Grades 9-12

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| **EALR 1: Systems**  |
| **Big Idea: Systems (SYS)** |
| **Core Content: Predictability and Feedback** |
| **Topic: Feedback in Systems** |
| **Grade 9-12 (SYSA)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** give an example of a positive feedback system and explain its regulatory mechanism *(e.g., global warming causes Earth’s ice caps to melt, reflecting less energy to space, increasing temperatures)*
* give an example of a negative feedback system and explain its regulatory mechanism *(e.g., when a human body overheats, it produces sweat that cools the body by evaporation)*

**The student exhibits no major errors or omissions.** | * Describe how global warming causes Earth’s ice caps to melt, reflecting less energy to space, increasing temperatures.
 |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls examples of a positive feedback system and its regulatory mechanism
* recognizes or recalls examples of a negative feedback system and its regulatory mechanism
* recognizes or recalls basic terminology such as: feedback, regulatory mechanism

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** | * Given a list of examples of feedback systems identify those that are positive feedback and those that are negative feedback.
 |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 1: Systems**  |
| **Big Idea: Systems (SYS)** |
| **Core Content: Predictability and Feedback** |
| **Topic: Systems Thinking** |
| **Grade 9-12 (SYSB)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** determine if a systems approach will be helpful in answering a question or solving a problem
* represent a system with a diagram specifying components, boundaries, flows, and feedbacks
* describe relevant subsystems and the larger system that contains the system being analyzed
* determine how a system functions with respect to other systems

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls the criteria used to determine if a systems approach is useful
* completes a teacher provided diagram of a system
* recognizes or recalls accurate statements about subsystems and the larger system that contains the system being studied
* recognizes or recalls accurate statements about how a system functions in respect to other systems

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 1: Systems**  |
| **Big Idea: Systems (SYS)** |
| **Core Content: Predictability and Feedback** |
| **Topic: Complex Systems** |
| **Grade 9-12 (SYSC)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** create a simplified model of a complex system, trace the possible consequences of a change in one part of the system and explain how the simplified model may not be adequate to reliably predict consequences

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls the possible consequences of a change in one part of the system and recognizes or recalls how the simplified model may not be adequate to reliably predict consequences given a simplified model of a complex system

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 1: Systems**  |
| **Big Idea: Systems (SYS)** |
| **Core Content: Predictability and Feedback** |
| **Topic: Equilibrium in Systems** |
| **Grade 9-12 (SYSD)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** analyze whether or not a system *(e.g., population)* is changing or in equilibrium
* determine whether a state of equilibrium is static or dynamic *(e.g., inflows equal outflows)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls examples of systems that are changing or in equilibrium
* recognizes or recalls examples of static and dynamic equilibrium

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 2: Inquiry** |
| **Big Idea: Inquiry (INQ)** |
| **Core Content: Conducting Analyses and Thinking Logically** |
| **Topic: Question** |
| **Grade: 9-12 (INQA)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** generate and evaluate a question that can be answered through a scientific investigation
* critique questions generated by others and explain whether or not the questions are scientific

 **The student exhibits no major errors or omissions.** | * From a list of Earthquake epicenters, generate a question that can be answered through a scientific investigation.
* Exchange papers and critique one another’s questions.
 |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes the criteria for a scientific question

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** | * From a list of questions select one and give reasons why it is investigable or not.
 |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 2: Inquiry** |
| **Big Idea: Inquiry (INQ)** |
| **Core Content: Conducting Analyses and Thinking Logically** |
| **Topic: Investigate** |
| **Grade: 9-12 (INQB)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** plan and conduct a scientific investigation, choosing a method appropriate to the question being asked
* collect, analyze, and display data using calculators, computers, or other technical devices when available

**The student exhibits no major errors or omissions.** | * Note to teacher – the use of technology is also in 9-12 APPD
 |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** conducts a teacher directed scientific investigation
* analyzes given data

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 2: Inquiry** |
| **Big Idea: Inquiry (INQ)** |
| **Core Content: Conducting Analyses and Thinking Logically** |
| **Topic: Explain** |
| **Grade: 9-12 (INQC)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** draw conclusions supported by evidence from an investigation and consistent with established scientific knowledge
* analyze alternative explanations and decide which best fits the data and evidence

