5TH Grade Mathematics [Arithmetic 5]

Required Textbook: A Beka Arithmetic 5, Work-Text, Pensacola, Florida, current edition.

[a] Solve problems, compute fluently, and make reasonable estimates.
[i] Select appropriate methods and tools for computations (e.g., mental computation, estimation, calculators, paper and pencil).
[ii] Explain why one from of a number might be more useful for computation than another form.
[iii] Add, subtract, multiply, and divide whole numbers and decimals.
[iv] Use models, benchmarks, and equivalent forms to add and subtract commonly used fractions with like and unlike denominators.
[v] Solve real-world problems using decimals, fractions, and percents.
[vi] Represent and analyze patterns, relations, and functions.
[vii] Generalize and extend geometric and numerical patterns.
[viii] Represent and analyze mathematical situations and structures using algebraic symbols.
[ix] Demonstrate understanding that an equation is a number sentence stating two quantities are equal.

[b] Illustrate general properties of operations.
[i] Apply commutative, associative, zero, distributive, and identity properties.
[ii] show that division is not commutative.
[iii] Develop an understanding of geometric concepts and relationships as the basis for geometric modeling and reasoning to solve problems involving one-, two-, and three-dimensional figures.
[iv] Use the attributes of geometric figures to develop definitions.
[v] Draw points, lines, line segments, rays, and angles.
[vi] Identify and describe the attributes of a circle using appropriate mathematical language (e.g., radius, diameter, center).
[vii] Investigate and describe the results of subdividing and combining geometric figures.
[viii] Compare and contrast congruent and symmetrical geometric figures.
[ix] Describe characteristics of lines and angles (e.g., parallel, perpendicular, intersecting, right, acute, obtuse).
[x] Describe location and movement using appropriate mathematical language (Quadrant I, II...) of a coordinate system.

[c] Use visualization, spatial reasoning, and geometric modeling to solve problems.
[i] Construct and draw two- and three-dimensional geometric figures.
[ii] Create and describe mental images of objects, patterns, and paths;
[iii] Build a three-dimensional object from a two-dimensional representation (nets) of that object and use visualization and spatial reasoning to solve real-world problems.
[iv] Understand measurable attributes of objects and the units, systems, and processes of measurement.
[v] Demonstrate understanding of the concepts of length, perimeter, circumference, area, weight, capacity, volume, elapsed time, and angle measure;
[vi] Demonstrate understanding that measurements are approximations, how differences in units affect precision.

[vi] Demonstrate understanding of the relationships among the units within the same system of measurements.

[d] Understand and apply basic statistical and probability concepts as they, organize, and analyze data, and to make predictions and conjectures.
[i] Collect data using observations, surveys, and experiments and understand how data-collection methods affect the nature of the data set.
[ii] Represent data using pictographs, bar graphs, tables, circle graphs, and line graphs. Interpret data displayed in pictographs, bar graphs, tables, circle graphs, and line graphs.
[iii] Select and use appropriate statistical methods to analyze data. Use measures of central tendency (i.e., mean, median, mode).
[iv] Understand and apply basic concepts of probability.
[v] Describe the likelihood or chance of events as likely, unlikely, certain, equally likely, or impossible using a sample space to predict the probability of an event.
[vi] Understand that the measure of the likelihood of an event can be represented as a number from 0-1

5TH Grade Science [Science 5]

Required Textbook: A Beka, Science 5, Work-Text, Pensacola, Florida, current edition.

[a] Simple Machines/Technology
[i] Distinguish between natural objects and objects made by humans. Objects can be categorized into two groups, natural and designed.
[ii] Tools help scientists make better observations, measurements, and equipment for investigations. They help scientists see, measure, and do things that they could not otherwise see, measure and do.
[iii] Machines can be used to alter a force. Functioning of machines is affected by friction.

[b] Light, heat, electricity, and magnetism
[i] Light travels in a straight line unless it strikes an object Light can be reflected by a mirror, refracted by a lens, or absorbed by the object.
[ii] Heat can be produced in many ways such as burning, rubbing, and mixing chemicals. The heat can move from one object to another by conduction.
[iii] The path of light may be affected by lenses. These can have concave or convex surfaces.

[c] Properties of objects and materials
[i] Objects have many observable properties, including size, weight, shape, color, temperature, and the ability to react with other substances. These properties can be measured using tools such as rulers, balances, and thermometers.
[ii] Objects are made of one or more materials, such as paper, wood, and metal. Objects can be described by the properties of the materials from which they are made, and these properties can be used to separate or sort a group of objects or materials.
[iii] Materials have different states - solid, liquid, and gas. Some

common materials such as water can be changed from one state to another by heating or cooling.
[iv] The properties of matter can be identified and measured (mass and weight).

[d] The characteristics of organisms
[i] Plants require air, water and light.
[ii] Each plant or animal has different structures which serve different functions in growth, survival, and reproduction.
[iii] Plants and animals have life cycles that include being born, developing into adults, reproducing, and eventually dying.
[iv] Plants and animals closely resemble their parents. Many characteristics of an organism are inherited from the parents of the organism, but other characteristics result from, an individual's interactions with the environment.
[v] All animals depend on plants. Some animals eat plants for food. Other animals eat animals that eat the plants.
[vi] Plants have complex structures with specialized functions.
[vii] Understand the characteristics of seed bearing and non-seed bearing plants, how green plants differ from non-green plants.
[viii] Understand the oxygen-carbon dioxide cycle.

[e] Personal health
[i] Different substances can damage the body and how it functions. Such substances include tobacco, alcohol, over-the-counter medicines, and illicit drugs. Some substances such as prescription drugs can be beneficial but any substance can be harmful.
[ii] Humans have specialized systems responsible for body functioning. Understand the parts and functions of the body.
[iii] There are diseases associated with each system of the body. Understand diseases associated with the body systems.
[iv] There are diseases associated with drug abuse. Understand the effects of drug abuse on the body.

[f] Types of resources
[i] Resources include those things that we get from the living and nonliving environment to meet the needs and wants of a population.
[ii] Some resources include basic materials, such as air, water, and soil; some are produced from basic resources, such as food, fuel, and building materials; and some resources are nonmaterial, such as quiet places, beauty, security, and safety.
[iii] The supply of many resources is limited. If used, those materials can be extended through recycling and decreased use.
[iv] Energy consumption impacts the environment. Alternative energy forms have been developed to conserve natural resources.
[v] Understand the relationship between energy and the environment. As well as the kinds, uses and problems associated with renewable and non-renewable resources.

