

DAWOOD PUBLIC SCHOOL

Course out line 2011-2012

Subject Chemistry

Class – IX

Text Book:Tin Yin Toon And John Sadler *Chemistry Matters*, 2007, Mc Grewhill.**Introduction**

This syllabus is designed to place more emphasis on factual material and aims to concentrate the understanding and application of scientific concepts and principles.

Aims

The aims are to:

(a) Develop abilities and skills that:

- i) Are relevant to the study and practice of science;
- ii) Are useful in everyday life;
- ii) Encourage efficient and safe practice;
- iii) Encourage effective communication.

(b) Develop attitudes relevant to science such as:

- i) Accuracy and precision;
- ii) Objectivity
- iii) Integrity
- iv) Enquiry:
- v) Initiative;
- vi) Inventiveness

(c) Stimulate interest and care for the environment.**(d) Promote awareness that:**

- i) The study and practice of science are cooperative and commutative activities, and are subject to social, economical, technological, ethical and cultural influences and limitations;
- ii) The applications of science may be both beneficial and detrimental to the individual, the community and the environment.

ASSESSMENT OBJECTIVES:**1. Knowledge with understanding:**

Students should be able to demonstrate knowledge and understanding in relation to:

- i) Scientific phenomena, facts, laws, definitions, concepts, theories;
- ii) Scientific vocabulary, terminology, conventions (including symbols, quantities and units);
- iii) Scientific instruments and apparatus, including techniques of operation and aspects of safety;
- iv) Scientific quantities and their determination;
- v) Scientific and technological applications with their social, economic and environmental implications.

2. Handling information and solving problems:

Student should be able to use words or through symbolic, graphical and numerical forms of presentation:

- i) Locate, select, organize and present information from a variety of sources;
- ii) Translate information from one form to another;
- iii) Manipulate numerical and other data;
- iv) Use information to identify patterns, report trends and draw inference;
- v) Present reasoned explanations for phenomena, pattern and relationships;
- vi) Make predictions and hypotheses;
- vii) Solve problems.

3. Experimental skills and investigations:

Students should be able to:

- i) Follow a sequence of instructions ;
- ii) Use techniques, apparatus and materials;
- iii) Make and record observations, measurements and estimates;
- iv) Interpret and evaluate observations and experimental results;
- v) Plan an investigation, select techniques, apparatus and materials;
- vi) Evaluate methods and suggest possible improvements.

SCHEME OF ASSESSMENTS:

Students are required to enter:

- i) In monthly and surprise tests;
- ii) In mid-year and final exams give two papers;

Total marks for both papers are 100

Paper Type of Paper Duration Marks

1 Multiple Choice	45	minutes 30
2 Theory 1hour	30	minutes 70

Instructions:

- i) Students should have her own text book in the class.
- ii) Students are allowed to note the lecture points and ask questions after the lecture.
- iii) Students shall only submit their journals weekly on the allotted days after completing their work .
- iv) Students are allowed to ask and share their problems any time.
- v) Students must write the name of the chapter and date on their work.
- vi) Students must draw diagrams where necessary and write neatly in journals.
- vii) Students are not permitted to use corrector fluids in exams and in class work.
- viii) Talking, doing any other subject's work during class will be strictly penalized.
- ix) Sharing of stationary during test and exams is not allowed.

SUBJECT CONTENTS WITH TIME LINE**FIRST TERM**

August 2011

1st week

Chapter 1: kinetic theory

Learning and Assessment objectives:

Students should be able to:

- i) Differentiate, identify and draw states- of- matter diagrams;
- ii) Determine the effects of impurities on melting and boiling points of different substances;
- iii) Interpret graphs for melting and boiling points of substances;
- iv) Determine the states of matter at room temperature from the given data;

Contents:

- 1.1 States of matter
- 1.2 Kinetic Particle Theory
- 1.3 Changes of states and the Kinetic Particle Theory
- 1.4 Diffusion

Practical:

Determine the rate of diffusion in gases and in liquids.

Assignments

Exercise from Chemistry Matters, Chapter 1

Topical past papers Unit 1 MCQs and Structure questions

Resources

Chemistry by Richard Harwood

Chemistry for O level By Christopher N Prescott

2nd Week

Chapter2: Measurement and experimental Techniques

Learning and Assessment Objectives

Students should be able to

- i) Know the name and understand the use of suitable apparatus for different physical quantities
- ii) Arrange apparatus for determining the rate of reactions.

Contents

- 2.1 Measuring time
- 2.2 Measuring temperature
- 2.3 Measuring mass
- 2.4 Measuring volume

2.5 Collecting gases and measuring volume of gases

Practical:

Students will measure liquids and solids through different apparatus

Assignments

Exercise from Chemistry Matters, Chapter 2
Topical past papers Unit 2 MCQ and Structure questions

Resources

Christopher N Prescott chapter 1

3rd and 4th Week

Chapter 3: Purification And Separation

Learning and Assessment Objectives

Students should be able to

- i) Understand the differences between pure and impure substances.
- ii) Describe the methods of purification using solvent, evaporation crystallization and distillation (simple and fractional).
- iii) Suggest suitable methods of purification, given information about the substances involved.
- iv) Describe paper chromatography and interpret chromatograms including comparisons with known samples and the use of R_f values.
- v) Explain the need and use of locating agents in the chromatography of colorless substances.
- vi) Deduce from the given melting and boiling points, the identities of substances and their purity.
- vii) Explain that the measurement of purity in substances used in everyday life, drugs and foodstuffs is very important.

