

Timeline	Themes/Enduring Understandings/Essential Questions for the Unit	Common Core Standards Addressed	Assessments	Standards Based Skills and Concepts Targeted	Strategies/Practices Used to Teach Skills and Concepts	Resources/Texts Used
August/ September UNIT 1: Intro to Biology and characteristic of life	<p>What are the essential parts of an experiment?</p> <p>Describe the major characteristics that distinguish living from nonliving things.</p> <p>What are the major elements essential for life?</p> <p>What are the differences between prokaryotes and Eukaryotes?</p>	<p>A.12.5 A.12.7 B.12.3 B.12.4 G.12.1 A.12.1 F.12.1 F.12.2</p>	<p>Formal lab discussions. Lab reports, Graphs, analysis of data, test, quiz, Journal reflection, computer model, concept mapping</p>	<p>Describe the common characteristics of life.</p> <p>Compare and contrast the cellular structures and degrees of complexity of prokaryotic and eukaryotic cells developed from early prokaryotic cells (e.g., mitochondria, chloroplasts)</p>	<p>Lecture: Ch-1. Notes PP Lecture: Ch-2. Notes PP Lecture: Lab Safety Notes PP Lecture: How to Write up a Lab Report Notes PP Activity: Scientific Method Smart board Activity: Microscope study Activity: What is a living thing? (outside) Activity: Video/Play of cell functions Activity: Jeopardy! Review</p>	<p>Biology by Glencoe Science Textbook Internet Resources</p>
October UNIT 2: Cell and Organelle structure and function	<p>What is the endosymbiont theory?</p> <p>How do prokaryotes and eukaryotes differ in structure and function?</p> <p>What are main organelles of eukaryotes and how do they function individually and as a whole?</p>	<p>A.12.5 A.12.7 A.12.12 B.12.3 B.12.4 G.12.1 A.12.1 F.12.1 F.12.2 F.12.4</p>	<p>Lecture, worksheets, Vocabulary, WebQuest, 3-D Cells Project,</p>	<p>Explain how the structure of an organelle is essential to its function Identify the parts of a cell under a microscope. Manipulating microscope parts. Creating a wet mount</p>	<p>Lecture, Notes, Smart board Presentation, online video ACTIVITY: students will create a play or video where they will use an analogy to describe the functions of the organelle.</p>	<p>Biology by Glencoe Science Textbook Internet Resources</p>
November UNIT 3: Ecology	<p>What is the difference between a population and a community?</p> <p>How do organisms cooperate and compete in ecosystems?</p> <p>How might destruction, overpopulation, invasive species and overharvesting influence biodiversity around the world?</p> <p>How do chemicals in agricultural runoff influence water quality and pollution?</p>	<p>A.12.1 A.12.5 A.12.7 B.12.1 B.12.5 C.12.1 C.12.2 C.12.6 C.12.7 F.12.5 F.12.6 F.12.7 F.12.8 F.12.9 F.12.10 F.12.11</p>	<p>Chapter Tests Chapter Quizzes Research paper on effect of introduction of new species. Analysis of ecological data</p>	<p>Evaluate evolution in terms of evidence as found in the following: viral evolution, antibiotic and pesticide resistance in various organisms.</p> <p>Understanding succession, carrying capacity, logistic and exponential growth, limiting factors, niches, endangered organisms, habitat fragmentation.</p> <p>Discuss the effects of phosphates, and nitrates on water quality and soil richness.</p> <p>Using the science themes, infer changes in ecosystems prompted by the introduction of new species, environmental conditions, chemicals and air, water or earth pollution.</p>	<p>Lecture: Biomes, Energy Flow, Evolution Smart board Presentation Activity: make inferences about the effects of destruction, overpopulation, invasive species and overharvesting in different scenarios.</p>	<p>Biology by Glencoe Science Textbook Internet Resources Current event articles Scientific Journal analysis</p>
December Unit 4: Inorganic Chemistry and water properties	<p>What is a polar molecule and how does polarity affect bonding between water?</p> <p>What is the difference between a covalent bond and an ionic bond?</p> <p>How do water properties support life on earth?</p> <p>How does the cell membrane keep some substances out?</p> <p>Which substances can cross the lipid bilayer?</p>	<p>F.12.3 F.12.11 D.12.4 D.12.1 D.12.2 D.12.3 D.12.11 D.12.12</p>	<p>Formal Lab Lab reports Graphs Analysis of Data Test Quiz Journal Reflection</p>	<p>Explain the role of water in cell metabolism.</p> <p>Explain how water properties are essential to the proper functioning of living things on the cellular level, tissue level and organismal level.</p> <p>Predict water movement into and out of cells with various solute concentrations.</p> <p>Explain how the cell membrane functions as a regulatory structure and a protective barrier for the cell.</p> <p>Describe transport mechanisms across the plasma membrane.</p>	<p>Dialysis bag as a model for cell membrane. Diffusion and osmosis LAB Create a wet mount of plant and animal cells. Showing plasmolysis and turgidity. Draw hydrogen bonds between water molecules and use water properties to explain biological phenomenon.</p>	<p>Biology by Glencoe Science Textbook Internet Resources</p>

	What are the building blocks of carbohydrates, proteins, lipids and nucleic acids?	F.12.9 F.12.10	Formal Lab Lab reports	Use organic model kits to build functional groups.	
January 2 weeks	What is each used for in living things?	D.12.4 D.12.3	Graphs	Use diagrams to recognize and classify organic compounds.	Biology by Glencoe Science Textbook
Unit 5: Biochemistry and organic Chemistry	What methods and indicators are used to identify nutrients in foods?	D.12.2 D.12.3 D.12.6 D.12.12	Analysis of Data Test Quiz	Use indicator solutions such as Benedict's test and Biuret reagent to identify carbohydrates and proteins.	Internet Resources
	What are the main reactants and products of photosynthesis and cellular respiration?		Journal Reflection	Measure the rate of cell respiration in various organisms under various conditions using digital equipment.	Online LAB activities
				Identify photosynthetic pigments through chromatography.	
	What types of molecules enter and leave cells easily through the plasma membrane?			Relate the structure of cell organelles to their function.	
	Which substances use transport proteins?			Explain the role of water in cell metabolism.	Biology by Glencoe Science Textbook
January 2 weeks	How do the structures of the cell membrane relate to its functioning transporting substances?	A.12.7, C.12.3, C.12.4, C.12.5, F.12.1, F.12.2, F.12.4, F.12.9, F.12.10, F.12.11	Formal Lab Lab reports	Discuss the conditions of active transport versus passive transport.	Internet Resources
Unit 6: Cellular Transport and Homeostasis	How do large substances enter and exit the plasma membrane?		Graphs Analysis of Data Test Quiz	Explain how cells perform endocytosis and exocytosis.	Online LAB activities
	What is the role of the cell membrane in maintaining homeostasis?		Journal Reflection	Identify the main components and functions of the components in the plasma membrane.	
	What are some examples of homeostasis in animal and plant systems?				
	How does the structure of the mitochondria and chloroplast enable the fast movement of nutrients, CO ₂ , and ATP into and out of cells?		Notes on videos	Discuss the role of NAD and NADP as electron carriers and reducing agents.	Use laboratory equipment to measure the rate of cell respiration and photosynthesis and biological systems.
February 2 weeks	What are the main reactants and products of photosynthesis and respiration?	A.12.7, C.12.3, C.12.4, C.12.5, F.12.1, F.12.2, F.12.4, F.12.9, F.12.10, F.12.11	Lab reports.	Explain the main role of enzymes in relation to activation energy and how they are influenced by temperature and pH.	Biology by Glencoe Science Textbook
Unit 7: Energy Transformations— photosynthesis and cellular respiration.	How are they different? Similar?		Worksheets		Internet Resources
	What is the role of co-enzymes, ATP and gases in photosynthesis and cellular respiration?		Quiz's Test		
				Describe now the process of meiosis results in the formation of haploid gametes and analyze the importance of meiosis in sexual reproduction	Modeling Mitosis and meiosis
			Lecture notes	Compare and contrast meiosis and mitosis.	Extract DNA from cheek cells.
	What is the difference between the prokaryotic and eukaryotic genome?	A.12.1 F.12.1 F.12.2	Worksheets	Illustrate that the sorting and recombining of genes in sexual reproduction results in a great variety of possible gene combinations in offspring.	Differentiate between mitosis and meiosis.
February 2 weeks	What cells typically undergo mitosis?	F.12.3 F.12.4	Project		Creating Punnett squares using Mendel's laws of heredity
Unit 8: Cell Cycle: Mitosis and Meiosis	When does mitosis occur?		Quizzes		Biology by Glencoe Science Textbook
	How does a normal cell become a cancerous cell?		Mitosis booklet	Explain how all organisms begin their life cycles as a single cell and that in multicellular organisms, successive generations of embryonic cells form by cell division.	Internet Resources
			Activity	Summarize the stages of the cell cycle.	Family Pedigree Project
			Test		Use smart board presentation to illustrate Mendelian Genetics.
			Examples of cause and effect in organisms.		Be able to complete a mono and dihybrid cross.

