

**Federal Democratic Republic of Ethiopia
Ministry of Education**

Chemistry Syllabus, Grades 9 and 10

2009

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Introduction

Students need an understanding of chemistry to fully appreciate the complexity and interactions present in their world. Chemistry deals with composition, properties and transformation of substances. The study of chemistry should help the students to increase their analytical and perceptive capabilities and provide opportunity to explore vocations in the field of chemistry. It also provides students with the knowledge and skills in chemistry and technology and enables them to solve problems and make decisions in everyday life based on scientific attitudes and noble values.

To achieve the above mentioned purpose and to cop up with the current demands of chemical knowledge for technological, agricultural and industrial development chemistry curriculum has to be updated all through the grade levels.

The chemistry curriculum for grades 9 and 10 are then revised based on the new curriculum framework of Ethiopian schools taking into consideration the assessment made in March 2008 in selected secondary schools of the country, international experiences and the current situations of our country.

Feedback of the assessment made it clear that the secondary school curriculum also has a problem of content overload, content difficulty inappropriate to the grade levels, giving less emphasis to active learning methods, limitations in integrating agriculture and technology and unnecessary repetitions. The curriculum revision then addressed these problems basically.

The revision also considered international standards. In this regard chemistry curriculum of different countries including India, Malaysia, Singapore, England, Ghana, and Uganda were taken as references. The international consultant has also contributed in keeping standards by sharing experiences and involving in the revision processes.

Consideration of the above mentioned major points led to some restructuring of the units of grade 9 and 10. In grade 9, the titles Chemical Symbols, Formulas and Equations and chemical Reaction are collectively given under the unit Chemical Reaction and stoichiometry. Similarly, Hydrocarbons and Oxygen Derivative Hydrocarbons are given in grade 10 as Introduction to Organic Chemistry and some parts of the oxygen derivative hydrocarbons are taken to grade 12. In the unit of Electrolysis of

grade 10 Electrolysis of aqueous solutions and their quantitative aspects are also taken to grade 12. To solve the problems of content overload, chemistry of only three selected metals (Al, Fe, and Cu) is treated in grade 10. Besides, some agricultural and industrial applications are integrated in the units.

The format of the syllabus is different from the traditionally used format. There are only three columns of competency, content and suggested activities respectively in the syllabus below which comes the assessment row.

In the assessment the minimum learning competencies for students working at the minimum requirement level are listed to evaluate their performances. The statement “**minimum requirement level**” should not mislead and should be understood as the “**standard level**”. Students working at the standard level are expected to achieve the competencies set for the grade level successfully. Teachers should give special considerations for those who are working above and below the standard levels by encouraging the ones that work above the standard and by giving extra attention for those who work below the standard. Enrichment activities should be designed and provided through optional exercises, supplementary exercises, etc, for those who work above and remedial activities should be designed and provided through tutorial, peer tutorial, group work, etc, for those who work below.

Assessment is done through continuous process; however, specific assessment techniques are selected in order to collect information about how well students are achieving the competencies. The assessment techniques used at any particular time depends on what facility with the knowledge, skill, or process the teacher wants the student to demonstrate. The appropriateness of the techniques therefore results on the content, the instructional strategies used, the level of development of the students and what is to be assessed. The environment and culture of the students must also be considered.

Various assessment techniques are listed below. The techniques listed are meant to serve only fore reference, since the teacher exercises professional judgement in determining which techniques suit the particular purpose of assessment.

