# Virginia Standards of Learning Assessment
## Biology (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:<br><br>*Reporting Category 1: Life at the Molecular and Cellular Level*<br><br><ul><li>Identify properties of water that affect life processes.</li><li>Name the types of macromolecules.</li><li>Recognize the purpose of protein synthesis.</li><li>Identify the processes of cellular respiration and photosynthesis, including: reactants, products, and energy transfer.</li><li>Identify cellular processes, including the cell cycle and membrane transport.</li><li>Identify organelles.</li><li>Recognize the structure and function of DNA.</li></ul> | A student performing at this level should be able to engage in some scientific and engineering practices (when applicable) in order to:<br><br>*Reporting Category 1: Life at the Molecular and Cellular Level*<br><br><ul><li>Compare properties of water that affect life processes.</li><li>Describe roles of macromolecules, including enzymes.</li><li>Describe the process of protein synthesis.</li><li>Compare the process of cellular respiration and photosynthesis, including: reactants, products, and energy transfer.</li><li>Describe cellular processes, including the cell cycle and membrane transport.</li><li>Describe organelle roles in supporting life processes and maintaining homeostasis.</li><li>Describe the structure and function of DNA.</li></ul> | A student performing at this level should be able to apply scientific and engineering practices (when applicable) in order to:<br><br>*Reporting Category 1: Life at the Molecular and Cellular Level*<br><br><ul><li>Use properties of water to model and explain life processes.</li><li>Compare and contrast the roles of macromolecules in homeostasis.</li><li>Interpret the process of protein synthesis and predict the peptide products.</li><li>Explain the interrelatedness of cellular respiration and photosynthesis, and explain how these processes are critical to carbon cycling.</li><li>Analyze cellular processes, including the cell cycle and membrane transport, and predict movement of materials in membrane transport.</li><li>Explain how cells and organelles function individually and in a system to support life and maintain homeostasis.</li></ul> |

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| | | ● Evaluate DNA models for effectiveness in explaining their structure and function. |
| *Reporting Category 2: Life at the Systems and Organisms Level* | *Reporting Category 2: Life at the Systems and Organisms Level* | *Reporting Category 2: Life at the Systems and Organisms Level* |
| ● Identify characteristics of bacteria and viruses. ● Identify tenets of the germ theory. ● Recognize the use of modern classification systems in categorizing organisms. ● Recognize evolutionary relationships among organisms and changes in life forms through time. | ● Compare characteristics of bacteria and viruses. ● Identify evidence supporting the germ theory. ● Use modern classification systems in categorizing organisms. ● Interpret evolutionary relationships among organisms and changes of life forms and habitats through time. | ● Analyze processes of bacteria and viruses and their potential impact on living systems. ● Use evidence of germ theory as a rationale for modern health practices. ● Evaluate modern classification systems in categorizing organisms. ● Infer and explain evolutionary relationships among organisms and changes of life forms through time. |
| *Reporting Category 3: Interactions of Life Forms and Ecosystem Dynamics* | *Reporting Category 3: Interactions of Life Forms and Ecosystem Dynamics* | *Reporting Category 3: Interactions of Life Forms and Ecosystem Dynamics* |
| ● Identify inheritance and traits in an organism that result from various combinations of alleles. ● Identify sources of genetic variation in populations. | ● Describe inheritance and traits that result from various combinations of alleles. ● Compare sources of genetic diversity and variation. ● Compare credible, accurate, and unbiased resources, and infer the implications of synthetic biology. | ● Predict inheritance that results from various combinations of alleles. ● Evaluate sources of genetic diversity and variation, and analyze distributions of expressed traits in a population. |

| Fail/Does Not Meet | Pass/Proficient | Pass/Advanced |
|---|---|---|
| ● Recognize implications of synthetic biology.<br><br>● Recognize traits that can benefit individuals or populations.<br><br>● Identify pressures that affect survival of populations.<br><br>● Identify factors that result in changes in numbers and types of species.<br><br>● Recognize food webs, energy pyramids, and biomass pyramids to show energy transfer in an ecosystem.<br><br>● Identify types of succession found in ecosystems.<br><br>● Identify natural and human interactions that may affect Virginia ecosystems. | ● Compare how traits can benefit individuals or populations.<br><br>● Compare pressures that affect survival of populations.<br><br>● Differentiate among factors and mechanisms that may result in changes in numbers and types of species.<br><br>● Apply food webs, energy pyramids, and biomass pyramids to compare energy transfer in ecosystems.<br><br>● Describe patterns of succession found in ecosystems.<br><br>● Compare natural and human interactions that may affect Virginia ecosystems. | ● Evaluate credible, accurate, and unbiased resources, and interpret the implications of synthetic biology.<br><br>● Differentiate how traits can benefit or harm individuals or populations.<br><br>● Analyze pressures that affect survival of populations.<br><br>● Evaluate factors and mechanisms, and predict resulting changes in numbers and types of species.<br><br>● Evaluate food webs, energy pyramids, and biomass pyramids to predict impact on populations and ecosystems.<br><br>● Evaluate patterns of succession found in ecosystems, and suggest solutions for reducing the negative effects of human activity.<br><br>● Predict how natural and human interactions would affect Virginia ecosystems. |