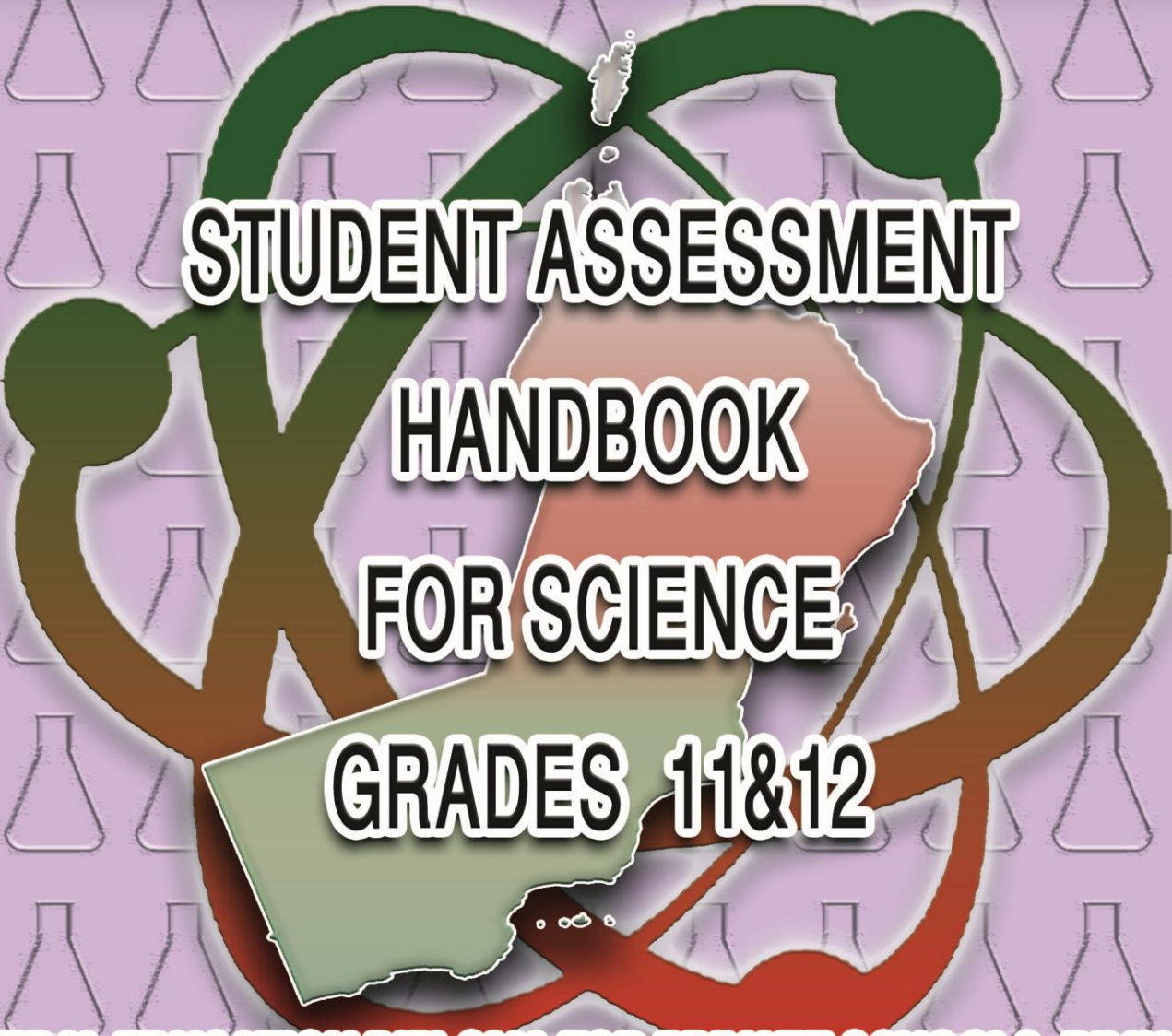




Sultanate of Oman

Ministry of Education

Directorate - General of Educational Evaluation

A map of Oman is centered on the page, overlaid with a thick, green, stylized ribbon that loops around the map. The ribbon has a gradient from green to brown. The background of the central section is light purple with a repeating pattern of laboratory flasks.