[g] Water and Oceanography
[i] The topography of the ocean floor is in constant change. Understand the structure and constant changing of the ocean floor.
[ii] Understand the changes which occur in the oceans and their effect on the earth. Understand relationships among oceans, weather, and climate.
[iii] Water, which covers the majority of the Earth's surface, circulates through the crust, oceans, and atmosphere in what is known

as the water cycle.
[iv] Water is a solvent. As it passes through the water cycle it dissolves mineral sand gases and carries them to the oceans.
[v] The atmosphere is a mixture of oxygen, nitrogen, and trace gases that include water vapor The atmosphere has different properties at different elevations.
[vi] Clouds, formed by the condensation of water vapor, affect weather and climate. Some do so by reflecting much of the sunlight that reaches Earth from the sun, while others hold heat energy emitted from the Earth's surface.
[vii] Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate, because water in the oceans hold a large amount of heat.

6TH Grade Mathematics [Arithmetic 6]

Required Textbook: A Beka Arithmetic 6, Work-Text, Pensacola, Florida, current edition.

[b] Make sense of numbers.
[i] Compare and order positive and negative fractions, decimals, and mixed numbers. Solve problems involving fractions, ratios, proportions, and percentages.
[ii] Compare and order positive and negative fractions, decimals, and mixed numbers and place them on a number line.
[iii] Interpret and use ratios in different contexts (e.g., batting averages, miles per hour) to show the relative sizes of two quantities, using appropriate notations (a/b, a to b, a:b).
[iv] Use proportions to solve problems (e.g., determine the value of N if 4/7 = N/ 21, find the length of a side of a polygon similar to a known polygon).
[v] Calculate given percentages of quantities and solve problems involving discounts at sales, interest earned, and tips.
[vi] Solve problems involving addition, subtraction, multiplication, and division of positive fractions and explain the meaning of multiplication and division of positive fractions.
[vii] Determine the least common multiple and the greatest common divisor of whole numbers; use them to solve problems with fractions (e.g., to find a common denominator to add two fractions or to find the reduced form for a fraction).

[c] Learn to write verbal expressions and sentences as algebraic expressions and equations, evaluate algebraic expressions, solve simple linear equations, and graph and interpret their results.
[i] Write and solve one-step linear equations in one variable.
[ii] Apply algebraic order of operations and the commutative, associative, and distributive properties to evaluate expressions; and justify each step in the process.
[iii] Convert one unit of measurement to another (e.g., from feet to miles, from centimeters to inches).
[iv] Demonstrate an understanding that rate is a measure of one quantity per unit value of another quantity.
[v] Solve problems involving rates, average speed, distance, and time.

[d] Algebraic description of geometric patterns.
[i] Use variables in expressions describing geometric quantities (e.g.,

P = 2w + 2l, A = 1/2bh, C = πd - the formulas for the perimeter of a rectangle, the area of a triangle, and the circumference of a circle, respectively).
[ii] Deepen your understanding of the measurement of plane and solid shapes and use this understanding to find their circumference and area.
[iii] Learn to use the formulas for the volume of triangular prisms and cylinders (area of base x height); compare these formulas and explain the similarity between them and the formula for the volume of a rectangular solid.
[iv] Identify angles as vertical, adjacent, complementary, or supplementary and provide descriptions of these terms.
[v] Use the properties of complementary and supplementary angles and the sum of the angles of a triangle to solve problems involving an unknown angle.

[e] Mathematical Reasoning: making decisions about how to approach problems.
[i] Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.
[ii] Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed.
[iii] Determine when and how to break a problem into simpler parts.
[iv] Use estimation to verify the reasonableness of calculated results.
[v] Use words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
[vi] Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.

6TH Grade Science [Science 6]

Required Textbook: A Beka, OBSERVING GOD'S WORLD, Pensacola, Florida, current edition.

[a] Motions And Forces.
[i] The motion of an object can be described by its position, direction of motion, and speed. This motion can be represented on a graph.
[ii] An object that is not being subjected to a force will continue to move at a constant speed and in a straight line.
[iii] If more than one force acts on an object, then the forces can reinforce or cancel one another, depending on their direction and magnitude.
[iv] Unbalanced forces will cause changes in the speed and/or direction of an object's motion.
[v] Magnetism is a force. Magnets are either natural or man-made. You should understand the construction of a magnet and the force it produces.

[b] Energy.
[i] Energy exists in many forms, including heat, light, chemical, nuclear, mechanical and electrical. Energy can be transformed from one form to another.
[ii] Heat energy moves in predictable ways, flowing from warmer objects to cooler ones until both objects are at the same temperature.
[iii] Light interacts with matter by transmission (including

refraction), absorption, or scattering (including reflection).
[iv] To see an object, light from that object -- emitted by or scattered from it -- must enter the eye.
[v] Electrical circuits provide a means of converting electrical energy into heat, light, sound, chemical or other forms of energy.
[vi] The sun is a major source of energy for changes on the Earth's surface. The sun's energy arrives as light with a range of wavelengths, consisting mainly of visible light with significant amounts of infrared and ultraviolet radiation.
[vii] Electricity is a form of energy. Various sources of energy can be utilized in the production of electricity (Law of conservation of energy).
[viii] Understand the structure of batteries and how the changing of chemical to electrical energy is useful.

[c] Reproduction And Heredity.
[i] Reproduction is a characteristic of all living systems; since no individual organism lives forever, it is essential to the continuation of species. Some organisms reproduce asexually. Other organisms reproduce sexually.
[ii] Each organism requires a set of instructions for specifying its traits. Heredity is the passage of these instructions from one generation to another.
[iii] Hereditary information is contained in genes, located in the chromosomes of each cell. Each gene carries a single unit of information, and an inherited trait of an individual can be determined by either one or many genes. A human cell contains many thousands of different genes.
[iv] The characteristics of an organism can be described in terms of a combination of traits. Some traits are inherited and others result from interactions with the environment.

