

Chemistry Teachers Content and pedagogy Standards for Grades 9 To 10

	Content standards	Know ledge Indicators	Performance Indicators
1.1	The Competent chemistry teacher understands - Structure of the Atom Atomic theory - Atom - Atomic theory - Dalton's atomic theory - Modern atomic theory	The Competence Chemistry teacher understands! - Atomic theory - Atom - Atomic theory - Dalton's atomic theory - Modern atomic theory - Elements - Compounds - Three laws of chemical combination	The Competent Chemistry teacher - Describe, what an atom is - Define what an atomic theory. - Explain Dalton's atomic theory. - Describe, the models atomic theory - Compare and contrast Dalton's atomic theory with modern atomic theory.
1.2	Discoveries of the fundamental subatomic particles and the atomic nucleus - Discovery of election - Discovery of the nucleus - Discovery of the neutron	- Atomic particles - Atomic Nucleus - Discovery of the electrons - Electron - Electrode - Negative electrode - Positive anode - Cathode rays - Cathode - Rays - J.J Thomson	- Define, what particles are? Electron? - Define an atomic nucleus is? Neutron? - Explain, Low William Crooke Crooke standard the discharge tubes of an electrons? - What are cathode rays? And what is cathode? Rays? - Who ways JJ Thomson? Explain his contribution
	The competent chemistry teacher understands? Properties of cathode rays.	The competent chemistry teacher understands - Charge and mass of an electron - Robert Millikan	The competent chemistry teacher Define, charge and mass of an electron are?-.

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	• Charge and mass of an electron • Rober Millikan's /1909/ charge of an electron to be 1.60×10^{19} coulombs.	• Wilheen Rontgen • Rontgen, called it "x-rays," • Alpha, rays • Discovery of the atomic Nucleus	
1.1.2	Discovery of the atomic Nucleus • Alpha (x) rays • Alpha(x) • Beta(B) rays or B-particles • Gamma (y) rays	• Alpha, rays • Alpha(x) rays • Beta(B)rays or B-particles	• Give explanation on the works of JJ Thomson and R.Millikan • Explain, how the positively bundle of matter the nucleus, was maintained by Rutherford
	The competent chemistry teacher understands! • Discovery of Neutrons • Neutrons, identified by James Chadwick	The competent chemistry teacher understands! • Discovery of Neutrons were produced (James Chadwick)	The competent chemistry teacher • Explain Alpha (a) rays consists of positively charged particles are deflected? • Define the term radioactive • Describe the nature of subatomic participle (electrons, protons. And neutrons) differ or contrast to that of the alpha participles, beta particles, and gamma rays.
1.3	The competent chemistry teacher understands	The competent chemistry teacher understands • All atoms have two regions • All atomic uncles are made of two particples • Protons: and neutrons • Rutherford's experiment • James Chadwick's observation on rays, and neutral particles, called neutrons	The competent chemistry teacher • Define, the term atomic number< mass number • Define, discovery of the electron: Atomic nucleus: Neutrons • Describe what an absolute and relative masses of an electron.

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		- Compos, torn of An atom - Atom - Isotopes - Relative charges of an electron - Relative charges of an electron	
1.4	Composition of an atom and Isotopes - Relative charges of an electrons, protons and neutron - The number of protons and electrons in an atom from the atomic number		
	- Isotopes and atomic mass - Isotopes - Atomic mass - Relative Atomic masses	The competent chemistry teacher understands: - Isotopes Vs nuclide - Radioactive, primordial, and stable isotopes.	The competent chemistry teacher - Define, what an Isotope is, what nuclide is? - Describe, the radioactive, primordial and stable isotopes - Explain, what an atomic nuclei contains for
	- Atomic models - Dalton's Atomic model - Thomson model - Ruther ford model - Bohr model - The Quantum mechanical model - Electron configuration - Rules Governing electron configuration	The Chemical and molecular properties of an Isotopes - Nuclear properties and stability - Number of isotopes per element Atomic mass of isotopes atomic mass - Atomic mass - Standard atomic weight - Relative atomic mass - Relative isotopic mass	- Describes how a student of chemistry or science, can maintain the number of isotopes of an element - Define, the atomic mass of the specific isotope - Describe, the atomic mass, standard atomic weight, relative atomic mass and relative isotopic mass. - Explain, the atomic theory of Democritus atomic theory J.Daptoin atomic theory sir J.J. Thomsen atomic mode and lord