			Research paper: Mutations	Describe the basic structure of DNA, including the role of hydrogen bonding.	Use gel electrophoresis for restriction enzyme analysis.	
			Worksheets	Explain how the process of DNA replication results in the transmission and conservation of the genetic code.	Activity: DNA line up in the hallway	
	How is an organism able to take up foreign DNA and express genes as part of its phenotype?		Project: Mutations		Create a model of DNA replication,	Biology by Glencoe Science Textbook
March			Quizzes	Describe how transcription and translation result in gene expression. Differentiate among the end products of replication, transcription and translation. Cite evidence to support that the genetic code is universal.	Transcription and Translation.	
Unit 9: DNA structure and Function and Genetic engineering	What is the main process of DNA semiconservative replication?	A.12.1 F.12.3 F.12.4 F.12.6	Activity: Replication, Transcription and Translation		LAB: DNA genetic code kit	Internet Resources
	How do mutations occur and what is the consequence of various mutations?		Test		LAB: DNA wheat germ	Current event articles on the use of biotechnology
Unit 10: Genetics	How do inheritance laws help determine and predict future phenotypes?		Compare and contrast DNA mutations and chromosomal mutations	Explain how genetic technologies have impacted the fields of medicine, forensics, and agriculture. Stem cells can differentiate because of chemical signals encoded in genetic code.	Article Summary	
	What is a stem cell?		Discuss the advantages and disadvantages of stem cell research.		Distinguish among observed inheritance patterns caused by several types of genetic traits (dominant, recessive, codominant, sex-linked, polygenic, incomplete dominance, multiple alleles.	
					explain the mechanisms or evolution through natural selection by manipulatives.	
	How do small changes in genetics accumulate in a gene pool?		Assignment: using a dichotomous key	Describe the theory suggesting that life on Earth arose as a single, primitive prokaryote about 4 billion years ago and that in the next 2 billion years a huge diversity of single-celled organisms evolved.	Be able to support the theory of evolution using specific documentations, examples and experiments.	
	How does genetic drift affect a population?		LAB: Leaf Lab		Compare various mechanisms of evolution.	Biology by Glencoe Science Textbook
	What is the evidence for evolution?	12.1 F.12.3 F.12.4 F.12.6	LAB: Classification Lab	Analyze how increasingly complex, multicellular organisms evolved once cells with nuclei developed.		Internet Resources
April	How does artificial selection provide experimental evidence for evolution?		Test		Understand that classification is based on an analysis of the presence and modification of features inherited from common ancestors.	Quran/Hadith
2 weeks	What is speciation?		PAPER on Islamic perspective on evolution.	Describe how mutations in sex cells may be passed on to successive generations and that the resulting phenotype may help, harm, or have little/ no effect on offspring's success in its environment.		
Unit 10: Evolution	What are the mechanisms that lead to speciation?		Bottleneck genes		Understand that genetic variation arises from sexual reproduction, genetic recombination (meiosis and crossing-over) and mutation.	
	How does genetics play a role in speciation?		LAB: Natural Selection			
			Quizzes	Describe the relationship between environmental changes and changes in the gene pool of a population.		
					Understand that mutations	
				Student will describe how the environment and interactions between organisms can affect the number of species and the diversity of species in an ecosystem.	LAB: Dissections: Worms, Frogs, Crayfish 4	
	How are living things classified?				Concept mapping	
	What are the key features of a plant?	A.12.1 A.12.3 A.12.4 B.12.1 B.12.5 F.12.5 F.12.6 F.12.7 F.12.9 F.12.11 F.12.12	Lecture	The student will relate the structure, complexity and organization	Students will categorize the traits of plants	Biology by Glencoe Science Textbook
May-June	How have plants adapted to life on land?		Worksheets	of organ systems to the methods of obtaining, transforming, releasing and	Students will categorize the key traits of chordates, sponges, cnidarians, flatworms and roundworms	Internet Resources
Unit 11: Organizing life's diversity	What are the major groups of plants?		Mini lab: 22.1	eliminating the matter and energy used		
Plants and Animals	What are the key features of animals?		WebQuest 7	to sustain the organism.		
	Which anatomical features mark branch points on the animal evolutionary tree?				Students will categorize the key features of arthropods, invertebrates, amphibians, fishes, birds and mammals.	
	What are the major animal phyla?			The student will recognize that organisms have both innate and learned behavioral responses to internal and external stimuli, including	Minilab 24.1 p 63	
				the tropic responses in plants.		

