

Virginia Grade Level Alternative Worksheet

Grade 8 Science (2003)

Student's Name: \_\_\_\_\_ State Testing Identifier: \_\_\_\_\_

Check all that apply:

\_\_\_\_\_ Assigned scores have been entered into the online VGLA System.

\_\_\_\_\_ Assigned scores have been verified and submitted for final scoring in the online VGLA System

An "X" under No Evidence represents a Total of 0.

Reporting Category	SOL #	Specific Virginia Standard of Learning	Demonstrated (0 to 4)	Inferred (0 to 4)	No Evidence (0)	Total (0 to 4)
RC 1	6.1	The student will plan and conduct investigations in which a) observations are made involving fine discrimination between similar objects and organisms; b) a classification system is developed based on multiple attributes; c) precise and approximate measures are recorded; d) scale models are used to estimate distance, volume, and quantity; e) hypotheses are stated in ways that identify the independent (manipulated) and dependent (responding) variables; f) a method is devised to test the validity of predictions and inferences; g) one variable is manipulated over time with many repeated trials; h) data are collected, recorded, analyzed, and reported using appropriate metric measurement; i) data are organized and communicated through graphical representation (graphs, charts, and diagrams); j) models are designed to explain a sequence; and k) an understanding of the nature of science is developed and reinforced				
RC 1	LS.1	The student will plan and conduct investigations in which a) data are organized into tables showing repeated trials and means; b) variables are defined; c) metric units (SI International System of Units) are used; d) models are constructed to illustrate and explain phenomena; e) sources of experimental error are identified; f) dependent variables, independent variables, and constants are identified; g) variables are controlled to test hypotheses, and trials are repeated; h) continuous line graphs are constructed, interpreted, and used to make predictions; i) interpretations from a set of data are evaluated and defended; and j) an understanding of the nature of science is developed and reinforced.				
RC 1	PS.1	The student will plan and conduct investigations in which a) chemicals and equipment are used safely; b) length, mass, volume, density, temperature, weight, and force are accurately measured and reported using metric units (SI- International System of Units); c) conversions are made among metric units, applying appropriate prefixes; d) triple beam and electronic balances, thermometers, metric rulers, graduated cylinders, and spring scales are used to gather data; e) numbers are expressed in scientific notation where appropriate; f) research skills are utilized using a variety of resources; g) independent and dependent variables, constants, controls, and repeated trials are identified; h) data tables showing the independent and dependent variables, derived quantities, and the number of trials are constructed and interpreted; i) data tables for descriptive statistics showing specific measures of central tendency, the range of the data set, and the number of repeated trials are constructed and interpreted; j) frequency distributions, scattergrams, line plots, and histograms are constructed and interpreted; k) valid conclusions are made after analyzing data; l) research methods are used to investigate practical problems and questions; m) experimental results are presented in appropriate written form; and n) an understanding of the nature of science is developed and reinforced.				

Virginia Grade Level Alternative Worksheet

RC 2	6.2	The student will investigate and understand basic sources of energy, their origins transformations, and uses. Key concepts include a) potential and kinetic energy; and e) energy transformations (heat/light to mechanical, chemical, and electrical energy).				
RC 2	6.4	The student will investigate and understand that all matter is made up of atoms. Key concepts include a) atoms are made up of electrons, protons, and neutrons; b) atoms of any element are alike but are different from atoms of other elements; c) elements may be represented by chemical symbols; d) two or more atoms may be chemically combined; e) compounds may be represented by chemical formulas; f) chemical equations can be used to model chemical changes; and g) a limited number of elements comprise the largest portion of the solid Earth, living matter, the oceans, and the atmosphere.				
RC 2	6.5	The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. Key concepts include a) water as the universal solvent; b) the properties of water in all three states;				
RC 2	6.6	The student will investigate and understand the properties of air and the structure and dynamics of Earth's atmosphere. Key concepts include a) air as a mixture of gaseous elements and compounds;				
RC 2	PS.2	The student will investigate and understand the basic nature of matter. Key concepts include a) the particle theory of matter; b) elements, compounds, mixtures, acids, bases, and salts; c) solids, liquids, and gases; d) characteristics of types of matter based on physical and chemical properties, e) physical properties (shape,density,solubility,odor, melting point, boiling point, color); and f) chemical properties (acidity, basicity, combustibility, reactivity).				
RC 2	PS.3	The student will investigate and understand the modern and historical models of atomic structure. Key concepts include a) the contributions of Dalton, Thomson, Rutherford, and Bohr in understanding the atom; and b) the modern model of atomic structure.				
RC 2	PS.4	The student will investigate and understand the organization and use of the periodic table of elements to obtain information. Key concepts include a) symbols, atomic number, atomic mass, chemical families (groups), and periods; b) classification of elements as metals, metalloids, and nonmetals; and c) simple compounds (formulas and the nature of bonding).				
RC 2	PS.5	The student will investigate and understand changes in matter and the relationship of these changes to the Law of Conservation of Matter and Energy. Key concepts include a) physical changes; b) nuclear reactions (products of fusion and fission and the effect of these products on humans and the environment); and c) chemical changes (types of reactions, reactants, and products; and balanced equations).				
RC 2	PS.6	The student will investigate and understand states and forms of energy and how energy is transferred and transformed. Key concepts include a) potential and kinetic energy; b) mechanical, chemical, and electrical energy; and c) heat, light, and sound.				
RC 2	PS.7	The student will investigate and understand temperature scales, heat, and heat transfer. Key concepts include a) Celsius and Kelvin temperature scales and absolute zero; b) phase change, freezing point, melting point, boiling point, vaporization, and condensation; c) conduction, convection, and radiation; and d) applications of heat transfer (heat engines, thermostats, refrigeration, and heat pumps).				