**STUDENT ASSESSMENT  
HANDBOOK  
FOR SCIENCE  
GRADES 11&12**

**GENERAL EDUCATION DIPLOMA FOR PRIVATE SCHOOLS (BILINGUAL)**

**Trial Edition 2011/2012**

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## **A. INTRODUCTION**

This ‘Student Assessment Handbook’ (SAH) is based on the official guidelines for assessment issued by the Directorate-General of Educational Evaluation (DGEE) of the Ministry of Education to provide information and guidance for teachers and supervisors on the assessment of students studying Science in Grades 11 & 12.

## **B. GENERAL NOTE ON CONTINUOUS ASSESSMENT**

Continuous Assessment (CA) includes a range of different assessment techniques which can be used in the classroom to gather information about student’s learning.

Summative assessment is assessment of student’s learning, with the aim of providing evidence for reporting to parents and others. Its purpose is to measure standards.

Formative assessment is assessment for learning, with the aim of helping students to achieve the relevant learning outcomes. Its purpose is to improve standards.

Both summative and formative assessments are important and valuable; neither should be neglected.

## **C. THE BENEFITS OF CONTINUOUS ASSESSMENT**

The most important ways in which Continuous Assessment (CA) can be beneficial are:

- It is based on a positive view of assessment as a natural part of the teaching-learning process.
- It allows assessment of learning outcomes which are, for practical reasons, difficult to assess by means of formal testing.
- It can provide a fairer, more balanced picture of student’s achievement, especially for those who become nervous during formal tests.
- It provides information about student’s learning at an early stage, making it possible for action to be taken promptly, while the academic year is still in progress.
- It encourages teachers to have good idea about the performance of all their students and to closely observe individual student’s on-going progress and development.

- It (possibly) motivates students to work hard consistently, if they know that their everyday work in class contributes to their report card assessment.

## **D. Tools & Techniques for Continuous Assessment**

This Section provides further information and explanation regarding the various tools and techniques, which can be used for assessment purposes in science during the semester:

### **i. Homework**

Homework MUST:

- Be related to the curriculum outcomes.
- **Be assessed twice per semester**. The average mark of the assessed homework is taken into account. The teacher must not consider the highest mark only.
- Prepared by the teacher.
- Contain extended questions that vary between knowledge & understanding, application and reasoning questions.
- Cater for the different needs and different levels of the students.
- The teacher should take the following into account:
  - Assess every time a group of students with different learning levels of extended questions.
  - Follow up homework regularly and give feedback on time.
  - It is advisable to include homework in the scheme of the work.

### **ii. Short tests**

*The following criteria must be taken in to consideration while preparing the short tests:*

1. There will be two short tests in each semester; each one worth 10 marks. For Grade 12 the average of these tests must be taken at the end of the semester, while for Grade 11 the sum is counted to be 20 marks.
2. The teacher should inform the student about the date of the test.
3. The short test must be short lasting no more than 20 minutes.

4. The test must be set according to the approved curriculum outcomes.
5. The test must cover different units or chapters (this is to ensure that each course topic is tested over time).
6. Each short test must consist of two parts: (40% Multiple-choice items and 60% Extended response items).
  - Question 1: (Multiple choices) consists of 4 items each worth one mark.
  - Question 2: (Extended response) consists of minimum two parts worth 6 marks in total.
7. All short tests must reflect different learning levels (30% Knowledge, 50% application, 20% reasoning) and these level domains will be in details in the following tables.