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Quarter one	<p>Unit 1: Scientific Measurement Overarching: How are measurements used in the study of chemistry? Topical: How are numbers written using Sig. Figs? What is scientific notation? How are numbers manipulated using scientific notation? What is the connection between some lab equipment and the level of accuracy achieved in measurements?</p> <p>Unit 2: The atom and matter Overarching: What is the basic unit of matter in the universe? Topical: What identifies an element (what makes each element unique from the others)? What is the currently accepted model of the atom? What is an orbital? What is the pattern of electron filling?</p> <p>Unit 3: The periodic table Overarching: What does the location of an element on the periodic table indicate about its reactivity? Lessons: How is an element identified? What atomic particle is used? What are the major trends in: - Atomic radius (down a group and across a period)? - What is the significance of the group #? - Ionic radius? (down a group and across a period)? - Electronegativity? What elements form cations and what elements form anions? How is the atomic mass of an element calculated? - What is an isotope?</p>	A.12.5, B.12.4, D.12.1, D.12.2, D.12.3, D.12.4, D.12.5, D.12.6, H.12.6, H.12.7	Homework Problems, Classwork Worksheets, Individual and Group Presentations, Laboratory Notebooks and Procedures, Quizzes and Tests	<p>Unit 1: Scientific Measurement A. Scientific Measurements B. Scientific Notation C. Metric System D. Accuracy and measurement Vocabulary: Metric Pre-fixes Significant figures Table C – Reference tables</p> <p>Unit 2: The atom and matter A. Physical and chemical properties B. Elements and compounds C. Calculating percentages of elements in compounds D. Atom structure (models) E. electron orbitals and diagrams Vocabulary: Physical properties Chemical properties Atoms Element Law of definite proportions Daltons atomic theory Wave-mechanical model Valence electrons Quantum # Orbital Atomic radius Gold foil experiment</p> <p>Unit 3: The periodic table A. Classify Elements B. Explain the Placement of an Unknown Element on the Periodic Table Based on Properties C. Compare and Contrast Properties Within a Group and Within a Period D. Explain Periodic Trends in Terms of Structure E. Calculate atomic mass of an element F. Explain the trends of action and anion formation Vocabulary: atomic radius electronegativity family group ionic radius ionization energy metal metalloid</p>	Teacher led discussions, Student led discussions, individual and group presentations, hands-on laboratory work, Teacher lecturing, Students employing the Socratic questioning method in group type activities, laboratory demonstrations, videos, in-class worksheets/examples.	Prentice Hall Chemistry Textbook, workbook, resource book and small scale laboratory notebook.
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Quarter two	<p>Unit 4 - Bonding and Naming Overarching: Why do elements form chemical bonds? Topical: What is the Octet Rule? How is electronegativity used to determine bond type? When will ionic bonds conduct electricity? How does symmetry determine polarity? What is the difference between molecular and empirical formulas?</p> <p>Unit 5 - Matter and Energy Overarching: How can KMT be used to describe the relationship between pressure, volume and temperature of a substance? Part I - What is homogenous matter? What is heterogeneous matter? What is a pure substance? What is the law of definite proportions? When does it apply? (Is there a chemical bond in the substance you are looking at?) What is a mixture? What is a solution? What are the techniques for the separation of a mixture? When does each need to be used? What is potential energy? Where on the energy diagram is it increasing? Staying the same? What is kinetic energy? Where on the energy diagram is it increasing? Staying the same? What is heat? What is temperature? What are the phases of matter? What does the particle diagram look like for solid and gas?</p>	D.12.10, H.12.6, H.12.7	Homework Problems, Classwork Worksheets, Individual and Group Presentations, Laboratory Notebooks and Procedures, Quizzes and Tests	<p>Unit 4 - Bonding and Naming A. Distinguish Between Ionic, Molecular, and Metallic Substances Based on Properties B. Draw Lewis Dot Diagrams C. Distinguish Between Polar and Nonpolar Bonds and Molecules D. Compare Physical Properties of Substances Based on Chemical Bonds and Intermolecular Forces Vocabulary: octet rule action anion ionic compound salt crystal lattice monatomic ion binary compound polyatomic ions covalent bond molecular compound nonpolar covalent bond polar covalent bond hydrogen bond single bond Lewis structure Asymmetrical symmetrical double bond, triple bond, molecular formula, empirical formula.</p> <p>Unit 5 - Matter and Energy A. Draw Particle Diagrams B. Differentiate Between Different Forms of Matter 1. Interpret and understand the phase change diagram C. Describe How to</p>	Teacher led discussions, Student led discussions, individual and group presentations, hands-on laboratory work, Teacher lecturing, Students employing the Socratic questioning method in group type activities, laboratory demonstrations, videos, in-class worksheets/examples.	Prentice Hall Chemistry Textbook, workbook, resource book and small scale laboratory notebook.

	What is a heating, cooling curve? Can you label the important information? What is a physical change? What is a chemical change? What processes on the heating, cooling curve is endothermic, which are exothermic?			Separate a Given Mixture Vocabulary: condensation deposition freezing fusion gas phase heat heat of fusion heat of vaporization kinetic molecular theory liquid phase solid phase sublimation temperature vaporization		
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Quarter three	<p>Unit 5 - Matter and Energy Part II Overarching: How can KMT be used to describe the relationship between pressure, volume and temperature of a substance? Part II - 1. What are the phases of matter? 2. What are the parts of the phase change diagram? a.) How does potential and kinetic energy relate to the diagram? 3. What is meant by average kinetic energy? 4. How is heat energy measured? a.) What is the equation used to measure heat? Where heat? 5. What are the four assumptions made for an ideal gas? 6. How are pressure, volume and temperature related to each other: a.) Using Boyles law? (what is the equation) b.) Using Charles law? (what is the equation) c.) Combined gas law? (what is the equation) 7. When is each gas law applied? 8. When does a real gas behave like an ideal gas? a.) What conditions must exist for a real gas to behave like an ideal gas? b.) What real gases behave most like ideal gases? c.) What is standard temperature and pressure? 9. Why do equal volumes of a gas contain the same number of particles? 10. How does the polarity of a molecule affect its vapor pressure? a.) How do you use reference table H? Unit 6 - Math of Chemistry Overarching: What technique is used to count objects that are too small to be seen without the aid of instruments? Topical: What is the Law of Conservation of mass and how does a balanced chemical equation show this law? What is the relationship between the gram-atomic mass of an element or compound and the number of molecules (atoms) that is contains? What are the mole to mole ratios in a chemical equation or compound and what do they mean? How do we calculate the amount of a substance made in grams given an amount in grams? Unit 6b - Solutions Overarching: What are the properties and characteristics of solutions? Topical: How are solutions represented in a chemical reaction? How are solutions different from a mixture? How do we describe solutions quantitatively in chemistry? Make a .3M Kool-Aid solution of your own using a cup and the Kool-Aid mix. What mass of Kool-Aid (C₁₂H₂₂O₁₁) is in your cup? What is ppm and % by volume? Where do you see them used? How do you use reference table F? What compounds on this reference table are not electrolytes? How do you use reference table G? Why do some of the lines show an increasing trend</p>	D.12.10, H.12.6, H.12.7	Homework Problems, Classwork Worksheets, Individual and Group Presentations, Laboratory Notebooks and Procedures, Quizzes and Tests	<p>Unit 5 - Matter and Energy Part II D. Calculate the Heat in joules E. Convert Between Celsius and Kelvin F. Describe an ideal gas G. Describe the KMT H. Apply the gas laws I. Describe vapor pressure and polarity of molecules relationship (reference Table H) Vocabulary: Kinetic energy Vapor pressure Potential energy KMT STP</p> <p>Unit 6 - Math of Chemistry A. Name and Write Formulas for Compounds B. Convert Between Grams, Moles, and Molecules C. Determine Empirical and Molecular Formulas D. Identify Reactions E. Balance Equations F. Predict the Products of a Reactions G. Convert Moles Using a Balanced Equation Vocabulary: formula mass gram formula mass mole percentage composition</p> <p>Unit 6b - Solutions A. Recognize the aqueous phase in a chemical reaction B. Differentiate between a solution and a mixture C. Quantitative descriptions of a solution: - calculating Molarity, and parts per million D. Recognize colligative properties of solutes. (both ionic and covalent) Vocabulary boiling point molarity parts per million (ppm) percent by volume percent mass saturated solute solution solvent supersaturated unsaturated vapor vapor pressure Unit 7 - Equilibrium A. define collision theory B. Recognize endothermic and exothermic reactions C. Recognize and label parts of the potential energy diagram. Relate temperature change to delta H. D. Define the major factors of a chemical reaction E. Explain the effect of a catalyst on a chemical reaction F. Define LeChatliers principle G. Understand the effect of stresses on a system at equilibrium H. Recognize a reaction that is spontaneous Vocabulary: activated complex activation energy catalyst entropy equilibrium LeChatliers principle potential energy diagram stress</p>	Teacher led discussions, Student led discussions, individual and group presentations, hands-on laboratory work, Teacher lecturing, Students employing the Socratic questioning method in group type activities, laboratory demonstrations, videos, in-class worksheets/examples.	Prentice Hall Chemistry Textbook, workbook, resource book and small scale laboratory notebook.