[d] Populations And Ecosystems.
[i] Populations consist of all individuals of a species that occur together at a given place. All of the populations living together and the physical factors with which they interact compose an ecosystem.
[ii] Populations of organisms can be categorized by the function they serve in an ecosystem. Plants and some micro-organisms are producers--they make their own food. All animals, including humans, are consumers, which obtain food by eating other organisms. Decomposers, primarily bacteria and fungi, are consumers that use waste materials and dead organisms for food. Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.
[iii] For ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is converted by producers into stored chemical energy through photosynthesis, It then passes from organism to organism in food webs.
[iv] The number of organisms an ecosystem can support depends on the resources available and abiotic factors such as quantity of light and water, range of temperatures, and the soil composition. Given adequate biotic and abiotic resources and no disease or predators, populations, including humans, increase at very rapid (exponential) rates. Limitations of resources and other factors such as predation and climate limit the growth of populations in specific niches in the ecosystem.
[v] Photosynthesis and cellular respiration are life-sustaining plant processes. The process of photosynthesis changes sunlight into stored

chemical energy by producers

[e] Structure Of The Earth
[i] The solid Earth is layered with a thin brittle crust, hot convecting mantle, and dense metallic core.
[ii] Crustal plates on the scale of continents and oceans constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events, such as earthquakes, volcanoes, and mountain building, result from these plate motions.
[iii] Land forms are the result of a combination of constructive and destructive forces. Constructive forces include crustal deforamtion, volcanoes, and deposition of sediment, while destructive forces include weathering and erosion.
[iv] Changes in the solid Earth can be described as the rock cycle. Old rocks at the Earth's surface weather, forming sediments that are buried, then compacted, heated, and often recrystallized into new rock. Eventually, these new rocks may be brought to the surface by the forces that drive plate motions, and the rock cycle continues.
[v] Soil consists of weathered rocks, decomposed organic material from dead plants, animals, and bacteria. Soils are often found in layers, with each having a different chemical composition ant texture.

[f] The Solar System
[i] The Earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system.
[ii] Most objects in the solar system are in regular and predictable motion. These motions explain such phenomena as the day, the year, phases of the moon, and eclipses.
[iii] Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system. Gravity alone holds us to the Earth's surface and explains the phenomena of the tides.
[iv] The sun is the major sources of energy for phenomena on the Earth's surface, such as growth of plants, winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the Earth's rotation axis.

7TH Grade Mathematics [Arithmetic 7]

Required Textbook: A Beka, Basic Mathematics, Work-Text, Pensacola, Florida, current edition.

[a] Become familiar with basic number theory and study of computations with integers, ordering, graphing, and absolute values.
[i] Write expressions from phrases and word problems, simplify expressions using the associative and distributive properties, and solve expressions for given values of variables.
[ii] Solve one, two, and multi-step equations using inverse operations, order of operations, and properties of addition and multiplication, complete function charts and graph equations and use equations to solve word problems.
[iii] Learn how to solve single and multi-step inequalities, simple and compound inequalities, and use inequalities in word problems and real-

life situations.
[iii] Make use of mental math strategies, real number properties, adding decimals, subtracting decimals, multiplying decimals, dividing decimals, solving equations, and writing equations from word problems.
[vi] Learn the basics of statistics, ratios, proportions, and probability.
[v] Order fractions, decimals, and percents and solving practical problems that involve percents.

[b] Measurement units, measurement and geometry.
[i] Learn how to classify geometric shapes, similarity, congruence, and the application of formulas.
[ii] Apply what you have learned in solving real-life problems to demonstrate understanding of the concepts.
[iii] Use exponents and scientific notation to find area and volume.
[iv] Use fractions and mixed numbers in measurements, such as distance and area.

[c] Solve mathematical problems using a variety of methods.
[i] Use integers to solve problems involving signed numbers.
[ii] Use rational numbers to solve problems involving signed numbers.
[iii] Use rational numbers to solve fractional, decimal, percent, and ratio/proportion problems.
[iv] Use four arithmetic operations with integers and rational numbers to solve problems involving signed numbers.
[v] Use square roots to solve problems involving right triangles and squares.
[vi] Identify two dimensional figures to calculate perimeter and area.

[d] Communicate mathematical information using a variety of methods.
[i] Use integers to create number lines.
[ii] Use rational numbers to create number lines.
[iii] Demonstrate the rules for the arithmetic operations for integers and rational numbers.
[iv] Plot points on a number line to represent signed numbers.
[v] Plot points on a Cartesian plane to visually represent ordered pairs.
[vi] Create charts and tables to logically organize and interpret sets of data.
[vii] Identify points, lines, and planes to discuss, draw, and measure Geometric shapes.

7TH Grade Science [Science 7]

Required Textbook: A Beka, Order and Reality, Work-Text, Pensacola, Florida, current edition.

[a] Focus on the Life Sciences.
[i] All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope.
[ii] Learn how cells function similarly in all living organisms.
[iii] Distinguish plant cells from animal cells, including chloroplasts and cell walls.
[iv] Learn the function of different parts of the cell. The nucleus is the repository for genetic information, mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight

energy for photosynthesis.
[v] Cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes. In multicellular organisms the component cells differentiate as the organism develops.
[vi] A typical cell of any organism contains genetic instructions that specify its traits. Those traits may be modified by environmental influences.
[vii] Learn the differences between the life cycles and reproduction methods of sexual and asexual organisms.
[viii] Sexual reproduction produces offspring that inherit half their genes from each parent. An inherited trait can be determined by one or more genes. Plant and animal cells contain many thousands of different genes and typically have two copies of every gene.
[ix] DNA (deoxyribonucleic acid) is the genetic material of living organisms and is located in the chromosomes of each cell.

[b] In Earth and Life History, evidence from rocks allows us to understand the evolution of life on Earth.
[i] Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time.
[ii] The history of life on Earth has been disrupted by major catastrophic events, such as major volcanic eruptions or the impacts of asteroids.
[iii] The rock cycle includes the formation of new sediment and rocks and that rocks are often found in layers, with the oldest generally on the bottom.
[iv] Evidence from geologic layers and radioactive dating indicates that the Earth is approximately 4.6 billion years old and that life on this planet has existed for more than 3 billion years.
[v] Movements of Earth's continental and oceanic plates through time, with associated changes in climate and geographic connections, have affected the past and present distribution of organisms.
[vi] Most events mentioned in this subject occur in the geologic time scale.

[c] The anatomy and physiology of plants and animals illustrate the complementary nature of structure and function.
[i] Plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism.
[ii] Organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.
[iii] Bones and muscles work together to provide a structural framework for movement.