Knowledge		
1.	Recall/ Recognize	Make or identify accurate statements about science facts, relationships, processes, and concepts; identify the characteristics or properties of specific organisms, materials, and processes.
2.	Define	Provide or identify definitions of scientific terms; recognize and use scientific vocabulary, symbols, abbreviations, units, and scales in relevant contexts.
3.	Describe	Describe organisms, physical materials, and science processes that demonstrate knowledge of properties, structure, function, and relationships.
4.	Illustrate with Examples	Support or clarify statements of facts or concepts with appropriate examples; identify or provide specific examples to illustrate knowledge of general concepts.
5.	Demonstrate knowledge of scientific instruments	Demonstrate knowledge of how to use science apparatus, equipment, tools, measurement devices, and scales.

Applying		
1.	Compare/ Contrast/ Classify	Identify or describe similarities and differences between groups of organisms, materials, or processes; distinguish, classify, or order individual objects, materials, organisms, and processes based on given characteristics and properties.
2.	Use Models	Use a diagram or model to demonstrate understanding of a science concept, structure, relationship, process, or biological or physical system or cycle (e.g., food web, electrical circuit, water cycle, solar system, atomic structure).
3.	Relate	Relate knowledge of an underlying biological or physical concept to an observed or inferred property, behavior, or use of objects, organisms, or materials.
4.	Interpret Information	Interpret relevant textual, tabular, or graphical information in light of a science concept or principle.
5.	Find Solutions	Identify or use a science relationship, equations, or formulas to find a qualitative or quantitative solution involving the direct application/demonstration of a concept.
6.	Explain	Provide or identify an explanation for an observation or natural phenomenon, demonstrating understanding of the underlying science concept, principle, law, or theory.

Reasoning		
1.	Analyze	Analyze problems to determine the relevant relationships, concepts, and problem-solving steps; develop and explain problem-solving strategies.
2.	Integrate/ Synthesize	Provide solutions to problems that require consideration of a number of different factors or related concepts; make associations or connections between concepts in different areas of science; demonstrate understanding of unified concepts and themes across the domains of science; integrate mathematical concepts or procedures in the solutions to science problems.

3.	Hypothesize/ Predict	Combine knowledge of science concepts with information from experience or observation to formulate questions that can be answered by investigation; formulate hypotheses as testable assumptions using knowledge from observation and/or analysis of scientific information and conceptual understanding; make predictions about the effects of changes in biological or physical conditions in light of evidence and scientific understanding.
4.	Design	Design or plan investigations appropriate for answering scientific questions or testing hypotheses; describe or recognize the characteristics of well-designed investigations in terms of variables to be measured and controlled and cause-and-effect relationships; make decisions about measurements or procedures to be use in conducting investigations.
5.	Draw Conclusions	Detect patterns in data, describe or summarize data trends, and interpolate or extrapolate from data or given information; make valid inferences on the basis of evidence and/or understanding of science concepts; draw appropriate conclusions that address questions or hypotheses, and demonstrate understanding of cause and effect.
6.	Generalize	Make general conclusions that go beyond the experimental or given conditions, and apply those conclusions to new situations; determine general formulas for expressing physical relationships.
7.	Evaluate	Weigh advantages and disadvantages to make decisions about alternative processes, materials, and sources; consider scientific and social factors to evaluate the impact of science and technology on biological and physical systems; evaluate alternative explanations and problem-solving strategies and solutions; evaluate results of investigations with respect to sufficiency of data to support conclusions.

8. It is prohibited to repeat any test to any students without an official excuse.

9. The answer key must be prepared for each test as follows:

The Question	The item	The answer	learning levels			Objective number
			Knowledge	Application	reasoning	
<b>First question</b> Multiple choices <b>(4 marks)</b>	1					
	2					
	3					
	4					
<b>Second question</b> Extended response <b>(6 marks)</b> (This question could be divided into two or more sub-questions)	QA	1				
		2				
		...				
	QB	1				
		2				
		...				
<b>Total (10 marks)</b>			<b>3</b>	<b>5</b>	<b>2</b>	

9- The questions must not be repeated literally in any other written assignment tools.