	<p>and others show a decreasing trend? What are colligative properties of solutions? What difference do covalent bonds and ionic bonds have on melting and boiling points of water? Unit 7 - Equilibrium Overarching: Topical: What is collision theory? Why do collisions need to occur? What role does energy play in chemical reactions? How is the energy in chemical reactions represented graphically? What is an exothermic reaction? What ΔH sign does it have? What is an endothermic reaction? What ΔH sign does it have? What are the parts of the energy graph? What are the major factors that affect a chemical reaction? What is a catalyst and how does it affect the energy required to start a chemical reaction? How do you know a chemical reaction is in dynamic equilibrium? What is the exact definition of dynamic equilibrium? If a forward reaction is exothermic, what is the reverse reaction? What is LeChatliers principle? What are the changes that are made to a chemical reaction? How does a catalyst effect the chemical equilibrium? What is the definition of entropy and enthalpy? What are the symbols associated with it? And what is the sign with each?</p>			to a closed system		
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Quarter four	<p>Unit 8 - Acids and Bases Overarching: What are the properties and characteristics of acids and bases? Topical: What are the differences between acids and bases? What is an electrolyte? Are Acids and bases electrolytes? What is the Arrhenius theory of acids and bases? What is a neutralization reaction? What general category do they fall into? What are the products of an acid-base reaction? What is a titration? What is ionization? How is ionization related to pH level and the strength of acids and bases?</p> <p>Unit 9 - Redox and electrochemistry Overarching: What are the electrical properties of the elements? Topical: What is meant by the term redox? What is reduction? What is oxidation? What is a reducing agent? What is an oxidizing agent? What are the rules for determining oxidation numbers for: elements? ions? atoms in polyatomic? What are redox reactions? How are redox reactions balanced? What is a corrosion reaction?</p>	D.12.11, D.12.12, H.12.6, H.12.7	Homework Problems, Classwork Worksheets, Individual and Group Presentations, Laboratory Notebooks and Procedures, Quizzes and Tests	<p>Unit 8 - Acids and Bases A. Identify and define an Arrhenius acid and Arrhenius base. B. Identify acids, bases and salts as electrolytes. C. Identify a neutralization reaction as double replacement reaction. Identify a neutralization by the products produced. D. Define titration. E. Differentiate between strong acids and bases and weak acids and bases. Link this to the pH level of various solutions. F. Identify and manipulate the pH scale as a logarithmic scale. Vocabulary: acidity alkalinity Arrhenius acid Arrhenius base electrolyte hydrogen ion hydronium ion indicator neutralization pH scale salt titration Unit 9 - Redox and electrochemistry A. Identify the elements that are captions and</p>	Teacher led discussions, Student led discussions, individual and group presentations, hands-on laboratory work, Teacher lecturing, Students employing the Socratic questioning method in group type activities, laboratory demonstrations, videos, in-class worksheets/examples.	Prentice Hall Chemistry Textbook, workbook, resource book and small scale laboratory notebook.

How are half reactions written? What is a voltaic cell? What is electrolysis? What is electroplating? **Unit 9 - Redox and electrochemistry** **Unit 10 - Organic Chemistry** Overarching: In which ways are organic compounds and reactions classified? Topical: What is meant by "organic"? What element must be present to classify a compound as organic? What are hydrocarbons? What is meant by saturated and unsaturated hydrocarbons? What is a homologous series? What reference table do you use for hydrocarbons? What are the major functional groups of organic compounds? What is an isomer? What are the major organic chemistry reactions?

the elements that are anions. B. Define the term redox. C. Define reduction and oxidation. D. Identify elements that are reducing agents and elements that are oxidizing agents. E. Learn and apply the rules for assigning oxidation values for elements in compounds. Recall the crisscross method for making compounds. F. Define redox reaction and balance redox reactions. G. Define a corrosion reaction. H. Identify and write redox half-reactions. I. Define voltaic and electrolytic cells and the associated parts of each. J. Compare and contrast the voltaic and electrolytic cells. K. Define electroplating. Vocabulary: anode cathode electrochemical cell electrode electrolysis electrolytic cells half-reaction oxidation oxidation number (state) redox reduction salt bridge voltaic cell. **Unit 10 - Organic chemistry** A. Name the element that is present in all organic compounds. B. Define hydrocarbons. Manipulate the NYS reference tables in order to identify homologous series of hydrocarbons. C. Define saturated and unsaturated in terms of hydrocarbons. D. Identify the major functional groups of organic compounds. E. Identify and define isomers of different organic compounds. F. Identify the major classes or organic reactions. Vocabulary: addition reaction functional group alcohol hydrocarbon aldehyde isomer alkane ketone alkene organic acid alkyne organic halide amide polymer amine polymerization amino acid saponification esterification saturated ester substitution reaction ether unsaturated fermentation

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		Nature of Physics. Physics is a physical science related to other fields. Process in physics are defined by the scientific method. Measurement systems esp. the S.I. relate physical quantities to units. Students distinguish between fundamental and derived units and use dimensional analysis to confirm validity of equations. Tolerance in measurements allows for numbers to adhere to sci. not. and significant figures. Orders of magnitude allow for "ball-park" figures to estimate final answers.	UNIFYING CONCEPTS AND PROCESSES UCP.1 Using the science themes, distinguish between basic vs. compound units and use mathematical models to represent phenomenon. UCP.2 Using the science themes during laboratory investigation, collect evidence, use models and establish verifiable explanations. UCP.3 Using the science themes apply error and uncertainty in measurement, develop consistency in units and conversions.	1. Chapter Project: construct a timeline of science advances. 2. Section Quizzes and Chapter Test 3. Content labs 4. Develop a spreadsheet on the seven areas of physics.	1. Demonstrate understanding of measurement.. 2. Perform unit conversions. 3. Formulate questions (Blooms Taxonomy) 4. Graph and estimate physical data. 5. Describe the theory of continental drift. 6. Make estimates and rough calculations to the nearest order of magnitude. 7. Apply dimensions to validate equations.	1. Instruction on Material 2. Guided Practice 3. Independent Practice 4. Projects 5. Content Labs 6. Inquiry	Holt, Physics and Interactive Edition. Advance Work from James Walker AP Physics, Fourth Edition
		Linear Motion/Kinematics or Translational Motion. Motion in a straight line allows for the use of an inertial frame of reference. Students describe motion in terms of displacement, time, and velocity and changes in velocity (acceleration). Graphs are important tools for accelerated and non-accelerated motion. Students grasp that a pair of basic kinematic equations leads to the three kinematic equations of motion. Students draw connections between freely falling bodies to constant acceleration and re-arrange kinematic equations for falling objects.	SCIENCE AS INQUIRY UCP.2 Using the science themes, develop abilities to do scientific inquiry. UCP.3 Create line graphs using measured values of position and elapsed time. SAI 1. Using the science themes during the process of investigation, calculate impact speed from a random height. SAI 2. Using the science themes, distinguish between variables of distance, displacement, speed, velocity, and acceleration.	1. Chapter Project: Construct an accelerometer. 2. Section Quizzes and Chapter Test 3. Content labs 4. Homework	1. Solve math problems involving average speed and constant acceleration. 2. Create line graphs using measured values of position and elapsed time. 3. Use the area under a velocity-time graph to calculate the distance traveled. 4. Calculate the average speed, final velocity, and acceleration of an object in a lab setting. 5. Describe the effect of air resistance on free fall motion	1. Instruction on Material 2. Guided Practice 3. Independent Practice 4. Projects 5. Content Labs 6. Content Maps	Holt, Physics and Interactive Edition. Advance Work from James Walker AP Physics, Fourth Edition and Sticky Tape Demonstrations and Labs.
		TWO DIMENSIONAL MOTION AND VECTORS. Motion in two-dimension requires the knowledge of scalar and vector mathematics. Vectors are treated graphically and analytically. Students apply algebra and trigonometry in solving physics math. By using some basic strategies (like resolving a vector and adding their components), students solve more complex motion problems. Students recognize parabolic motion as a commingling of constant motion and accelerated motion. Students are engaged in solving relative motion problems utilizing earlier learning paradigms.	SCIENCE AS INQUIRY UCP.2 Using the science themes, describe and classify various motions in a plane as one dimensional, two dimensional, circular or periodic. UCP.3 Using the science themes, demonstrate how vectors can be added graphically using DTS. SA I. Using the science themes recognize that vectors have other mathematical properties including subtraction, multiplication, and commutative. SA 2. Using the science themes, compare and contrast projectile motion with and without gravity.	1. Chapter Project: Sports Physics (Throwing a Hardball) 2. Section Quizzes and Chapter Test 3. Content labs 4. Dart Gun/Blow Gun analysis.	1. Describe position, velocity, and acceleration in two dimensions. 2. State and define the terminology innate to two-dimensional motion. 3. Distinguish problem-solving strategies in mathematically solving 2-D problems with launch angles vs. horizontal deliveries. 4. Explain why the velocity along the x-plane is invariant. 5. Describe the properties of a parabola and how they relate to two-dimensional motion.	1. Instruction on Material 2. Guided Practice 3. Independent Practice 4. Projects 5. Content Labs 6. homework	Holt, Physics and Interactive Edition. Advance Work from James Walker AP Physics, Fourth Edition and Sticky Tape Demonstrations and Labs.
	August - September						
	October						
	November						

