Ware Public Schools

SCIENCE CURRICULUM - Grades 8-12

***SUBJECT MATTER*: Science** **Grade: 8**

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Exploring Physical Science and Chemistry	1. Science: Not Just for Scientists 2. The Scientific Method – A way of Problem Solving 3. The Metric System 4. Tools of Measurement 5. Safety in the Science Laboratory Essential Questions: 1. Why is the metric system used by the entire science world? 2. Why is the scientific method the most effective way to set up an experiment? 3. Why are the triple beam balance, the	1. Students should be able to use the scientific method to solve a problem. 2. Students should be able to accurately measure volume, mass, temperature, and length using the metric system. 3. Students should be able to use a balance, thermometer, graduated cylinder for measurement 4. Students should be familiar with safety equipment and have a general knowledge of appropriate laboratory safety.	Lab Report Lab Activity Quizzes Teacher Observation and Monitoring of skills taught Class Participation and Discussion Lab Practical Chapter test	Text for all Units: Exploring Physical Science Prentice Hall Triple-Beam Balance Graduated Cylinders Thermometers Metric Rulers	SSIS 1-4 • Make observations, raise questions, and formulate hypotheses. • Design and conduct scientific investigations • Analyze and interpret results of scientific investigations4. Communicate and apply the results of scientific investigations

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	graduated cylinder and metric thermometers the most effective tools for measurement in a science laboratory?				
General Properties of Matter	1. Matter 2. Mass and Weight 3. Volume and Density <u>Essential Questions:</u> 1. What is weight? 2. What is mass? 3. What is density? 4. What is volume? 5. What is a closed system?	1. Students will be able to explain what is meant by the term matter. 2. Students will be able to describe matter in terms of specific properties. 3. Students will be able to identify general properties of matter. Students will be able to define volume and give the metric units used to measure volume. 4. Students will be able to describe matter in terms of mass and volume. 5. Students will be able to define density and compare the densities of various objects. 6. Students will be able to describe why an object sinks or floats in water, using the concepts of density.	Density Lab Activity Lab Report Teacher observation and monitoring of skills taught. Class participation and discussion Chapter Test	Triple-Beam Balance Graduated Cylinders Stones, popcorn, raisins, marbles and other items for demonstration.	Grades 6-8 Physical Science (Chemistry and Physics) Properties of Materials and Matter • Volume and mass are distinct. • Appropriate tools and use of significant digits are needed to measure volume and mass. • Mass is conserved in a closed system.

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Physical and Chemical Changes	1. Phases of Matter 2. Phase Changes 3. Chemical Properties and Changes <u>Essential Questions:</u> 1. What is a physical change? 2. What is a chemical change? 3. What are the four phases of matter?	1. Students will be able to identify a phase as an important physical property of matter. 2. Students will be able to describe the four phases of matter. 3. Students will be able to state the gas laws. 4. Students will be able to identify the phase changes in matter. 5. Students will be able to explain how adding or taking away energy will produce a phase change. 6. Students will be able to discuss the relationship of heat, energy, and phase change. 7. Students will be able to distinguish between physical and chemical changes of matter. 8. Students will be able to explain how chemical properties are useful in identifying substances. 9. Students will be able to define and discuss the chemical property of flammability. 10. Students will be able to distinguish between a chemical property and a chemical change.	Lab Activity Lab Report Teacher observation and monitoring of skills taught. Class participation and discussion Chapter Test	Hot Plate Vinegar Baking soda Beakers	Grades 6-8 Physical Science (Chemistry and Physics) States of Matter Kinetic and Molecular Theory, and Thermo-chemistry

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Mixtures, Elements, Compounds	1. Classes of Matter 2. Mixtures 3. Elements 4. Compounds <u>Essential Questions:</u> 1. What are the four classes of matter? 2. What is a mixture? 3. What is a pure substance? 4. What is a solution? 5. What is an atom? 6. What is an element? 7. What is a molecule? 8. What is a balanced chemical equation?	1. Students will be able to identify the four classes of matter. 2. Students will be able to explain why it is more important to classify matter according to makeup rather than phase. 3. Students will be able to describe the three properties of a mixture. 4. Students will be able to compare a heterogeneous mixture with a homogeneous mixture. 5. Students will be able to explain what a solution is and what its properties are. 6. Students will be able to describe a pure substance. 7. Students will explain the relationship between atoms and an element. 8. Students should be able to identify the chemical symbols for some common elements. 9. Students will be able to describe how a compound differs from an element. 10. Students will be able to explain how a molecule is represented. 11. Students will be able to explain why a chemical equation must be balanced.	Lab Report Lab Activity Quizzes Teacher Observation and Monitoring of skills taught Class Participation and Discussion Chapter test	The Periodic Table of the Elements Items to use for the demonstration of the differences between solutions, mixtures and pure substances such as salt, sugar, oil, vinegar, sand, cereal, etc. Beakers Glass jars with lids.	Grades 6-8 Physical Science (Chemistry and Physics) Elements, Compounds and Mixtures; Atomic Structure and Nuclear Chemistry • Difference between an atom and a molecule. • Basic examples of elements and compounds. • Differences between mixtures and pure substances

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Classification of Elements: The Periodic Table	1. Arranging the elements 2. Design of the Periodic Table 3. Chemical Families 4. Periodic Properties of the elements <u>Essential Questions:</u> 1. What is an element? 2. What is a period? 3. What is a family? 4. How do elements combine?	1. Students will explain how Mendeleev 2. developed his periodic table. 3. Students will be able to explain the concepts of atomic mass, valence, and atomic number. 4. Students will be able to describe Henry Moseley's contribution to the modern periodic table. 5. Students will be able to describe the design of the modern periodic table. 6. Students will be able to discuss how families contain elements with similar properties. 7. Explain how properties of elements of elements vary across a horizontal row, or period. 8. Students will be able to compare the properties of metals, nonmetals, and metalloids. 9. Students will locate the families of elements on the periodic table. 10. Students will be able to describe the properties of the eighteen families of elements in the periodic table. 11. Students will be able to describe some periodic properties of the elements.	Lab Report Lab Activity Quizzes Teacher Observation and Monitoring of skills taught Class Participation and Discussion Element Brochure Project and Presentation Chapter test	Library/Computer Lab Tools for coloring	Grades 6-8 Physical Science (Chemistry and Physics) Elements, Compounds and Mixtures; Atomic Structure and Nuclear Chemistry • Many elements combine in a multitude of ways to produce compounds that make up living and nonliving things

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Atoms and Bonding	1. What is chemical bonding? 2. Ionic Bonds 3. Covalent Bonds 4. Metallic Bonds 5. Predicting Types of Bonds <u>Essential Questions:</u> What is chemical bonding?	1. Students will be able to describe chemical bonding in terms of an atom's electron arrangement. 2. Students will be able to define energy level. 3. Students will be able to list the maximum number of electrons in the first three energy levels. 4. Students will be able to predict the resulting charge on an atom when electrons are added to or taken away from a specified atom. 5. Students will be able to identify elements that either have low ionization energy or high electron affinity. 6. Students will be able to describe the result of ionic bonding between elements as a regular pattern of ions in a crystal lattice. 7. Students will predict which atoms are most likely to engage in covalent bonding. 8. Students will be able to compare the characteristics of ionic crystals and covalent molecules. 9. Students will be able to construct an electron dot diagram for a covalently bonded molecule. 10. Students will be able to predict the common oxidation number of atoms, based on the position of that atom on the periodic table. 11. Students will be able to predict the common oxidation number of atoms, based on the position of that atom on the periodic table. 12. Students will be able to predict the formation of compounds between elements.	Lab Report Lab Activity Quizzes Teacher Observation and Monitoring of skills taught Class Participation and Discussion Chapter test		Grades 6-8 Physical Science (Chemistry and Physics) Elements, Compounds and Mixtures: Atomic Structure and Nuclear Chemistry • Many elements combine in a multitude of ways to produce compounds that make up living and nonliving things.

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What is Motion?	1. Frames of Reference 2. Measuring motion 3. Changes in velocity 4. Momentum <u>Essential Questions:</u> 1. What is a frame of reference and why is it important? 2. What is speed? 3. What is momentum?	1. Students will be able to explain why all motion is relative. 2. Students will be able to describe how motion occurs with respect to a particular frame of reference. 3. Students will be able to identify the frames of reference and the moving objects in different situations. 4. Students will be able to define motion and speed. 5. Students will be able to calculate speed using the formula speed equals distance divided by time. 6. Students will be able to represent speed graphically as speed divided by time. 7. Students will be able to distinguish between speed and velocity. 8. Students will be able to define acceleration and deceleration. 9. Students will be able to calculate acceleration and deceleration using the given formula. 10. Students will be able to interpret the distance/time graph for acceleration. 11. Students will be able to describe circular motion. 12. Students will be able to define momentum. 13. Students will be able to calculate momentum using the equation momentum equals mass times velocity. 14. Students will be able to explain the law of conservation of momentum.	Lab Report Lab Activity Quizzes Teacher Observation and Monitoring of skills taught <u>Class Participation and Discussion</u> Chapter test	Toy cars Ramps Paper for airplanes Marbles	Grades 6-8 Physical Science (Chemistry and Physics) Position and Motion of Objects: Motion and Forces An object's motion can be described by its position, direction of motion, and speed. Distance vs. time graphs for constant speed.

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What is Force?	1. What is force? 2. Friction: A force opposing motion. 3. Newton's laws of motion 4. Gravity <u>Essential Questions:</u> 1. What is force? 2. What is friction? 3. What is gravity?	1. Students will be able to define force. 2. Students will be able to describe the nature of forces. 3. Students will be able to explain how force is related to motion. 4. Students will be able to define friction. 5. Students will be able to explain how friction affects motion. 6. Students will be able to identify three types of friction. 7. Students will be able to define inertia. 8. Students will be able to describe Newton's three laws of motion. 9. Students will be able to relate force, mass and acceleration. 10. Students will be able to relate gravity and the motion of falling objects. 11. Students will be able to explain the effects of air resistance on a falling object. 12. Students will be able to state Newton's third law of universal gravitation. 13. Students will be able to relate force, mass, and acceleration.	Lab Report Lab Activity Quizzes Teacher Observation and Monitoring of skills taught Class Participation and Discussion Chapter test	Balls of various sizes Cards Coins Beakers Sandpaper	Grades 6-8 Physical Science (Chemistry and Physics) Position and Motion of Objects: Motion and Forces • Weight is the amount of gravitational pull on an object and is distinct from mass.
Work Power and Simple Machines	1. What it meant to do work 2. Power 3. Machines 4. Simple and Compound Machines <u>Essential Questions:</u> 1. What is work? 2. What is power? 3. Name six simple	1. Students will be able to define work in terms of force and distance. 2. Students will be able to explain the units used for work. 3. Students will be able to calculate work using the formula W = F x D. 4. Students will be able to describe power and how it is calculated. 5. Students will be able to explain the units of power. 6. Students will be able to calculate power using the formula P = W ÷ T. 7. Students will be able to define a machine.	Lab Report Lab Activity Quizzes Teacher Observation and Monitoring of skills taught Class Participation and	1. Rope 2. Spring Scale 3. Sample of simple machines	Grades 6-8 Physical Science (Chemistry and Physics) Position and motion of Objects: Motion and Forces (High School) 2.3 Work can be expressed as a

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	machines.	8. Students will be able to describe the relationship between force and distance as it relates to machines. 9. Students will be able to explain what is meant by the efficiency and the mechanical energy of a machine. 10. Students will be able to identify six simple machines. 11. Students will be able to explain how each of these simple machines works. 12. Students will be able to explain the differences among the three classes of levers. 13. Students will describe how fixed and movable pulleys work.	Discussion Chapter test		change in mechanical energy. 2.4 Power can be expressed as work done per unit time.
Energy: Forms and Changes	1. Nature of Energy 2. Kinetic and Potential Energy 3. Energy Conversions 4. Conservation of Energy 5. Physics and Energy <u>Essential Questions:</u> 1. What is kinetic energy? 2. What is potential energy? 3. What is the conservation of energy?	1. Students will be able to explain how energy and work are related and why they are measured in the same units 2. Students will be able to list the five main forms of energy of examples of each. 3. Students will be able to describe two states of energy. 4. Students will be able to state examples of objects with kinetic and potential energies. 5. Students will be able to calculate the kinetic energy of a given mass at a given velocity. 6. Students will be able to calculate the gravitational potential energy of a given weight at a given height. 7. Students will be able to define energy conversion. 8. Students will be able to discuss the energy conversions between states of energy and forms of energy. 9. Students will be able to list several processes that show energy conversions that	Lab Report Lab Activity Quizzes Teacher Observation and Monitoring of skills taught <u>Class Participation and Discussion</u> Chapter test	Boards Rubber Bands Nails Washers Beakers Thermometer	Grades 6-8 Physical Science (Chemistry and Physics) Forms of Energy: Conservation of Energy and Momentum 13. Kinetic energy can be transformed into potential energy and vice versa.