Virginia Grade Level Alternative Worksheet

RC 2	PS.8	The student will investigate and understand characteristics of sound and technological applications of sound waves. Key concepts include a) wavelength, frequency, speed, and amplitude; b) resonance; c) the nature of mechanical waves; and d) technological applications of sound.				
RC 2	PS.9	The student will investigate and understand the nature and technological applications of light. Key concepts include a) the wave behavior of light (reflection, refraction, diffraction, and interference); b) images formed by lenses and mirrors; and c) the electromagnetic spectrum.				
RC 2	PS.10	The student will investigate and understand scientific principles and technological applications of work, force, and motion. Key concepts include a) speed, velocity, and acceleration; b) Newton's laws of motion; c) work, force, mechanical advantage efficiency, and power; and d) applications (simple machines, compound machines, powered vehicles, rockets, and restraining devices.)				
RC 2	PS.11	The student will investigate and understand basic principles of electricity and magnetism. Key concepts include a) static electricity, current electricity, and circuits; b) magnetic fields and electromagnets; and c) motors and generators.				
RC 3	LS.2	The student will investigate and understand that all living things are composed of cells. Key concepts include a) cell structure and organelles (cell membrane, cell wall, cytoplasm, vacuole, mitochondrion, endoplasmic reticulum, nucleus, and chloroplast); b) similarities and differences between plant and animal cells; c) development of cell theory; and d) cell division (mitosis and meiosis).				
RC 3	LS.3	The student will investigate and understand that living things show patterns of cellular organization. Key concepts include a) cells, tissues, organs, and systems; and b) life functions and processes of cells, tissues, organs, and systems (respiration, removal of wastes, growth, reproduction, digestion, and cellular transport).				
RC 3	LS.4	The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes. Key concepts include a) plant needs (light, water, gases and nutrients); b) animal needs (food, water, gases, shelter, space); and c) factors that influence life processes.				
RC 3	LS.5	The student will investigate and understand how organisms can be classified. Key concepts include a) the distinguishing characteristics of kingdoms of organisms; b) the distinguishing characteristics of major animal and plant phyla; and c) the characteristics of the species.				
RC 3	LS.6	The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life. Key concepts include a) energy transfer between sunlight and chlorophyll; b) transformation of water and carbon dioxide into sugar and oxygen; and c) photosynthesis as the foundation of virtually all food webs.				
RC 3	LS.13	The student will investigate and understand that organisms reproduce and transmit genetic information to new generations. Key concepts include a) the role of DNA; b) the function of genes and chromosomes; c) genotypes and phenotypes; d) factors affecting the expression of traits; e) characteristics that can and cannot be inherited; f) genetic engineering and its applications; and g) historical contributions and significance of discoveries related to genetics.				
RC 3	LS.14	The student will investigate and understand that organisms change over time. Key concepts include a) the relationships of mutation, adaptation, natural selection, and extinction.				