December - January	<p>FORCES AND THE LAWS OF MOTION. Forces play an important role in our lives. In general, forces are dichotomized into two categories: field and contact. They are describe mathematically by Newton's Laws of Motion. The first law depicts why objects maintain their state of motion, inertia. The second law, describes how net forces impact the extent of direction and velocity changes. The third law defines the interdependence of pairs of forces equal in magnitude but opposite in direction.</p>	<p>SCIENCE AS INQUIRY.</p> <p>UCP.1 Recognize the presence of forces and name common forces.</p> <p>UCP 1. Draw force vector scale diagrams</p> <p>UCP 1. Interpret and create free body diagrams and establish conditions for equilibrium</p> <p>UCP 2. Apply Newton's Second Law in a variety of different situations.</p> <p>UCP 2. Decompose s single vector into two components.</p> <p>SA 1. Explain the difference between mass and weight.</p> <p>SA 2. Predict the net external force on an object. SA 2. Find the direction and magnitude of normal forces.</p> <p>SA 2. Use Coefficients of Friction to calculate friction force in an experimental setting.</p>	<ol style="list-style-type: none"> 1. Oral Presentation or Demonstration 2. Chapter tests. 3. Traffic accident investigation applying Newton's laws. 4. Research paper on Newton, Galileo, Einstein related to the study of mass. 5. PowerPoint on the four forces of the universe with the possibility of the fifth force. 6. Review and assessment quizzes. 	<ol style="list-style-type: none"> 1. Understand the historical context between the advent of Newtonian physics and the work of Galileo. 2. Explain how normal forces are developed and their role in calculating friction. 3. Differentiate between inertial and accelerated motion by using free-body diagrams. 4. Identify action-reaction pairs of forces. 5. Describe how dynamic problems are solved using the unification of free-body diagrams and vector math. 6. Describe how contact and field forces affect the movement of electrical charges and free-falling objects. 7. Identify forces in their relationship to changes in motion and relate to precious studies in 2-D. 	<ol style="list-style-type: none"> 1. Oral Presentation. 2. Design an experiment incorporating multi-force environment. 3. Instruction Material 4. Guided Practice 5. Content Labs 	5.
February	<p>WORK, POWER, ENERGY. Work, energy, and power are related to another. Everyday machines, such as motors, are usually described by the amount of work that they are capable of doing. Equally fundamental to force is work. It is the idea that a force times a displacement through which its acts is an important physical quantity. In this chapter the student gets a precise definition of work and shows how it is related to energy. Energy is described by its motion or kinetic qualities and by its elevation above zero height or potential. The student also learns that the total amount of energy in the universe is constant...never changing. Finally, consideration is given to the rate of energy consumed or power.</p>	<p>SCIENCE AS INQUIRY.</p> <p>UCP 1. Recognize the difference between the scientific and ordinary definitions of work. UCP 1. Define where work is being performed in a variety of situations. Calculate the net work done when many forces are applied to an object..</p> <p>SA 1. Identify several forms of energy and calculate the kinetic energy in an object. Calculate the potential energy associated with an object's position.</p>	<ol style="list-style-type: none"> 1. Chapter Project: Human power Lab 2. Section Quizzes and Chapter Test 3. Content labs 4. Problem WB and WS 	<ol style="list-style-type: none"> 1. Explain how energy can be transferred in many different ways. 2. Describe how energy is associated with heat, light, electricity, motion, sound, and the nature of a chemical reaction. 3. Describe the movement of a pendulum (roller coaster) as to the energy transformations that occur between U and K. 4. Analyze a situation as to no work, positive work, and negative work. 5. Explain the role of friction between contact surfaces and its function in dissipating energy. 6. Explain the nature of the scalar quantity in K and U. 7. Describe the meaning of the elastic constant in a spring system. 	<ol style="list-style-type: none"> 1. Instruction on Material 2. Guided Practice 3. Independent Practice 4. Projects 5. Content Labs 6. Research Project 	Holt, Physics and Interactive Edition. Advance Work from James Walker AP Physics, Fourth Edition and Sticky Tape Demonstrations and Labs.
March	<p>MOMENTUM AND COLLISIONS. Collisions and other transfers of momenta occur frequently in everyday life. Examples in sports include the motion of balls against rackets or the motion of human bodies against each other in football. Here again, conservation laws play a major role. Like energy, the total momenta can not be changed within a system of interest. In its simplest form, momentum is merely a product of its mass times its velocity. This concept is expanded to include what causes linear momentum...merely a force exerted through time. This concept is quite analogous to the concept of work.</p>	<p>SCIENCE AS INQUIRY.</p> <p>UCP 1. Define and calculate linear momentum and impulse.</p> <p>UCP 1. Calculate the change of momentum and relate it to impulse. SA 1. Observe and Describe different types of collisions.</p> <p>UCP 1. Solve collision problems using the conservation of momentum in both elastic and inelastic situations.</p> <p>UCP 1. Calculate the change of momentum and relate it to impulse.</p>	<ol style="list-style-type: none"> 1. Chapter Project: Momentum changes in Sports 2. Section Quizzes and Chapter Test 3. Content labs 4. Formal Lab write-up 	<ol style="list-style-type: none"> 1. Explain the role of Newton's second law in forming the basis behind Leibniz and Huygens impulse-momentum equation. 2. Describe the effects of changing mass and speed on the overall total momentum of an object. 3. Relate the role of restraint systems and seat belts on surviving a collision to the laws of momentum. 4. Identify the relationship between the conservation of K and the conservation of momentum during all three types of collisions. 	<ol style="list-style-type: none"> 1. Instruction on Material 2. Guided Practice 3. Independent Practice 4. Projects 5. Content Labs 6. Design an experiment 	Holt, Physics and Interactive Edition. Advance Work from James Walker AP Physics, Fourth Edition and Sticky Tape Demonstrations and Labs.

