Virginia Standards of Learning Assessment
Grade 8 Science (2018 SOL) Performance Level Descriptors

Fail/Does Not Meet	Pass/Proficient	Pass/Advanced
A student performing at this level should be able to recognize scientific and engineering practices (when applicable) in order to: *Reporting Category 1: Force, Motion, Energy, and Matter* ● Identify properties of water and the water cycle. ● Identify chemical and physical properties and changes to matter. ● Define the law of conservation of matter. ● Identify subatomic particles of elements from a periodic table. ● Identify energy systems in both nature and in everyday human use. ● Identify examples of radiation, conduction, and convection. ● Identify the properties and behaviors of longitudinal and transverse waves. ● Recognize Newton's Laws of Motion. ● Identify the properties and characteristics of electricity and electric circuit components.	A student performing at this level should be able to engage in some scientific and engineering practices (when applicable) in order to: *Reporting Category 1: Force, Motion, Energy, and Matter* ● Describe properties of water and the water cycle, and apply these to everyday uses such as power generation, water management, and the environment. ● Compare chemical and physical properties and changes to matter, and identify bonding types. ● Describe the law of conservation of matter, and identify reactants and products in simple chemical equations. ● Use the periodic table to describe the periodicity, families, groups, and periods of an element. ● Describe energy systems, to include transformations in nature and everyday human use. ● Describe the role of radiation, conduction, and convection in systems.	A student performing at this level should be able to apply scientific and engineering practices (when applicable) in order to: *Reporting Category 1: Force, Motion, Energy, and Matter* ● Explain how the properties of water relate to power generation, water management, and the environment. ● Distinguish between chemical and physical properties and changes, and explain bonding types. ● Explain the law of conservation of matter and energy, and balance simple chemical equations. ● Use the periodic table to determine the identity of an element, and describe periodicity, family, group, and period. ● Compare and contrast energy systems, to include transformations in nature and in human use. ● Explain the role of radiation, conduction, and convection in the distribution of Earth's energy. ● Explain how waves transfer energy in longitudinal and transverse waves, and

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● Identify uses of motors, generators, semiconductors, and magnetism in modern technology. *Reporting Category 2: Life Systems and Ecosystems* ● Identify features of watersheds and aquatic ecosystems, and recognize their ecological roles and importance to humans. ● Recognize cell theory and identify mitosis as the process for cell reproduction. ● Recognize animal and plant cells, and identify organelles. Identify the levels of organization in living system. ● Recognize that organisms are classified based on criteria. ● Recognize reactants and products in the process of photosynthesis and respiration. ● Identify interactions and energy flow within food webs and energy pyramids. ● Recognize the presence of water, carbon, and nitrogen cycles. ● List adaptations and interactions in populations. ● Identify changes that affect populations and communities in an ecosystem. ● Recognize basic function of genes, chromosomes, and DNA.	● Compare and contrast longitudinal and transverse waves, and identify a technological use of waves. ● Differentiate among Newton's Laws of Motion. ● Model the properties and characteristics of electricity and electric circuit components. ● Identify components including motors, generators, semiconductors, and magnetism in modern technology. *Reporting Category 2: Life Systems and Ecosystems* ● Describe the features and ecological roles of watersheds and aquatic ecosystems, including their importance to humans. ● Describe the components of cell theory and sequence the steps of mitosis. ● Compare and contrast animal and plant cells, and match each organelle to its function. ● Describe the levels of organization and the role these levels have in living systems. ● Use classification tools to identify domains, kingdoms of Eukarya, and major animal phyla and plant divisions. ● Identify reactants, products, and cellular organelles responsible for the process of photosynthesis, and cellular respiration.	indicate how waves are used in technological applications. ● Apply Newton's Laws of Motion. ● Analyze the properties of electricity and electric circuit components. ● Explain the roles of motors, generators, semiconductors, and magnetism in modern technology. *Reporting Category 2: Life Systems and Ecosystems* ● Analyze features and the impact of change on watersheds and aquatic ecosystems. ● Explain the development of cell theory and differentiate between mitosis and meiosis as the processes for reproduction. ● Explain the function of each organelle in both plant and animal cells. ● Explain how the levels of organization allow organisms to carry out life processes. ● Apply classification tools when comparing and contrasting domains, kingdoms of Eukarya, and major animal phyla and plant divisions. ● Explain the processes of photosynthesis, and cellular respiration. ● Evaluate interactions and energy flow within food webs and energy pyramids. ● Compare and contrast key processes in water, carbon, and nitrogen cycles and

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● Recognize that Mendelian genetics predict the distribution of traits in offspring. *Reporting Category 3: Earth and Space Systems* ● Identify the major components of the solar system. ● Recognize that the Earth's location in the solar system impacts Earth systems. ● Identify renewable and nonrenewable natural resources.	● Describe interactions and energy flow within food webs and energy pyramids. ● Summarize key processes in water, carbon, and nitrogen cycles and identify human actions' impact on these processes. ● Categorize adaptations and interactions in populations and their impact on populations over time. ● Determine the effect of environmental changes on the distribution of populations within communities in an ecosystem. ● Describe DNA's role in storing information and making proteins. ● Describe attributes of Mendelian genetics and complete Punnett's squares. *Reporting Category 3: Earth and Space Systems* ● Describe the major components and identify interactions of the solar system, and interpret a timeline of technology and space explorations. ● Demonstrate an interaction between the Earth-moon-sun and explain its impact on an Earth systems. ● Explain how human use of both renewable and nonrenewable natural resources impacts the ecosystem.	describe human actions that impact these processes. ● Explain how adaptations and interactions in populations lead to dynamic changes in populations over time. ● Predict the effect of environmental changes on the distribution of populations within communities in an ecosystem. ● Explain that the structure and function of DNA impacts reproduction, growth, and development ● Apply principles of Mendelian genetics and use a Punnett's square to predict genetic traits in offspring. *Reporting Category 3: Earth and Space Systems* ● Explain how the components of the solar system interact, and evaluate a timeline of technology and space explorations. ● Explain the interactions between the sun-Earth-moon that impact Earth systems. ● Analyze the impact of human use of both renewable and nonrenewable natural resources on ecosystems.