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		do not involve gravitational potential energy. 10. Students will be able to state the law of conservation of energy. 11. Students will be able to apply the law of conservation of energy to energy conversions within a process. 12. Students will be able to explain how $E = mc^2$ broadens the law of conservation of energy to include matter. 13. Students will be able to explain why the topic of energy is essential to learning any subject in physical science. 14. Students will be able to relate speed, momentum, force, power, and work.			
What is Heat?	1. Heat a form of energy 2. Temperature and Heat 3. Measuring Heat 4. Heat and Phase Change 5. Thermal expansion <u>Essential Questions:</u> 1. What is heat? 2. What does a calorie measure? 3. Define freezing point, melting point and boiling point.	1. Students will be able to explain how scientists discovered that heat is a form of energy. 2. Students will be able to describe how heat energy is created by moving molecules. 3. Students will be able to list examples of heat-energy transfer by conduction, convection, and radiation. 4. Students will be able to define temperature in terms of the kinetic energy of molecules. 5. Students will be able to explain how a thermometer is used to measure temperature. 6. Students will be able to explain the Celsius and Kelvin temperature scales. 7. Students will be able to describe how heat is measured indirectly by measuring temperature changes. 8. Students will be able to explain the difference between the measurement of temperature and the amount of heat in a	Lab Report Metric Mania Lab Activity Lab Practical Quizzes Teacher Observation and Monitoring of skills taught Class Participation and Discussion Chapter test	Beakers Thermometers Food Coloring	Grades 6-8 Physical Science (Chemistry and Physics) Heat Energy: Heat and Heat Transfer 13. Kinetic energy is transferred into potential energy and vice versa. 14. Temperature change results from adding or taking away heat energy from a system. 16. Heat moves in predictable ways,

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		substance. 9. Students will be able to calculate the heat changes (in calories) using values for specific heat. 10. Students will be able to explain how a transfer of energy brings about a phase change. 11. Students will be able to explain how heat of fusion and heat of vaporization relate to phase changes. 12. Students will be able to define freezing point, melting point, and boiling point as temperatures at which substances undergo phase changes. 13. Students will be able how thermal expansion occurs. 14. Students will be able to describe some of the practical applications of thermal expansion.			from warmer to cooler objects until reaching equilibrium.

SUBJECT MATTER: Physical Science Grade: 9-12

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Introduction to Physical Science	What is physical science? 1. Math review: Basic Algebra Conversions - ratios, percentages area/volume 2. Scientific Notation 3. % Error 4. Precision/Accuracy 5. Temperature Scales 6. Measurement 7. The Complete Graph 8. Metric System 9. Laboratory practices, safety and report writing	1. Basic mathematical computation 2. English to metric conversion 3. Knowledge and use of laboratory equipment 4. Reporting format 5. Organization of data and presentation in proper English 6. Scientific method 7. Lab technique	Written test Tile Lab	Textbook, Chapter 1 Hand outs: Metric conversions • Temperature • Report format Safety procedures/demos Fire procedures First aid Emergency procedures Lab handout Measuring equipment	Chemistry II SIS 1,2,3 III

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Gases	1. Pressure 2. STP 3. Boyle's Law 4. Charles' Law 5. Gay-Lussac's Law 6. Avogadro's Principle 7. Combined Gas Law	1. Reading /understanding 2. Algebra 3. Data analysis 4. Graphing 5. Lab technique	Written test Boyle's law lab	Textbook, Chapter 3 Gas handouts Piston apparatus3	Chemistry I 6.1 I 6.3 II SIS 2,3,4 III
Atomic Structure	1. History of the Atom 2. Structure of the Atom 3. Atomic number 4. Atomic mass 5. Isotopes 6. PENZA 7. Forces within the Atom	1. Reading/understanding 2. Algebra	Written test	Textbook, Chapter 5	Chemistry I 2.1 I 2.2 III
Nuclear Chemistry	1. Radioactive decay 2. Alpha, beta and gamma particles 3. Half-life 4. Carbon dating 5. Fission/fusion	1. Reading/understanding 2. Algebra	Written test	Textbook, Chapter 11	Chemistry I 2.5 I 2.6 I 2.7 III

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Motion	1. Distance/displacement 2. Speed/velocity 3. Acceleration 4. Momentum/impulse	1. Reading/understanding 2. Algebra 3. Lab technique	Written test Motion lab Lab practical test	Textbook, Chapter 12 Rolling objects Tape measure Stop watch	Physics I 1.2 II SIS 2,3,4 III
Forces	1. What is force? 2. Newton's Laws of Motion 3. Friction 4. Gravity	1. Reading/understanding 2. Algebra 3. Lab technique	Written test Gravity lab	Textbook, Chapter 13 CPO lab kit	Physics I 1.4 I 1.6 II SIS 2,3,4 III
Simple Machines	1. What is work? 2. What is power? 3. Levers: 1^o, 2^o & 3^o 4. Inclined planes 5. Pulleys 6. Wheel and axle	1. Reading/understanding 2. Algebra 3. Lab technique	Written test Machine lab Lab practical test	Textbook, Chapter 15 Levers, pulleys and ramps Machine demos	Physics I 2.3 I 2.4 II SIS 2,3,4 III
Electricity	1. Flow of current 2. Ohm's Law 3. DC vs. AC 4. Basic circuits	1. Reading/understanding 2. Algebra 3. Lab technique	Written test Motor lab Lab practical test	Textbook, Chapter 19 Wires, batteries, resistances Motor kit	Physics I 5.2 I 5.3 II SIS 2,3,4 III

SUBJECT MATTER: Topics in Science Grade: 9

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Scientific Method/Introduction	1. Steps of scientific method 2. What must a scientist do in order to research something? 3. Scientific measurement 4. How are scientific measurements used? 5. Tools of a scientist 6. Why do scientist use tools? 7. Lab safety 8. Why is lab safety an issue? 9. Balancing chemical equations 10. What is the law of conservation of matter?	1. Learn steps of scientific method and be able to apply to solving different problems 2. Become familiar with metric measurements 3. Use scientific tools to measure length, volume, weight, and temperature 4. Practice with lab technique and lab safety 5. Know that matter cannot be created or destroyed 6. Show matter cannot be created or destroyed by balancing chemical equations 7. Water drop scientific method lab 8. Mini Metric Olympics Lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995 www.biologycorner.com	All Standards reported are High School Standards Chemisty 3.1, 3.2, 3.3, 5.1, 5.2

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Water	1. What are the physical and chemical properties of water? 2. Why is water essential for life? 3. Water is a renewable resources. Explain. 4. How is water used in the environment? 5. Point and nonpoint pollution. Compare.	1. Know the physical and chemical properties of water. 2. Ph lab 3. Function of water in human body and in environment. 4. Sources of pollution. 5. Microscope lab—organisms found in water 6. Water filtration lab. 7. Osmosis chicken egg lab.	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995 www.biologycorner.com	Chemistry 1.1, 1.2, 1.3, 5.3
A Global Perspective	1. What is ecology? 2. How do we apply knowledge of ecology? 3. What is sustainability? 4. Why are there crises in population and consumption? 5. How can science be used to solve environmental	1. Learn that ecology is a complex science with many components. 2. Discuss how decisions are made on a local and global level concerning major environmental issues. 3. Find out how scientists collect data that is used to make environmental decisions. 4. Compare and contrast a population and a consumption crisis. Know what causes each. 5. Discuss importance of alternatives to nonrewable resources. Implications of pollution.	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*.,	Biology 6.2 Earth and Space Science 2.1, 2.2

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	problems? 6. Who makes environmental decisions? 7. Why are some resources nonrewable? 8. How do humans create pollution?	6. Research project on countries and environmental decisions.		McGraw-Hill, 1995 www.biologycorner.com	
Living Things in Ecosystems	1. What relationships can be seen in a food web? 2. Why do food chains begin with the sun? 3. What relationships can be identified between organisms? 4. Photosynthesis 5. Cellular respiration	1. Recognize that all organisms are interconnected and that food webs are an arrangement of interconnected food webs. 2. All energy used by organisms comes from the sun. 3. The suns energy is converted to food energy in photosynthesizing plants and bacteria. 4. There are 4 major symbiotic relationships. 5. Students will create a poster demonstrating knowledge of all symbiotic relationships. 6. Students will trace a food chain beginning with the sun and ending with a decomposer. 7. Students will understand the process of photosynthesis and cellular respiration (in general) 8. Carbon dioxide lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995 www.biologycorner.com	Biology 2.4, 6.3

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Evolution	1. Evolution occurs in populations over time. Explain. 2. How does natural selection work? 3. What organisms would be involved in a co-evolutionary relationship? 4. What examples can you give of rapid evolution?	1. Evolution by natural selection is a non random process that changes the physical traits of a population over time in response to environmental conditions. 2. There are five criteria that must be met for natural selection. 3. Evolution can occur by adaptive genetic mutation or as a response to a co-evolutionary partnership. 4. Students will do a research project and presentation on specific examples of evolution by natural selection. 5. Examples of evolution 6. Identifying fossils lab activity—supports evolution 7. Peppered moth lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995 www.biologycorner.com	Biology 5.1, 5.2, 5.3
How Ecosystems Work	1. How does energy flow in an ecosystem? 2. Why do elements cycle? 3. What are the steps of succession? 4. How do humans interfere with the cycling of nutrients? 5. How do ecosystems change?	1. Understand cycling of nutrients in the framework of the Law of Conservation of Matter 2. Project—design a succession poster to trace steps of succession 3. Investigation—human activities that interfere with the carbon, nitrogen, and water cycles 4. Windograsky columns—six week succession lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995	Biology 6.2, 6.3, 6.4 Earth and Space Science 3.2, 3.3

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				www.biologycorner.com	
Kinds of Ecosystems	1. What role does climate play in the distribution of plants and animals? 2. What is a biome? 3. How are organisms specialized to live in specific habitats? 4. Freshwater ecosystems contains numerous species of plants and animals. Explain. 5. On a map, where would you find marine ecosystems?	1. Discuss the nine biomes located around the world 2. Understand plants and animals are adapted to live in their environment 3. Learn the regions of a lake and the organisms that live there 4. Understand the parts of the ocean and what organisms live there 5. Trace marine food webs 6. Travel project 7. Biome brochure project	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995 www.biologycorner.com	Earth and Space Science 1.3, 1.7