April	<p>CIRCULAR MOTION AND GRAVITATION. Circular motion is omnipresent. A rotating Ferris wheel and a space shuttle orbiting the Earth share this quantity. A satellite orbiting the Earth is just a projectile that moves fast enough tangentially that it falls around the planet rather than into it. Forces play a big part here, too. Inward forces or centripetal pull their objects toward a center. The Earth revolving around the planet is a good example. But, other forces might not be so obvious. The force of gravity, the pull of a string, the movement of your leg while walking, friction are just a few examples of center seeking forces and motion.</p>	<p>MOTIONS AND FORCES UCP 1. While conducting investigations, explain the motion of objects by describing the forces acting on them UCP 1. While conducting investigations, identify the forces acting on objects moving with constant circular motion. UCP 2. While conducting investigations explain the earth-moon interactions utilizing the concepts of gravity, centripetal force, inertia, centrifugal force, tangential velocity, and other dynamic parameters.</p>	<p>1. Chapter Project: Analysis of mass on a string. 2. Section Quizzes and Chapter Test 3. Content labs 4. Lab Reports</p>	<p>1. Distinguish between rotation and revolution and describe and contrast the two speeds of an object like the Earth. 2. Identify forces acting on objects moving with uniform circular motion (e.g. a car on a circular track). 3. Predict how the gravitational force between objects changes when the distance between them changes. 4. Calculate force, masses, or distance using the Law of Universal Gravitation. 5. Draw vector arrows to represent how the direction and magnitude of a force changes on an object with eccentricity.</p>	<p>1. Instruction on Material 2. Guided Practice 3. Independent Practice 4. Projects 5. Content Labs 6. Demonstrations</p>	<p>Holt, Physics and Interactive Edition. Advance Work from James Walker AP Physics, Fourth Edition and Sticky Tape Demonstrations and Labs.</p>
May	<p>PERIODIC WAVES AND SOUND. When an object is displaced from a position of stable equilibrium it experiences a restoring force that is directed toward the equilibrium. Thus a restoring force accelerates the object in the direction of the equilibrium position. but, it does stop there. Carried by its own momentum, it oscillates back and forth undergoing periodic motion. Students will learn that this is a significant even. In timepieces, the pendulum; in a bumper of a car the shock absorber. Connecting oscillators leads to an assortment of new phenomena including waves (mechanical, water, sound, and light).</p>	<p>MOTIONS AND FORCES UCP 1. Identify that elastic potential energy is stored in stretched or compressed elastic objects. UCP 1. Explain the position of maximum acceleration and velocity in respect to the rest position of a vibrating body. UCP 2. Distinguish between transverse and longitudinal waves. Apply the wave equation to find either the velocity, frequency, or wavelength of a mechanical wave. UCP 2. Compare and contrast standing wave behavior at free and fixed boundaries. Describe how beats are formed by sound waves and the displacement of particles in constructive and destructive interference.</p>	<p>1. Chapter Project: Human Ear 2. Section Quizzes and Chapter Test 3. Content labs 4. Presentation</p>	<p>1. Identify everyday examples of transverse and longitudinal waves. 2. Describe specific mechanical waves in terms of lambda, amplitude, frequency and speed. 3. Calculate the amount of energy transferred by compression waves of different amplitudes and frequencies. 4. Explain how waves propagate from vibrating sources and why the intensity decreases with the square of the distance from a point source. 5. Define the beat frequency .</p>	<p>1. Instruction on Material 2. Guided Practice 3. Independent Practice 4. Projects 5. Content Labs 6. Demonstrations</p>	<p>Holt, Physics and Interactive Edition. Advance Work from James Walker AP Physics, Fourth Edition and Sticky Tape Demonstrations and Labs.</p>

Timeline	Themes/Enduring Understandings/Essential Questions for the Unit	Common Core Standards Addressed	Assessments	Standards Based Skills and Concepts Targeted	Strategies/Practices Used to Teach Skills and Concepts	Resources/Texts Used
Quarter one	<p>Unit 1: Introduction to Science. Describe the main branches of natural science and relate them to each other. Distinguish between scientific laws and theories. Describe how mathematics can describe physical events. Explain the objective of a consistent system of units, and identify the 7 fundamental units in science and their corresponding derived units. Use the unit cancellation method in converting between SI and other systems of measurements. Apply significant figures in rounding your final answers. Utilize mathematics to determine the slope of a linear graph, and be able to apply basic statistical measures viz. omega values and regression analysis to class experimental data. Unit 2: Measuring Motion and Dynamics. Explain the relationship between motion and frame of reference. Describe motion in terms of distance, displacement, speed, and velocity.. Differentiate between scalar and vector quantities encompassing magnitude and direction. Explain the role of the slope of a line on a position vs. time graph. Describe the concept of acceleration both positive and negative as a change in velocity. Explain the effects of unbalanced or net forces on the motion of objects. Compare and contrast static, kinetic, and rolling friction. Explain how the coefficient of friction is determined and its role in representing the resistance to motion. Identify ways in which friction can be reduced or increased. Recognize the role of Newton's 1st law in technological applications especially in safety. Use Newton's second law in determining the net force, mass, or acceleration of a body. Explain the relationship of mass and distance in the inverse square law of gravitation. Describe orbital motion as a result of two concomitant motions. Demonstrate mathematically how free-fall acceleration relates to weight. Clarify the relationship between paired forces as action-reaction couples.</p>	A.12.1, A.12.2, A.12.3, A.12.4, A.12.5, A.12.6, A.12.7,	Homework Problems, Classwork Worksheets, Individual and Group Presentations, Virtual Lab, Quizzes and Tests	<p>Unit1: Introduction to Science. Identify the areas of physics, chemistry and astronomy and their contributions to careers. Illustrate the role of serendipity in scientific discoveries. Create a concept map of the various divisions and branches of science. Differentiate between a theory and law and gives examples in the history of science. State scientific ideas in a mathematical context by using equations and manipulate their terms using algebraic methods. (isolating variables). Explain and identify the roles of dependent and independent variables in a controlled scientific experiment. Use scientific apparatus i.e. microscope, telescope, spectroscope, etc. in an experiment and explain how the scientific tools work and what they detect. Describe how significant figures track down imprecision and place limitations on final mathematical answers and the tolerance of instruments. Explain the difference between SI base units and derived units . Give examples of each. Use scientific apparatus i.e. microscope, telescope, spectroscope, etc. in an experiment and explain how the scientific tools work and what they detect. Interpret line graphs, bar graphs, and pie graphs using extrapolation and interpolation skills. Unit 2: Measuring Motion and Dynamics Describe the measurements needed to describe the average speed, acceleration, etc. of a body. Explain how to combine parallel vectors in the same and opposite directions in finding a resultant. Identify, by using units, magnitudes of speed, velocity, acceleration, etc. Solve mathematical problems using equations for speed, velocity, acceleration. Identify whether an object is speeding up or slowing down by analyzing the magnitudes of kinematics. Explain the criteria for accelerating and constant velocity and give examples of both. Explain how circular motion at constant speed is still considered a form of acceleration (centripetal). Identify the forces interacting on a body and be able to construct an FBD (free-body diagram). Describe a situation in which net forces act on an object and compute its value relating it to a masses acceleration. Understand the role of friction in calculating the net force that causes an acceleration. Differentiate between the three</p>	Teacher led discussions, Student led discussions, individual and group presentations, hands-on laboratory work, Teacher lecturing, Students employing the socratic questioning method in group type activities, laboratory demonstrations, videos, in-class worksheets/examples.	Khanacademy.org, MIT opencourseware