Correlating Instruction, Evaluation, and Science Goals

Instructional Strategies	Some Important Active Learning Methods for Science	Some Corresponding Assessment Techniques
Direct	<ul style="list-style-type: none"> • Demonstrations 	<ul style="list-style-type: none"> • Group/Individual (Peer/Self): Performance Assessments • Short-Answer Quizzes & Tests
Indirect	<ul style="list-style-type: none"> • Concept Mapping/Formation/Attainment • Inquiry • Problem Solving 	<ul style="list-style-type: none"> • Individual/Group: Presentations • Oral Assessments • Performance Assessments • Written Assignments
Experiential	<ul style="list-style-type: none"> • Conducting Experiments • Field Observations & Trips • Model Building • Simulations 	<ul style="list-style-type: none"> • Group/Individual: Performance Assessments • Written Assignments • Peer/Self: Oral Assessments • Technical Skills
Independent Study	<ul style="list-style-type: none"> • Reports • Homework • Research Projects 	<ul style="list-style-type: none"> • Performance Assessments • Portfolios • Presentations • Quizzes • Written Assignments
Interactive	<ul style="list-style-type: none"> • Brainstorming • Co-operative Learning Groups • Discussion • Laboratory Groups 	<ul style="list-style-type: none"> • Group/Peer: Oral Assessments • Written Assignments

For the better implementation of the curriculum material the chemistry syllabus of each grade level is accompanied by materials such as flowchart, minimum learning competencies, student textbook, teachers guide, practical activities manual and student workbook.

This syllabus for grades 9 and 10 were revised by 13 teachers and national and international education experts.

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**Allotment of Periods
for Units and Sub-units of Chemistry
Grades 9 and 10**

<i>Grade</i>	<i>Unit</i>	<i>Sub-unit</i>	<i>Number of Periods</i>	
			<i>Sub-unit</i>	<i>Total</i>
9	Unit 1: Structure of the Atom	1.1 Atomic theory	3	15
		1.2 Discoveries of the fundamental subatomic particles and the atomic nucleus	3	
		1.3 Composition of an atom and the isotopes	3	
		1.4 The atomic models	6	
	Unit 2: Periodic Classification of the Elements	2.1 Introduction	1	13
2.2 The modern periodic table		5		
2.3 Periodic properties in the periodic table		6		
2.4 Advantages of periodic classification		1		
Unit 3: Chemical Bonding and Intermolecular Forces	3.1 Chemical bonding	1	17	
	3.2 Ionic bonding	3		
	3.3 Covalent bonding	8		
	3.4 Metallic bonding	1		
	3.5 Intermolecular forces	4		
Unit 4: Chemical Reaction and Stoichiometry	4.1 Introduction	1	32	
	4.2 Fundamental laws of chemical reactions	2		
	4.3 Chemical equations	3		
	4.4 Energy changes in chemical reactions	3		
	4.5 Types of chemical reactions	3		
	4.6 Stoichiometry	10		
	4.7 Oxidation and reduction reactions	5		
	4.8 Rate of chemical reaction and chemical equilibrium	10		
Unit 5: The Physical States of Substances	5.1 Introduction	1	20	
	5.2 Kinetic theory and properties of matter	3		
	5.3 The gaseous state	11		
	5.4 The liquid state	3		
	5.5 The solid state	2		
10	Unit 1: Introduction to Organic	1.1 Introduction	1	34

<i>Grade</i>	<i>Unit</i>	<i>Sub-unit</i>	<i>Number of Periods</i>	
			<i>Sub-unit</i>	<i>Total</i>
	Chemistry	1.2 Saturated hydrocarbons - alkanes 1.3 Unsaturated hydrocarbons – alkenes and alkeynes 1.4 Aromatic hydrocarbons-benzene 1.5 Natural sources of hydrocarbons 1.6 Alcohols 1.7 Industrial and agricultural applications of organic compounds	9 9 2 2 9 2	
	Unit 2: Important Inorganic Compounds	2.1 Introduction 2.2 Oxides 2.3 Acids 2.4 Bases 2.5 Salts	1 3 7 5 5	21
	Unit 3: Electro Chemistry	3.1 Introduction 3.2 Electrical conductivity 3.3 Electrolysis 3.4 Galvanic cells (voltaic cells) 3.5 Industrial applications of electrolysis	1 2 2 3 2	10
	Unit 4: Chemistry in Industry and Environmental Pollution	4.1 Introduction 4.2 Natural resources and industry 4.3 Production of some important metals and non metals 4.4 Some industries in Ethiopia 4.5 Environmental pollution	1 1 12 6 5	25