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Population	1. What factors control the size of a population? 2. How do scientists describe populations? 3. What are the stages of demographic transition? 4. What can you learn about the classification and potential growth of a country by looking at a population pyramid? 5. What problems are created by unlimited population growth? 6. Population can grow linearly or exponentially. Explain. 7. How can science predict population growth? 8. Do we need to search for new places to farm and live?	1. Be able to use a simple equation to determine if a population will rise or decline. 2. Identify populations in different stages of demographic transition. Map first, second, and third world countries. 3. Interpret graphs and figures on population data. 4. Recognize different types of population growth. 5. Understand what regulates populations in nature. 6. Investigation—what will the population of the world be in the next decades at the current level of growth. 7. What will you do to conserve resources? Discuss alternatives to nonrenewable resources.	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995 www.biologycorner.com	Biology 6.1, 6.2

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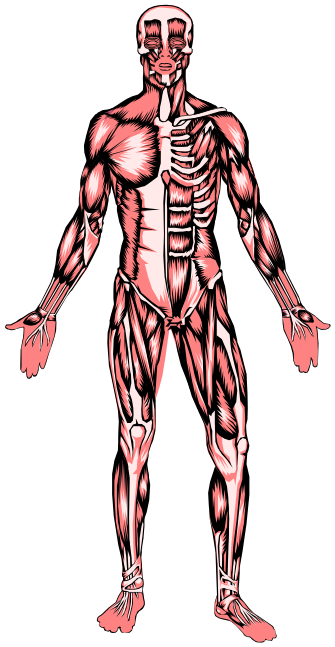
Biodiversity	1. Biodiversity is important to the health of an ecosystem. Explain. 2. Extinction is a natural phenomenon. Explain. 3. What is mass extinction? 4. Why are only some species in danger of extinction? 5. What reasons do we have to preserve existing species? 6. What are the effects of removing a keystone species or adding an exotic species? 7. Zoos, egg banks, and botanical gardens are steps toward species preservation. Do you this is this effective?	1. Definition of species and biodiversity. 2. Design a diverse ecosystem. 3. Understand what role extinction plays and has played in the Earth's natural history. 4. Research threatened and endangered species. 5. Discuss complexity of ecosystems by showing what role keystones and exotics play. 6. Look at the future of preservation and conservation. 7. Report on endangered wildlife of Massachusetts.	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995 www.biologycorner.com	Biology 5.3, 6.2, 6.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Body Systems	1. Major organs of body systems. 2. What is the relationship between anatomy and physiology? (form and function)	1. Overview of the following body systems, with specific emphasis on digestion—digestive, circulatory, respiratory, nervous, muscular, skeletal, reproduction 2. Individual report on one body system 3. Enzyme lab 4. Models	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995 www.biologycorner.com	Biology 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8
Disease	1. What is homeostasis? 2. Active and passive transport. 3. Communicable diseases are caused by pathogens. Explain. 4. What is the function of the immune system? 5. Cellular and antibody immunity. 6. How are communicable diseases prevented and/or treated?	1. Definition of homeostasis. 2. Draw models of active and passive transport. 3. Describe four types of pathogens and diseases caused. 4. Trace the path of antibody and cellular immunity. 5. Passive and active immunity. 6. Antibiotics and vaccines. 7. Environment, heredity and lifestyle choices cause noncommunicable diseases. 8. Continue body system report by researching diseases affecting that system. 9. Whole class model of body systems and diseases. 10. Discussion of how to stay healthy—nutrition, sleep, exercise.	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Holt Environmental Science, Arms, Karen, 2000, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Glencoe Science Interactions Course 4, McGraw-Hill, 1996. Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995 www.biologycorner.com	Biology 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	7. Causes of non-communicable disease. 8. How are non-communicable diseases prevented and/or treated?				



SUBJECT MATTER: Earth Science Grade: 9-12

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Exploring Earth Science/Introduction to Scientific Method	1. Steps of scientific method 2. What must a scientist do in order to research something? 3. Scientific measurement 4. How are scientific measurements used? 5. Tools of an Earth Scientist 6. Why do scientist use tools? 7. Lab safety 8. Why is lab safety an issue?	1. Learn steps of scientific method and be able to apply to solving different problems 2. Become familiar with metric measurements 3. Use scientific tools to measure length, volume, weight, and temperature 4. Practice lab technique and lab safety 5. Building a telescope lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities.	All standards reported are Earth Science, High School 1.8
Stars and Galaxies	1. Theories of formation of universe 2. How was universe formed? 3. Star groups and movement 4. What is the red shift? 5. How are groups of stars classified? 6. What are the major star	1. Be able to discuss theories on how universe was formed 2. Learn how stars move and how constellations are described 3. Identify different stars by sight 4. Trace the life cycle of a star 5. Using a flame test to identify substances lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities.	4.1, 4.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	constellations? 7. What are the different types of stars? 8. Life cycle of a star				
The Solar System	1. Nebular theory 2. How was solar system formed? 3. What are the characteristics of our sun? 4. How do objects move throughout the solar system? 5. Planets 6. What are the major characteristics of a planet? 7. Meteoroids, comets, and asteroids.	1. Be able to discuss nebular theory—how and why the sun was formed. 2. Describe the sun—characteristics 3. Understand how objects move in our solar system—planets, comets, meteoroids, and asteroids. 4. Learn what makes a rock a planet 5. Relative distance of the planets investigation	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities.	1.1

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
The Earth and Moon	1. What are the major features of the Earth? 2. What causes day and night? 3. Why do we have seasons? 4. What are the major features of the moon? 5. Look at the interactions between the sun, earth, and moon	1. Understand what the main features of the Earth. 2. Describe what occurs to cause day and night cycles. 3. Diagram the seasons in the northern and southern hemispheres 4. See how the sun and moon affect the Earth and cause tidal and diurnal cycles 5. Using shadow patterns to determine the apparent motion of the sun lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	1.1, 1.2, 1.3, 1.4, 1.5, 4.2
The Nature of Matter	1. What is matter? 2. How are phases of matter described? 3. What are subatomic particles and how are they arranged? 4. How are elements, compounds, and mixtures alike and different? 5. How are compounds formed?	1. Understand the physical properties of matter 2. Describe the specific phase of matter 3. Draw and label an atom and its subatomic particles 4. Build a model of a simple atom 5. Understand the definition of an element and how elements are arranged on the periodic table 6. Show how compounds are formed by using atom models 7. Finding the density of objects lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	Chemistry 1.1, 1.2, 1.3, 2.1, 4.1

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Minerals	1. Define a mineral 2. What are the properties of a mineral? 3. Can you identify minerals by their physical properties? 4. Mineral usage—industry and biotechnology	1. List the properties of a mineral 2. Identify mineral specimens by sight 3. Discuss how minerals are used in societies across the world 4. Identifying physical properties of minerals lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.6
Rocks	1. What is the rock cycle? 2. Igneous, metamorphic, and sedimentary 3. How are igneous, metamorphic, and sedimentary rocks formed?	1. Learn parts of rock cycle and understand how the parts are related. 2. Describe igneous, metamorphic, and sedimentary rocks. 3. Identify rock specimens by sight. 4. Discuss the traits of various rocks 5. Compaction of clay lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.1, 3.6
T he Earth's Interior	1. Can you relate seismic wave movements to the composition of the Earth's core? 2. Compare and contrast the characteristics of the inner and outer core 3. What are the properties and composition of the mantle? Where is the	1. Know that seismic waves alter the composition of the Earth's core 2. Describe differences between the inner and outer core of the Earth 3. Understand what the Earth's mantle is and what it does 4. Describe differences between the continental and oceanic crust of Earth 5. Simulating plasticity lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.8, 3.9, 3.10, 3.11, 3.12

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	Moho located? 4. Compare and contrast the properties of the continental crust and the oceanic crust.				
The Earth's Landmasses	1. How many continents are found on Earth? 2. What are major characteristics of mountains, plains, and plateaus? 3. Why do we need an international date line? 4. Explain Mercator and Equal-area projections. 5. Interpret a topographical map and read the map's legend.	1. Know the continents names and locations 2. Read a topological map and legend 3. Understand major geographical formations 4. Learn what the international date line is and how it is used 5. Discuss Mercator and Equal-area projections 6. Making a topographic map lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	1.8, 3.7

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
The Earth's Fresh Water	1. What are the parts of the water cycle? 2. Where does fresh water come from? 3. Groundwater and water table 4. Why is water the universal solvent? 5. How can water pollution be prevented?	1. List parts of water cycle and understand how they interconnect 2. Discuss where fresh water comes from and what we can do to keep it fresh 3. Lab work to understand properties of water—ph, solvency 4. Porosity of various soils lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	2.2, 3.4, 3.5
The Earth's Oceans	1. Where are Earth's major oceans and seas located? 2. What is the composition of ocean water? 3. What does the ocean floor look like? How is it mapped? 4. How is ocean life distributed through out the world? 5. What are the motions of the oceans and what are their effects?	1. Know ocean/sea names and locations 2. Discuss what makes up sea water 3. Understand what is found on the ocean floor and how scientists were able to map the ocean floor 4. Describe various forms of sea life found in the intertidal zone, neritic zone, and open ocean 5. Compare and contrast waves, currents, and tides 6. Observing a model thermocline lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	1.4, 1.7, 1.8, 4.2

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
The Earth's Atmosphere	1. What gases are found in the atmosphere? 2. Describe the process that changed the Earth's atmosphere 3. Oxygen, nitrogen, carbon dioxide cycles 4. Explain the layers of the atmosphere 5. How was the magnetic field of the Earth formed?	1. List the gases found in the atmosphere and describe the cycles 2. Be able to draw and label the layers of the atmosphere 3. Discuss how the atmosphere has evolved over time 4. Describe the features of the magnetosphere 5. Radiant energy and surface temperature lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.2, 3.3, 3.5
Weather	1. What factors interact to form weather? 2. Compare three methods of heat transfer. 3. What affects air pressure? 4. Local and global wind patterns. 5. How are clouds classified? 6. What makes an air mass? 7. How do fronts affect weather patterns? 8. What is cloud	1. Understand how weather is made. 2. Know how heat is transferred. 3. Draw and label a map to show global wind patterns. 4. Identify clouds by sight. 5. Describe three factors that affect air pressure. 6. Locate fronts on a weather map and know what that means. 7. Discuss why clouds may be seeded. 8. Be able to read a weather map. 9. Using a sling psychrometer to determine relative humidity lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	1.1, 1.2, 1.3, 1.4, 1.6, 1.7, 1.8, 3.5,

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	seeding? 9. How do you read a weather map?				
Climate	1. What factors determine climate? 2. How are temperature and precipitation formed? 3. Earth's climate zones 4. Major climate regions of the United States 5. Explain what factors cause a climate to change	1. Define climate 2. Understand where precipitation and temperature originate 3. Read a climate zone map 4. Discuss how climates can change 5. Graphing climate characteristics lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	1.1, 1.2, 1.3, 1.4, 1.6, 1.7, 1.8, 3.5,
Weathering and Soil	1. How are chemical and mechanical weathering different? 2. How is soil formed? 3. Soil layers 4. What factors influence the speed of soil formation? 5. Soils found in the United States	1. Compare and contrast chemical and mechanical weathering 2. Trace how soil is formed and deposited into specific layers 3. Understand what affects the speed of soil formation 4. Identify types of soil by sight 5. Understand different parts of the United States have different soils. 6. The effect of chemical weathering on rocks lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.1