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			element Rutherford atomic model.
2	The competent chemistry teacher understands Periodic classification of the element • The modern periodic table • Periodic properties in the periodic table • Advantages of periodic classification	The Competent chemistry teacher understands • Modern periodic table • The periodic law • Atomic Radius • Mendeleev's periodic law • Ionic Radw • First Ionization • Electro negativity • John Newlands • Mendeleev	The competent chemistry teacher • Define, what is meant by the term periodicity? • State Mendeleev's and modern period is law • Explain the relationship between the electronic configuration and the structure at the modern periodic table. • Describe the three classes of the elements in the modern periodic table. • Describe the three classes of the elements in the modern periodic table • Describe, how the cunerot periodic table is make
	Characteristics of groups and periods • Periodic table • Valance electron	The competent chemistry teacher understands: • Periodic table • Valence electrons- group • The first periodic table of the elements	The competent chemistry teacher • Define periodic table meant • Periodic table • Valence electron
	• The first penodre elements • ---- • Grouping elements • Atomic Radius • Ionic Radius • First Ionization Energy • Electro negativity	• Grouping elements together • Atomic radius • Ionic radius • Ionization energy • Electron gating • Early attempts to classify chemical elements • Periodicity	• Define, terms like atomic radius, Ionization energy, and electron gating of an element. • Describe, what a periodicity is • Describe period and group • Describe the three classes of the elements in the modern

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	• Early attempts in classifying the elements • The history of the penodie table • Classifying elements • Periodicity	• Periodic events in nature • Early attempts to classify elements were based merely on atomic mass • First attempts to group similar elements, by Dobereiner's traids (1817) • Newland's Law of octaves (1864), by John Newlands	periodic table • Explain the four blocks of the elements as related their electron configuration in the modern periodic table.
2	• The periodic Law • A- Mendeleev's periodic Law • Dmitri Mendeleev (1869) • Luther Meyer • Periodic Law • Mendeleev's	The competent chemistry teacher understands. • Mendeleev's observation of elements • Formulation of the periodic Law • Mendeleev's periodic law • Family of groups of elements • Undiscovered element • The modern periodic Law • Mosley(1913)-Atomic Number • Periodic Law	The competent chemistry teacher • Define, periodic law is? • Explain, how me delve formulated a family or group of elements. • Define, what eka-aluminum is? • Explain, Low the element Gallium (eka-silicon) was discovered (1886)? • Describe, Mosley's contribution to the modern
2.2	The Competent chemistry teacher understands Characteristic of groups and premeds • Forms of periodic table • Periods or services horizontal rows of elements in the periodic table. • Elements in a period-increasing order of the of their atomic numbers • Long periods	The competent chemistry teacher understands Characteristic of groups and periods • Forms of periodic table • Horizontal row of elements period or • Long periods • Groups of families vertical columns of elements	The competent chemistry teacher • Define, what the term group in relate to chemistry knowledge. • What are the basis for classifying the elements into groups and periods? • What are the simulates and differences in the electron configuration S and Cl ? • Define who Group of or families
	The competent chemistry teacher understands Representative Elements :S and P-block	The competent chemistry teacher understands • S, and p-block • Main group elements	The competent chemistry teacher • Define, s-block elements • Define, d-block elements are

