**STEMscopes Virginia-Life Science**

Overall Rating of Standards

| **Standard** | **Determined Rating** |
| --- | --- |
| LS.1 The student will demonstrate an understanding of the scientific and engineering practices. | This standard was evaluated in the context of the content standards. |
| LS.2 The student will investigate and understand that all living things are composed of one or more cells that support life processes, as described by the cell theory. | Adequate |
| LS.3 The student will investigate and understand that there are levels of structural organization in living things. | Adequate |
| LS.4 The student will investigate and understand that there are chemical processes of energy transfer which are important for life. | Adequate |
| LS.5 The student will investigate and understand that biotic and abiotic factors affect an ecosystem. | Adequate |
| LS.6 The student will investigate and understand that populations in a biological community interact and are interdependent. | Adequate |
| LS.7 The student will investigate and understand that adaptations support an organism’s survival in an ecosystem | Adequate |
| LS.8 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time. | Adequate |
| LS.9 The student will investigate and understand that relationships exist between ecosystem dynamics and human activity. | Adequate |
| LS.10 The student will investigate and understand that organisms reproduce and transmit genetic information to new generations. | Adequate |
| LS.11 The student will investigate and understand that populations of organisms can change over time. | Adequate |

Overall Rating for Instructional Design and Support

| **Instructional Design and Support** | **Determined Rating** |
| --- | --- |
| Materials emphasize the use of effective instructional practices and learning theory. | Adequate |
| The science content is significant and accurate. | Adequate |
| Materials present content in an accurate, unbiased manner. | Adequate |

Review of Standards with Curriculum Framework

| Standard | Expectation |
| --- | --- |
| LS.1 The student will demonstrate an understanding of the scientific and engineering practices by:1. asking questions and defining problems
2. planning and carrying out investigations
3. interpreting, analyzing, and evaluating data
4. constructing and critiquing conclusions and explanations
5. developing and using models
6. obtaining, evaluating, and communicating information.
 | The expectation of the 2018 *Science Standards of Learning* is that the scientific and engineering practices are embedded into the instruction of content standards.  The rating for an individual standard includes the evaluation of standard 1 as it pertained to that standard.  For specific grade level/course expectations for standard 1, see the Standards of Learning and the Curriculum Framework.  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.2 The student will investigate and understand that all living things are composed of one or more cells that support life processes, as described by the cell theory. Key ideas include |  |  |  |
| 1. the development of the cell theory demonstrates the nature of science;
 | X |  |  |
| 1. cell structure and organelles support life processes;
 | X |  |  |
| 1. similarities and differences between plant and animal cells determine how they support life processes;
 | X |  |  |
| 1. cell division is the mechanism for growth and reproduction; and
 | X |  |  |
| 1. cellular transport (osmosis and diffusion) is important for life processes.
 |  | X |  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.3 The student will investigate and understand that there are levels of structural organization in living things. Key ideas include |  |  |  |
| 1. patterns of cellular organization support life processes;
 | X |  |  |
| 1. unicellular and multicellular organisms have comparative structures; and
 | X |  |  |
| 1. similar characteristics determine the classification of organisms.
 | X |  |  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.4 The student will investigate and understand that there are chemical processes of energy transfer which are important for life. Key ideas include |  |  |  |
| 1. photosynthesis is the foundation of virtually all food webs; and
 | X |  |  |
| 1. photosynthesis and cellular respiration support life processes.
 | X |  |  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.5 The student will investigate and understand that biotic and abiotic factors affect an ecosystem. Key ideas include |  |  |  |
| 1. matter moves through ecosystems via the carbon, water, and nitrogen cycles;
 | X |  |  |
| 1. energy flow is represented by food webs and energy pyramids; and
 | X |  |  |
| 1. relationships exist among producers, consumers, and decomposers.
 | X |  |  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.6 The student will investigate and understand that populations in a biological community interact and are interdependent. Key ideas include |  |  |  |
| 1. relationships exist between predators and prey and these relationships are modeled in food webs;
 | X |  |  |
| 1. the availability and use of resources may lead to competition and cooperation;
 | X |  |  |
| 1. symbiotic relationships support the survival of different species; and
 | X |  |  |
| 1. the niche of each organism supports survival.
 | X |  |  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.7 The student will investigate and understand that adaptations support an organism’s survival in an ecosystem. Key ideas include |  |  |  |
| 1. biotic and abiotic factors define land, marine, and freshwater ecosystems; and
 | X |  |  |
| 1. physical and behavioral characteristics enable organisms to survive within a specific ecosystem.
 | X |  |  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.8 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time. Key ideas include |  |  |  |
| 1. organisms respond to daily, seasonal, and long-term changes;
 | X |  |  |
| 1. changes in the environment may increase or decrease population size; and
 | X |  |  |
| 1. large-scale changes such as eutrophication, climate changes, and catastrophic disturbances affect ecosystems.
 | X |  |  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.9 The student will investigate and understand that relationships exist between ecosystem dynamics and human activity. Key ideas include |  |  |  |
| 1. changes in habitat can disturb populations;
 | X |  |  |
| 1. disruptions in ecosystems can change species competition; and
 | X |  |  |
| 1. variations in biotic and abiotic factors can change ecosystems.
 | X |  |  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.10 The student will investigate and understand that organisms reproduce and transmit genetic information to new generations. Key ideas include |  |  |  |
| 1. DNA has a role in making proteins that determine organism traits;
 | X |  |  |
| 1. the role of meiosis is to transfer traits to the next generation; and
 | X |  |  |
| 1. Punnett squares are mathematical models used to predict the probability of traits in offspring.
 | X |  |  |