10- Note the following instructions carefully:

- Prepare at least one sample of the test, if the number of the students in the class is  $\leq 10$ .
- Prepare at least two samples of tests, if the number of the students in the class is between 11 and 20.
- Prepare at least three samples of tests, if the number of the students in the class is  $> 20$ .

iii. *Practical work:*

It is divided into two main parts:

a) Practical activity ( 10 marks)

Practical activity with the following specifications:

1. Assess the student's performance during the practical activity either pair or among group **(worth 10 marks for grade 11 and 12)**. The groups and the student's roles in the experiment should be changed during the semester.
2. Assess the students twice a semester.
3. Teacher should use the following practical activity chart in order to assess each student in the group twice a semester and take the average of the two assessment..
4. The student should write a brief report taking into account the following points:
  - Title of the practical activity
  - Introduction
  - Aim or purpose
  - Procedure
  - Observations & Results
  - Discussion
  - Conclusion
5. The teacher should provide the students with the criteria of the practical evaluation.

## PRACTICAL ACTIVITY ASSESSMENT FORM

School's Name:		Grade:	
Experiment's No.:		Date:	
Experiment's Title:			
No.	Student's name		
1			
2			
3			
4			

Abilities	Skills	Mark	Stu. 1	Stu. 2	Stu. 3	Stu. 4
Initiating & Planning	Understand the meaning of the aim or scientific question.	1				
	Predict the results of the practical work.	1				
Exploring & Recording	Consideration of the safety precautions when dealing with the tools and laboratory materials.	1				
	Follow the steps of the practical activity: step by step.	1				
	Observe & record the variations that occur during the practical work.	1				
Analyzing & Interpreting	Analyze the results that collected during the practical work.	1				
	Interpretation of the results of the practical work in a scientific way	1				
	To solve a problem or to find some relationships, conclusions and generalizations	1				
Communicating & Teamwork	Communicate with colleagues during the implementation of the practical work.	1				
	Providing solutions and proposals to overcome the difficulties	1				
Total		10				

## b) Formal Lab Report

This is a general format of the formal lab reports for the science subjects: Physics, Chemistry, and Biology. The report format and its basic components could be modified according to the nature of the experiment within the subject. It should contain:

**1. Title Page:** contains the following information which is advised to be in cover page:

- School's Name
- Title of Experiment
- Student's name
- Subject's Name (Phys., Chem., or Bio.)
- Teacher's name
- Date of submission (not the deadline)

**2. Introduction:** Contains the following specific items:

- Background information of the work, including important equations (**Omit** this part if there are none)
- Scientific Concepts related to the work.
- Hypothesis: Predict the results of the experiment, and must be in "if...then" format. (Optional for this level).
- Important equations( if exist)

**3. Aim or purpose** (This gives the objective of the experiment):

- What concept or skill was highlighted by this practical work?
- What is going to be investigated in this practical work?

**4. Procedure:** Must be in detailed steps written by the student's own words (Student can **OMIT** any part of the following if there are none).

- All materials used during the experiment must be listed.
- All steps must be described.

- Diagrams, drawings or graphs must be included and clearly explained.
- Identify independent and dependent variables.
- Identify other possible variables. How will they be controlled (kept constant).

**5. Observations & Results:** include data, observations, tables, graphs, drawings, etc. depending on the subject and the nature of the experiment. Here, the significance of observations versus the inferences should be stressed by the teacher.

**6. Discussion:** This section should contain the following specific items:

- The analyzed data. Charts, Diagrams, Graphs & drawings.
- Formulae & calculations given and Correct units used.
- Observations related to concept.
- Comparison between the attained results and the theoretical background of the experiment.
- Clear explanations of the results.
- Relate results to daily life (Applications).