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Erosion and Deposition	1. What causes erosion and deposition? 2. Why are there different ways erosion and deposition occur? 3. Wind and water erosion—compare the effects. 4. What is glacial deposition? 5. How have waves changed the appearance of the Earth's surface?	1. Define erosion and deposition 2. Learn about erosion caused by gravity, water, and wind 3. Show the importance of glacial deposition and wave action on the composition/appearance of the Earth's surface 4. Observing erosion and deposition in a model stream lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.1
Movement of the Earth's Crust	1. How is the Earth's crust deformed by stress? 2. What is faulting and folding? 3. Explain how plateaus and dome mountains are formed 4. What is an isostasy?	1. Understand the Earth's crust is moving/shifting and becomes deformed 2. Compare the major types of faulting and folding 3. Trace the process of plateau and dome mountain formation 4. Describe how isostasy effects the movement of the Earth's crust. 5. Examining isostasy lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.8, 3.9, 3.10, 3.11
Earthquakes and Volcanoes	1. What happens during an earthquake? 2. How are earthquakes detected? 3. Are there	1. List the steps of an earthquake. 2. Understand what scientific tools are used to detect and measure earthquakes 3. Describe the three types of lava and identify their particles by sight 4. Identify a volcano by its shape 5. Locate areas of volcanic activity on a	Open response questions, discussion, homework assignments, lab activities and lab reports,	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research	3.8, 3.9, 3.10, 3.11, 3.12

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	different types of lava—Why? 4. How are volcanoes classified? 5. Where are the zones of volcanic activity found?	world map 6. Locating patterns of volcano and earthquake distribution lab	vocabulary quizzes, and exams	opportunities	
Plate Tectonics	1. What is the theory of continental drift? 2. How can you relate fossil and rock evidence to continental drift? 3. Why is the ocean floor spreading? 4. What are lithospheric plates? 5. Three plate boundaries and plate motion 6. How are the types of plate collisions described?	1. Discuss/explain continental drift and support with specific examples found in rocks and fossils. 2. Describe how ocean floor is spreading 3. Know the Earth has lithospheric plates that move and collide 4. Mapping lithospheric plates lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.8, 3.9, 3.10
Fossils and the Past	1. How are fossils formed? 2. Can you use fossils to understand the Earth's past? 3. How can the relative ages of the rock layers be	1. Know what fossils are and how they are formed. 2. Understand how scientists use fossils to determine the history of the Earth. 3. Learn what tools scientists use to identify the age of the layers of rock. 4. Trace a timeline of Earth history. 5. Observing fossil molds and casts lab.	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.7

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	identified? 4. What tools would be used to determine the age of rocks and fossils?		exams		
Change and Geologic Time	1. What methods are used to date rocks? 2. What are the four geologic eras? 3. Organic and in-organic changes 4. What are the major geologic events of each era?	1. Discuss how rocks are dated to era 2. Draw a timeline of geologic eras 3. Compare and contrast organic and inorganic changes. 4. Determine the major events of each geologic era. 5. Constructing a geologic time line lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	3.7, 3.11
New Directions in Earth Science	1. Why are some resources non-renewable? 2. What is conservation? 3. How does land become polluted? 4. How does water become polluted? 5. How are fossil fuels made and what are alter-native energy sources? 6. Earth science and technology	1. Compare and contrast renewable and nonrenewable resources 2. Discuss sources of land and water pollution. 3. Understand the problems created by reliance on fossil fuels—environmental damage and dwindling natural resources. Look at alternatives. 4. Comparing the decomposition of different types of litter in a landfill lab 5. Wrap up the semester by discussing new directions in Earth Science and technology.	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes, and exams	Coble, Rice, Walla, Murray, Prentice Hall Earth Science, New Edition, 1993 with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities	2.1, 2.2, 3.5

SUBJECT MATTER: Biology Grade: 10

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Scientific Method/Introduction to Biology	1. Biology is the study of life 2. Steps of scientific method 3. What must a scientist do in order to research something? 4. Scientific measurement—SI units of weight, length, and temperature 5. How are scientific measurements used? 6. Tools of a scientist 7. Why do scientist use tools? 8. Kinds of microscopes and their parts 9. Lab safety 10. Why is lab safety an issue? 11. What are organic compounds? 12. How is carbon arranged in organic compounds?	1. Meaning of what it is to be living 2. Organic compounds—structure and function 3. Biological organisms are composed of elements C, H, N, O, P, S 4. Four organic compounds 5. Role of enzymes 6. Lab techniques 7. Steps of scientific method for research 8. Microscope lab 9. Metric Olympics measuring lab 10. Lab safety skills 11. Balancing chemical equations	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	Chemistry, High School 5.1, 5.2, All other Standards reported are Biology, High School Standards: 1.1, 1.2, 1.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	13. What is matter 14. What is the law of conservation of matter?				
Features of Life and the Cell	1. What are the 8 features of all living things? 2. What is a cell? 3. Cell theory 4. Where does the energy that plants and animals need come from? 5. Photosynthesis and cellular respiration 6. Are there differences between animal and plant cells? Explain. 7. What organelles are found in animal and plant cells? 8. Anatomy and physiology of organelles 9. How do cells regulate what goes in and out? 10. Osmosis and diffusion 11. What is the	1. What is living? 8 requirements 2. History of cell theory 3. Creators of cell theory 4. Three parts of cell theory—all things made of cells, cells come from other cells, cells are building blocks of life 5. One single cell is responsible for its digestion, respiration, excretion, and has a nucleus that controls the cell's functioning 6. Organelles found in plant and animal cells 7. Create a cell model to represent organelles found in animal and plant cells 8. Microscope lab to look at animal and plant cells 9. Chemical equations of photosynthesis and cellular respiration 10. Role of ATP in metabolism 11. Learn to make a dry mount and wet mount 12. Mechanics of osmosis and diffusion 13. Lab work on osmosis and diffusion	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	2.1, 2.2, 2.3, 2.4, 2.5

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	function of osmosis? 12. How does diffusion work?				
Taxonomy	1. What is taxonomy? 2. Why are organisms classified? 3. How are organisms classified? 4. Species 5. What is a Kingdom? 6. How many Kingdoms? 7. Taxonomic groups—kingdom, phylum, class, order, family, genus, species 8. Taxonomic key	1. History of taxonomy—Aristotle and Linnaeus 2. Traits—structural (comparative anatomy), biochemical, embryological, behavioral, fossorial, cytological—used by scientists to classify organisms 3. Phylogenic mapping 4. Species definition 5. Six kingdoms—examples of organisms from each kingdom 6. Taxonomic groupings 7. Classification lab 8. "How are objects grouped" lab 9. Grasshopper lab—steps in using a taxonomic key 10. Binomial nomenclature	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	5.1, 5.2
Evolution	1. What is evolution? 2. What is natural selection? 3. How does natural selection occur? 4. What populations would you see natural selection	1. Trace examples of evolution by natural selection—bacterial resistance, peppered moths, Darwin's finches 2. Know five criteria required for an organism to evolve by natural selection 3. Darwin's theory of evolution versus creationism and intelligent design—discuss pros and cons of each theory 4. Look at what makes a species and	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities.	5.1, 5.2, 5.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	occuring at a fast rate? 5. Who was Darwin? 6. What are the alternative theories for evolution? 7. Creationism and Intelligent Design 8. Species definition and species diversity	understand the importance of species diversity	prefixes/ suffixes, pop quizzes, exams, and projects	Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	
Viruses and Monerans	1. Virus structure 2. Why are viruses nonliving? 3. How are viruses host-specific? 4. How can viruses be controlled? 5. Lytic and lysogenic cycles 6. What is a Eubacteria and an Archaebacteria? 7. Bacterial structure—coccus, bacillus, spirillum, gram positive and gram negative 8. How can bacteria reproduce sexually and asexually? 9. Why are not all	1. Draw and label a bacteriophage 2. Anatomy and physiology of a virus 3. Learn examples of host-specificity 4. Compare and contrast lytic and lysogenic cycles 5. Independent research project—Diseases caused by viruses—paper, 3-D model, and presentation 6. Viral infection—vaccines, hygeine 7. Draw and label a bacterium 8. Anatomy and physiology of bacteriium 9. Three shapes of bacteria—Gram staining lab 10. Beneficial versus harmful bacteria 11. Bacteria in biotechnology 12. Ways bacteria can be controlled—freezing, pasteurization, canning, boiling, salting, disinfectants	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	2.2, 2.8

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	bacteria harmful? 10. How can bacterial infection be controlled?				
Photosynthesis and Cellular Respiration	1. What is photosynthesis? 2. Calvin cycle 3. Where does photosynthesis occur? 4. How does photosynthesis work? 5. What role does ATP play in photosynthesis? 6. What is cellular respiration? 7. Krebs cycle 8. Where does cellular respiration occur 9. How does cellular respiration work? 10. What role does ATP play in cellular respiration?	1. Structure and function of chloroplasts, chlorophyll 2. Trace steps of Calvin cycle 3. ATP and electron transport chain 4. Structure and function of mitochondria 5. Trace steps of cellular respiration 6. ATP and electron transport chain 7. Photosynthesis compared to cellular respiration—efficiency 8. Microscope Lab—movement of chloroplasts in relation to heat and light	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	1.3, 2.4

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Cell Reproduc-tion-Mitosis and Meiosis	1. Why do cells grow and divide? 2. Cell cycle 3. Mitosis 4. What are the stages of mitosis? 5. What occurs at each stage of mitosis? 6. Errors in mitosis 7. Why do sex cells divide? 8. Meiosis 9. What are the stages of meiosis? 10. What occurs at each stage of meiosis? 11. Errors in meiosis 12. Diploid and haploid cells (2n and 1n) 13. Chromosome structure and function	1. Draw and label a chromosome 2. Learn that body cells divide for growth and repair 3. Understand cells go through a cycle that has several parts—gap 1, synthesis, gap 2, and mitosis 4. Mitosis has five stages—interphase, prophase, metaphase, anaphase, and telophase 5. Animal cells divide differently than plant cells because of their structures 6. Errors in mitosis lead to mutations. Caused by mutagens such as radiation. 7. Learn that sex cells go through two divisions to reduce doubled chromosomes 8. Meiosis has ten stages 9. Male and female sex cells go through meosis differently 10. Steps occuring in fertilization 11. Errors occuring in meosis are passed on to children and may cause birth defects 12. Examples of conditions caused by meiotic errors—Trisomy 21 or Downs syndrome 13. Chromosome number differs in body cells and sex cells 14. Microscope lab—chromosomes 15. Make a flip book of the stages of mitosis	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	2.6, 2.7,
Inheritance of Traits—Mendelian Genetics	1. Principles of Mendelian Genetics 2. Mendelian vocabulary—recessive and dominant, filial generations,	1. History of Gregor Mendel and his pea plants—father of modern genetics 2. Understand why some traits are dominant and some are recessive 3. Learn to use a Punnet Square to determine expected and observed results—probability 4. Understand what it means to be homozygous and heterozygous	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities.	3.3, 3.4, 3.5, 3.6

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	pedigree 3. What is a gene and where is it found? 4. What is an allele? 5. How are Punnett Squares used to predict traits of offspring? 6. Three laws of Mendelian Genetics—Segregation, Dominance, and Independent Assortment 7. Monohybrid and dihybrid crosses 8. Autosomal and sex-linked conditions 9. What is incomplete or codominance? 10. What are polygenic traits? 11. Blood type example of multiple alleles	5. Mendel's three laws of inheritance—how traits are passed from parent to offspring 6. Compare the results of monohybrid and dihibrid crosses 7. Lab—Genes are selected at random 8. Examples of autosomal and sex linked conditions—use Punnett square as a tool for parents—genetic counseling 9. Examples of incomplete and co-dominance found in nature 10. ABO blood typing lab 11. Predict the genotypes of individuals in a pedigree chart	quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	