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	Elements . -Main group Elements -s-block elements -transition Elements :d=block elements.	• P-block elements • Transition Elements -d-block elements	
	The competent chemistry teacher understands • Rare-earth elements • F-block elements • Lanthanide series -Elements in the same group--- -Periodic properties of the element	The compliant chemistry teachers understands -rare –earth elements: - Valence electrons - Chemical properties -periodic properties of the element -explained nuclear energy -effective nuclear charges. -Elements in the same group: • Valence electrons • Chemical properties • Enplaned nuclear energy • Effective nuclear charge	The competent chemistry teacher Define valence electrons? What are chemical properties discuss about?
3	Ionization Energy	The competent chemistry teacher understands • Ionization energy • Lowest tendency to lose electrons. And • Highest tendency to lose electrons	The competent chemistry teacher • Explain, what Ionization energy is?
	The competent chemistry teacher understands: • Electron Affinity (E_A) • Electro negativity • Metallic character	-Electron Affinity /E_n Non-metals gains electron -electro negativity Linus pauling [1901-1994] -metallic character Electropositive elements metalloids	The Competent chemistry teacher understands • Describe what non metals Are? • Describe what non-metals gains of electrons mean? • Define electron affinity electron negativity are? •
	The competent chemistry teacher understands • Chemical Bonding and intermolecular	The Competent chemistry teacher understands? • Chemical Bonding • Chemical bond	The competent chemistry teacher • Define, what a chemical bonding is?

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	forces.	GN Lewis	Explain, why atoms form chemical bonds?
	- Ionic Bonding - Ion - Cat ions - Anions - Ionic Bond formation	- Ionic Bonding - Ion - Cat ions - anions - Ionic bond formation - An electrostatic forces of attraction - Ionic bond - Electrovalent bond - Electron-dot - Lewis formulas	- Define, the thermion - Define, Ionic bonding and describe the formation of anionic bonds.
	Covalent bonding	- Covalent bonding - Types of covalent bonds - Single bonds, - Double bonds - Triple bonds	- Define, covalent bonding? - Describe formation of a covalent bond.
	The competent chemistry teacher understands? Polarity in covalent molecules	The competent chemistry teacher understands - Polarity in covalent Molecular - Non-polar covalent bond - Non-polar - Polar covalent bond (polar bond) - Electro negativity	The competent chemistry teacher - Describe, how covalent bond is formed - Draw how Lewis structure is formed
	- Coordinate covalent bond - Coordinate Covalent bond (dative bond)	Coordinate covalent bond	
	- Metallic bonding - Properties of metallic bonding - Inter molecular forces	- Metallic bonding - Properties of metallic bonding - Malleability and ductility - Intermolecular force	- Explain the formation of metallic bond - Describe how a metallic bond is different from those of antonic

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			bond - Define inter molecular forces? - Explain Low hydrogen forces are set. - Explain dispersion forces
	The competent chemistry teacher understands Chemical Reaction and stoichiometry	The competent chemistry teacher understands - Chemical reaction and stoichiometry - Chemical Reaction - Reactants - Products - Chemical change	The competent chemistry teacher - Define, what alchemical reaction is Reactants products? And - What is a chemical change is about?
	Fundamental Laws of chemical Reactions	- Laws of chemical ?Reaction - Law of conservation of mass - Law of definite proportion - Law of multiple proportion - Law of constant composition	- Define, terms of following - Laws of conservation of mass - Law of definite proportion - Law of multiple proportion - Law of constant composition
	Chemical Equation	- Chemical equation reactants - Reactants - Chemical equation	- Define, chemical equation - Describe b/n chemical equation and alchemical reactants are?
	Energy change in chemical Reactions	- Energy change in chemical reactions - Energy change - Chemical reaction - Endothermic reaction - Exothermic reaction	- Explain energy change in chemical reactions. - Define endothermic and exothermic reactions? - Describe endothermic and exothermic reactions
	- Balancing chemical equation - Inspection and the Least Common Multiple (LCM) method	- Balancing Chemical equation - Inspection and the least common Multiple (LCM) method	Define, balancing an equation by in section, mean?

