S2 CHEMISTRY SCHEME OF WORK 2021-2022

Academic year: 2021-2022 **Term**: I,II & III **School**:……. ……..**Subject**: CHEMISTRY
Subject leader's name: …….. **Class** : S2 **Number of period per week**: 4

Dates & number of week	Units	Lessons and evaluation	Learning objectives & key units competences	Teaching methods & techniques and evaluation procedures	Resources and references	Observation
Week 1 11-15/10/2021	**Unit 1: CHEMICAL BONDING.**	**Lesson title1** Stability of atoms by losing ,gaining and sharing electrons(formation of ionic compound **)** **Lesson title 2** Covalent bonding **Lesson title3** Metallic bonding	**Knowledge and understanding:** – Explain the nature of ionic,covalent and metallic bonding. – State the typical physical properties of ionic compounds, and of covalent compounds. - Explain the physical properties of metals in termsof their structure **Skills:** -Show the formation of bonds using dotand cross diagrams. -Classify variouschemical compounds as ionic or covalent. -Perform experiments to show	– In groups, perform exercises on the formation of ions from atoms. – Discussion in group and make a presentation. – Group work – Carry out experiments which illustrate the physical properties of ionic and covalent compounds: ○ Solubility	CBC S2 STUDENTS BOOK for REB. Teaching guide & New chemistry for O L Internet	

			the physical properties of metals, ionic compounds and covalent **Attitudes andvalues:** – Develop a senseof orderliness and self-confidence in presentations ofresults. – Respect the procedures while carryingout experiments.	using computer and projector		
Week2 18-22/10/21		**Summative evaluation 1**	**Key unit competency:** To be able to relate the nature of bonding to properties of substances.	**Evaluation procedures: (oral, written, practical, …)**		
Week3 25-29/10/21	**Unit 2**: **TRENDS IN PROPERTIES OF ELEMENTS IN THE PERIODIC TABLE.**	**Lesson title1:** Classification of elements into metals, metalloids and non-metals. **Lesson title2:** Physical properties of metals andnon-metals. **Lesson title3:** Trends in reactivity for metals andnon-metals	**Knowledge and understanding:** -Describe trendsin reactive elements with acids, water, and halogens. -Explain the trends in the physical properties across a periodand down a group. **Skills:** -Classify elements into metals, metalloids and	-Group discussion -Observation in groups -Research from library or internet -Project work Watching video - Making report - Exercises in group - Internet research	CBC S2 STUDENTS BOOK for REB. Teacher guide & New chemistry for O L	

Week 4 **1-5/11/21**		**Lesson title 4 :** Chemical properties (reaction withwater, acids and halogens).	non-metals. -Compare and contrast the physical properties of metals and non-metals using simple experiments. -Compare the reactivity of metals across the period and down the groupwith the help of simple experiments. **Attitudes andvalues:** – Respect the procedures during practical activities. – Develop teamwork in group activities.	- Carrying out experiment And making lab report	Internet	
		Summative evaluation 2	**Key unit competency:** To be able to describe the trends and patterns in properties of elements in groups and periods.	**Evaluation procedures: (oral, written, practical, …)**		
Week 5 **8-12/11/21**	**Unit 3**: WATER POLLUTION.	**Lesson title 1:** Definition of water pollution and Main water pollutants **Lesson title 2:** Dangers of polluted water **Lesson title 3:** Prevention of water pollution	**Knowledge and understanding:** – Define water pollution. – Identify the main waterpollutants. – Describe the dangers of polluted water. -Suggest the ways of	**Research work** **Presentation** **Field visit of water body, making report** **Carrying out the experiments** **Group work**	CBC S2 STUDENTS BOOK for REB. Teaching guide & New chemistry for O L	

			preventing water pollution **Skills:** – Develop research skills Evaluate waysof minimising pollution. **Attitudes andvalues:** – Develop awareness of the dangers of polluted water.		Internet	
Week 6 15- 19/11/21		**Summative evaluation3**	**Key unit competency**: To be able to assess the causes and effects of water pollution and suggest ways of control.	**Evaluation procedures: (oral, written, practical, …)**		
Week 7 22- 26/11/21 Week 8 29/11- 3/12/21	**Unit 4: EFFECTIVE WAYS OF WASTE MANAGEMENT.**	**Lesson title 1:** Steps to effective waste management **Lesson title 2:** Importance and benefits of waste recycling **Lesson title 3:** Effects of waste and poor disposal.	**Knowledge and understanding:** – Describe the steps involvedin effective waste management. – Explain the importance andbenefits of waste recycling. – Discuss the various effects of waste materials and poor waste disposal. **Skills:** – Make some useful materialsfrom waste. **Attitudes andvalues:** – Develop a senseof	– Group work and discussion and make presentation. – Research how to make useful products from waste (like fertilisers, briquettes,… -Field visits and study tours to different industrial sites e.g. garbage pits, or biogas production	CBC S2 students book Teacher guide Internet	