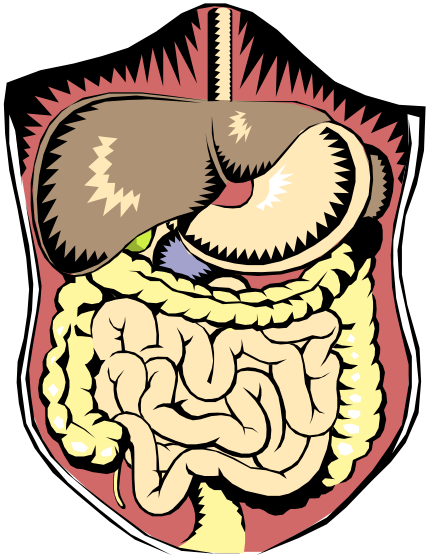
Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Applied Genetic Principles	1. How are traits controlled by genes? 2. What are the effects of mutations? 3. Use of family histories to predict disease inheritance 4. Karyotyping—how to read a karyotype? 5. What is cloning? 6. What is recombinant DNA? 7. What is the future of biotechnology? 8. Gene therapy 9. Human genome mapped	1. Human genome mapped 2. Parts of a gene 3. Genetic inheritance of disorders—linked to sex chromosomes or body chromosomes 4. Make a karyotype of a healthy person 5. Examples of how recombinant DNA is used to make drugs like insulin 6. Trace steps of cloning 7. Discuss implications—ethical, moral, scientific of cloning research 8. Future of gene therapy 9. Discuss who owns genes 10. Implications of designer babies 11. Lab—blue people of Kentucky	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	3.3, 3.4, 3.5, 3.6
DNA & DNA Replication	1. What is DNA? 2. What is the function of DNA? 3. Who "discovered" DNA and how it works? 4. What does DNA look like? 5. How is DNA passed on from parent to child?	1. History of DNA research—Watson & Cricke, Griffiths, Avery 2. Draw and label parts of DNA—double helix 3. Parts of DNA—sugar/phosphate backbone, nucleotide bases 4. The genetic code is the order of four nucleotide bases—adenine, guanine, cytosine, thymine. 5. The genetic code is millions of base pairs long. 6. Unique genes are a result of unique genetic codes	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991	3.1, 3.2, 3.3

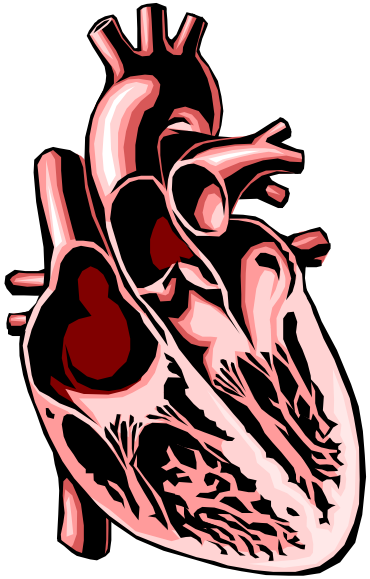
Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	6. What is the genetic code? 7. How does the genetic code control traits? 8. How can the genetic code be universal among all kingdoms? 9. DNA and evolution—one common ancestor 10. DNA replication occurs in mitosis. Explain. 11. Semi-conservation replication theory and enzymes	7. All organisms use the same four base pairs, supporting the theory of one common ancestor 8. DNA makes an identical copy of itself in a process called replication which uses enzymes to unzip the molecule 9. Trace the steps of replication 10. Errors in replication produce mutations. 11. Not all mutations are harmful or lethal 12. DNA spooling lab 13. Gel electrophoresis lab 14. CSI forensics lab		www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	
Protein Synthesis	1. The body is made of structural proteins, enzymatic proteins, and hormonal proteins 2. Proteins are organic molecules—what elements would you find in a protein? 3. What are amino acids and peptide bonds? 4. Compare a codon	1. Understand the function of proteins. 2. Know that proteins have four shapes—primary, secondary, tertiary, and quaternary. 3. Proteins are made of chains of amino acids linked together by peptide bonds. 4. The genetic code of DNA is read in the process of transcription and changed to a mRNA code which can be carried out of the nucleus. 5. Trace the chain of events that change the DNA code from mRNA, to tRNA, and rRNA. 6. Know the enzymes involved in this process. 7. Read a table that shows what codons are translated into specific amino acids.	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	1.3, 3.2, 3.3

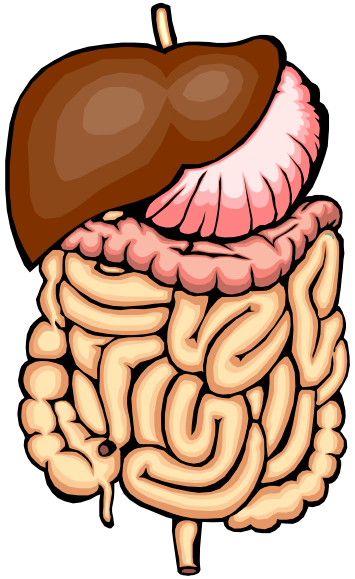
Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	and anti-codon 5. Amino acids are essential or nonessential 6. The DNA code is copied to RNA during transcription—explain. 7. The RNA code is translated and produces distinct proteins—explain. 8. Proteins have many sizes and shapes—explain. 9. Correlate the size and shape of a protein with its function	8. See that the genetic code has many redundancies built in to prevent mutations. 9. Understand translation occurs at the ribosomes as amino acids are linked. 10. Errors can occur in protein synthesis which can be beneficial or harmful—point and nonpoint mutations 11. Discuss the implications of genetic and chromosomal mutations—natural and artifical selection processes 12. Lab—arranging genetic bases—A with T, C with G 13. Dinosaur genetic lab			
Simple Animals	1. What are the traits of all animals? 2. What is symmetry? 3. What is a consumer or heterotroph? 4. Cellular respiration 5. Invertebrate traits 6. Where do you find simple animals? 7. What are	1. Traits of all animals—consumers, movement, symmetry, reproduction, have cells 2. Discuss the traits of animals and how they are arranged by trait into categories—review taxonomy 3. Review cellular respiration 4. Discuss how traits of animals are adapted to the environment 5. Examples of many diverse organisms 6. Invertebrate does not mean simple 7. Body systems of simple animals 8. Comparative anatomy of invertebrates 9. Hydra/sponge lab 10. Jellyfish/sea cucumber/sea urchin lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/	4.1, 4.2, 4.3, 4.4, 4.4, 4.5, 4.6, 4.7, 4.8, 5.1, 5.2, 5.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	examples of simple animals? 8. Diversity of invertebrates	11. Roundworm/flatworm/segmented worm comparative anatomy of parasites lab 12. Clam Lab 13. Earthworm lab		curriculm_map.htm http://www.wordinfo.info/	
Complex Animals	1. Review traits of animals 2. Vertebrate traits 3. Vertebrate classification 4. Where do you find complex animals? 5. What are examples of complex animals? 6. Diversity of vertebrates 7. Comparative anatomy of body systems 8. Ectothermic and endothermic animals differ in life styles. Explain.	1. Discuss traits of animals and how they are arranged by trait into categories 2. Discuss how traits of animals are adapted to the environment 3. Examples of organisms from diverse classes 4. Body systems of vertebrates—variations and adaptations 5. Warm and cold blooded animals 6. Crayfish lab 7. Starfish lab 8. Perch lab 9. Snake lab 10. Bird anatomy—eggs, feathers, body systems 11. Frog lab 12. Fetal pig lab	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities. Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	4.1, 4.2, 4.3, 4.4, 4.4, 4.5, 4.6, 4.7, 4.8, 5.1, 5.2, 5.3
Body Systems	1. Comparitive anatomy 2. How form and function are related? 3. Organisms are adapted to their environments—	All body systems are described and discussed during animal dissections. Students are quizzed on the location and functions of organs/organ systems in oral quizzes and lab practicals. Problems in body systems interrupt homeostasis and lead to specific diseases. These are the systems covered: 1. Digestion	Open response questions, discussion, homework assignments, lab activities and lab reports, vocabulary	Glencoe, Biology: An Everyday Experience, Kaskel, *et al*., McGraw-Hill, 1995, with supporting workbooks, lab activities and investigations, handouts, assignments, and independent research opportunities.	4.1, 4.2, 4.3, 4.4, 4.4, 4.5, 4.6, 4.7, 4.8, 5.1, 5.2, 5.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	explain. 4. Unicellular and multicellular	2. Excretion/elimination 3. Respiration 4. Blood 5. Immunity 6. Circulation 7. Skeletal 8. Muscular 9. Nervous 10. Endocrine 11. Sense organs 12. Reproduction	quizzes—word prefixes/ suffixes, pop quizzes, exams, and projects	Prentice Hall, Biology: The Study of Life, Schraer and Stoltze, 1991 www.biologycorner.com http://sps.k12.ar.us/massengale/curriculm_map.htm http://www.wordinfo.info/	







SUBJECT MATTER: Advanced Biology Grade: 10

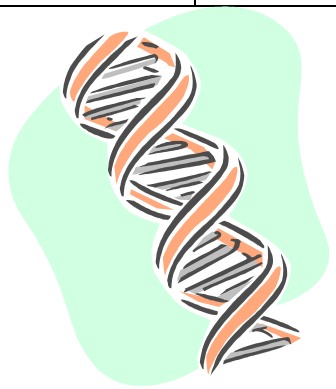
Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
The nature of Science	1. Scientific method 2. Metric system 3. Lab safety 4. "spaceship" Earth 5. What is science?:	1. Students should be able to use the scientific method to solve a problem 2. Students should be able to measure accurately mass, length, volume and temperature using the metric system. 3. Students should understand general laboratory safety 4. Students should understand why the earth is a spaceship	Lab report scientific method Metric scavenger hunt Written safety test	Metric supplies: ruler, balance, thermometers, weights, graduated cylinders	SIS 1-4
Biology as a science	1. Characteristics of living things 2. What is a living thing? 3. Who uses biology?	1. students should be able to understand the difference between living and non living things 2. Understand various ways to use biology 3. students should be able to use a microscope correctly to identify various cells 4. Identify various and function types of microscopes	Living /nonliving lab Write a paragraph explaining how a car could be a living thing if made of cells is removed Leaf activity comparing 3 main types of microscopes	Microscopes (stero and compound light) Picture of an electron micrograph Hand lens Box of various living/ non living articles	1.1,2.2
Introduction to general biochemistry	1. Physical Vs chemical change 2. Chemical bonding 3. Four major chemical reactions 4. Balancing	1. Understand the difference between compounds and elements 2. Understand how to balance chemical equations. 3. Understand the differences between the four major types of chemical reactions 4. Understand essential organic molecules and how they function.	Physical vs chemical change lab Ph lab Lab differ-entiating organic	Demo electrode Demo all four reactions (NaCl, Mg ribbon, Bunsen burner, AgNO3, Na) Ph strips	1.1,1.2,1.3,