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	Types of chemical Reaction	- Types of chemical reaction - Decomposition reaction - Combination reaction - Single displacement reaction - Single displacement reactions - Double displacement reaction	Define combination reaction, decomposition reaction; single displacement reaction double displacement reaction?
	Stoichiometry	- Stoichiometry - Mole ratios - Mass -mass problems - Molar volume - Avogadro principle - Volume- Volume problems	Define terms mole ratios: mass-mass problems: molar volume: Avogadro principle volume-volume problems: mass-volume problems
	The competent chemistry teacher understands Molar Rations in Balanced Chemical Equation	The competent chemistry teacher understands - Molar Rations in balanced chemical equation - Stoichrometry - Mass-mass problems - Mass-ratio method - Mole-ratio method	The Competent chemistry teacher - Define, stoichio metry? Mass-mess problems Mass- ratio method Mole- ratio method - What mass of nitrogen dioxide is produced by the decomposition of 1829 of magnesium nitrate? - How many grams of calcium carbonate are needed to react with 15.2g of HCL in according to the following equation? - Define, Avogadro's principles of Law? Molar volume? - What volume of oxygen will react with carbon monoxide to to produce 20 liters of carbon dioxide at STP? - How many grams of calcium

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			carbonate are decomposed to produce 11.2L of carbon dioxide at STP? • How many liters of oxygen at STP react with 72g of aluminum to produce aluminum oxide? • What mass of aluminum would be completely oxidized by 44.8 L of oxygen to produce Al_2O_3 at STP
	Limiting and Excess reactants	Limiting and excess reactants • Limiting reactants • Stoichiometric proportion	• Define, Limiting reactants; stoichio meter proportions • How much ammonia is produced if 10 g of hydrogen reacts with 18g of nitrogen? • Define, actual yield; theoretical and percentage yields? • 25 grams of methane gas (CH_4) + $2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$ What is the percentage yield if 60.3 grams of carbon dioxide is produced? • Define, terms oxidation reduction oxidation number or oxidation state • What is oxidation number of chromium in $\text{Na}_2\text{Cr}_2\text{O}_7$? Identify the oxidizing agent reducing agent, the substance oxidized and reduced on the following reaction $\text{H}_2\text{S} + \text{Br}_2 \rightarrow 2\text{HBr} + \text{S}$

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			Write the oxidizing and reducing agents for the reaction given below $\text{Cu} + \text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{NO} + \text{H}_2\text{O}$
	Historical development of organic compounds	- Organic compounds - Compounds - Organic compounds - Inorganic Compounds - Fried rich Walter - Organic chemistry - Catenation - Functional groups	Define, Compounds: Organic and inorganic compounds - Who was F. Wohler and what le did Contributes - What are hydro carbons saturated hydro carbons homologous series unsaturated hydro compounds;
	Alkenes or Parafins	- Alkenes or paraffin's - Alkenes - methylene group - Homologous series - Homologues - Vander Waal 's	- Define alkenes ethylene group: homologous series: homologues - Explain what Vander Waal 's? Isomerism; Isomers;
	The competent chemistry teacher understands alkenes or olefins	The competent chemistry teacher understands - Alkenes or Olefins - Alkenes - Olefins - Addition reaction - Addition of halogens (halogens) - Addition of hydrogen (hydrogenation) - Addition of hydrogen halide, Hx(hydro halogenation) - Mor kovnikov 's rule	The competent chemistry teacher understands - Define alkenes or olefins - Describe, what addition of halogenations hydrogenation addition or hydrogen halides HX(hydrogenation) - State, Markovnikov 's rule? - Describe, the oxidation of alkenes; polymerization (self-

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		- Addition of water (hydration) - Oxidation of alkanes - Polymerization (self-addition) of alkali - Cycloalkones	addition) of alkenes; and cydoalkanes
	- Properties and uses of A-cetylene or ethyne - Aromantic hydrocarbons - Alcohols	- Acetylene - Ethyne - Aromantie hydrocanbons - Alchols - Alconoes - Funetronal groups of alcohols - Hydroxyl groups - Monohydrrie alcholes - Physical properties of alchols	- Define, term: - Acetylene; ethyne - Define, the term a romantic hydrocarbons - Explain the chemical reaction of benezine - Define alcohols and tell the funetronal group of alcohols - Explain, what a hydroxyl groups; mono hydriealcohoes; and physical properties of alcohols.
	Classification of Monohydric Alcohols	- Ethanol - Monohydric alcohols - Dihydrie alcohols-glycols or diols - Trihydric alcohols - Polyhydric alcohols - Carbon atoms - Primary (1°) - Secondary (2°) - Tertiary (3°) and - quaternary (4°)	- Define terms; ethanol; dihydnc alcohols; ;trihydrie alcohols; polyhydrre alcohols. - Describe, the four carbon atoms.
	Soaps and Detergengts	- Soaps and Detergents - Surfactants - Hard soaps - Soft soaps - Saponification	Explain, terms surfactants; hard soaps; soft soaps; and saponification