[d] Physical Principles in Living Systems underlie biological structures and functions.
[i] Visible light is a small band within a very broad electromagnetic spectrum, for an object to be seen, light emitted by or scattered from it must be detected by the eye.
[ii] Light travels in straight lines if the medium it travels through does not change.
[iii] Simple lenses are used in a magnifying glass, the eye, a camera, a telescope, and a microscope.

[iv] White light is a mixture of many wavelengths (colors) and that retinal cells react differently to different wavelengths.
[v] Light can be reflected, refracted, transmitted, and absorbed by matter. The angle of reflection of a light beam is equal to the angle of incidence.
[vi] Compare joints in the body (wrist, shoulder, thigh) with structures used in machines and simple devices (hinge, ball-and-socket, and sliding joints).
[vii] Levers confer mechanical advantage, the application of this principle applies to the musculoskeletal system.
[viii] Contractions of the heart generate blood pressure and that heart valves prevent backflow of blood in the circulatory system.

[e] Scientific progress is made by asking meaningful questions and conducting careful investigations.
[i] Develop your own questions and perform investigations.
[ii] Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data, and display data.
[iii] Use a variety of print and electronic resources (including the World Wide Web) to collect information and evidence as part of a research project.
[iv] Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.
[v] Construct scale models, maps, and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).
[vi] Communicate the steps and results from an investigation in written reports and oral presentations.

8TH Grade Mathematics [Pre-Algebra]

Required Textbook: A Beka, Pre-Algebra, Work-Text, Pensacola, Florida, current edition.

[a] Understand the basics of numerical operations, quantitative reasoning and algebraic thinking.
[i] Numerical operations include an understanding of numbers negative, positive, whole, decimal, and fraction.
[ii] Quantitative reasoning and algebraic thinking enables you to make generalizations before performing the actual mathematical operations and study relationships among quantities.
[iii] Algebraic thinking uses a variety of representations; numerical or graphical to model mathematical situations and solve meaningful problems.

[b] Get the knowledge and skills to understand that a function represents a dependence of one quantity on another and can be described in a variety of ways.
[i] Describe independent and dependent quantities in functional relationships and retrieve data to determine functional relationships between quantities.
[ii] Describe functional relationships and write equations or inequalities to answer questions arising from the situations.
[iii] Represent relationships among quantities using tables, graphs,

diagrams, verbal descriptions, equations and inequalities.
[iv] Identify and sketch the general forms of linear ($y = x$) and quadratic ($y = x^2$) functions.
[v] Identify the mathematical domains and ranges, determine reasonable domain and range values for given situations ($\sqrt{x}$ is valid in what domain?).
[vi] Interpret situations in terms of graphs or creates situations that fit given graphs.
[vii] Understand how algebra can be used to express generalizations and use of symbols to represent situations. Such symbols represent unknowns and variables. These must sometimes be manipulated to simplify algebraic expressions.
[viii] Find specific function values, simplify polynomial expressions, transform and solve equations, and factor as necessary. The simplification process might use the commutative, associative, and distributive properties.

[c] Understand that linear functions can be represented in different ways and you can determine whether or not given situation can be represented by a linear function.
[i] Determine the domain and range values for which a linear function makes sense.
[ii] Understand the meaning of the slope and intercepts of linear functions and interpret the effects of changing their parameters (the effects of changes in m and b on the graph of $y = mx + b$).
[iii] Write equations of lines given characteristics such as two points, a point and a slope, or a slope and y-intercept.
[iv] Determine the intercepts of linear functions from graphs, tables, and algebraic representations.

[d] Understand that the graphs of quadratic functions and the effects of changing their parameters: the effects of changes in a on the graph of $y = ax^2$ and the effects of changes in c on the graph of $y = x^2 + c$.
[i] Understand there is more than one way to solve a quadratic equation, solve them using appropriate methods.
[ii] Use patterns to generate the laws of exponents and apply them in problem- solving situations.
[iii] Analyze data and represent situations involving exponential growth and decay using tables, graphs, or algebraic methods.

8TH Grade Science [Science 8]

Required Textbook: A Beka, Matter and Motion, Work-Text, Pensacola, Florida, current edition.

[a] Introduction to the Physical Sciences.
[i] The velocity of an object is the rate of change of its position. Position is defined relative to some choice of standard reference point and a set of reference directions. Average speed is the total distance traveled divided by the total time elapsed.
[ii] Solve problems involving distance, time, and average speed.
[ii] Unbalanced forces cause changes in velocity. A force has both direction and magnitude.
[iii] The greater the mass of an object the more force is needed to achieve the same change in motion.
[iv] The role of gravity in forming and maintaining planets, stars and

the solar system.

[b] Elements, their distinct properties and atomic structure of Matter
[i] The structure of the atom and how it is composed of protons, neutrons and electrons.
[ii] Compounds are formed by combining two or more different elements. Compounds have properties that are different from the constituent elements.
[iii] The states (solid, liquid, gas) of matter depend on molecular motion. In solids the atoms are closely locked in position and can only vibrate, in liquids the atoms and molecules are more loosely connected and can collide with and move past one another, while in gases the atoms or molecules are free to move independently, colliding frequently.

[c] The Solar System, structure and composition of the universe.
[i] Galaxies are clusters of billions of stars, and may have different shapes. The sun is one of many stars in our own Milky Way galaxy. Stars may differ in size, temperature, and color.
[ii] Use astronomical units and light years as measures of distance between the sun, stars, and Earth.
[iii] Stars are the source of light for all bright objects in outer space. The moon and planets shine by reflected sunlight, not by their own light.
[iv] The appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.

[d] Chemical reactions are processes in which reactant atoms and molecules form products with different chemical properties.
[i] Explain the law of conservation of matter: in chemical reactions the number of atoms stays the same no matter how they are arranged, so their total mass stays the same.
[ii] Tell the difference between a chemical and a physical process. Physical processes include freezing and boiling, in which a material changes form with no chemical reaction.
[iii] Determine whether a solution is acidic, basic or neutral.
[iv] Understand the chemistry of biological systems and the central role of carbon in the chemistry of living organisms because of its ability to combine in many ways with itself and other elements.
[v] Make inferences as to the relative size of molecules in living systems: small ones such as water and salt, and very large ones such as carbohydrates, fats, proteins and DNA.