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	chemical equations 5. Ph scale 6. Organic compounds 7. How do chemicals affect your body?		compounds Jeopardy review	Test tubes, Bunsen burners, benedicts solution, buirets solution,	
Cell structure and function	1. Cell Theory 2. Cell structure and organelles 3. Osmosis and diffusion 4. Cell levels of organization	1. Understand the cell theory 2. Students should know the difference between plant and animal cells and their functions 3. Students should understand the function of various cell organelle 4. Students should understand and be able to reproduce the actions of diffusion and osmosis 5. Students should be able to recognize the various levels of cell organization	Create cell model Cell box activity Lab plant vs animal cell Relate cell organelles to that of buildings found around town Lab diffusion and osmosis	Materials to create model Cell box (things that resemble parts of cell ex car = transport = ER) Microscope and various cells (potato, cheek, elodea) Dialysis tubing, iodine, starch, glucose, string, water	2.1,2.2,
Cell growth and division	**Cell division**: interphase, mitosis, meiosis, cytokinesis How do cells reproduce?	1. Students should understand how body cells are formed (diploid to diploid) 2. Students should understand how sex cells are made (diploid to haploid)	Lab mitosis (using onion cell and whitefish cells) Lab meiosis (using pipe cleaners)	Microscope, mitosis slides	2.6,2.7, 4.6

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Genetics	1. Gregor Mendel history of genetics 2. Punnet squares (phenotype vs. genotype) 3. Dihybrid crosses 4. Incomplete dominance 5. Karyotypes 6. Sex linked traits 7. Recombinant DNA and cloning 8. What is genetics? How does it affect you? 9. How do species change over time?	1. Student should understand how genes make them who they are 2. Students should understand how to construct a single and dihybrid cross 3. Student should understand that some traits are not recessive or dominant thus they are incomplete dominance 4. Students should understand how to read a gene map and determine whether or not chromosomal abnormalities are present 5. Students should understand that some traits are more common in males due to it being a sex linked trait 6. Students should understand that blood type is genetically determined. 7. Students should understand the impact of cloning and recombinant DNA on society. 8. Students should understand the basic concepts of evolution.	Lab single punnet squares Lab dihybrid crosses Incomplete dominance lab Lab karyotypes Demo sex linked traits Lab blood typing and Rh factor Lab on evolution	Karyotype materials and chromosomes PTC paper Color blindness charts Simulated blood and RH factor Cloning video (national geographic) Pepper moth lab materials	,3.3,3.4, 3.5,3.6,5.1,5.2,5.3
DNA and ProteinSynthesis	DNA and Protein Synthesis How can one DNA change affect your entire life?	1. Students should understand the basic structure and function of DNA 2. Students should understand the process of DNA replication and how it relates to the transmission of the genetic code. 3. Students should be able to explain the steps of protein synthesis 4. Students should be able to explain how one mutation can cause you to create the wrong proteins.	DNA lab build DNA model Electrophoresis lab/DNA finger printing Lab protein synthesis Crime scene investigation	Kinex DNA models <u>Electrophoresis chamber, gel light, agarose, DNA, buffer solution, micropipets</u> CSI box unit (blood, chromatography, microscope, slides, fibers, hairs,)	1.3, 3.1,3.2

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
How cells get their energy	1. Photosynthesis Vs cellular respiration. 2. Why would we die if plants became extinct? 3. Where does the color of fall leaves come from?	1. Students should be able to explain the process of photosynthesis and cellular respiration and how they are related. 2. Students should be able to explain the role of ATP 3. Students should understand how plant pigments work. 4. Students should be able to perform a chromatography lab	Chromatography lab	Red and green leaves, mortar and pestle, filter paper, acetone	2.4, 2.5, 6.4
Classifica-tion	1. Classification 2. History of Why are things classified?	1. Student should understand the 6 kingdoms of classification. 2. Students should be able to recognize organisms of each category. 3. Students should understand the difference between a virus and a bacteria	Classi-fication lab Gram stain bacteria lab Fungi/Pro-tista lab	Lugols iodine, crystal violet, safrin, 95% ethanol, incubator, inoculating loop, agar, petri dishes, microscope, slides, Bunsen burner	2.3, 2.8
Invertebrates	1. Porifera 2. Cndarians 3. Platyhelminthes 4. Nematoda 5. Annelids 6. Arthropods 7. mollusks	1. Students should now the 8 phylum's of invertebrates and characteristics and examples of each. 2. Students should know the 5 classes of arthropods and 3 classes of mollusks. 3. Student should be able to recognize different invertebrates anatomy.	Lab dissection and oral quiz on: Sponge/hydra/jel ly fish Flat &round	Preserved animal specimens Dissecting tray, pins, scalpel Demo and examples of other specimens	4.1 through 4.8 relating that particular animals functions 6.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	8. Echinodermata 9. What inverte-brates are related to whom and why?		worms Earthworm Clam Grasshopper/-crayfish Starfish	Modern Biology book	
Chordates and how human body systems differ from theirs.	1. Jawless fish 2. Cartilage fish 3. Bony Fish (pisces) 4. Circulatory 5. Amphibians digestive 6. Retilia respiratory 7. Aves excretory 8. Mammalia nervous system	1. Students should be able to point out various anatomical structures on these different animals. 2. Students should understand how humans are similar/not similar to these animals 3. Students should know the main human body systems and how they function.	Dissection and comparison to • Humans • Perch • Frog • Snake • Pig	Preserved animal specimens Dissecting tray, pins, scalpel Cartesian diver (show swim bladder) • Sheep lung system • Sheep heart • Sheep Brain	4.1 through 4.8



SUBJECT MATTER: Anatomy and Physiology Grade: 11-12

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Basic biochemistry	1. Atoms, bonding, chemical reactions, balancing equations, elements 2. Organic molecules and their building blocks 3. Body levels of organization, planes, symmetry	1. Students should be able to understand how to balance an equation and identify various types of bonding. 2. Students should be able to physically point out all body planes and use correct anatomical words to describe a body part location. 3. Students should understand proteins and how they greatly affect the body	Lab on various body planes and parts	Microscopes, skeleton, magazines	Bio 1.1, 1.2, 1.3,
General Cellular knowledge	1. Cell organelles and function 2. Diffusion and osmosis 3. Tonicity 4. Mitosis and Meiosis	1. Students should understand the function and location of various cell structures. 2. Students should understand how a cell uses diffusion and osmosis to regulate itself and how tonicity is interrelated 3. Students should understand the process of cellular division	Lab cell parts, Box activity Lab tonicity using fake blood, Lab diffusion and osmosis Lab mitosis cells	Demo Cell models Cell box activity Glucose, albumin, starch, dialysis tubing, osmotic meters, beakers, sucrose, iodine, gel, methyl blue Microscopes, mitosis slides	Bio 2.1, 2.6, 2.7, 3.1, 4.6
Histology	Various tissues: 1. epithelial 2. connective 3. muscle/nervous	Students should be able to recognize by sight various types of epithelial, connective, muscular, and nervous tissues. (Specifically but not limited to cardiac, skeletal, smooth, areolar, hyaline, adipose, spinal cord, bone, simple cubodial, transitional, columnar and squamous)	Lab epithelial tissue Lab connective tissue Lab muscle and nervous tissues Lab practical all	Slides of epithelial tissues, connective tissues, muscle tissue and nervous tissue Microscope Histology book for reference	Bio 4.7,4.5

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
			tissues		
Membrane, glands and skin	1. Various glands and the hormones they release 2. Membranes that line the entire body 3. Epidermis and dermis and their components 4. Is the skin really your first line of defense?	1. Students should understand that without glands, many functions of the body would not exist. 2. Students should understand the various linings and cavities created within the body. 3. Students should understand that the skin is the largest organ and that it provides and essential line of defense.	Lab skin	Skin model Cat Slides related to various types of skin Microscope	Bio 4.7
Skeletal system	1. Upper extremities 2. Lower extremities 3. Skull 4. Trunk (Vertebrae, pelvis) 5. Bone diseases and fractures 6. Macroscopic bone structure 7. Microscopic bone structure	1. Students should be able to recognize the difference between an extremities and a trunk. 2. Students should be able to name and locate all the bones in the human body 3. Students should be able to differentiate between a male and female skeleton. 4. Students should be able to recognize different types of fractures and bone diseases 5. students should understand how bones grow and repair themselves	Upper extremities lab and oral quiz Lower extremities lab and oral quiz Skull lab and oral quiz Skull written quiz as well, trunk lab and oral quiz	Several skeletons Several skulls X-rays	Bio 4.5

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Articula-tions	Articulations specifically: Synovial (pivot, hinge, ball and socket, saddle)	1. Students should recognize the three main types of joints 2. Students should be able to name and identify various types of synovial joints found throughout the body.	Lab articulations	Joint models specifically the knee	Bio 4.5
Muscular system	1. Upper extremities human and cat 2. Lower extremities human/cat 3. Head/Trunk human and cat 4. Muscle contraction and relaxation	1. Students should be able to recognize all major muscles and muscle groups located in the human and in the cat. 2. Students should understand how muscles work in connection with each other (antagonist). 3. Students should be able to explain the process of muscle contraction and relaxation at the chemical level.	Lab & oral quiz upper extremities Lab & oral quiz lower extremities Lab & oral quiz head/trunk Cat lab practical	Cat dissecting tray, cat lab book manuals, scalpel, scissors, probes, t pins Human muscle models	Bio 4.5
Nervous system	1. Central nervous system 2. Peripheral nervous systems 3. Neurons structure/ function	1. Students should know the main parts of the brain and their functions 2. Students should understand how the peripheral nervous system and the central nervous system work together. 3. Students should be able to recognize the specific structures that make up a brain cell and how some medications have effects on the brain.	Brain lab Spinal cord lab	Sheep brain, cow spinal cord, brain models, dissection pans, probes, scalpels	Bio 4.4

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Excretory system	1. Microscopic and macroscopic kidney structures 2. Kidney diseases and abnormalities 3. Urine analysis	1. Students should be able to recognize the 3 main parts of a kidney 2. Students should be able to trace a drop of dirty blood through the kidneys and be able to explain how its wastes become urine. 3. Students should be able to analyze urine specimens well enough to detect certain diseases	Sheep Kidney dissection lab and oral quiz Simulated kidney function lab Urinalysis lab	Sheep kidneys, manual, scalpel, dissection pan, Kidney simulation kit using dialysis bags, simulated blood, salt test strips Urine samples, glucose test strips, benedicts solution, silver nitrate, nitric acid, collection cups	Bio 4.2
Circulatory system	1. Heart structures and function 2. Arteries vs. veins 3. Blood types (antigen/ antibodies) 4. Types of blood cells and their functions 5. Heart/blood diseases	1. Students should be able to trace a drop of blood from the vena cava to the aorta. 2. Students should understand the various types of blood and the problems associated with not getting the correct match 3. Students should be able to name at least two diseases associated with the circulatory system. 4. Students should recognize that there are several different types of blood cells; all with a specific function	Sheep Heart dissection and oral quiz Simulated blood clotting lab	Sheep heart, heart model, dissection pan, scalpel Simulated blood kit with antigen A and antigen B Blood pressure cuff	Bio 4.2
Digestive system	1. Structures and functions of all organs related to digestive system 2. Disease of digestive system	1. Students should be able to trace a hamburger from their mouth through their digestive tract and out of their body. They must give specific details was to which enzymes can break down which food particles. 2. Students should understand how all these organs work together to do one main function 3. Students should be able to discuss several disease both communicable and non communicable that can affect your digestive system.	Lab cat dissection of digestive system	Cat, cat lab books, dissection trays	Bio 4.1