			managing natural resources while discussing effective ways of waste management. – Develop teamwork and confidence in group activitiesand presentations.	plants.		
Week 9 6-10/12/21		**Summative evaluation 4**	**Key unit competency**: To be able to transform waste materials into different useful materials e.g. fuel (briquettes) and fertilisers (composted manure).	**Evaluation procedures: (oral, written, practical)**		
Week 10 13-17/12/21	**Exam of 1st term+ Supervision**					
Week 11 20-24/12/21	**Correction of exams and making school reports**					
SECOND TERM FROM (10 Jan-31 March 2022)						
Dates & number of week	**Units**	**Lessons and evaluation**	**Learning objectives & key units competences**	**Teaching methods & techniques and evaluation**	**Resources and references**	**Observation**

				procedures		
Week1 10-14/1/22	**Unit 5:** CATEGORIES OF CHEMICAL REACTIONS.	**Lesson title 1** – Types of reactions: o Combination. o Decomposition. o Single replacement. o Double displacement (precipitation and neutralisation). o Combustion.	**Knowledge and understanding:** – Explain the difference between a decompositionreaction and combination reaction. – Explain single displacement, double displacement (precipitation and neutralisation) and combustionreactions. – Write and balance ionic equations. **Skills:** – Apply the rules of balancing equations to write balanced chemical reactions. – Carry out experiments to show precipitation reactions, and to differentiate endothermic and exothermic reactions – Classify chemical reactions as endothermic and exothermic using simple experiments.	Carrying out differnts experiments Perform many exercises Making lab report Group presentation Group work and discussion .	**New chemistry for ordinary level (S1,S2&S3)** CBC S2 students book Teacher guide Internet.	
Week2 17-21/1/22		**Lesson title 2** – Classification of chemical reactions as endothermic and exothermic reactions.				
Week 3 24-28/1/22		**Lesson title 3** Ionic equations/rules ofwriting ionic equations.				

			– Properly use a thermometer to measure changes intemperature. **Attitudes andvalues:** – Develop a teamspirit, sense of responsibility when performing experiments.			
		Summative evaluation 5	**Key unit competency:** To be able to differentiate between the types of chemical reactions.	**Evaluation procedures: (oral, written, practical)**		
Week 4 31/1-4/2/22 **Week 5 7-11/2/22**	**Unit 6:** PREPARATION OF SALTS AND IDENTIFICATION OF IONS.	**Lesson title 1** – Definition of: ○ Solubility. ○ Unsaturated. ○ Saturated. ○ Super saturated solutions. **Lesson title 2** – Factors influencing solubility of different salts e.g temperature. **Lesson title 3** **Different ways of preparing normal salts from reaction of:**	**Knowledge and understanding:** – Define solubility. – Describe factors that affect solubility. – Explain the concept of unsaturated, saturated and supersaturated solutions. – Explain the solubility curves of different salt solutions. Describe different methods ofpreparing soluble and insoluble salts. – Name the sources and	Carrying out differnts experiments Perform many exercises Making lab report Group presentation Group work and discussion **.**	New chemistry for ordinary level (S1,S2&S3) CBC S2 students book Teacher guide	

		-Acid with active metals. -Acids with carbonates andhydrogen carbonates. -Acids with metal oxides. -Acids with bases. -Precipitation and neutralization reactions. -Metal oxides with non-metal oxides and a base and non-metal oxides.	uses of salts indaily life. **Skills:** – Prepare different soluble and insoluble saltsusing suitable chemicals. – Interpret solubility curves of different solutions. – Carry out experiments to show the effect of temperature on the solubilityof different salts. Use solubilitycurves to determine the solubility of different salt solutions at different temperatures. Perform tests toidentify cations and anions. **Attitudes andvalues:** – Develop a team spirit and sense of responsibilityduring experiments. – Appreciate the uses of salts in daily life such as	Research and make presentation of findings	Internet.	
Week 6 **14-18/2/22**		**Lesson title 4** Uses and sources of salts and Identification of cations & anions. E.g.: Ca^{2+}, NH_4^+, Al^{3+}, Zn^{2+},Mg^{2+}, Fe^{2+}, Cl^- , CO_3^{2-}, SO_4^{2-} , Fe^{3+}, NO_3^-, Cu^{2+}, SO_3^{2-}				