[e] The scientific method: how to ask meaningful questions and conduct careful investigations.
[i] Plan and conduct a scientific investigation to test a hypothesis, evaluate the accuracy and reproducibility of data and distinguish between variable and controlled parameters in a test.
[ii] Construct appropriate graphs from data and develop quantitative statements about the relationships between variables.
[iii] Apply simple mathematical relationships to determine one quantity given the other two (including speed = distance/time, density = mass/volume, force = pressure x area, volume=area x height).
[iv] Distinguish between linear and non-linear relationships on a graph of data.

9TH Grade Mathematics [Algebra Level 1]

Required Textbook: A Beka, Algebra 1, Work-Text, Pensacola, Florida, current edition.

[a] Understand the basics of functions and know how to apply them to problem-solving situations.
[i] Identify the mathematical domains and ranges and determine reasonable domain and range values for given situations.
[ii] Know how to manipulate symbols in order to solve problems and use the necessary algebraic skills required to simplify algebraic expressions (factoring, properties of exponents etc.).
[ii] Connect the function notation of y = and $f(x)$ =.
[ii] Analyze situations and formulate systems of equations or inequalities in two or more unknowns to solve problems.
[iii] Interpret and determine the reasonableness of solutions to systems of equations or inequalities.
[iv] Identify and sketch graphs of parent functions, including linear ($y = x$), quadratic ($y = x^2$), square root ($y = \sqrt{x}$), inverse ($y = 1/x$), exponential ($y = a^x$), and logarithmic ($y = \log_a x$) functions.

[b] More advanced functions.
[i] Describe a conic section as the intersection of a plane and a cone.
[ii] Identify symmetries from graphs of conic sections and identify the conic section from a given equation.
[iii] Understand that quadratic functions can be represented in different ways and learn to translate among their various representations.
[iv] Determine the reasonable domain and range values of quadratic functions, interpret and determine the reasonableness of solutions to quadratic equations and inequalities.
[v] Relate representations of quadratic functions, such as algebraic, tabular, graphical, and verbal descriptions.
[iv] Determine a quadratic function from its roots or a graph.
[v] Use characteristics of the quadratic parent function to sketch the related graphs and connect between the $y = ax^2 + bx + c$ and the $y = a(x - h)^2 + k$ symbolic representations.

[c] Rational functions.
[i] Formulate equations and inequalities based on rational functions.
[ii] Use quotients to describe the graphs of rational functions, describe limitations on the domains and ranges, and examine asymptotic behavior.
[iii] Determine the reasonable domain and range values of rational functions and determine the reasonableness of solutions rational equations and inequalities.
[iv] Analyze a situation modeled by a rational function, formulate an equation or inequality.

[d] Exponential and logarithmic functions.
[i] Formulate equations and inequalities based on exponential and logarithmic functions.
[ii] Develop the definition of logarithms by exploring and describing the relationship between exponential functions and their inverses.
[iii] Analyze a situation modeled by an exponential function, formulate an equation or inequality.

9TH Grade Science [Earth Science]

Required Textbook: A Beka, Physical Creation, Work-Text, Pensacola, Florida, current edition.

[a] Key ideas about the solid Earth.
[i] Energy resources are derived from the upper layers of the lithosphere (crust) by drilling and mining; they include fossil fuels (coal, oil, natural gas), nuclear fuels and geothermal sites.
[ii] Materials of the lithosphere are the source for all soils.
[iii] The Earth's dimensions may be determined by direct or indirect measurements.
[iv] The Earth's composition and structure are known from detailed studies of surface materials, volcanoes, drill hole samples, and inferences made from geophysical data.
[v] Physical and chemical laws control the formation and characteristics of minerals and rocks.
[vi] All rocks may undergo changes by long-term exposure to different environments. The rock cycle represents these changes.
[vi] The relative ages of rocks and events in Earth's history can be determined by applying the laws of uniformitarianism, original horizontally, superposition, cross-cutting relationships, and inclusions.
[vii] The age of the Earth and individual events in history can be determined by various radiometric dating techniques.
[viii] Earth's lithosphere is composed of large pieces called plates, which can be oceanic, continental, or both. The plates move in response to seafloor spreading, to give the appearance of what Alfred Wegener called continental drift.
[ix] Evidence of plate movement includes continental fit, age of the sea floor, studies of Earthquake foci, paleomagnetism and magnetic reversals, and direct measurement using satellites. The rate of plate movements is measured in centimeters per year.
[x] Earth's continental and oceanic features are mostly the result of movements of lithospheric plates.

[b] Key ideas about water.
[i] In the water cycle, water undergoes constant changes in location, phase [state], and energy level.
[ii] New water is introduced into the atmosphere and hydrosphere by volcanic activity and [predominantly small] comet impacts.
[iii] Many mineral, petroleum, and gas resources were formed in ancient oceans.
[iv] Both renewable and non-renewable resources come from present-day oceans. These resources include minerals, energy, food, and drinking water.
[v] Huge amounts of water are stored underground in the openings between mineral and rock fragments.
[vi] The abundance of underground water is directly related to climatic factors; its quality and availability are dependent upon the Earth materials through which it moves and the possible influence of surface activities.
[vii] All bodies of surface water undergo change within a comparatively short span of geologic time. Streams change in position, gradient, and discharge. Lakes fill with sediment and may become eutrophic.

[viii] The kinetic energy of flowing surface water causes the water to erode the landscape over which it flows. When the level of kinetic energy of a stream diminishes, the stream may deposit sediment on the landscape.

[c] Key ideas about the air.
[i] The atmosphere is a mixture of gases that absorbs, transmits, reflects, and radiates solar energy. The composition of the atmosphere has changed through geologic history.
[ii] The atmosphere is relatively thin compared to the Earth's dimensions and provides life on Earth with a protective shell against harmful solar radiation.
[iii] The atmosphere interacts with the Earth's crust, water, and life: The chemical interaction between these spheres includes the rock cycle, water cycle, oxygen cycle, carbon cycle, nitrogen cycle, and sulfur cycle.
[iv] The physical properties of water and its abundance have significant effects on weather. Water can absorb and transfer tremendous amounts of heat energy, particularly during changes in phase during evaporation and condensation.
[v] Low and High pressure areas have a significant effect on weather. The rotation and transverse motion depend on their latitude and prevailing wind belts.
[vi] Wind blows as a result of differential heating, which results in differences in atmospheric pressure.
[vii] Weather fronts are borders between air masses of different temperature and moisture. Changes in weather and possible precipitation are associated with weather fronts.
[viii] The observation, measurement, and analysis of the atmosphere are the basis for preparing weather forecasts.