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** chooses an appropriate conclusion from a list, that is supported by evidence and is consistent with established scientific knowledge
* gives a logical explanation based on data and evidence

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 2: Inquiry** |
| **Big Idea: Inquiry (INQ)** |
| **Core Content: Conducting Analyses and Thinking Logically** |
| **Topic: Communicate Clearly** |
| **Grade: 9-12(INQD)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** write a detailed laboratory report that includes: the question that motivated the study, a justification for the kind of investigation chosen, hypotheses (if any), a description of what was done, a summary of data in tables and graphs, and a conclusion, based on the evidence, that responds to the question

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** completes a teacher provided lab report form

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 2: Inquiry** |
| **Big Idea: Inquiry (INQ)** |
| **Core Content: Conducting Analyses and Thinking Logically** |
| **Topic: Model** |
| **Grade: 9-12(INQE)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** formulate a hypotheses based on a model or theory of a causal relationship (demonstrate creativity and critical thinking to formulate and evaluate the hypotheses)

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** matches given hypotheses to models or theories

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 2: Inquiry** |
| **Big Idea: Inquiry (INQ)** |
| **Core Content: Conducting Analyses and Thinking Logically** |
| **Topic: Communicate**  |
| **Grade: 9-12 (INQF)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** evaluate an investigation to determine if it was a valid means of answering the question, and whether or not the results were reliable
* describe the development of a scientific theory that illustrates logical reasoning, creativity, testing, revision, and replacement of prior ideas in light of new evidence

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes the criteria used to evaluate an investigation based on validity and reliability
* recognizes or recalls accurate statements about the development of a scientific theory
* recognizes or recalls basic terminology such as: validity/reliability

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |
| **EALR 2: Inquiry** |
| **Big Idea: Inquiry (INQ)** |
| **Core Content: Conducting Analyses and Thinking Logically** |
| **Topic: Intellectual Honesty** |
| **Grade: 9-12 (INQG)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain inconsistent findings in a scientific discussion about one’s own investigations and those performed by others
* respond to questions and criticisms, and if appropriate, revise explanations based on these discussions
* provide appropriate citations for all ideas, findings, and information used in any and all written reports
* explain the consequences for failure to provide appropriate citations

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the failure to provide appropriate citations
* completes teacher provided citation worksheets

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 3: Application** |
| **Big Idea: Application (APP)** |
| **Core Content: Science, Technology and Society** |
| **Topic: Science Effects Society** |
| **Grade: 9-12 (APPA)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe ways that scientific ideas have influenced society or the development of differing cultures
* describe questions that scientists investigate that are stimulated by the needs of society *(e.g., medical research, global climate change)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the ways that scientific ideas have influenced society or the development of cultures
* recognizes or recalls questions that scientists investigate that are stimulated by the needs of society *(e.g., medical research, global climate change)*

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 3: Application** |
| **Big Idea: Application (APP)** |
| **Core Content: Science, Technology and Society** |
| **Topic: Technological Design** |
| **Grade: 9-12 (APPB)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** work collaboratively with other students to generate ideas for solving a problem (identify criteria and constraints, research the problem, and generate several possible solutions)

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls the steps of the problem solving process and the procedures for working collaboratively to solve problems

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 3: Application** |
| **Big Idea: Application (APP)** |
| **Core Content: Science, Technology and Society** |
| **Topic: Choosing Solutions** |
| **Grade: 9-12 (APPC)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** choose the best solution for a problem, create a model or drawing of the final design, and devise a way to test it. Redesign the solution, if necessary, then present it to peers.