Virginia Grade Level Alternative Worksheet

RC 4	6.7	The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include a) the health of ecosystems and the abiotic factors of a watershed; b) the location and structure of Virginia's regional watershed systems; c) divides, tributaries, river systems, and river and stream processes; d) wetlands; e) estuaries; f) major conservation, health, and safety issues associated with watersheds; and g) water monitoring and analysis using field equipment including hand-held technology.				
RC 4	LS.7	The student will investigate and understand that organisms within an ecosystem are dependent on one another and on nonliving components of the environment. Key concepts include a) the carbon, water, and nitrogen cycles; b) interactions resulting in a flow of energy and matter throughout the system; c) complex relationships in terrestrial, freshwater, and marine ecosystems; and d) energy flow in food webs and energy pyramids.				
RC 4	LS.8	The student will investigate and understand that interactions exist among members of a population. Key concepts include a) competition, cooperation, social hierarchy, territorial imperative; and b) influence of behavior on a population.				
RC 4	LS.9	The student will investigate and understand interactions among populations in a biological community. Key concepts include a) the relationship among producers, consumers, and decomposers in food webs; b) the relationship between predators and prey; c) competition and cooperation; d) symbiotic relationships; and e) niches.				
RC 4	LS.10	The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem. Key concepts include a) differences between ecosystems and biomes; b) characteristics of land, marine, and freshwater ecosystems; and c) adaptations that enable organisms to survive within a specific ecosystem.				
RC 4	LS.11	The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time (daily, seasonal, and long term). Key concepts include a) phototropism, hibernation, and dormancy; b) factors that increase or decrease population size; and c) eutrophication, climate change, and catastrophic disturbances.				
RC 4	LS.12	The student will investigate and understand the relationships between ecosystem dynamics and human activity. Key concepts include a) food production and harvest; b) change in habitat size, quality, and structure; c) change in species competition; d) population disturbances and factors that threaten or enhance species survival. e) environmental issues (water supply, air quality, energy production, and waste management).				
RC 5	6.2	The student will investigate and understand basic sources of energy, their origins, transformations, and uses. Key concepts include b) the role of the sun in the formation of most energy sources on Earth; c) nonrenewable energy sources (fossil fuels including petroleum, natural gas, and coal); d) renewable energy sources (wood, wind, hydro, geothermal, tidal, and solar).				
RC 5	6.3	The student will investigate and understand the roles of solar energy in driving most natural processes within the atmosphere, the hydrosphere, and on the Earth's surface. Key concepts include a) the Earth's energy budget; b) the role of radiation and convection in the distribution of energy; c) the motion of the atmosphere and the oceans; d) cloud information; and e) the role of heat energy in weather-related phenomena including thunderstorms and hurricanes.				

Virginia Grade Level Alternative Worksheet

RC 5	6.5	The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment . Key concepts include c) the action of water in physical and chemical weathering; d) the ability of large bodies of water to store heat and moderate climate; e) the origin and occurrence of water on Earth; f) the importance of water for agriculture, power generation, and public health; and g) the importance of protecting and maintaining water resources.				
RC 5	6.6	The student will investigate and understand the properties of air and the structure and dynamics of Earth's atmosphere. Key concepts include b) air pressure, temperature, and humidity; c) how the atmosphere changes with altitude; d) natural and human-caused changes to the atmosphere; e) the relationship of atmospheric measures and weather conditions; f) basic information from weather maps including fronts, systems, and basic measurements; and g) the importance of protecting and maintaining air quality.				
RC 5	6.8	The student will investigate and understand the organization of the solar system and the relationships among the various bodies that comprise it. Key concepts include a) the sun, moon, Earth, other planets and their moons, meteors, asteroids, and comets; b) the relative size of and distance between planets; c) the role of gravity; d) revolution and rotation; e) the mechanics of day and night and the phases of the moon; f) the unique properties of Earth as a planet; g) the relationship of the Earth's tilt and the seasons; h) the cause of tides; and i) the history and technology of space exploration.				
RC 5	6.9	The student will investigate and understand public policy decisions relating to the environment. Key concept include a) management of renewable resources (water, air, soil, plant life, animal life); b) management of nonrenewable resources (coal, oil, natural gas, nuclear power, mineral resources); c) the mitigation of land-use and environmental hazards through preventive measures; and d) cost/benefit tradeoffs in conservation policies.				
RC 5	LS.14	The student will investigate and understand that organisms change over time. Key concepts include b) evidence of evolution of different species in the fossil record; and c) how environmental influences, as well as genetic variation, can lead to diversity of organisms.				

**Reporting Category Key**

**RC 1 Scientific Investigation**

**RC 2 Force, Motion, Energy, and Matter**

**RC 3 Life Systems**

**RC 4 Ecosystems**

**RC 5 Earth and Space Systems**