Contents

- 3.1 Determining purity
- 3.2 Chromatography
- 3.3 Separation Techniques
- 3.4 Separating a Solid from a Liquid
- 3.5 Separating Solids
- 3.6 Separating a Liquid from a Solution
- 3.7 Separating Liquids

Practical:

Separate different salts from the given mixture
Perform paper chromatography for different substances

Assignments:

Exercise from Chemistry Matters, Chapter 3
Collect information on medicinal importance of chromatography
Topical past papers Unit 2 Topic 2B

Resources:

Chemistry by Richard Harwood
Chemistry for O level By Christopher N Prescott

September 2011

1st Week

Chapter 4: Elements Compounds And Mixtures

Learning and Assessment Objectives

Students should be able to:

- i) Define an atom and a molecule
- ii) Define elements, compounds and mixture
- iii) List the differences between mixture and compound
- iv) Describe alloys as mixture such as brass, as mixture of metal with other elements

Contents:

- 4.1 Elements
- 4.2 Compounds
- 4.3 Mixture

Resources:

Chemistry by Richard Harwood
Chemistry for O level By Christopher N Prescott

2nd Week

Chapter 5: Atomic Structure

Learning and Assessment Objectives

Students should be able to:

- i) State the relative charges and approximate relative masses of protons, neutrons and electrons
- ii) Define proton number and nucleon number
- iii) Use and interpret such symbols as ${}^6_{12}\text{C}$
- iv) Use proton number and the simple structure of atoms to explain the periodic table with special reference to the elements 1 to 20.
- v) Define isotopes.
- vi) State that some isotopes are radioactive.
- vii) Describe one medicinal and one industrial use of a named radioactive isotopes.
- viii) Understand electronic configuration of 1 to 20 elements of periodic table.

Contents:

- 5.1 Inside an atom
- 5.2 The proton number and nucleon number
- 5.3 Isotopes
- 5.4 Arranging electrons in an atom

Assignments:

Exercise from chemistry matters
Topical past paper

3rd Week

Chapter 6: Ionic Bonding

Learning and Assessment Objectives

Students should be able to:

- i) Describe the ion formation by electron loss or gain
- ii) Describe the formation of ionic bond between metallic and non metallic elements e.g. NaCl CaCl₂
- iii) Describe the lattice structure of sodium chloride
- iv) Describe some ionic compounds as refractory material e.g. MgO as lining furnace)
- v) Relate the volatility, solubility and electrical conductivity of its structure and bonding

Contents:

- 6.1 The stable noble gas structure
- 6.2 Forming ions
- 6.3 Forming ionic bonds
- 6.4 Ionic lattice formation
- 6.5 Uses of ionic compounds

Assignments

Exercise from chemistry matters.
Collect the information for use of ionic compounds.

4th week

Chapter 7: covalent and metallic bonding

Learning and Assessment objectives

Students should be able to:

- i) Describe the formation of covalent bonds between non - metallic elements leading to the noble gas configuration, e.g. H₂, Cl₂, N₂, HCl, CH₄, C₂H₄, CO₂

- ii) Deduce the electron arrangement in other covalent molecules;
- iii) Construct dot and cross diagrams to show the valence electrons in covalent molecules;
- iv) Describe metallic bonding as a lattice of positive ions in a sea of electrons and explain the electrical conductivity and malleability of metals;
- v) Relate the volatility, solubility and electrical conductivity of its structure and bonding;
- vi) Describe the structure of macromolecules such as graphite, diamond; silica and poly (ethane);
- vii) Describe the similarity in structure of diamond and silicon, diamond and silica and of their properties related to their structures;

Contents:

- 7.1 Covalent Bonds
- 7.2 Structure and Properties of Covalent Substances
- 7.3 Metallic Bond

Practical:

Determine the properties of covalent and ionic compounds like solubility in water and electrical conductivity.

Assignments:

Collect the information about the importance of covalent and ionic compounds in everyday life. Exercise from Chemistry Matters.

October 2011**1st Week**

Chapter 8: Writing Equations

Learning and Assessment Objectives

Students should be able to:

- i) Understand how to write a symbolic and word equation;
- ii) Know the balancing of equations;
- ii) Deduce the ionic equations from symbolic equations;

Content:

- 8.1 Chemical equations
- 8.2 Ionic equations

Assignments:

Exercise from Chemistry Matters.