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** matches problems to appropriate solutions

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 3: Application** |
| **Big Idea: Application (APP)** |
| **Core Content: Science, Technology and Society** |
| **Topic: Mathematical Solutions** |
| **Grade: 9-12 (APPD)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** use proportional reasoning, functions, graphing, and estimation to solve problems
* use technology *(e.g., computers, probes, and software)* to collect, display, and analyze data

**The student exhibits no major errors or omissions.** | * Note to teacher – the use of technology is also in 9-12 INQB
 |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** solves basic problems

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 3: Application** |
|  **Big Idea: Application (APP)** |
| **Core Content: Science, Technology and Society** |
| **Topic: Societal Trade offs** |
| **Grade: 9-12 (APPE)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** analyze a societal issue that may be addressed through science and/or technology
* compare and contrast alternative solutions by considering trade-offs and unintended consequences *(e.g., removing dams to increase salmon spawning)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about societal issues addressed through science
* recognizes or recalls accurate statements about alternate solutions

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 3: Application** |
| **Big Idea: Application (APP)** |
| **Core Content: Science, Technology and Society** |
| **Topic: Science and Society** |
| **Grade: 9-12 (APPF)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** analyze scientific information in current events to make personal choices or to understand public-policy decisions

**The student exhibits no major errors or omissions.** | * Students give examples of personal choices one would make based on scientific information (i.e., becoming a vegetarian, buying organic produce etc.).
 |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes current events that contain scientific information

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth in Space (ES1)** |
| **Core Content: Evolution of The Universe** |
| **Topic: Formation of Elements in Stars** |
| **Grade: 9-12 (ES1A)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** connect the life cycles of stars to the production of elements through the process of nuclear fusion

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes the life cycle of a star

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth in Space (ES1)** |
| **Core Content: Evolution of The Universe** |
| **Topic: The Big Bang Theory** |
| **Grade: 9-12 (ES1B)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** cite evidence that supports the “Big Bang theory” *(e.g., red shift of galaxies or 3K background radiation)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the big bang theory

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth Systems, Structures and Processes (ES2)** |
| **Core Content: Energy in Earth Systems** |
| **Topic: Global Climate** |
| **Grade: 9-12 (ES2A)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain why Earth is warmer near the equator and cooler near the poles (due to the uneven heating of Earth by the Sun)
* explain why it’s warmer in summer and colder in winter for people in Washington State (because the intensity of sunlight is greater and the days are longer in summer than in winter) and connect these seasonal changes in sunlight to the tilt of Earth’s axis with respect to the plane of its orbit around the Sun

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the uneven heating of the Earth by the Sun and the relationship to the tilt of Earth’s axis

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth Systems, Structures and Processes (ES2)** |
| **Core Content: Energy in Earth Systems** |
| **Topic: Factors that Influence Climate** |
| **Grade: 9-12 (ES2B)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how the climate in the Pacific Northwest region is affected by seasonal weather patterns, as well as other factors such as the addition of greenhouse gases to the atmosphere and proximity to mountain ranges and to the ocean

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes the climate in the Pacific Northwest

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth Systems, Structures and Processes (ES2)** |
| **Core Content: Energy in Earth Systems** |
| **Topic: Biogeochemical Cycles** |
| **Grade: 9-12 (ES2C)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe the different forms taken by carbon and nitrogen, and the reservoirs where they are found

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** gives examples of carbon found on Earth *(e.g., carbonate rocks such as limestone, in coal and oil, in the atmosphere as carbon dioxide gas, and in the tissues of all living organisms)*

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth Systems, Structures and Processes (ES2)** |
| **Core Content: Energy in Earth Systems** |
| **Topic: Renewable and Non-renewable Resources** |
| **Grade: 9-12 (ES2D)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how human use of natural resources stress natural processes and link that use to a possible long term consequence

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls renewable and nonrenewable resources in the Pacific Northwest region

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth History (ES3)** |
| **Core Content: Evolution of The Earth** |
| **Topic: Evolution of the Earth System** |
| **Grade: 9-12 (ES3A)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe which Earth processes may have caused a given rock formation in the Pacific Northwest *(e.g., erosion, deposition, and scraping of terrain by glaciers, floods, volcanic eruptions, and tsunami)*
* construct a possible timeline showing the development of rock formations in the Pacific Northwest

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls which Earth processes may have caused rock formations in the Pacific Northwest *(e.g., erosion, deposition, and scraping of terrain by glaciers, floods, volcanic eruptions, and tsunami)*
* recognizes or recalls the age of major rock formations in the Pacific Northwest