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Respiratory system	1. Structures and functions of all respiratory organs 2. Diseases of the respiratory system 3. How respiratory system plays a crucial role with the circulatory system	1. Students should be able to explain the process of cellular respiration 2. Students should be able to recognize all organs in the respiratory system 3. Students should be able to explain how photosynthesis and cellular respiration are related 4. Students should be knowledgeable of respiratory diseases	Lab respiratory system	Preserved sheep lungs	Bio 4.3
Senses (eye and ear)	1. Eye structure and function 2. How you are able to see 3. Common eye problems and tests 4. Visible light spectrum/ color blindness 5. Ear structure and function 6. How you are able to ear 7. Various tones and ranges of hearing 8. Common hearing issues	1. Students should be able to explain in depth the process that it takes for you to see a single object 2. Students should be able to conduct and give accurate results of simple eye tests (vision, astigmatism, colorblindness) 3. Students should be able to explain how a sound is transmitted from your outer ear to your brain. 4. Students should be knowledgeable about upcoming techniques to improve both hearing and vision 5. Students should be able to conduct simple hearing and balance tests	Structural eye dissection (sheep) Eye lab vision tests Structural ear lab combined with balance and hearing tests	Sheep eyes, scalpel, dissection tray, lab manual Eye model Eye charts and astigmatism charts Ear model, tuning forks, white board, markers, lamp	

SUBJECT MATTER: Biotechnology Grade: 11-12

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
History/ careers of biotech	1. History of biotech and timeline 2. Types of biotech 3. Careers available in this field 4. What is Biotechnology?	1. Students should be able to define the term biotechnology 2. Students should understand the various career paths open to them in this field.	Create a GM food Project: Design an ad for a gm food that you created	Library to research Article on flavor savor tomato	SIS1, SIS2
Aseptic technique and measure-ments	1. Introduction to aseptic technique 2. Learn how to use centrifuge, spectrophoto-meter, autoclave 3. Metric measurements 4. Eukaryotes vs. prokaryotes 5. Lab dilutions and media making 6. Lab safety 7. What are the most important tools used in a laboratory?	1. Students should understand proper laboratory conduct 2. Students should understand how to use various lab equipment 3. Students should understand proper aseptic technique 4. Students should understand the difference between prokaryotes and eukaryotes 5. Students should understand how to make the correct dilutions of a substance	Make and grow a bacterial culture Gram stain lab Lab dilutions	Bacteria, inoculating loop, agar plates, agar, incubator Gram stain kit Microscopes Gloves	SIS4, III 2.2 BIO
DNA and electricity	1. Notes DNA structure properties and function 2. Transcription and translation/protei n synthesis 3. Electrophoresis/	1. Students should understand what DNA is made of, its function and how it makes proteins 2. Students should understand how to extract DNA from various substances using various techniques. 3. Students should understand how to run a paternity test and read the results	Lab create a DNA model Lab DNA spooling Lab DNA extraction from a	Various types of DNA Electrophoresis chamber Agarose, dye, gel box, micropipettes, various chemicals, freezer Conex to make DNA model	BIO: 3.1,3.2,3.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	DNA fingerprinting 4. Ohm's law 5. PCR	4. Students should know how to use a micropipette	strawberry Lab DNA extraction from beans Create a DNA map Lab using micropipettes Lab electrophoresis and paternity testing/ gel staining Lab electrophoresis color migration	Video DNA (library)	
Transfor-mations	1. Notes genetic engineering, restriction enzymes, plasmids, and transformations 2. Transgenic plants 3. Gene therapy 4. Current technology and uses in agriculture	1. Students should understand the role restriction enzymes, plasmids, and genetic engineering play in transformations. 2. Students should understand how gene therapy would affect future society and agriculture. 3. Student should understand how to carry out a transformation.			BIO: 3.3,3.4,3.5 5.1

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Cloning	1. Cloning discussion and ethics 2. Parts cloning vs. entire organism cloning 3. Stems cells (embryonic and naturally occurring) 4. Is cloning ethical?	1. Students should understand the various types of cloning that exist 2. Students should be familiar with the various processes of cloning and what disease it can treat.	Lab cloning plant fronds	Video national geographic (cloning) Plant fronds, culture media, grow cart. Web site that simulates dog cloning	Bio: 3.5, 5.3, 6.2, 4.6
Western blots and ELISA assay	1. Discuss the immune system, endocrine/exocrine glands 2. Hormones and detection of disease in blood, urine and saliva 3. Western and northern blot function 4. ELISA assay tests as it relates to HIV and pregnancy 5. How do diagnostic tests work?	1. Students should understand the vital role of ELISA assay's to detect problems in bodily fluids. 2. Students should understand how western blots could be used to diagnosis disease. 3. 3. Students should be able to conduct both and ELISA assay and a western blot.	Lab ELISA assay Lab western blot	Chemicals, cellulose paper, electrophoresis chamber, micropipettes, vials, incubator, gel box	BIO: 4.2, 4.7
Chroma-tography	1. Separations, identifications, purification chromatography 2. Enzymes and	1. Students should understand the different types of chromatography and the techniques used to separate these pigments 2. Students should understand that pigments may be "masked " for a short time.	Lab paper chromatography (2 methods) Lab column	Column, filter paper, petri dish, leaves, beets, spinach, mortar and pestle, sand, pipettes	BIO 2.4

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	pigments 3. Column VS paper chromatography		chromatography		
Tissue culture	1. Uses for tissue cultures 2. Types of tissue cultures 3. Epithelial cells and degrees of burns 4. Tissue culture technique	1. Students should understand the uses for tissue culture 2. Student should know at least one technique for culturing tissues	Lab exploring epithelia tissue Lab tissue culture from a chick embryo	Chick embryo, incubator, flow hood, culture media, T flasks, Epithelial slides, microscope	Bio: 4.7, 4.8, 5.1
Forensics	1. History of forensics 2. Hair and fibers 3. Finger prints (3 types) 4. Handwriting analysis 5. Using chromatography (ink) 6. Blood spatter 7. Luminol detection 8. Entomology 9. Mold casting 10. DNA evidence & PCR	1. Students should understand the various techniques that must be used to analyze a crime science. 2. Students should have knowledge of how to run many of these tests. 3. Student should know when to use appropriate tests	Lab finger print lifting Lab blood spatter Lab how to use luminol Lab entomology Lab Mold casting Lab CSI using hand writing, fiber and hair Lab they make up and stage. Another group solves (Must collect all evidence)	Simulated blood, DNA**,** molding, play doh, fibers, hair sample, finger print powder and brush, super glue, meter sticks, insects, writing and finger print samples to make data base, luminol, microscopes, slides	BIO: SIS1, SIS2, SIS3, SIS4, 5.2, 6.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	1. Series of randomly assigned questions, which cause the students to choose which test they should run in order to get the desired results. 2. Questions: 3. In which seeds are the DNA yields the highest? 4. Is antibacterial soap really effective? 5. Which one is the real father? 6. Which antibiotic works better on these particular bacteria? 7. Do red leaves contain chlorophyll?	1. Students should be able to determine what test is needed in order to get the desired results 2. Students should be able to run these test with little prompting from the instructor	Several labs that would answer the questions previously stated.	All lab equipment previously mentioned	SIS1,SIS2,SIS3,SIS4

SUBJECT MATTER: Chemistry It Matters Grade: 11-12

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Introduction to Chemistry	1. What is chemistry? Measurement: Metric System 2. Significant Figures 3. Scientific Notation 4. Temperature: Measurement/-Scales 5. % Error 6. Accuracy and Precision 7. Laboratory Practices, Safety and Report Writing	1. Basic mathematical computation 2. English to metric conversions 3. Knowledge and use of laboratory equipment 4. Reporting format 5. Organization of data and presentation in proper English 6. Scientific method	Written test	Text book, Chapters 1 and 2 Hand outs: • Metric conversion • Temperature • Report format • Safety procedures/demos • Fire procedures • First aid • Emergency procedures	II. SIS 1,2,3 III
Matter	1. Types of Matter 2. States of Matter 3. Degrees of Freedom 4. Chemical/Physi-cal Properties 5. Elements and Symbols 6. Compounds and Mixtures 7. Density	1. Reading/understanding 2. Memorization 3. Algebra 4. Lab technique	Written test Separation Lab Density Lab	Text book, Chapter 3 Lab handout, "Separation of Mixture via Physical Means" Mixture of sand, salt & iron Metals for lab Equipment demos Density specimens	I 1.1 I 1.2 I 1.3 II SIS 2,3,4 III

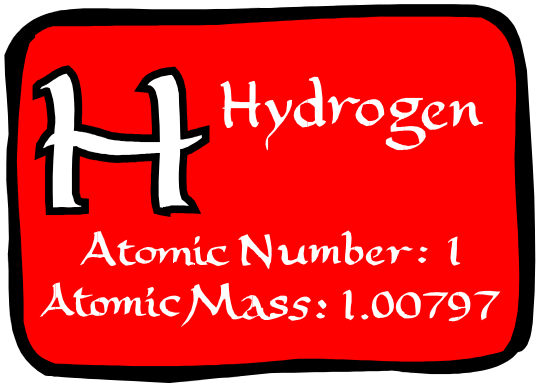
Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Energy	1. Heat and Temperature 2. Calorimetry: Within a phase At a phase change 3. Specific Heat c_p Heat of Vaporization/Fusion H_v/H_f 4. Kinetic Theory of Solids 5. Laws of Conservation of Energy and matter 6. Laws of definite and multiple proportions	1. Reading/understanding 2. Application of algebra 3. Lab technique	Written test c_p lab H_f ice lab Heating and cooling curve	Text book, Chapters 4 and 7 Calorimetry handouts How to solve problems Lab procedures Metal specimens Ice 1,4-dichlorobenzene	I 6.3 I 6.4 II SIS 2,3,4 III
Chemical Formulas	1. Empirical/molecular forms 2. Naming procedures for matter 3. Polyatomic ions 4. Ternary compounds 5. Oxidation states 6. Predicting formulas 7. Hydrates	!. Reading/understanding 2. Application of rules	Written test	Text book, Chapters 8 and 26 Hand outs	I 4.1 I 4.6 III

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Mathematics of Chemistry	1. Calculation of: molecular mass 2. % composition 3. Empirical formula 4. Concept of "the mole" 5. Avogadro's 6. Hypothesis 7. Ratios in Chemistry: Moles, grams, particles and liters (gases)	1. Reading/understanding 2. Mathematics 3. Conversions 4. Use of semi-micro lab equipment	Written test Color lab Hydrate lab	Text book, Chapter 9 Hand outs Colorimetry comparison kit Various hydrates	I 5.3 I 5.4 I 6.1 II SIS 2,3,4 III
Chemical Equations	1. Balancing 2. Classification 3. Ionic form	1. Reading/understanding 2. Mathematical analysis 3. Application of rules	Written test Reaction lab	Text book, Chapter 10 Hand outs Ion lab kit	I 5.1 I 5.2 II SIS 2,3,4 III
Redox Systems	Balance redox equations using the ½ cell method	1 Knowledge of oxidation states 2 Application of rules	Written test	Text book, Chapter 26	I 8.4 III
Stoichio-metry	1. Mass/mass relationships 2. Mass/volume relationships 3. ole/particle/mass/ volume 4. Relationships 5. % yield in reactions 6. Limiting reactant	1. Application of ratios 2. Mathematical analysis	Written test	Textbook, Chapter 11 Handouts How to do sheets	I 5.5 I 5.6

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Atomic Theory	4. History 5. Sub atomic particles 6. Atomic/molecular mass 7. PENZA 8. Aufbau principle 9. Block diagrams 10. Planetary diagrams 11. Lewis Dot structures 12. Prediction of compounds 13. Quantum numbers	1. Reading/understanding 2. Mathematical analysis 3. Compare/ contrast concepts 4. Deductive reasoning	Written test Probability lab	Textbook, Chapters 12 and 13 Aufbau handouts Determination of Quantum Nos.	I 2.1 I 2.2 III
Chemical Bonding	1. Polar/nonpolar bonds 2. Electronegativity 3. VSEPR 4. Hydrogen bonding	Geometry	Written test	Textbook, Chapters 14 and 15	I 4.3 I 4.4 I 4.5
Periodic Table	Relationship of elements to their reactivity	1. Reading/understanding 2. Interpretation of trends 3. Determination of configurations 4. Differentiation of atomic types 5. Prediction of reactivity	Written test	Textbook, Chapter 16 Periodic table	I 3.1 I 3.2 I 3.3 I 3.4
Solutions	1. Solute/solvent 2. Rate vs. degree of solubility 3. Solubility and % solution 4. Solution types 5. Molarity (M) 6. Molality (m)	1. Calculate concentrations 2. Read graphs 3. Distinguish types of solutions 4. Calculate stoichiometris relationships using solution concentrations 5. Find molarity of solutions using density and % solution	Written test Solubility lab	Textbook, Chapter 17 Potassium nitrate	I 7.1 I 7.2 I 7.3 I 7.5 II SIS 2,3,4 III