| Standard | Adequate | Limited | No Evidence |
| --- | --- | --- | --- |
| LS.11 The student will investigate and understand that populations of organisms can change over time. Key ideas include |  |  |  |
| 1. mutation, adaptation, natural selection, and extinction change populations;
 | X |  |  |
| 1. the fossil record, genetic information, and anatomical comparisons provide evidence for evolution; and
 | X |  |  |
| 1. environmental factors and genetic variation, influence survivability and diversity of organisms.
 | X |  |  |

Rubric for Instructional Design and Support

|  |  |  |
| --- | --- | --- |
| **Adequate** | **Limited** | **No Evidence** |
| 1. Materials emphasize the use of effective instructional practices and learning theory.
 |
| * 1. Students are guided through critical thinking and problem-solving approaches.
 |
| Materials consistently include content promoting use of critical thinking and problem-solving approaches. | Materials inconsistently include content promoting use of critical thinking and problem-solving approaches. | Materials do not include content promoting use of critical thinking and problem-solving approaches. |
| * 1. Concepts are introduced through concrete experiences that incorporate the scientific and engineering practices.
 |
| Materials consistently promote the introduction of concepts through concrete experiences. | Materials inconsistently promote the introduction of concepts through concrete experiences. | Materials do not promote the introduction of concepts through concrete experiences. |
| * 1. Multiple opportunities are provided for students to develop and apply concepts through scientific and engineering practices.
 |
| Materials consistently provide development and application of concepts through appropriate technologies. | Materials inconsistently provide development and application of concepts through appropriate technologies. | Materials do not provide development and application of concepts through appropriate technologies. |
| * 1. Students use a variety of representations (graphical, numerical, symbolic, verbal, and physical) to connect science concepts.
 |
| Materials provide consistent use of a variety of representations of science content and concepts.  | Materials provide inconsistent use of a variety of representations of science content and concepts. | Materials do not provide use of a variety of representations of science content and concepts. |
| 1. The science content is significant and accurate.
 |
| * 1. Materials are presented in an organized, logical manner which represents the current thinking on how students learn science.
 |
| Materials consistently support the balanced use of conceptual and procedural approaches. | Materials inconsistently support the balanced use of conceptual and procedural approaches. | Materials do not support a balanced use of conceptual and procedural approaches. |
| * 1. Materials are organized appropriately within and among units of study.
 |
| Materials are consistently organized within and among units of study.  | Materials are inconsistently organized within and among units of study. | Materials are inappropriately organized within and among units of study. |
| * 1. Format design includes titles, subheadings, and appropriate cross-referencing for ease of use.
 |
| Materials consistently use formatting that is user-friendly. | Materials inconsistently use formatting that is user-friendly. | Materials do not use formatting that is user-friendly. |
| * 1. Writing style, length of sentences, vocabulary, graphics, and illustrations are appropriate.
 |
| Materials consistently include writing and visuals that are appropriate for the grade level. | Materials inconsistently include writing and visuals that are appropriate for the grade level. | Materials do not include writing and visuals that are appropriate for the grade level. |
| * 1. Level of abstraction is appropriate, and practical/real-life examples, including careers, are provided.
 |
| Materials consistently provide the appropriate level of abstraction and appropriate practical/real-life examples.  | Materials inconsistently provide the appropriate level of abstraction and appropriate practical/real-life examples. | Materials do not provide the appropriate level of abstraction and appropriate practical/real-life examples. |
| * 1. Sufficient applications are provided to promote depth of application.
 |
| Materials consistently provide sufficient applications to promote depth of application and are appropriate for the grade level. | Materials inconsistently provide sufficient applications to promote depth of application and are appropriate for the grade level. | Materials do not provide sufficient applications to promote depth of application and are not appropriate for the grade level. |
| 1. Materials present content in an accurate, unbiased manner.
 |
| Materials consistently present content in an accurate, unbiased manner. | Materials inconsistently present content in an accurate, unbiased manner. | Materials do not present content in an accurate, unbiased manner. |