2nd, 3rd and 4th Week

Chapter 9: The Mole

Learning and Assessment Objectives

Students should be able to:

- i) State the symbols of the elements and the formulae of the compounds mentioned in the syllabus;
- ii) Deduce the formula of simple compound from the relative number of atoms present or vice versa;
- iii) Determine the formula of an ionic compound from the charge on the ions present and vice versa;
- iv) Deduce the balanced chemical equation for a chemical reaction, given relative information;
- v) Define relative atomic mass A_r ;
- vi) Define relative molecular mass, M_r , and calculate its as a sum of relative atomic masses;
- vii) Use the mole concept to calculate empirical formula and molecular formulae;
- viii) Use molar gas volume, taken as 24dm^3 at room temperature and pressure;
- x) Calculate % yield and purity.

Contents:

- 9.1 Relative atomic mass
- 9.2 Relative molecular mass
- 9.3 The mole Page 6 of 7
- 9.4 Mole and molecular mass
- 9.5 Percentage composition of compounds
- 9.6 Finding the formula of compound
- 9.7 Molar gas volume

Assignments:

Exercise from chemistry matters
 Exercise from GCSE CHEMISTRY by E .N. Ramsden.

November 2011**Revision****December 2011****Mid-Year Examinations****Final Term****January 2012****1st and 2nd week**

Chapter 10: Chemical Calculations
 Learning and Assessment Objectives
 Students should be able to:

- i) Calculate stoichiometric reacting masses and volumes of gases and solutions, solution concentrations being expressed in g/dm^3 and /or in mol/dm^3 ; calculations involving the idea of limiting reactants may be set;
- ii) Calculate % yield and purity.

Contents:

- 10.1 Calculations from chemical reactions
- 10.2 The volume of reacting gases
- 10.3 Limiting reactants
- 10.4 The concentration of a solution
- 10.5 Volumetric analysis
- 10.6 Percentage yield and percentage purity

Assignment:

Exercise from Chemistry Matters.

3rd and 4th Week

Chapter 11: acids and bases
 Learning and Assessment objectives
 Students should be able to:

- i) Describe the meanings of the terms acid and alkali in terms of the ions they contain or produce in aqueous solution and their effects on indicator paper;
- ii) Describe neutrality and relative acidity and alkalinity in terms of PH measured using universal indicator paper;
- iii) Describe the characteristics properties of acids as in reactions with metals , bases, alkalis, carbonates;
- iv) Describe the characteristic properties of bases as in reactions with acids and with ammonium salts;
- v) Describe and explain the importance of controlling the PH of soil;
- vi) Classify oxides as either acidic, basic or amphoteric related to metallic /non metallic character;
- vii) State the use of sulfur dioxide as bleach in the manufacture of wood pulp for paper; as a food preservative;
- viii) Describe the manufacture of sulfuric acid from sulfur by contact process;
- ix) Describe the properties of dilute sulfuric acid as a typical acid;
- x) State the use of sulfuric acid as in the manufacture of detergent and fertilizers;

Contents:

- 11.1 Acids
- 11.2 Bases and Alkalis
- 11.3 Concentration and strength
- 11.4 The PH scale
- 11.5 Types of oxides
- 11.6 Sulfur dioxide and sulfuric acid

Practical:

Determine the PH of different solutions.
 Perform acid base titration.

Assignments:

Search the physical and chemical properties of acids and alkalis with their industrial uses.

Exercise from Chemistry Matters.

February 2012

1st, 2nd and 3rd Week

Chapter 12: salts

Learning and Assessment objectives

Students should be able to:

- i) Describe the preparation, separation and purification of salts;
- ii) Describe preparation of salts by a titration method;
- iii) Suggest a method of preparing a given salt from suitable starting materials, given appropriate information;
- IV) Describe and explain the tests to identify:
 - a) Aqueous cat ions; Aluminums, ammonium, calcium, copper (II), iron (II), iron (III) and zinc ,using aqueous ammonia and aqueous sodium hydroxide
 - b) Anions; Carbonate; chloride; iodide; nitrate and sulfate
 - c) Gases; Ammonia, carbon dioxide, chlorine; hydrogen, oxygen; and sulfur dioxide

Contents:

- 12.1 Salts
- 12.2 Preparing salts
- 12.3 Qualitative analysis

Practical:

Perform acid base titration.

Prepare insoluble salts by neutralization.

Assignments:

Search the importance of salts in industries and daily life.

Exercise from chemistry matters.

4th Week

Topical past papers MCQS

Topical past papers STRUCTURE QUESTIONS

March and April 2012

Revision through past papers and exercises of different books as given in the resource list

Resource List:

Students may also find references to the following books helpful; these are suitable for use with this syllabus.

Harwood, R Chemistry (edition 2, 2003), Cambridge University Press

Berry, R IGCSE study guide for chemistry (2005) Hoober Murray

Clegg, A Chemistry for IGCSE (2006) Heinemann

Eral, B & Chemistry John Murray, Hoober Murray (2003)

Wilford, L D R

Hill, g Chemistry counts Hoober and Stoughton (2003)

Lewis & Thinking Chemistry (GCSE edition) Oxford University press (2004)

Waller

May 2012

Final examinations

Websites for general use:

http://www.chemsc.org/networks/learnnet/classic_exp.htm

<http://www.thecatalyst.org/>

<http://www.wpbschoolhouse.btinternet.co.uk/page10.htm>

<http://www.s-cool.co.uk/contents.asp>

<http://www.howstuffworks.com/>