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2	The competent chemistry teacher understands Inorganic Compounds	The competent chemistry teacher understands Types of oxides and their chemical properties - Arrhenius - Bronsted-Lowry - Lewis	The competent chemistry teacher - Define, what are oxides? - Define what Inorganic compounds - Explain Johannes Bronsted and Thomas M.Lowry's definition of acids.
	- Classification of inorganic compounds - Acidic oxide	- Oxides are - Acidic - Basic; - Amphoteric - Neutral and peroxides - Chemical properties of acidic oxides; - Basic oxides	Define acidic oxides; basic oxides; - Distinguish acidic oxides from basic oxides; - Compare and Contrast acidic and basic oxides
	- Chemical properties of - Acidic oxides - Basic oxides - Neutral oxides	- Amphoteric oxides - Neutral oxide - Peroxides - Classification of Acids - Monoprotic or polyprotic acids	- Define amphoteric oxides - Chemical properties of amphoteric oxides, neutral oxide; chemical properties of peroxides - Distinguish peroxides from other oxides
	The competent chemistry teacher understands Bases	The competent chemistry teacher understands - Bases - Bases Interns of the concepts of Arrhenius, Bronsted-Lowry and Lewis;	The competent chemistry teacher understands Define, what bases are based on the concept of (Arrhenius; bronsted lowry and lewis)
	Properties of bases	- Properties of bases - Strong and weak bases - Relationship between PH and POH	- Explain the properties of bases - Solve the following The hydroxide ion concentration in a solution $5.0 \times 10^{-5} \text{ M}$? calculate

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			(a) POH (b) (H ⁺) (c) PH - Determine the (OH⁻) in 3x10⁻⁵M solution of HCL - Determine the PH of 2.0x10⁻² M Sr (OH₂) solution assuming compete dissociation
	- Salts - Classification of salts	Salts can be classified as - Acidic salts - Normal salts - Basic salts	Define salts; acidic; normal and basic salts are?
3	Electro chemistry Metallic conductors	- Electrochemistry - Electrochemical cells - Electrolytic cells - Galvanic or voltaic cells - Metallic conductivity - Electrolytic conductivity - Electrolysis - Electrode - Anode - Cathode - Electrolytic - Anion - Cat ion	- What are hydroscope salts; Deliquescent; Efflorescent salts; Define electrochemistry is? Electrochemical cells? Galvanic or voltaic cells? - Define metallic conductivity; electrolytic conductivity; and electrolysis? - Define terms electrode; anode; cathode; electrolyte; anion and cation
	- Gaevnie (Voltanc) cells - Electroplating	- Galvanic (Voltaire) cells - Different types of voltaic cells - Voltaic cell and an electrolytic cell - Describe voltaic cell - Purpose of electroplating	- Define Voltaic cell - Distinguish between voltaic cell and an electrometer cell - Define, what an electroplating is?
4	The competent chemistry teacher	The competent chemistry teacher understands	The competent chemistry teacher