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	7. Normality(N) 8. Solution stoichiometry				
Colligative Properties	1. Cryoscopy 2. Ebullioscopy 3. Molecular weight determination	1. Use of molality 2. Mathematical analysis	Written test	Textbook, Chapter 18	I 7.4 III
Gases	1. Pressure 2. STP	Reading/understanding	Written test	Textbook, Chapter 5	
Kinetic Theory Gas laws	1. Gas model 2. Ideal vs real gases 3. Molar Volume 4. Boyle's Law 5. Charles" Law 6. Gay-Lussac's Law 7. Combined Gas Law 8. Ideal Gas Law 9. Dalton's Law 10. Graham's Law	1. Reading/Understanding 2. Algebra 3. Analysis of data 4. Graphing 5. Adjustment to STP	Written test Boyle's law lab Ideal gas lab	Textbook, Chapter 6 Handouts Piston apparatus Butane gas, glassware	I 6.1 I 6.2 I 6.3 II SIS 2,3,4 III
Kinetic Theory Liquids/Solids	Properties of liquids/solids Contrast behavior vis-à-vis gases	1. Reading/understanding 2. Compare and contrast	Written test	Textbook, Chapter 7	I 6.3

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Acids, Bases and Salts	1. Classification of matter 2. Arrhenius theory of acids 3. Bronsted-Lowry theory of acids 4. Acid strength 5. Hydrogen ion concentration 6. pH 7. Buffers	1. Reading/understanding 2. Algebra 3. Scientific notation 4. Logarithms	Written test Titration lab	Textbook, Chapter s 23 and 24 Handouts Burettes and standard solutions	I 8.1 I 8.2 I 8.3 II SIS 2,3,4 III
Chemical Equilibrium	1. Reversible reactions 2. Equilibrium constant 3. Mass action expression 4. LeChatelier's principle	1. Reading/understanding 2. Algebra 3. Scientific notation	Written test Equilibrium lab	Textbook, Chapter 21 Equilibrium lab kit	I 7.6 II SIS 2,3,4 III



SUBJECT MATTER: Inorganic/Organic Chemistry Grade: 11-12

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Introduction to Chemistry	1. What is chemistry? Measurement: Metric System 2. Significant Figures 3. Scientific Notation 4. Temperature: Measurement/-Scales 5. % Error 6. Accuracy and Precision 7. Laboratory Practices, Safety and Report Writing	1. Basic mathematical computation 2. English to metric conversions 3. Knowledge and use of laboratory equipment 4. Reporting format 5. Organization of data and presentation in proper English 6. Scientific method	Written test	Text book, Chapters 1 and 2 Hand outs: • Metric conversion • Temperature • Report format Safety procedures/demos Fire procedures First aid Emergency procedures	II. SIS 1,2,3 III
Matter	1. Types of Matter 2. States of Matter 3. Degrees of Freedom 4. Chemical/Physical Properties 5. Elements and Symbols 6. Compounds and Mixtures 7. Density	1. Reading/understanding 2. Memorization 3. Algebra 4. Lab technique	Written test Separation lab Density lab	Text book, Chapter 3 Lab handout, "Separation of a Mixture via Physical Means" Mixture of sand, salt & iron Metals for lab Equipment demos Density specimens	I 1.1 I 1.2 I 1.3 II SIS 2,3,4 III

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Chemical Formulas	1. Empirical/molecular forms 2. Naming procedures for matter 3. Polyatomic ions 4. Ternary compounds 5. Oxidation states 6. Predicting formulas 7. Hydrates	1. Reading/understanding 2. Application of rules	Written test	Text book, Chapters 8 and 26 Hand outs	I 4.1 I 4.6 III
Chemical Equations	1. Balancing 2. Classification 3. Ionic form	1. Reading/understanding 2. Mathematical analysis 3. Application of rules	Written test Reaction lab	Text book, Chapter 10 Hand outs Ion lab kit	I 5.1 I 5.2 II SIS 2,3,4 III
Atomic Theory	1. History 2. Sub atomic particles 3. Atomic/molecular mass 4. PENZA 5. Aufbau principle 6. Block diagrams 7. Planetary diagrams 8. Lewis Dot structures 9. Prediction of compounds	1. Reading/understanding 2. Mathematical analysis 3. Compare/ contrast concepts 3. Deductive reasoning 4. Graphing	Written test Probability lab	Textbook, Chapters 12 and 13 Aufbau handouts Dice/cards .	I 2.1 I 2.2 III

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Mathematics of Chemistry	1. Calculation of: molecular mass % composition empirical formula 2. Concept of "the mole" 3. Avogadro's Hypothesis 4. Ratios in Chemistry: moles, grams, particles and liters(gases)	1. Reading/understanding 2. Mathematics 3. Conversions 4. Use of semi-micro lab equipment	Written test Color lab Hydrate lab	Textbook Chapter 9 Hand outs Colorimetry comparison kit Various hydrates	I 5.3 I 5.4 I 6.1 II SIS 2,3,4 III
Periodic Table	Relationship of elements to their reactivity	1. Reading/understanding 2. Interpretation of trends 3. Determination of configurations 4. Differentiation of atomic types 5. Prediction of reactivity	Written test	Textbook, Chapter 16 Periodic table	I 3.1 I 3.2 I 3.3 I 3.4
Gases	1. Pressure 2. STP	Reading/understanding	Written test	Textbook, Chapter 5	
Kinetic Theory Gas laws	1. Gas model 2. Ideal vs. real gases 3. Molar Volume 4. Boyle's Law 5. Charles" Law 6. Gay-Lussac's Law 7. Combined Gas Law 8. Ideal Gas Law 9. Dalton's Law 10. Graham's Law	1. Reading/Understanding 2. Algebra 3. Analysis of data 4. Graphing 5. Adjustment to STP	Written test Boyle's law lab Ideal gas lab	Textbook, Chapter 6 Handouts Piston apparatus Butane gas, glassware	I 6.1 I 6.2 I 6.3 II SIS 2,3,4 III

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Kinetic Theory Liquids/Solids	1. Properties of liquids/solids 2. Contrast behavior vis-à-vis gases	1. Reading/understanding 2. Compare and contrast	Written test	Textbook, Chapter 7	I 6.3
Nuclear Chemistry	1. Radioactivity 2. Decay particles 3. Fission/fusion	1. Reading/understanding 2. Mathematics	Written test	Textbook, Chapter 31	I 2.5 I 2.6 I 2.7 III
Organic Chemistry	1. Hybridization of carbon 2. Nature/properties of organic compounds 3. Structural formulas 4. Isomers 5. IUPAC rules 6. Naming rules 7. Drawing/building compounds • Hydrocarbons: Alkanes • Alkenes • Alkynes 8. Halogenated hydrocarbons Functional groups: Alcohols • Aldehydes • Ketones • Ethers • Acids	1. Reading/understanding 2. Drawing 3. Geometry 4. Construction 5. Logic 6. Sorting/ordering	Written test Construction Nylon lab	Textbook, Chapters 29 and 30 Building sets Adipoyl chloride Hexamethylene diamine	

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	• Esters • Amines • Amides 9. Thio (sulfur) compounds 10. Simple aromatic compounds 11. Simple alicyclic 12. compounds 13. Simple organic reactions				

SUBJECT MATTER: Physics Grade: 12

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Introduction to Physics	1. What is physics? 2. The search for understanding 3. The scientific method 4. Significant figures 5. Scientific notation 6. Measurement in metric units 7. % error 8. Accuracy and precision 9. Math review: Algebra 10. Trigonometry 11. Laboratory practices, safety and 12. report writing	1. Basic computation 2. English to metric conversions 3. Metric conversions 4. Knowledge/use of lab equipment 5. Reporting format 6. Data organization and presentation in proper English 7. Graphing 8. Use of scientific calculator	Written test Paper tower Mystery plot Height lab	Textbook Chapters 1 and 2 Hand outs: Metric conversions Report format Safety procedures/demos Fire procedures First aid Emergency procedures Colored paper Copper wire lengths Odd shaped floor tile Meter stick String Protractor	II SIS 1,2,3,4 III
Describing Motion	1. Motion diagrams 2. Coordinate systems 3. Time intervals 4. Distance vs. displacement 5. Velocity vs. speed	1. Reading/understanding 2. Drawing 3. Graphing 4. Computation 5. Conceptual analysis	Written test	Textbook Chapter 3	I 1.2 I 1.3 II SIS 3 III

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
	6. Acceleration				
Vectors	Representing vectors Adding/subtracting vectors: Mathematically/graphically Vector components	1. Reading/understanding 2. Graphing 3. Computation	Written test	Textbook Chapter 4	I 1.1 III
Motion Models	1. Use of graphs 2. Use of equations 3. Equations of motion 4. Acceleration due to gravity	1. Reading/understanding 2. Graphing 3. Computation 4. Derivation of equations 5. Manual dexterity 6. Organization/reporting data	Written test Lab: Car and ramp	Textbook Chapter 5 CPO Science lab kit Derivation handouts	I 1.3 II SIS 1,2,3,4 III
Forces	1. Newton's First Law 2. Newton's Second Law 3. Newton"s Third Law 4. Friction: Static vs. kinetic 5. Periodic motion	1. Reading/understanding 2. Computation 3. Manual dexterity 4. Organization/reporting data 5. Drawing 6. Create/analyze free-body force diagrams	Written test Labs: • Gravity drop • Pendulum	Textbook Chapter 6 CPO Science lab kits Newton's Laws handout Friction handout	I 1.4 I 1.5 I 1.6 II SIS 1,2,3,4 III

Unit/Theme	Content and Essential Questions	Skills	Methods of Assessment	Teacher Resources & Notes	Framework Strand/s & Standard/s
Forces and Motion in Two dimensions	1. Motion on an inclined plane 2. Projectile motion 3. Circular motion 4. Centripetal acceleration	1. Reading /understanding 2. Computation 3. Manual dexterity 4. Organization/reporting data	Written test Labs: • Marble launch • Centripetal Acc.	Textbook, Chapter 7 CPO Science lab kit	I 1.1 I 1,2 I1.4I 1.6 I 1.8 II SIS 1,2,3,4 III
Momentum and its Conservation	1. Impulse/Momentum 2. Angular momentum 3. Conservation of momentum	1. Reading/ understanding 2. Computation	Written test	Textbook, Chapter 8	I 2.1 I 2.5 III
Energy and Work	1. Calculate work 2. Calculate power	1. Reading/comprehension 2. Computation	Written test	Textbook, Chapter 10	I 2.3 I 2.4 III
Simple Machines	1. Levers 2. Inclined planes 3. Pulleys 4. Wheel and axle 5. Mechanical advantage 6. Machine efficiency	1. Reading/comprehension 2. Computation 3. Drawing 4. Manual dexterity 5. Organization/reporting data	Written test Lab: Pulleys	Textbook, Chapter 10 CPO Science lab kit	III