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth History (ES3)** |
| **Core Content: Evolution of The Earth** |
| **Topic: Geological Time** |
| **Grade: 9-12 (ES3B)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how decay rates of radioactive materials in rock layers are used to establish the timing of geologic events
* given a geologic event, explain multiple methods that could be used to establish the timing of that event

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** lists methods that can establish the timing of a geologic event

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth History (ES3)** |
| **Core Content: Evolution of The Earth** |
| **Topic: Evolution of the Atmosphere** |
| **Grade: 9-12 (ES3C)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** compare the chemical composition of the Earth’s atmosphere before bacteria and plants evolved and after they became widespread

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes the current chemical composition of the Earth’s atmosphere

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Earth and Space Science** |
| **Big Idea: Earth History (ES3)** |
| **Core Content: Evolution of The Earth** |
| **Topic: Historical Climate** |
| **Grade: 9-12 (ES3D)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe factors that change climates over long periods of time and describe methods that scientists have found to gather information on ancient climates

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** lists factors that change climates and methods that scientists use to gather information on ancient climates

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Structures and Functions of Living Organisms (LS1)** |
| **Core Content: Processes Within Cells** |
| **Topic: Photosynthesis** |
| **Grade: 9-12 (LS1A)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how plant cells use photosynthesis to produce their own food, use the following equation to illustrate how plants rearrange atoms during photosynthesis: 6CO2+6H2O+light energy —> C6H12O6+6O2
* explain the importance of photosynthesis for both plants and animals, including humans

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: photosynthesis
* recognizes or recalls accurate statements about the importance of photosynthesis
* labels a diagram of the photosynthetic cycle

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Structures and Functions of Living Organisms (LS1)** |
| **Core Content: Processes Within Cells** |
| **Topic: Cellular Respiration** |
| **Grade: 9-12 (LS1B)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how the process of cellular respiration is similar to the burning of fossil fuels (*e.g., both processes involve combustion of carbon-containing compounds to transform chemical energy to a different form of energy)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes cellular respiration

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Structures and Functions of Living Organisms (LS1)** |
| **Core Content: Processes Within Cells** |
| **Topic: Cell Essential Functions** |
| **Grade: 9-12 (LS1C)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** draw, label, and describe the functions of components of essential structures within cells *(e.g., cellular membrane, nucleus, chromosome, chloroplast, mitochondrion, ribosome)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls the components of essential structures within cells

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Structures and Functions of Living Organisms (LS1)** |
| **Core Content: Processes Within Cells** |
| **Topic: Cell Membrane** |
| **Grade: 9-12 (LS1D)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe the structure of the cell and how the membrane regulates the flow of materials into and out of the cell

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the structure of the cell and the importance of the membrane

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Structures and Functions of Living Organisms (LS1)** |
| **Core Content: Processes Within Cells** |
| **Topic: Genetic Information and DNA** |
| **Grade: 9-12 (LS1 E)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** illustrate the process by which gene sequences are copied to produce proteins

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes howDNA molecules are long chains linking four subunits (smaller molecules) whose sequence encodes genetic information

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Structures and Functions of Living Organisms (LS1)** |
| **Core Content: Processes Within Cells** |
| **Topic: Chemical Reactions in Cells** |
| **Grade: 9-12 (LS1F)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how cells break down food molecules and use the constituents to synthesize proteins, sugars, fats, DNA and many other molecules that cells require
* describe the role that enzymes play in the breakdown of food molecules and synthesis of the many different molecules needed for cell structure and function
* explain how cells extract and store energy from food molecules

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about how cells break down food molecules
* recognizes or recalls accurate statements about the role that enzymes play in the breakdown of food
* recognizes or recalls accurate statements about how cells extract and store energy

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Structures and Functions of Living Organisms (LS1)** |
| **Core Content: Processes Within Cells** |
| **Topic: Encoding Enzymes** |
| **Grade: 9-12 (LS1G)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how regulation of cell functions can occur (by changing the activity of proteins within cells and/or by changing whether and how often particular genes are expressed)

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about regulation of cell functions

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Structures and Functions of Living Organisms (LS1)** |
| **Core Content: Processes Within Cells** |
| **Topic: Mitosis** |
| **Grade: 9-12 (LS1H)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe and model the process of mitosis, in which one cell divides, producing two cells, each with copies of both chromosomes from each pair in the original cell