	Content standards	Know ledge Indicators	Performance Indicators
	understands - Natural resources - Renewable and non renewable natural resources	- Natural resources - Renewable natural resources - Non-renewable natural resource	Explain, the renewable natural resource and non-renewable natural resources are?
	Types of environmental pollution and the names of the pollutants	- Three types of environmental pollution - Causes and effects of air, water and land population - Extraction of aluminum by the all process - Physical and chemical properties of aluminum - Use of aluminum - Physical properties - Chemical properties	Causes and effects of air, water and land pollution Describe, how Al_2O_3 converted to Al using
	Oxygen Occurrence and production	- Oxygen most abundant element on earth - Relatmely reactive and combines directly, to form oxides - Oxygen combine, with non metals to form acidic oxides	Describe oxygen?
	The competent chemistry teacher understands Industry -in Ethiopia	- Industry - Glass - Ceramics - Cement - Sugar manufacturing - Paper and pulp - Tannery - Food proceeding and preservation	The competent chemistry teacher - Define, industry, means? - Define, glass; soda-lime glass; Borosilicate glass: - Explain, what cermic is - Define, cement? calcination? sugar cane? Paper and paep;Tannery; and food processing and preservation
	Environmental pollution	- What is pollution environmental pollution, and how air pollution is one of them? - Explain, how land pollution has be come one factor of pollution?	Define, pollution? Pollutant? Explain, the three types of pollution, and how air pollution is one of them?

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			Explain, how land pollution has be come one factor of pollution?
1	The competent chemistry teacher understands The essence of chemistry	The competent chemistry teacher understands - Chemistry - The essence of chemistry - The production of new nutrials - Economical way of utilizing natural rescurer	The competent chemistry teacher - Define, the term chemistry is? - Explain, the position of chemistry in natural science, from its classification of basic science.
	The Relationship between chemistry and the natural sciences	- The relationship between chemistry and the natural sciences - The three branches of natural sciences; biology ; chemistry; and physics	- Identify and explain chemistry to that of the natural sciences - Define the three branches of sciences biology, chemistry, and physics
	Rale played by chemistry in production and society	- Chemists contribution in experimenting and preparing new substances - The finding of medicine for HIV/AIDS - The making of hospital equipment - Give help to the metal work by shading how better steel can be made sin manganese and iron - Chemists are producing fertilizers, insecticides, - Chemists are producing fertureers, insecticides and herbicides (weedkillers) that heep farmers to produce----etc. - Chemists are producing furriers, insect ides (weed killers) that help farmers to produce---etc	Describe, chemists contribution to the society
2	The competent chemistry teacher understands Substance	The competent chemistry teacher understands - Properties of substances - Environment matter	The competent chemistry teacher Define the terms what substance is? Matter? env't?

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	Properties of substance	- matter - Substance(s) - Substances are classified in to elements, compounds and mixtures - Substance has characteristics property - Property are two kinds physical and chemical - Physical properties - Absence of any change in composition (color, density, hundreds , meeting point, boiling points, etc) - Chemical properties - Undergone changes in composition - The rusting of iron in moisture - Burning magnesium - To demonstrate the ill flammability of substances - Identifying substances on the bases of their properties	- Describe the properties of a substance - Explain what substance describe, some characteristics of a substance are? - Define the physical and chemical properties of subsidies. - Describe, what happened when an iron is dissolved with water.
	Physical and chemical changes	- Physical and chemical changes - Physical changes and processes - Change of state - Chemical change - A physical change - The effects of a catalyst - Rusting of iron	- Explains what a physical and chemical change could mean. - Describe, the term mechanical changes - What would lapper if – - A magnesium ribbon is burned - Heating sugar; put iron in wet places
	- Types of substances - Compounds	- Types of substances - Elements - Metals; non-metals and metal lords - Compounds	Describe, the types and characteristics of substances are define, the term compounds are and its significance.

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		• Oxides • Acids • Base • Salt	
	• Moistures	• Mixtures • Homogeneous mixture(solution) • Heterogeneous mixtures	• Describe, what mixtures and how it classifies
	• Techniques for separating mixtures into useful components	• Separating mixtures in to useful components • Decantation • Filtration • Using separator funnel • Magnetite separation • Simple distillation • Fractional distillation	• Describe, terms ; decantation; filtration; magnetic separation; using separations funnel crystallization; simple distillation and fractional distillation
3	The competent chemistry teacher understands • The Language of chemistry	The competent chemistry teacher understands • The Language of chemistry • Chemical symbols of elements	The competent chemistry teacher? • Define, what a symbol is? • Describe, how elements of different kind give names (symbol)?
	Chemical formula	• Chemical formula • Formula V_s symbols • Valiancy	• Define, terms; Formula: • Symbols; binary compounds; • Compounds of metals with variable valence numbers; • Gnaliture meaning so symbols and formals: quantitative meaning of symbols and • Formulas; meaning of coefficients and subscripts of symbols and formulas; the mole concept.
	• Naming simple compounds	• Naming simple compounds	• Explain, the Law of conservation