**7. Conclusion:** This section should contain the following specific items:

- Relates to the main objective(s)& Shows learning outcomes;
- States a conclusion based on the hypothesis/ purpose (supports or rejects hypothesis)
- Identifies sources of error and explains their effects on results (if any)
- Any suggestions for further experimentations
- Any suggestions for reducing errors
- Student must focus more on the significance of the experiment and results rather than possible errors (omit the part of errors if there are none).

**8. References:** Number of references must not be less than two. One of them must be a scientific book. The formal format of referencing/citing is:

**"Book's title, author's name, year, publisher's name".**

**Example:** "Teacher guide of biology, Mcdougal Littell. (2005), all Int, London".

Internet websites are allowed to be used as resources and their URL must be included in the references. Search engines, such as "google" and "yahoo" are not accepted as references.

There are some specifications which must be followed while carrying out the practical work as well as writing the final report:

- The student must submit one detailed lap report (from the assigned experiments in the syllabus) per semester.
- Lab report should be written in past perfect / passive tense.
- The practical work must be implemented by the students themselves and not just DEMONSTRATED by teacher.
- All pages must be numbered and all figures and equations must be labeled and referred by their labels.
- Sometimes the laboratory work requires cooperation between two or more students, depending either on number of students in the class or on the lab facilities. In this case, practical part may be done in groups working together and sharing responsibility. However, students must gather, record their data and write their reports individually.
- Number of students in one group must not exceed 3.
- The marking scheme is shown in the table below and the total score of the lap report to be recorded in the assessment sheet is out of **5 marks (20/4) for Grades 11 and 12.**
- The mark of the hypothesis (if exists in the student report) should be part of the introduction mark.
- If the report submitted after the deadline, one mark of the final score must be deducted.
- Half of the final mark (50%) must be deducted if there is an evidence of plagiarism.
- The specification of each experiment - including the feedback – has to be attached on the front of the student's report after correction.

*Note that: Not all rubric indicators below must necessarily be used in every experiment. It depends on the components that have been used by the student, whereas the criteria and the marking scheme remains the same.*

## Formal Lab Report's Evaluation Sheet

Student's Name:		Teacher's Name:	
Criteria			Mark
<b>Style</b> (2 marks)	<ul style="list-style-type: none"> <li>• Format: Past Perfect /Passive Tense, Punctuation and Capitalization.</li> <li>• Form: (Title/Students &amp; Teachers name/subject/Date of submission).</li> </ul>		
<b>Introduction</b> (2 marks)	<ul style="list-style-type: none"> <li>• Background information/ Concept related to the work.</li> <li>• Hypothesis (optional for this level)</li> <li>• Important equations( if exist)</li> </ul>		
<b>Purpose /Aim</b> (1 marks)	<ul style="list-style-type: none"> <li>• Clarity &amp; Correctness</li> </ul>		
<b>Procedure</b> (3 marks)	<ul style="list-style-type: none"> <li>• List of the materials</li> <li>• Details of the steps</li> <li>• Identify independent, dependent variables.</li> <li>• Identify other possible variables. How will they be controlled (kept constant).</li> <li>• Diagrams, drawings or graphs</li> </ul>		
<b>Observations &amp; Results</b> (4 marks)	<ul style="list-style-type: none"> <li>• Observation &amp; Data: organized and accurate</li> <li>• Units used consistently</li> <li>• Clear &amp; concise descriptions</li> <li>• Tables/graphs/drawings</li> </ul>		
<b>Discussion</b> (4 marks)	<ul style="list-style-type: none"> <li>• Explain observations, Diagrams, Graphs and drawings related to concept.</li> <li>• Formulae given &amp; calculations. Relate results to daily life.</li> </ul>		
<b>Conclusion</b> (2 marks)	<ul style="list-style-type: none"> <li>• Relates to the main objective(s)&amp; The data is analyzed in an appropriate way, and States a conclusion based on the hypothesis/ purpose (supports or rejects hypothesis)</li> <li>• Identifies sources of error and explains their effects on results (if any)</li> <li>• Gives some suggestions in order to reduce the errors (if any).</li> </ul>		
<b>References</b> (2 marks)	<ul style="list-style-type: none"> <li>• References: use at least two different references written in formal format. One must be a scientific book.</li> </ul>		
<b>Total: 20 marks</b>	<b>Total mark</b>		
<b>Student's Final mark (5) =(total mark)/4</b>			

\* The practical exam will replace the formal lab report next academic year (2012-2013).