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about mitosis

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Structures and Functions of Living Organisms (LS1)** |
| **Core Content: Processes Within Cells** |
| **Topic: Meiosis** |
| **Grade: 9-12 (LS1I)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe and model the process of meiosis in which egg and sperm cells are formed with only one set of chromosomes from each parent
* model and explain the process of genetic recombination that may occur during meiosis and how this then results in differing characteristics in offspring
* describe the process of fertilization that restores the original chromosome number while reshuffling the genetic information, allowing for variation among offspring
* predict and explain the outcome of specific genetic crosses involving two characteristics

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about meiosis
* recognizes or recalls accurate statements about genetic recombination
* recognizes or recalls accurate statements about fertilization

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Ecosystems (LS2)** |
| **Core Content: Maintenance and Stability of Populations** |
| **Topic: Energy and Matter Cycles in Ecosystems** |
| **Grade: 9-12 (LS2A)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how plants and animals cycle carbon and nitrogen within an ecosystem
* explain how matter cycles and energy flows in ecosystems, resulting in the formation of differing chemical compounds and heat

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about how matter cycles and energy flows in ecosystems
* recognizes or recalls accurate statements about how plants and animals cycle carbon and nitrogen in ecosystems

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Ecosystems (LS2)** |
| **Core Content: Maintenance and Stability of Populations** |
| **Topic: Population Density** |
| **Grade: 9-12 (LS2B)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** evaluate the conditions necessary for rapid population growth *(e.g., given adequate living and nonliving resources and no disease or predators, populations of an organism increase at rapid rates)*
* calculate the population density of an organism given ecosystem data

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about conditions needed for rapid population growth

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Ecosystems (LS2)** |
| **Core Content: Maintenance and Stability of Populations** |
| **Topic: Population Growth** |
| **Grade: 9-12 (LS2C)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain factors, including matter and energy, in the environment that limit the growth of plant and animal populations in natural ecosystems

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls examples of environmental factors that limit plant and animal population growth

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Ecosystems (LS2)** |
| **Core Content: Maintenance and Stability of Populations** |
| **Topic: Representing Ecosystems with Models** |
| **Grade: 9-12 (LS2D)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** draw a systems diagram to illustrate and explain why introduced (nonnative) species often do poorly and have a tendency to die out, as well as why they sometimes do very well and force out native species

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the reasons that introduced species do poorly or survive

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Ecosystems (LS2)** |
| **Core Content: Maintenance and Stability of Populations** |
| **Topic: Biodiversity** |
| **Grade: 9-12 (LS2E)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** compare the biodiversity of organisms in different types of ecosystems *(e.g., rain forest, grassland, desert)* noting the interdependencies and interrelationships among the organisms in these different ecosystems

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** given an ecosystem, describes the biodiversity of organisms found there

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Ecosystems (LS2)** |
| **Core Content: Maintenance and Stability of Populations** |
| **Topic: Sustainability** |
| **Grade: 9-12 (LS2F)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how scientific concepts and findings relate to a resource issue currently under discussion in the state of Washington *(e.g., removal of dams to facilitate salmon spawning in rivers; construction of wind farms)*
* explain how the concept of sustainable development may be applied to a current resource issue in the state of Washington

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls examples of current natural resource issues in the state of Washington

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Biological Evolution (LS3)** |
| **Core Content: Mechanisms of Evolution** |
| **Topic: Biological Evolution** |
| **Grade: 9-12 (LS3A)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain biological evolution as the consequence of the interactions of four factors: population growth, inherited variability of offspring, a finite supply of resources, and natural selection by the environment of offspring better able to survive and reproduce
* predict the effect on a species if one of these factors should change

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls the factors that affect biological evolution
* describes the effect on a species if one factor changes

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Biological Evolution (LS3)** |
| **Core Content: Mechanisms of Evolution** |
| **Topic: Mutations** |
| **Grade: 9-12 (LS3B)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe the molecular process by which organisms pass on physical and behavioral traits to offspring, as well as the environmental and genetic factors that cause minor differences (variations) in offspring or occasional “mistakes” in the copying of genetic material that can be inherited by future generations (mutations)
* explain how a genetic mutation may or may not allow a species to survive and reproduce in a given environment