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		- Naming binary compounds - Naming compounds of metals - Qualitative and Quantitative significance of symbols and formulas - Meaning of coefficients and subscripts of symbol and formals - The mole concept	of mass; writing simple chemical equations: meaning of chemical equation.
	Chemical equation	- Chemical equation - The law of conservation of mass - Writing simple chemical equations - Meaning of chemical equation	Explain, the Law of conservation of mass: writing simple chemical equations: meaning of chemical equations.
	- Formula equation - Balanced chemical formula	- Formula equation - Balanced chemical	- Define, what a formula equation - Define, what a balanced chemical equation.
4	The competent chemistry teacher understands Some important compounds:	- The competent chemistry teacher understands - Some Important compounds - Oxides	The competent chemistry teacher understands Define, what compounds are; oxides;
	Types of oxides	- Types of oxides? - Metallic oxides - Non-metallic oxide - Acidic oxide - Basic oxide - Amphoteric oxide - Neutral acids - Peroxide	- Describe, both metallic and non-metallic oxides are? - Explain, terms like; - Acidic oxide - Basic oxide - Amphoteric oxide - Neutral acids and peroxide - Explain how oxides of different kind are prepared
	- Acids - Some common acids	- Acids - Some common Acids	Define what acids are and indicate some properties of

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	Properties of acids	- HCl - HNO₃ - Properties of Acids - Strength of Acids	acids. Describe, how acids are prepared?
	- Bases - Some common bases - Properties of bases	- Bases - Some common bases - Properties of bases	Define what bases are and its function.
	The Competent chemistry teacher understands - Salts: - Some common salts	The competent chemistry teacher understands - Salts - Some common salts	The competent chemistry teacher
5	Environmental chemistry	Environmental chemistry	Define, what air is?
	- Air - Composition of air - Air pollution	- Air - Composition of air - Importance of air - Air pollution - Oxygen - Hydrogen - Natural rescuers.,	- hat composition air, mean? - Describe, what air pollution mean 2 - Define, the elements, oxygen; hydrogen; are prepared, in laboratory and explain the properties of these gases. - Describe, how the elements oxygen and hydrogen are prepared, in Laboratory and explain the properties of these gases - Describe about the natural recourses and identify its either the significance of some resource or its harmfulness.
	The competent chemistry teacher understands	The Competent chemistry teacher understands	The competent chemistry teacher

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1	- The structure of substance - Atomic theory - Dalton' atomic theory	- Historical development of the atomic nature of substance - Atomic View of matter, by Leucippus (450 B.C) - Democritus' proposal on the first atomic theory. - Atoms, Greek word= uncut able or indivisible. - Aristotle's conflicting (opposing) ideas, - Atomic theory - Dalton's atomic theory - The modern atomic theory	- Define, what a substance is matters--- atomic theory - Explain the historical development of atomic nature of substance. - Compare and contrast, the modern atomic theory to that of Dalton 's atomic theory.
	- The structure of the atoms	- The structure of the atoms - Subatomic particles - Electrons - Protons - Neutrons - Nucleus	- Define, what subatomic particles are? - Define, electrons; protons: neutrons, and nucleus of an atom are?
	- The Triad system (Dobereiner's triads) - The Law of octave	- Classifying elements - Major categories of elements - Dobereiner's Triads and the law of octave - Law of octave – the order of mastering atomic mass	- How do elements classify? - Name the major categories of elements - Why did Dobereiner's system require other arrangement?
	- Mendeleeve's periodic table and its Law - Periodicity - Mendeleeve Vs Meye's	- Mendeleeves periodic table - Modern periodic table and its law	- Describe, the periodic table and Mendeleev's contribution? - Define, what atomic number; electron configuration and valiancy?