[d] Key ideas about ice.
[i] Thick masses of ice (glaciers) accumulate on land, they will move either downslope or outwardly by plastic-like flow of the ice and slippage due to water in the ice.
[ii] Movement of glaciers over land surfaces results in the formation of characteristic erosional and depositional features.
[iii] Long-term changes in solar radiation reaching the earth's surface (insolation) would alter the volume of year-round ice. Changes in the volume of glacial ice would result in global changes of sea level, weather patterns, and climate.
[iv] The cryosphere provides potential hazards on the land and in the oceans. Widespread melting of the Earth's glaciers and snow fields would cause worldwide rise of sea level. Widespread accumulation of ice would cause glaciers to spread over land now occupied by humans.

[e] Key ideas about life
[i] During the first two billion years on earth, only single-cell microorganisms existed. Once cells with nuclei appeared about a billion years ago, increasingly complex multicellular organisms have flourished.
[ii] Fossils reveal information such as how (meat eaters or plant-eaters) and where (marine or terrestrial) the organisms lived, their physical structures (vertebrate or invertebrate); anatomical features (e.g., teeth),; and chemical composition (e.g., shells).
[iii] The study of fossils and their distribution provides information on water temperatures, depths, and composition (fresh or marine), and

contributes to our understanding of paleogeography and the changes that have taken place during Earth's history.
[iv] The succession of fossil assemblages in the stratigraphic column provides insight into the changes in life forms through exceedingly long intervals of time.

[f] Key ideas about Earth in space.
[i] Historical events displaced the idea that the earth was the center of the universe.
[ii] The universe is estimated to be over ten billion years old, and that its entire contents expanded explosively from a hot, dense, chaotic, massive body.
[iii] The Solar System includes the Sun, planets with their moons and planetary rings, comets, asteroids, and meteors.
[iv] As a planet in the Solar System, the Earth has some unique features that include liquid water, plant and animal life, large Moon, and atmosphere with mostly nitrogen and oxygen.
[vi] The nebular theory states that the Solar System began as a large cloud of gas and dust called a nebula about five billion years ago.
[vii] The distances between objects in the Solar System and galaxy are so great that they have to be measured through indirect techniques [in astronomical units, light years, and parsecs.]
[viii] The Solar System is part of a large system of stars called the Milky Way galaxy. The Solar System revolves around the center of the galaxy.
[ix] Because of the vast distances in the Universe, the light reaching our eyes and instruments from distant objects is millions of years old. Thus, our present view is actually a view of history.
[x] Gravity is a force that exists between any two masses. The magnitude of the force is proportional to the masses and weakens rapidly with increasing distance between them.

[g] Key ideas about the nature of science and scientific inquiry.
[i] How to formulate a testable hypothesis.
[ii] Scientists view the universe as a vast single system and the rules that govern it are the same everywhere. The rules may be simple or complex, but scientists believe they can be understood through careful, systematic study.
[iii] The usefulness of a model can be tested by comparing its predictions to actual observations.
[iv] Most changes that take place in the scientific view are small modifications of prior knowledge. Occasionally major shifts occur in the scientific view of how the world or the universe work, but these are rare.
[v] Testing, revising, and occasional discarding of theories, new and old, never ends. This process leads to an increasingly better understanding of how things work in the world but not to absolute truth.
[vi] Progress in all fields of science depends on intelligence, hard work, imagination, and even chance.
[vii] Tables, graphs, and symbols are alternative ways of representing data and relationships that can be translated from one to another.
[viii] Extremely large and small numbers can be represented in many different ways that make them easier to work with and compare to one another.

10TH Grade Mathematics [Geometry]

Required Textbook: A Beka, Geometry, Work-Text, Pensacola, Florida, current edition.

[a] Get skills on geometric thinking and spatial reasoning. Spatial reasoning plays a critical role in geometry; shapes and figures provide powerful ways to represent mathematical situations and to express generalizations about space and spatial relationships.
[i] Geometry consists of the study of geometric figures of zero, one, two, and three dimensions and the relationships among them. Students study properties and relationships having to do with size, shape, location, direction, and orientation of these figures.
[ii] Understand the structure of, and relationships within, an axiomatic system.
[iii] Develop an awareness of the structure of a mathematical system, connecting definitions, postulates, logical reasoning, and theorems.
[iv] Compare and contrast the structures and implications of Euclidean and non-Euclidean geometries.
[v] Analyze geometric relationships in order to make and verify conjectures about angles, lines, polygons, circles, and three-dimensional figures, choosing from a variety of approaches such as coordinate, transformational, or axiomatic.

[b] Geometric patterns.
[i] Identify, analyze, and describe patterns that emerge from two- and three-dimensional geometric figures.
[ii] Use numeric and geometric patterns to make generalizations about geometric properties, including properties of polygons, ratios in similar figures and solids, and angle relationships in polygons and circles.
[iii] Identifies and applies patterns from right triangles to solve problems (Pythagorean theorem).

[c] Dimensionality.
[i] Analyze the relationship between three-dimensional objects and related two-dimensional representations and use these representations to solve problems.
[ii] Understand that coordinate systems provide convenient and efficient ways of representing geometric figures and use them accordingly.
[iii] Use slopes and equations of lines to investigate geometric relationships, including parallel lines, perpendicular lines, and special segments of triangles and other polygons.
[iv] Develop and use formulas including distance and midpoint.

[d] Congruence and the geometry of size.
[i] Extend measurement concepts to find area, perimeter, and volume in problem situations.
[ii] Find areas of regular polygons, composite figures, sectors and arc lengths of circles using proportional reasoning.
[iii] Find surface areas and volumes of prisms, pyramids, spheres, cones, and cylinders.
[e] Similarity and the geometry of shape.
[i] Use similarity properties and transformations to explore and justify triangle similarity relationships, such as right triangle

ratios, trigonometric ratios, and Pythagorean triples.
[ii] Describe the effect on perimeter, area, and volume when length, width, or height of a three-dimensional solid is changed.

10TH Grade Science [Biology]

Required Textbook: A Beka, God's Living Creation, Work-Text, Pensacola, Florida, current edition.