Timeline	Themes/Enduring Understandings/Essential Questions for the Unit	Common Core Standards Addressed	Assessments	Standards Based Skills and Concepts Targeted	Strategies/Practices Used to Teach Skills and Concepts	Resources/Texts Used
Quarter two	<p>Unit 3. Work and Energy. Define work and power. Calculate the work done on an object. Use the concept of mechanical advantage to explain how machines make doing work easier. Differentiate between work and power. Name the six types of simple machines and give examples of each. Describe how a lever can increase the force without changing the amount of work done. Choose a compound machine that you use everyday, and identify the simple machines that it contains. Explain the relationship between energy and work. Define potential and kinetic energy. Calculate GPE, KE, and EPE. Distinguish between mechanical and non-mechanical energy. Identify and describe the transformations of energy.</p> <p>Unit 4: Waves, Sound and Light. Recognize that waves transfer energy some through a medium others without a medium. Distinguish between mechanical and electromagnetic waves. Explain the relationship between particle vibration and wave motion. Distinguish between transverse and longitudinal waves. Identify the crest, trough, amplitude, and wavelength of a wave. Define the terms frequency and period. Describe the Doppler Effect. Solve problems using the wave equation for v, f, and λ. Explain what happens when wave interference takes place. Distinguish between constructive and destructive interference. Recognize how beats are produced by mechanical means. Recognize what parameters affect the speed of sound. Relate loudness and pitch to properties of sound waves. Describe the function of the ear and the biological process of hearing. Identify the duality of light as a particle and wave. Relate the energy of light to the frequency of EM waves. Explain how EM waves are used in communication, medicine, and other areas.</p>	B.12.3, B.12.4, B.12.5, C.12.2,	Homework Problems, Classwork Worksheets, Individual and Group Presentations, Laboratory Notebooks and Procedures, Quizzes and Tests	<p>Unit3: Work and Energy. Determine if and the amount of work being done under certain circumstances. Describe how energy cannot be created nor destroyed, but only changed in form. Explain how energy is different than work. Describe a situation where GPE is useful and deleterious. Explain how energy can be associated with biotic and abiotic sources and how it is transferred through the "web of life". List three situations in which PE converts to KE and vice versa. Describe the rise and fall of a basketball using the concepts of KE and PE. Explain why machines are not 100% efficient. Describe situations in sports that connect work and energy. Describe the movement of a pendulum or roller coaster using different energy forms and the effect of non-conservative forces like friction. Unit 4: Waves, Sound and Light. Distinguish between the motion of the medium and that of the wave. Explain how principles of simple harmonic motion can be applied to the motion of a swing. Compare and contrast and mass-spring system oscillation with that of a simple pendulum. Distinguish between transverse and longitudinal waves by drawing model diagrams of each and corresponding similar parts (crest=compression). Explain how oscillating waves can be polarized by film or sunglasses. Identify the medium for different types of waves. Describe the motion of a water molecule on the surface of the ocean as the wave passes by. Describe several situations in which a wave transports energy. Apply Planck's equation in chemistry to find the energy in a photon (particle) and relate it to visible light. Distinguish between seismic P and S waves and relate them to transverse and longitudinal waves. Illustrate the properties of a wave on a sine</p>	Teacher led discussions, Student led discussions, individual and group presentations, hands-on laboratory work, Teacher lecturing, Students employing the socratic questioning method in group type activities, laboratory demonstrations, videos, in-class worksheets/examples.	Khanacademy.org, MIT opencourseware

				curve. State the SI units for wavelength, frequency, period, speed, etc. Explain why sound waves travel faster in specific media viz. solids, liquids, etc. Describe the relationship (indirect) between frequency and wavelength. Arrange EM waves by wavelength and give uses for each form of electromagnetic radiation. Explain how the energy and penetration power of radiation is related to the color of visible light.		
Timeline	Themes/Enduring Understandings/Essential Questions for the Unit	Common Core Standards Addressed	Assessments	Standards Based Skills and Concepts Targeted	Strategies/Practices Used to Teach Skills and Concepts	Resources/Texts Used
Quarter three	<p>Unit 5: Atoms and the Periodic Table. Explain Dalton's theory and describe why it was more successful than Democritus's theory. State the charge, mass, and location of each part of an atom according to the modern model of the atom. Compare and contrast the Bohr model with the modern quantum model. Relate the organization of the periodic table to the arrangement of electrons within an atom. Explain why some atoms gain or lose electrons to form ions. Determine how many protons, neutrons, and electrons an atom has, given its symbol, atomic number, and mass number. Describe how the abundance of isotopes affects an element's average atomic mass. Locate alkali metals, alkaline-earth metals, and transition metals in the periodic table. Relate an element's chemical properties to the electron arrangement of its atoms. Explain the relationship between a mole of a substance and Avogadro's number. Find the molar mass of an element by using the periodic table. Solve problems converting the amount of an element in moles to its gram-mass and vice-versa. Unit 6 Structure of Matter. Distinguish between compounds and mixtures. Relate the chemical formula of a compound to the relative numbers of atoms or ions present. Draw models of compounds using the structural formula. Describe how the chemical structure of a compound affects its properties. Explain the role of the electron in forming ionic and covalent bonds. Compare the properties of substances with different types of bonds. Describe how carbon atoms bond covalently to form organic compounds. Identify the names and structures of groups of simple organic compounds and polymers. Identify what makes up the polymers that are essential to life including proteins, DNA, and carbohydrates. Unit 7 Chemical Reactions and Kinetics. Recognize some signs that a chemical reaction may be taking place. Explain chemical changes in terms of the structure and motion of atoms and molecules. Describe the differences between endothermic and exothermic reactions. Identify situations involving chemical energy. Distinguish among the five general types of chemical reactions. Predict the products of some reactions based on the reaction type. Describe reactions that transfer or share electrons between</p>	D.12.1, D. 12.2, D.12.3, D.12.4, D.12.5, D.12.6, D.12.7, D.12.8, D.12.9, D.12.10, D.12.11, D.12.12	Homework Problems, Classwork Worksheets, Individual and Group Presentations, Laboratory Notebooks and Procedures, Quizzes and Tests	Unit 5: Atoms and the Periodic Table. Summarize the main ideas of Dalton's atomic theory. List the charge, mass, and location of each of the three sub-atomic particles found within atoms. Predict how many valence electrons a nitrogen atom has. Explain why atoms on the periodic table are essentially neutral. Explain how the path of an electron varies between Bohr's atom and the quantum-mechanical atom. Calculate the number of protons, electrons and neutrons an atom has from the atomic mass and its atomic number. Predict which isotope of nitrogen is the most common based on the periodic table and its two isotopes. Describe why the elements in the modern periodic table (Moseley) are arranged by atomic number not atomic mass as in earlier versions (Mendeleev). Compare and contrast the characteristics of metals, non-metals, and semi-conductors. Describe the reactivity trends in the periodic table using bromine as an example. Predict the charge of metallic and non-metallic ions in the periodic table using the family number. Define Avogadro's constant and how it relates to the mole. Explain why a graph relating the amount of a particular element and its mass is a linear function. Solve mathematics problems relating gram mass and mole. Unit 6: Structure of Matter. Classify substances as mixtures or compounds. Explain the relationship between bonding, chemical composition, melting point and function in various compounds. Manipulate ball and stick models in forming compounds. Be able to draw them in structural formula format. Explain the characteristics of network structures in forming strong solids and high boiling and melting points. Explain why glass	Teacher led discussions, Student led discussions, individual and group presentations, hands-on laboratory work, Teacher lecturing, Students employing the socratic questioning method in group type activities, laboratory demonstrations, videos, in-class worksheets/examples.	Khanacademy.org, MIT opencourseware