Based on recent Ministry of Education assessment procedures, the following specifications should be applied:

- The marks for the whole semester will be as follows:
  1. Continuous assessment: 40% for Grade11 and 30% for Grade12.
  2. End-of- Semester examination: 60% for Grade 11 and 70% for Grade 12.

**End-of-Semester Examination format (60 marks) for Grade11**

1. Question Type:

Question Type	Percentage	Marks
Multiple-Choice	40 %	24
Extended Response	60 %	36
Total	100 %	60

2. Taxonomy (Cognitive Domains):

Level	Knowledge & Understanding	Application	Reasoning
Weighting	30 %	50 %	20 %

**End-of-Semester Examination format (70 marks) For Grade12**

1- Question Type:

Question Type	Percentage	Marks
Multiple-Choice	40 %	28
Extended Response	60 %	42
Total	100 %	70

2- Taxonomy (Cognitive Domains):

Level	Knowledge	Application	Reasoning
Weighting	30 %	50 %	20 %

## The Continuous Assessment Summary Chart For Grades 11 & 12

Grade 11							
Continuous Assessment				Total	Final Exam	TOTAL	GRADE
Homework	Practical work (15 marks)		Short Test				
	Practical Activity	Lab report					
5 marks	10 marks	5marks	20 marks	40 marks	60 marks		
Twice a semester	Twice a semester	Once a semester	Twice a semester		Prepared by the school		

\* \* \* \* \*

Grade 12							
Continuous Assessment				Total	Final Exam	TOTAL	GRADE
Homework	Practical work		Short Test				
	Practical Activity	Lab report					
5 marks	10 marks	5 marks	10 marks	30 marks	70 marks		
Twice a semester	Twice a semester	Once a semester	Twice a semester		Prepared by MOE		

## **E. Moderation**

General Directorate of Private School staff will moderate continuous assessment marks awarded at schools at the end of every Semester. Teachers should allocate a portfolio for each student. The file has to have evidences (student's work) for the given mark for each assessment tools. As well as the student's work, each portfolio should contain details of the task assigned, the marking guide, the marks awarded, and any comments from the teacher. Each portfolio should contain evidence of the task:

- Two models of homework.
- Two models of practical activity assessment form and their experimental reports.
- Two short tests.
- Lab Report.

When visiting the school; the moderator will select at least 6 of student portfolio randomly to moderate. The student's mark will be deducted if there is no evidence for the tool in the portfolio.

## Bio/ Chem/ Phy Assessment Sheet for Grade 11

Subject:.....

Section: .....

Semester: .....

Academic Year: .....

No	Student Name	Continuous Assessment Tools (30)											Total (40)	Final Exam (60)	Total (100)	Grade	
		Homework (5)			Practical Work (15)					Short Tests (20)							
					Practical Activity			Practical Report	Total								
		5	5	Average (5)	10	10	Average (10)			5	15	10					10

Teacher's signature: .....

Principal's signature: .....

Supervisor's signature: .....

## Bio/ Chem/ Phy Assessment Sheet for Grade 12

**Subject :** .....

**Section:** .....

**Semester :** .....

**Academic Year:** .....

No	Student Name	Continuous Assessment Tools (30)											Total (30)	Final Exam (70)	Total (100)	Grade
		Homework (5)			Practical Work (15)					Short Tests (10)						
					Practical Activity			Practical Report	Total							
		5	5	Average (5)	10	10	Average (10)			5	15	10				

**Teacher's signature:** .....

**Principal's signature:** .....

**Supervisor's signature:** .....

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