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about genetic mutations

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Biological Evolution (LS3)** |
| **Core Content: Mechanisms of Evolution** |
| **Topic: Diversity of Organisms** |
| **Grade: 9-12 (LS3C)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how the millions of different species alive today are related by descent from a common ancestor
* explain how genes in organisms that are very different *(e.g., yeast, flies, and mammals)* can be very similar because these organisms all share a common ancestor

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the relationship of modern species to a common ancestor
* recognizes or recalls accurate statements about common shared genes among species

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Biological Evolution (LS3)** |
| **Core Content: Mechanisms of Evolution** |
| **Topic: Fossil Record** |
| **Grade: 9-12 (LS3D)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** using the fossil record and anatomical and/or molecular (DNA) similarities as evidence, formulate a logical argument for biological evolution as an explanation for the development of a representative species *(e.g., birds, horses, elephants, whales)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes an animal alive today that could be related to a given fossil representation (picture, model of a fossil etc.)

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Life Science** |
| **Big Idea: Biological Evolution (LS3)** |
| **Core Content: Mechanisms of Evolution** |
| **Topic: Biological Classifications** |
| **Grade: 9-12 (LS3E)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** classify organisms, using similarities and differences in physical and functional characteristics
* explain similarities and differences among closely related organisms in terms of biological evolution *(e.g., “Darwin’s finches” had different beaks due to food sources on the islands where they evolved)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes the physical and functional characteristics of organisms
* describes the similarities and differences in organisms due to biological evolution

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Force and Motion (PS1)** |
| **Core Content: Newton’s Laws** |
| **Topic: Velocity** |
| **Grade: 9-12 (PS1A)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** calculate the average velocity of a moving object, given the object’s change in position and time (v = x2-x1/ t2-t1)
* explain how two objects moving at the same speed can have different velocities

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about speed and velocity

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Force and Motion (PS1)** |
| **Core Content: Newton’s Laws** |
| **Topic: Acceleration (PS1B)** |
| **Grade: 9-12** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** calculate the average acceleration of an object, given the object’s change in velocity with respect to time (a = v2-v1/ t2-t1)
* explain how an object moving at constant speed can be accelerating

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about calculating acceleration

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Force and Motion (PS1)** |
| **Core Content: Newton’s Laws** |
| **Topic: Newton’s First** |
| **Grade: 9-12 (PS1C)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** compare the motion of an object acted on by balanced forces with the motion of an object acted on by unbalanced forces given specific scenarios

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: balanced force, unbalanced force
* describes how balanced and unbalanced forces will affect an object in motion

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Force and Motion (PS1)** |
| **Core Content: Newton’s Laws** |
| **Topic: Newton’s Second** |
| **Grade: 9-12 (PS1D)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** predict and explain how objects of different masses will accelerate when subjected to the same force
* calculate the acceleration of an object, given the object’s mass and the net force on the object, using Newton’s Second law of Motion (F=ma)

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls the formula used to calculate acceleration *(i.e., F=ma)*

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Force and Motion (PS1)** |
| **Core Content: Newton’s Laws** |
| **Topic: Newton’s Third** |
| **Grade: 9-12 (PS1E)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** illustrate with everyday examples Newton’s third law of motion *(i.e., for every action there is an equal and opposite reaction) (e.g., a person exerts the same force on the Earth as the Earth exerts on the person)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about Newton’s third law of motion

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Force and Motion (PS1)** |
| **Core Content: Newton’s Laws** |
| **Topic: Gravity** |
| **Grade: 9-12 (PS1F)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** predict and explain how the gravitational force between two bodies would differ for bodies of different masses or different distances apart
* explain how the weight of an object can change while its mass remains constant

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: gravitational force, weight, mass
* recognizes or recalls accurate statements about the effect of mass and distance on gravitational force

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Force and Motion (PS1)** |
| **Core Content: Newton’s Laws** |
| **Topic: Electrical Force** |
| **Grade: 9-12 (PS1G)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** predict whether two charged objects will attract or repel each other, and explain why