[a] Diversity of Life.
[i] The variation of organisms within a species increases the likelihood that at least some members of the species will survive under changed environmental conditions.
[ii] The diversity of species increases the chance that at least some living things will survive in the face of large changes in the environment.
[ii] The degree of kinship between organisms or species can be estimated from the similarity of their DNA sequences, which often closely matches their classification based on anatomical similarities.

[b] Heredity
[i] Some new gene combinations make little difference, some can produce organisms with new and perhaps enhanced capabilities, and some can be deleterious.
[ii] The sorting and recombination of genes in sexual reproduction results in a great variety of possible gene combinations from the offspring of any two parents.
[iii] The information passed from parents to offspring is coded in DNA molecules.
[iv] Genes are segments of DNA molecules. Inserting, deleting, or substituting DNA segments can alter genes.
[v] An altered gene may be passed on to every cell that develops from it. The resulting features may help, harm, or have little or no effect on the offspring's success in its environment.
[vi] Gene mutations can be caused by such things as radiation and chemicals. When they occur in sex cells, the mutations can be passed on to offspring; if they occur in other cells, they can be passed on to descendant cells only.
[vii] The many body cells in an individual can be very different from one another, even though they are all descended from a single cell and thus have essentially identical genetic instructions.

[c] Cells
[i] Every cell is covered by a membrane that controls what can enter and leave the cell. In all but quite primitive cells, a complex network of proteins provides organization and shape and, for animal cells, movement.
[ii] Within every cell are specialized parts for the transport of materials, energy transfer, protein building, waste disposal, information feedback, and even movement.
[iii] The work of the cell is carried out by the many different types of molecules it assembles, mostly proteins - long, usually folded chains made from 20 different kinds of amino-acid molecules. The function of each protein molecule depends on its specific sequence of amino acids and the shape the chain takes is a consequence of attractions between the chain's parts.

[iv] Before a cell divides, the instructions are duplicated so that each of the two new cells gets all the necessary information for carrying on.
[v] Complex interactions among the different kinds of molecules in the cell cause distinct cycles of activities, such as growth and division.
[vi] Gene mutations in a cell can result in uncontrolled cell division, called cancer. Exposure of cells to certain chemicals and radiation increases mutations and thus increases the chance of cancer.
[vii] A living cell is composed of a small number of chemical elements mainly carbon, hydrogen, nitrogen, oxygen, phosphorous, and sulfur.

[d] Interdependence of Life
[i] Ecosystems can be reasonably stable over hundreds or thousands of years. As any population of organisms grows, it is held in check by one or more environmental factors: depletion of food or nesting sites, increased loss to increased numbers of predators, or parasites.
[ii] Ecosystems tend to have cyclic fluctuations around a state of rough equilibrium. Human activities can, deliberately or inadvertently, alter the equilibrium in ecosystems.

[e] Flow of Matter and Energy
[i] At times, environmental conditions are such that plants and marine organisms grow faster than decomposers can recycle them back to the environment. Layers of energy-rich organic material have been gradually turned into great coal beds and oil pools by the pressure of the overlying earth.
[ii] By burning these fossil fuels, people are passing most of the stored energy back into the environment as heat and releasing large amounts of carbon dioxide.
[iii] The amount of life any environment can support is limited by the available energy, water, oxygen, and minerals, and by the ability of ecosystems to recycle the residue of dead organic materials.
[iv] The chemical elements that make up the molecules of living things pass through food webs and are combined and recombined in different ways. At each link in a food web, some energy is stored in newly made structures but much is dissipated into the environment as heat. Continual input of energy from sunlight keeps the process going.

[f] Evolution of Life
[i] The earth's present-day species developed from earlier, distinctly different species.
[ii] Molecular evidence substantiates the anatomical evidence for evolution and provides additional detail about the sequence in which various lines of descent branched off from one another.
[iii] Natural selection provides the following mechanism for evolution: Some variation in heritable characteristics exists within every species, some of these characteristics give individuals an advantage over others in surviving and reproducing, and the advantaged offspring, in turn, are more likely than others to survive and reproduce.
[iv] Heritable characteristics can be observed at molecular and whole-organism levels-in structure, chemistry, or behavior. These characteristics strongly influence what capabilities an organism will have and how it will react, and therefore influence how likely it is to survive and reproduce.
[v] New heritable characteristics can result from new combinations of existing genes or from mutations of genes in reproductive cells. Changes in other cells of an organism cannot be passed on to the next

generation.
[vi] Natural selection leads to organisms that are well suited for survival in particular environments.
[vii] The theory of natural selection provides a scientific explanation for the history of life on earth as depicted in the fossil record and in the similarities evident within the diversity of existing organisms.
[viii] Life on earth is thought to have begun as simple, one-celled organisms, but once cells with nuclei developed, increasingly complex multicellular organisms evolved.
[ix] Evolution does not necessitate long-term progress in some set direction. Some evolutionary changes survive, many die out altogether, sometimes giving rise to more complex organisms.

11TH Grade Mathematics [Algebra Level 2 and Trigonometry]

Required Textbook: A Beka, Algebra 2, Work-Text, Pensacola, Florida, current edition.

[a] The relationships among coefficients, exponents, degree and roots of equations.
[i] Solve and explore equations using the quadratic formula, completing the square, synthetic division, and graphing.
[ii] Classify solutions of quadratic equations through observations of graphs and through use of the discriminant.
[iii] Write a polynomial equation when given its roots.

[b] Systems of equations and inequalities.
[i] Explore methods of solving systems of equations to include algebraic methods and matrices.
[ii] Write a system of equations to solve a problem.
[iii] Interpret by graphing, and solve systems of inequalities.

[c] Recognize, classify, and perform operations with irrational and complex numbers.
[i] Explore and describe the complex number system.
[ii] Explain and apply complex conjugate methods to simplify problems.
[iii] Perform operations with complex numbers and review radicals.

[d] Identify and investigate relations and functions.
[i] Determine the domain, range, roots, and inverse of a function.
[ii] Recognize and determine graphs of linear, quadratic, absolute value, greatest integer, and piece-wise functions.
[iii] Develop a complex coordinate plane for complex numbers (a + bi) where reals are represented on the x-axis and imaginary units are represented on the y-axis and model operations of complex numbers.
[iv] Evaluate functions including composite functions.
[v] Explore and investigate solutions to compound and absolute value inequalities to include interval notation.
[vi] Use scatter plots and apply regression analysis to data.
[vii] Illustrate and apply the relationships between exponential and logarithmic functions.
[viii] Simplify radical, exponential, and logarithmic expressions. Solve equations involving radicals, exponents, and logarithms.
[ix] Collect, organize, and interpret data from exponential, logarithmic, and power functions.