			sodium chlorideas a table salt.			
Week 7 21-25/2/22		**Summative evaluation 6**	**Key unit competency**: To be able to prepare a salt from suitable starting materials and identify cations and anions in a solution.	**Evaluation procedures: (oral, written, practical)**		
Week8 28/2-04/3/22	**Unit 7: THE MOLE CONCEPT AND GAS LAWS.**	**Lesson title 1:** – Avogadro number and the mole concept and Calculation of the number of moles. **Lesson title 2:** – Definition of relative atomic mass. – Definition and calculation of relative molecular mass. **Lesson title 3:** – Definition and calculation of relative formula mass and Calculation of molar mass.	**Knowledge and understanding:** – Explain the mole concept. – Explain the concepts of: relative atomic mass, relative formula mass, relative molecular mass, molar mass, empirical and molecular formulae. **Skills:** – Experimentally determine the mass composition of a compound using magnesium oxide asan example. – Calculate the molar masses of various substances and weigh out 1 mole ofeach. – Perform calculations involving empirical and molecular formulae.	Carrying out experiments Perform many exercises Group presentation Group work and discussion **.**	New chemistry for ordinary level (S1,S2&S3) CBC S2 students book Teacher guide Internet.	
Week 9 7-11/3/22		**Lesson title4:** – Relationship between numbers of moles, mass and molar mass. **Lesson title5:**				

		Calculation of mass percentage compositionof an element in a compound. **Lesson title 6:** – Empirical and molecular formulae. – Stoichiometric calculations.	**Attitudes and values:** – teamwork approachin research, group activities and exercises. – Respect procedures while performing experiments.			
Week 10 14-18/3		**Summative evaluation7**	**Key unit competency**: To be able to determine the composition of compounds by mass, volume and number of moles	**Evaluation procedures: (oral, written, practical)**		
Week 11 21-25/3/22	**Second term exam and supervision of exam**					
Week 12 28-31/3/22	**Correction of second term and making school report.**					
THIRD TERM FROM (18 Apr-15 July 20220)						
Week 1 **18-22/4/22**	**Unit 7: THE MOLE CONCEPT AND GAS LAWS.**	**Lesson title 7:** – Limiting reactants. **Lesson title 8:** – Gas laws (Gay-Lussac, Charles' law, Boyle's law and the ideal gas law, Grahams' law of diffusion) and perform	**Knowledge and understanding:** – Explain the concepts of:limiting reactant. – State the gas laws: Gay-Lussac, Charles' law, Boyle's law and the ideal gas law, Grahams' law of diffusion. **Skills:**	Perform many exercises Group presentation Group work and	New chemistry for ordinary level (S1,S2&S3) CBC S2 students book Teacher guide	

		simple calculations on gas laws.	– Apply the gas lawsto calculate the volume, temperature and pressure of gases, and molecular weight of gases.	discussion **.**	Internet.	
Week 2 25-29/4/22		**Lesson title 9:** Calculation of molar gas volume under standard conditions.	**Attitudes and values:** Appreciate the work done by different personalities in the formulation of gas laws e.g. Gay- Lussac, Charles, Boyle, and Graham.			
		Summative evaluation 7	**Key unit competency**: To be able to determine the composition of compounds by mass, volume and number of moles	**Evaluation procedures: (oral, written, practical)**		

Week 3 **2-6/5/22**	**Unit 8:** PREPARATION AND CLASSIFICATION OF OXIDES. them based on their properties.	**Lesson title 1** – Preparation of oxides from: ○ Direct combination of anelement with oxygen. **Lesson title 2** ○ Thermal decomposition of hydroxides, carbonates and nitrates.	**Knowledge and understanding:** – Categorisedifferent oxides. – Explain how different oxidesare formed. – State the usesof different oxides. – Describe thereaction of oxides with other substances. – Describe theprocess of producing slaked lime. **Skills:** – Experimentally prepare different oxidesfrom elements and compounds – Test the properties of oxides preparedin the laboratory. - Classify oxidesinto alkaline, acidic, amphoteric andneutral. **Attitudes and values:** – Develop a team approach and a sense of responsibility ingroup activities. – Respect for the procedures while	Carrying out experiments Perform many exercises Group presentation Group work and discussion **.**	New chemistry for ordinary level (S1,S2&S3) CBC S2 students book Teacher guide Internet.	
Week4 **9-13/5/22**		**Lesson title3** – Reactions of oxides with water,acids and bases **Lesson title 4** – Classification of oxides as acidic,basic, neutral and amphoteric oxides. **Lesson title 5** Uses and production of slaked lime(ishwagara).				