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls the conditions under which charged objects will attract or repel each other

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Force and Motion (PS1)** |
| **Core Content: Newton’s Laws** |
| **Topic: Electro-Magnetism** |
| **Grade: 9-12 (PS1H)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** demonstrate and explain how an electric current flowing in a wire will create a magnetic field around the wire (electromagnetic effect)
* demonstrate and explain how moving a magnet near a wire will cause an electric current to flow in the wire (the generator effect)

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: magnetic field, electric current
* recognizes or recalls accurate statements about the electromagnetic effect
* recognizes or recalls accurate statements about the generator effect

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Atomic Structure** |
| **Grade: 9-12 (PS2A)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe the relative charges, masses, and locations of the protons, neutrons, and electrons in an atom of an element

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about protons, neutrons and electrons

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Elements** |
| **Grade: 9-12 (PS2B)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** predict the chemical properties of an element , given the number and arrangement of electrons in the outermost shell of an atom

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the relationship between the chemical property and arrangement of electrons in the outer shell

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Periodic Table** |
| **Grade: 9-12 (PS2C)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** use the Periodic Table to identify the element given the number of protons
* explain the arrangement of the elements on the Periodic Table, including the significant relationships among elements in a given column or row

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the significant relationships among elements in a given column or row

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Ions** |
| **Grade: 9-12 (PS2D)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how ions and ionic bonds are formed *(e.g., sodium atoms lose an electron and chlorine atoms gain an electron, then the charged ions are attracted to each other and form bonds)*
* explain the meaning of a chemical formula for an ionic array *(e.g., NaCl)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: ionic bond, ion, ionic array
* recognizes or recalls accurate examples of formulas for an ionic array
* recognizes or recalls accurate statements about ions and ionic bonds

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Molecular Compounds** |
| **Grade: 9-12 (PS2E)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
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|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** illustrate that molecules are groups of two or more atoms bonded together *(e.g., a molecule of water is formed when one oxygen atom shares electrons with two hydrogen atoms)*
* explain the meaning of a chemical formula for a molecule *(e.g., CH4 or H2O)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: molecule
* recognizes or recalls accurate examples of chemical formulas

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Organic Compounds** |
| **Grade: 9-12 (PS2F)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** demonstrate how carbon atoms form four covalent bonds to make large molecules

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** labels a diagram showing how carbon atoms form covalent bonds
* recognizes the functions of large carbon molecules *(e.g., plant and animal tissue, polymers, sources of food and nutrition, fossil fuels)*

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Chemical Reactions** |
| **Grade: 9-12 (PS2G)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe at least three chemical reactions that are of particular importance to humans *(e.g., burning of fossil fuels, photosynthesis, rusting of metals)*
* write a chemical equation for each of the three important chemical reactions *(e.g., burning of fossil fuels, photosynthesis, rusting of metals)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** uses a chemical equation to illustrate how the atoms in molecules are arranged before and after a reaction
* recognizes or recalls accurate examples of chemical reactions that acquire energy from their surroundings
* recognizes or recalls accurate examples of chemical reactions that release energy

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** | * From a list of reactions identify the reactions that release energy to the surroundings and those that acquire energy from the surroundings.
 |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Solutions** |
| **Grade: 9-12 (PS2H)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** give examples of common solutions
* explain the differences among the processes of dissolving, melting, and reacting
* predict the result of adding increased amounts of a substance to an aqueous solution, in concentration and pH

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: solution, dissolving, melting, reacting, concentration, pH
* describes the effect on concentration and pH of adding increased amounts of a substance to an aqueous solution

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Rates of Reactions** |
| **Grade: 9-12 (PS2I)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** predict and explain the effect of a change in temperature, surface area, or pressure on the rate of a given physical or chemical change

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** describes how temperature, surface area or pressure can affect the rate of a physical or chemical change

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Isotopes** |
| **Grade: 9-12 (PS2J)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe an isotope’s atomic structure (number of protons, neutrons, and electrons), given the atomic number and atomic mass number of an isotope
* use a decay curve for a radioactive isotope to find the age of the sample, given data from the sample and explain how the decay curve is derived