[e] Identify, locate, and apply trigonometric functions to the unit circle.
[i] Identify and locate angles in radians and degrees based on the unit circle.
[ii] Convert between degree and radian measurements of angles.
[iii] Use the definition of the six trigonometric functions to find missing parts of a triangle.
[iv] Determine the values of inverse trigonometric functions.
[v] Utilize special right triangle relationships and symmetry as they apply to the unit circle.
[vi] Relate the unit circle to the right triangle.

[f] Utilize and extend algebraic and geometric techniques to trigonometric equations and applications.
[i] Solve for unknown parts of triangles to include Law of Sines and Law of Cosines.
[ii] State, verify, and utilize trigonometric identities.
[iii] Find arc length and area of a sector of a circle.
[iv] Find the area of a triangle using Heron's Formula and/or (1/2)BCsin(A).
[v] Solve trigonometric equations, using both radians and degrees.
[vi] Model and apply right triangle formulas, Law of Sines, and Law of Cosines to problem-solving situations.

11TH Grade Science [Chemistry]

Required Textbook: A Beka, Chemistry: Precision and Design, Work-Text, Pensacola, Florida, current edition.

[a] Properties of Matter
[i] Differentiate between pure substances and mixtures based on physical properties such as density, melting point, boiling point, and solubility.
[ii] Determine the properties and quantities of matter such as mass, volume, temperature, density, melting point, boiling point, conductivity, solubility, color, numbers of moles, and pH (calculate pH from the hydrogen-ion concentration), and designate these properties as either extensive or intensive.
[iii] Recognize indicators of chemical changes such as temperature change, the production of a gas, the production of a precipitate, or a color change.
[iv] Describe solutions in terms of their degree of saturation.
[v] Describe solutions in appropriate concentration units (be able to calculate these units), such as molarity, percent by mass or volume, parts per million (ppm), or parts per billion (ppb).
[vi] Predict formulas of stable ionic compounds based on charge balance of stable ions.
[vii] Use appropriate nomenclature when naming compounds.
[viii] Use formulas and laboratory investigations to classify substances as metal or nonmetal, ionic or molecular, acid or base, and organic or inorganic.

[b] The Nature of Chemical Change
[i] Describe chemical reactions with balanced chemical equations.
[ii] Recognize and classify reactions of various types such as oxidation-reduction.

[iii] Predict products of simple reaction types including acid/base, electron transfer, and precipitation.
[iv] Use the principle of conservation of mass to make calculations related to chemical reactions. Calculate the masses of reactants and products in a chemical reaction from the mass of one of the reactants or products and the relevant atomic masses.
[v] Use Avogadro's law to make mass-volume calculations for simple chemical reactions. Given a chemical equation, calculate the mass, gas volume, and/or number of moles needed to produce a given gas volume, mass, and/or number of moles of product.
[vi] Calculate the percent composition by mass of a compound or mixture when given the formula.
[vii] Perform calculations that demonstrate an understanding of the relationship between molarity, volume, and number of moles of a solute in a solution.
[viii] Use titration data to calculate the concentration of an unknown solution.
[ix] Predict how a reaction rate will be quantitatively affected by changes of concentration temperature, surface area, and the use of catalysts.
[x] Use oxidation states to recognize electron transfer reactions and identify the substance(s) losing and gaining electrons in an electron transfer reaction.

[c] The Structure of Matter
[i] Describe physical changes and properties of matter through sketches and descriptions of the involved materials.
[ii] Describe chemical changes and reactions using sketches and descriptions of the reactants and products.
[iii] Explain that chemical bonds between atoms in molecules, such as H_2, CH_4, NH_3, C_2H_4, N_2, Cl_2, and many large biological molecules are covalent.
[iv] Perform calculations that demonstrate an understanding of the gas laws. Apply the gas laws to relations between pressure, temperature, and volume of any amount of an ideal gas or any mixture of ideal gases.
[v] Use kinetic molecular theory to explain changes in gas volumes, pressure, and temperature (Solve problems using $pV=nRT$).
[vi] Use an element's location in the Periodic Table to determine its number of valence electrons, and predict what stable ion or ions an element is likely to form in reacting with other specified elements.
[vii] Use the Periodic Table to compare attractions that atoms have for their electrons and explain periodic properties, such as atomic size, based on these attractions.
[viii] Infer and explain physical properties of substances, such as melting points, boiling points, and solubility, based on the strength of molecular attractions.
[ix] Describe the nature of ionic, covalent, and hydrogen bonds and give examples of how they contribute to the formation of various types of compounds.
[x] Describe that spectral lines are the result of transitions of electrons between energy levels and that these lines correspond to photons with a frequency related to the energy spacing between levels by using Planck's relationship ($E=h\nu$).

[d] The Nature of Energy and Change
[i] Distinguish between the concepts of temperature and heat.
[ii] Solve problems involving heat flow and temperature changes, using

known values of specific heat and latent heat of phase change.
[iii] Classify chemical reactions and/or phase changes as exothermic or endothermic.
[iv] Describe the role of light, heat, and electrical energies in physical, chemical, and nuclear changes.
[v] Describe that the energy release per gram of material is much larger in nuclear fusion or fission reactions than in chemical reactions. The change in mass (calculated by $E=mc^2$) is small but significant in nuclear reactions.
[vi] Calculate the amount of radioactive substance remaining after an integral number of half-lives have passed.

[e] The Basic Structures and Reactions of Organic Chemicals
[i] Convert between formulas and names of common organic compounds.
[ii] Recognize common functional groups and polymers when given chemical formulas and names.

Grading:

60 pts -- Homework/take-home assignments/in-class assignments
40 pts -- Tests
100 pts -- Total points possible

GRADE RANGE NUMERICAL		LETTER	EXPLANATION
[90 - 100]	--	[A- - A+]	EXCELENT
[80 - 89]	--	[B- - B+]	GOOD
[70 - 79]	--	[C- - C+]	SATISFACTORY
[60 - 69]	--	[D- - D+]	PASSING
[0 - 59]	--	[F -]	FAILURE

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