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	classification	• Periods and groups • Periods (series) • Groups(families) • Arrangement of the elements in the periodic table • Atomic number(2) • The electron configuration of the first 20 elements • Valence electrons of atoms and the group	Describe, groups of the periodic table are? Explain, what nuclear change: ionization energy?
		• Number of shells and group of elements	Identify and explain - Mendeleev's way of classifying elements, in the periodic table
	The competent chemistry teacher understands	The competent chemistry teacher understands	The competent chemistry teacher
	• Atomic number, mass number; atomic mass and isotopes	• Atomic number(2) • Mass Number (A) • Isotopes • Atomic mass	Define what atomic number; Mass number; atomic mass Isotopes.
	• Electron Configuration	• Electron configuration • Valence electrons • Ions ▪ Cat ion ▪ anion	• Electron Configurations? • Valance electrons • Ions • Cartons • Anions
	• Moleeules • Differed between atoms, ions, molecules	• Molecules of elements • Monatomic molecules • Diatomic molecules • Polyatomic molecules	• Define molecule? • Definite atoms? • Identify and explain the defiance between polyatomic molecules

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		Molecules of compounds	and molecules or compounds Explain, what monatomic molecules are?
2	The competent chemistry teacher under stands - Periodic classification of the elements - Historical development of the periodic classification of the elements	The competent chemistry teacher understands - periodic classification of the element - monatomic molecules - Diatomic molecules - Polyatomic molecules - Molecules of compounds	The competent chemistry teacher - Define, the periodic table? - What are elements to do with the periodic
	The competent chemistry teacher understands - Moving from left to right or right to left of the periodic table - Atomic radii - Nuclear shielding (shielding, effect) - Effective nuclear change	The competent chemistry teacher understands Nuclear change - Atomize size - Ionization Energy - Electronegativity - The first Ionization energy - The second Ionization energy	The competent chemistry teacher - Define what metals are? Non-metals:are - Describe, the physical and chemical properties of metals
	The Alkali metals	- Alkali metals - Properties of the alkali metals - Chemical properties of the alkali metals	Describe, the statement made as, the consequence of an electrons activity of the halogens gets discommended?
	The competent chemistry teacher understands - The Alkali- metals - Properties of the alkali-metals	The competent Chemistry teacher understands - Alkali-metals - Properties of the alkali-metals - Chemical properties of the alkali-metals - Uses of the alkali-metals and their compouads	The competent chemistry teacher - Compare, the alkaline earth to the alkali metals - Define, the following terms:- - Electroplating - Tin plating - Alloying - Oiling - Rusting - Souder - Hematite

	Content standards	Know ledge Indicators	Performance Indicators
			Explains, why elements in the B-Groups in the periodic table are know as-transition elements?
4	The competent chemistry teacher understand Non-metals and their compounds	The competent chemistry teacher understands - Non-metals and their compels - Non-metals - metals	The competent chemistry teacher Define metals: non metals? No bre-gas? Define the term "metalloids" and compare them to that of other elements. Classified in the periodic table
	- Carbon and some of its compounds - Reactrons of oxides of metals basic an hydrides (ternary acids)	- Properties of non-metals - Physical properties - Carbon and some of its compounds - The positions of carbon in the periodic table - Chemical properties - Oxides of carbon	Define terms properties of carbon: oxides of carbon; monoxide What are reactions of oxides of metals and non-metals are?
5	The competent chemistry teacher understands - Molecular mass and formulas mass - Molecular mass - Formula mass - Percentage composition of a compound	The competent chemistry teacher understands - Molecular mass and formulas mass - Molecular mass - Formula mass - The mole concept - Mole - Percentage composition of a compound	The competent chemistry teacher understands - Define, terms; molecular mass; mole; molar mass - Identify and give a definition of gram stom, gram mole cule and gram formula - Describe, what a percentage composition of a compound is?