			performing experiments. – Care about harmful oxideslike sulphur dioxide and nitrogen dioxide, during experiments			
Week 5 **16-20/5/22**		**Summative evaluation 8**	**Key unit competency**: To be able to prepare oxides and classify them based on their properties.	**Evaluation procedures: (oral, written, practical)**		
Week 6 **23-27/5/22**	**Unit 9:** ELECTROLYTES AND NON-ELECTROLYTES.	**Lesson title 1** – Definition of electrolyteand non-electrolyte. **Lesson title 2** – Definition of electrolysis.	**Knowledge and understanding:** – Define an electrolyte anda non- electrolyte. – Give examples of weak and strong electrolytes andnon- electrolytes. – State applications of electrolytes in daily life. **Skills:** – Carry out experimentto distinguish between electrolytes and non-electrolytes. – Carry out experiments to classify solutions as strong electrolytes, weak	Group work Research making Carry out experiment Group presentation	New chemistry for ordinary level (S1,S2&S3) CBC S2 students book Teacher guide Internet.	
Week 7 **30/5-3/6/22**		**Lesson title 3** – Strong and weak electrolyte and examples (e.g. mineral acids and organic acids respectively). **Lesson title 4** – Conductivity of electricityby electrolytes.				

Week 8 **6-10/6/22**		**Lesson title 5** Applications of electrolytesin daily life e.g. Leclanché cell (dry cell) and car batteries.	electrolytes ornon-electrolytes. **Attitudes and values:** – Develop an awareness of safety issues when carryingout experiments. – Appreciate the importance of electrolytes in daily life like sulphuric acid in a car battery.			
		Summative evaluation 9	**Key unit competency**: To be able to distinguish between non-electrolytes, weak electrolytes and strong electrolytes.	**Evaluation procedures: (oral, written, practical)**		
Week 9 **13-17/6/22**	**Unit 10:** PROPERTIES OF ORGANIC COMPOUNDS AND USES OF ALKANES.	**Lesson title 1** – Definition of organic chemistry. **Lesson title 2** – Differences between organic andinorganic chemistry. **Lesson title 3** – Occurrence of organic compounds. **Lesson title 4** – Homologous series.	**Knowledge and understanding:** ➢ Identify organic compounds and their origin. ➢ Describe the physical and chemical properties ofalkanes (methane). ➢ State the uses of methane and some other alkanes. ➢ Explain structural	Group work Research making Carry out experiment Group presentation Perform many exercises	New chemistry for ordinary level (S1,S2&S3) CBC S2 students book Teacher guide	
		Lesson title5				

Week 10 20-24/6/22		– General formulae and nomenclature of alkanes (from C_1-C_{10}). **Lesson title 6** – Structural isomerism up to C_4. **Lesson title 7** Physical properties of alkanes. **Lesson title 8** Chemical properties (reaction withhalogens, combustion and thermal cracking).	isomerism. **Skills:** ➢ Use simple experiments to classify compounds intoorganic and inorganic. ➢ Prepare methane gas inthe laboratory. ➢ Apply IUPAC rules to the nomenclature of alkanes. **Attitudes and values:** ➢ Develop a team approach and sense of responsibility ingroup discussions and experiments. ➢ Appreciate the economic importance of alkanes in daily life such as fuels.	Group discussions	Internet.	
Week 11 27/6-1/7/22		**Lesson title 9** Laboratory preparation of methane. **Lesson title 10** Uses of alkanes (methane) in daily activities.				
		Summative evaluation 10	**Key unit competency**: To be able to compare the properties of organic and inorganic compounds and explain the uses of alkanes in daily life.	**Evaluation procedures: (oral, written, practical)**		

Week 12 4-8/7/22	**Third term exam and supervision**
Week 13 11-15/7/22	**Correction of Third term exam and making annually school report**

Prepared By HENRY HAHIRWA

CHEMISTRY TEACHER

Tel: 0784169319/0725666722

Email: henryhahirwa@gmail.com

ES GISHOMA

RUSIZI DISTRICT