	<p>molecules, atoms, or ions. Demonstrate how to balance chemical equations. Interpret chemical equations to determine the relative number of moles of reactants needed and moles of products formed. Explain the law of definite proportions and how it allows for predicting reaction amounts. Identify mole ratios in a balanced chemical equation. Calculate the relative masses of reactants and products from a chemical equation. Describe the factors affecting a chemical reaction. Explain the role of a catalyst on a chemical reaction. Explain chemical equilibrium in terms of equal forward and reverse reaction rates. Apply LeChatelier's principle to predict the effect of changes in concentration, temperature, and pressure in an equilibrium reaction.</p>			<p>(esp. Pyrex) has properties that allow it to be used for cookware. Explain the role of electrolytes (salts) in producing good and bad health. Compare and contrast the electron movement in metallic bonds versus covalent and ionic. Describe a polar covalent molecule (water or ammonium) and draw the bonding relationship between H-O or N-H atoms. Name and write ionic compounds using the valence electrons that are transferred and the periodic table. Explain why the Stock System (Roman numerals) is necessary for naming transitional compounds. Distinguish between alkanes, alkenes, or alcohols based on their names. Explain why certain compounds i.e. CBr₅ can not exist according to your knowledge of valency. Draw a carbon atom skeleton and determine the number and positions of the hydrogen's in the hydrocarbon.</p> <p>Unit 7: Chemical Reactions and Kinetics. Identify chemical reactions involving simple changes in state versus product formation. List three signs that a chemical reaction is taking place. List four forms of energy that might be absorbed or released during a chemical reaction. Classify reactions as exothermic or endothermic. Predict which atoms will be found in the products if the original reactants are known. Classify given chemical reactions by type. Identify which element is oxidized and which is reduced in a chemical reaction. Define Radical. Compare and contrast single and double displacement reactions based on the number of reactants. Contrast synthesis and decomposition reactions. List three possible results from a double-replacement reaction. Identify whether reactions are balanced or unbalanced. Be able to balance equations regardless of type. Explain why coefficients not subscripts must be changed to balance an equation. Demonstrate that in a balanced equation that the gram masses in the reactants and products are uniform (conservation of mass). List five factors that may affect the rate of a chemical reaction. Describe what can happen to the reaction rate of a system that is heated and then cooled. Compare and contrast a catalyst and an inhibitor. Describe which way an increase in pressure will change an equilibrium system.</p>		
Timeline	Themes/Enduring Understandings/Essential Questions for the Unit	Common Core Standards Addressed	Assessments	Standards Based Skills and Concepts Targeted	Strategies/Practices Used to Teach Skills and Concepts	Resources/Texts Used
Quarter four	<p>Unit 8: Chemistry of Life. Explain the significance of carbon in organic molecules. Recognize the six most common elements in</p>	E.12.3, E.12.4, E.12.5, F. 12.1, F.12.2, F.12.3, F.12.4, F.12.5, F.12.6, F.12.7, F.12.8, F.12.9,	Homework Problems, Classwork Worksheets, Individual and Group Presentations, Laboratory	<p>Unit 8: Chemistry of Life. Identify the three subatomic particles found in atoms. Compare and</p>	Teacher led discussions, Student led discussions, individual and group presentations, hands-on	Khanacademy.org, MIT opencourseware

organic molecules (C, H, N, O, P, S). Describe the composition and functions of the four major categories of organic molecules (carbohydrates, lipids, proteins, and nucleic acids). Describe how dehydration synthesis and hydrolysis relate to organic molecules. Explain the role of enzymes in biochemical reactions. Essential Questions: Of what are living things made? How are organic molecules formed? How do organic molecules interact to support life? **Unit 9: Chemical Structure and Function of Cell.** 1. Relate cell parts/organelles to their functions. 2. Differentiate between prokaryotic cells and eukaryotic cells, in terms of their general structures and degrees of complexity. 3. Distinguish between plant and animal cells. 4. Describe how cells function in a narrow range of physical conditions, such as temperature, and pH, to perform life functions that help to maintain homeostasis. 5. Explain the role of cell membranes as a highly selective barrier (diffusion, osmosis, and active transport). 6. Identify the reactants and products in the general reaction of photosynthesis. Describe the use of isotopes in this identification. 10. Provide evidence that the organic compounds produced by plants are the primary source of energy and nutrients for most living things. 11. Identify how cellular respiration is important for the production of ATP. 12. Explain the interrelated **Unit 10: Ecology.** 1. Explain how biotic and abiotic factors cycle in an ecosystem (water, carbon, oxygen, and nitrogen) 2. Use a food web to identify and distinguish producers, consumers, and decomposers, and explain the transfer of energy through trophic levels. 3. Identify the factors in an ecosystem that influence fluctuations in population size. 4. Analyze changes in an ecosystem resulting from natural causes, changes in climate, human activity, or introduced non-native species. 5. Explain how symbiotic behavior produces interactions within ecosystems. **Unit 11: Classification.** 1. Analyze the classification of organisms according to their evolutionary relationships. 2. The historical development and changing nature of classification systems. 3. Similarities and differences between eukaryotic and prokaryotic organisms. 4. Similarities and difference among the eukaryotic kingdoms: Protists, Fungi, Plants, and Animals. 5. Classification of organisms using keys. 6. Highlight the changing nature of classification based on new knowledge generated by research on evolutionary relationships. 7. Analyze the processes by which organisms representative of the following groups accomplish essential life functions including: 8. Unicellular protists, annelid worms, insects, amphibians, mammals, nonvascular plants, gymnosperms, and angiosperms. 9. Transport (circulation), excretion, respiration, regulation, nutrition, synthesis, reproduction, and growth and development

F.12.10, F.12.11, F.12.12,

Notebooks and Procedures, Quizzes and Tests

Contrast the isotopes of an element. State the definition of a chemical compound. Describe The two main types of chemical bonds. Explain why water molecules are polar. Differentiate between solutions and suspensions. Define acidic solutions and basic solutions. Describe the composition and function of each group of organic compounds. Explain how chemical reactions affect chemical bonds in compounds. Describe how energy changes affect how easily a chemical reaction will occur. Explain why enzymes are important to living things **Unit 9: Chemical function and Structure of Cell.** Explain the cell theory. Name the basic cell structures. Contrast and Compare prokaryotes and eukaryotes. Describe the main function of the cell wall. Describe the function of the cell nucleus. Identify the main roles of the cytoskeleton. Describe The functions of the major cell organelles. Identify the main function of the cell membrane. Describe diffusion. Compare and Contrast the processes of osmosis, facilitated diffusion, and active transport. Describe cell specialization. Identify the organization levels in multicellular organisms. Explain where plants get the energy they need to produce food. Describe the role of ATP in cellular activities. Explain what the experiments of van Helmont, Priestly, and Ingenhousz reveal about how plants grow. **Unit 10 Ecology.** Identify the levels of organization that ecologists study. Describe the methods used to study ecology. Identify the source of energy for life processes. Trace the flow of energy through living systems. Evaluate the efficiency of energy transfer among organisms in an ecosystem. Describe how matter cycles among the living and non-living parts of an ecosystem. Explain why nutrients are important in living systems. Describe how the availability of nutrients affects the productivity of ecosystems. Analyze how biotic/abiotic factors influence an ecosystem. Identify interactions that occur within communities. Describe how ecosystems recover from a disturbance. State the characteristics used to describe a population. Identify factors that affect population size. **Unit 11: Classification.** 1. Follow the history of the classification system. 2. Originally two kingdoms (plants and animals). More kingdoms added as knowledge of the diversity of organisms increased. 3. Development of the seven level classification system (KPCOFGS) and binomial nomenclature. 4. Basis of classification system: Evolutionary phylogeny, DNA and biochemical analysis, Embryology, Morphology. 5. Comparison and contrast of prokaryotic and eukaryotic organisms should include,

laboratory work, Teacher lecturing, Students employing the socratic questioning method in group type activities, laboratory demonstrations, videos, in-class worksheets/examples.

				<p>presence/absence of membrane-bound organelles, Ribosomes in both. Contrasts in Chromosome structure. Contrast in size. 6. Comparison between eukaryotic kingdoms should include: Cellular structures, Unicellular vs. multi-cellular, Methods of making getting/making food and breaking down food to get energy. Reproduction 7. Use dichotomous keys to classify organisms</p>		
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