**The student exhibits no major errors or omissions.** | * Draw and label a model of the isotope’s atomic structure.
 |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: atomic number, atomic mass number, and isotope
* describes the decay curve of a radioactive isotope

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Properties and Change (PS2)** |
| **Core Content: Chemical Reactions** |
| **Topic: Fission/Fusion** |
| **Grade: 9-12 (PS2K)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** distinguish between nuclear fusion and nuclear fission by describing how each process transforms elements present before the reaction into elements present after the reaction

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about nuclear fusion and fission
* recognizes or recalls basic terminology such as: nuclear fusion and nuclear fission

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Energy: Transfer, Transformation and Conservation (PS3)** |
| **Core Content: Transformation and Conservation of Energy** |
| **Topic: Conservation of Energy** |
| **Grade: 9-12 (PS3A)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain how energy is conserved in a situation in which energy is transferred from one place to another
* explain how energy is conserved in a situation in which energy is transformed from one form to another

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: conservation of energy
* recognizes or recalls accurate statements about the conservation of energy in various situations

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Energy: Transfer, Transformation and Conservation (PS3)** |
| **Core Content: Transformation and Conservation of Energy** |
| **Topic: Kinetic Energy** |
| **Grade: 9-12 (PS3B)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** calculate the kinetic energy of an object, given the object’s mass and velocity

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls the formula for calculating the kinetic energy of an object

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Energy: Transfer, Transformation and Conservation (PS3)** |
| **Core Content: Transformation and Conservation of Energy** |
| **Topic: Gravitational Potential Energy** |
| **Grade: 9-12 (PS3C)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** explain a situation in which gravitational, potential energy and kinetic energy are changed from one to the other *(e.g., a child on a swing illustrates the alternating transformation of kinetic and gravitational potential energy)*

**The student exhibits no major errors or omissions.** |  |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** gives an example of gravitational, potential and kinetic energy being changed into one another

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Energy: Transfer, Transformation and Conservation (PS3)** |
| **Core Content: Transformation and Conservation of Energy** |
| **Topic: Wave Properties** |
| **Grade: 9-12 (PS3D)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** characterize physical waves by frequency, wavelength, amplitude, and speed
* apply these properties to the pitch and volume of sound waves and to the wavelength and magnitude of water waves

**The student exhibits no major errors or omissions.** | * Use a spring or string to demonstrate frequency, wavelength, amplitude, and speed.
 |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls basic terminology such as: frequency, amplitude, speed, wavelength, pitch, volume, magnitude as applied to waves

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |

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| **EALR 4: Physical Science** |
| **Big Idea: Matter: Energy: Transfer, Transformation and Conservation (PS3)** |
| **Core Content: Transformation and Conservation of Energy** |
| **Topic: Electromagnetic Waves** |
| **Grade: 9-12 (PS3E)** |
| **Score 4.0** | **In addition to Score 3.0, in-depth inferences and applications that go beyond what was taught.** | **Sample Tasks** |
|  |
|  | **3.5** | In addition to score 3.0 performance, in-depth inferences and applications with partial success. |  |
| **Score 3.0** | **The student will:*** describe how regions of the electromagnetic spectrum differ regarding wavelength, frequency, and energy, and how they are used *(e.g., infrared in heat lamps, microwaves for heating foods, X-rays for medical imaging)*

**The student exhibits no major errors or omissions.** | * Illustrate the electromagnetic spectrum with a labeled diagram.
 |
|  | **2.5** | No major errors or omissions regarding 2.0 content and partial knowledge of the 3.0 content |  |
| **Score 2.0** | **There are no major errors or omissions regarding the simpler details and processes as the student:*** recognizes or recalls accurate statements about the electromagnetic spectrum

**However, the student exhibits major errors or omissions regarding the more complex ideas and processes.** |  |
|  | **1.5** | Partial knowledge of the 2.0 content but major errors or omissions regarding the 3.0 content |  |
| **Score 1.0** | **With help, a partial understanding of some of the simpler details and processes and some of the more complex ideas and processes.** |
|  | **0.5** | With help, a partial understanding of the 2.0 content but not the 3.0 content |
| **Score 0.0** | **Even with help, no understanding or skill demonstrated.** |