

Position at 1530 D = 47° 12' S 59° 30.1' E

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**APPENDIX F**  
**ASSESSMENT TERMINOLOGY**  
 From Department of Education  
 20 04 06

| TERMINOLOGY   | EXAMPLES   |
|---|--|
| Types of assessment (X4)  | Formative assessment, Summative assessment, Baseline assessment and Diagnostic assessment  |
| Methods of assessment – <i>i.e. who is carrying out the assessment</i> (X4) | Teacher assessment, Self-assessment, Peer assessment and Group assessment  |
| Methods of collecting evidence (X3)   | Observation-based assessment, Test-based assessment and Task-based assessment  |
| Forms of Assessment   | Assignment, Aural test, Case study, Examinations, Multiple response questions, Demonstrations, Role plays, etc.                              |
| Tools for assessing learner performance                                     | Rubrics, Rating scales, Checklists, Observation sheets, Marking memoranda, Assessment grids, etc.  |
| Recording tools   | Class list, Mark sheet, Promotion schedule, etc.   |
| Reporting tools   | Report card using competence descriptions, Teacher-parent interview, Teacher-learner interview, Written comments in learner work books, etc. |

- Assessment:** Gathering of evidence to make a judgement or describe the status of learning of an individual or group.
- Assessment for learning:** Formative or diagnostic assessment, which aims to monitor and improve the teaching and learning process.
- Assessment of learning:** Assessment which serves as a basis for documenting the extent to which the learner mastered the learning outcomes for the unit of study / work. Assessment for the purposes of promotion and certification.
- Assessment form:** Refers to the kind of assessment instrument used in relation to the learning outcomes. A variety of assessment forms are used to ensure a fair assessment process.
- Assessment method:** Refers to the activity that an assessor engages in, as he/she assesses a learner and the learner's work.
- Assessment instrument:** Refers to the nature of the assessment task or activity given to the learner to do as well as the relevant criteria used to assess the learner's performance.
- Day-by-day Assessment:** It is a problem-solving exercise done in class with clear guidelines and of specified length. Assignments are less open-ended than projects.
- Fairness:** An assessment should not in any way hinder or advantage a learner.
- Learner Portfolio:** Collection of different types of evidence, which relates to work being assessed.
- Performance Assessment** A task based on problem solving involving investigation designing , making , evaluating and communicating. The this task in done over a period of time. The essential focus of this task is to test practical competency practical; the work being carried out under supervision of the educator.

|                                 |  |
|---------------------------------|--|
| <b>Recording:</b>               | Recording involves the detailed record keeping of a learner's performance to monitor the learner's progress and to work out methods that can improve the learner's development.  |
| <b>Reporting:</b>               | This involves presenting information about the learner to the learner and his / her parents / guardian. This information is selected from the teacher's records and is presented in such a way that it reflects the learner's progress in achieving the required outcomes. |
| <b>Reliability:</b>             | Reliability in assessment is about consistency. Consistency refers to the same judgement being made in the same, or similar contexts each time a particular assessment for specified stated intentions is administered.  |
| <b>School-based Assessment:</b> | Schools internally assess learning continuously / on an ongoing basis.   |
| <b>Educator's portfolio:</b>    | contains all the instructions and assessment criteria and rubrics pertaining to all the internal assessment tasks set for the learners.  |
| <b>Validity:</b>                | Assessment procedures, methods, instruments and materials have to match what is being assessed.  |