Oklahoma Grade 11

Physical Science

Performance Level Descriptor Tables

Advanced

Students demonstrate superior performance on challenging subject matter and clearly exhibit readiness for college and career. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically:

- evaluate multiple patterns to develop and use models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.
- use complex mathematical models and plan and conduct investigations to produce and refine reliable data considering the types, amounts, accuracy and limitations of data needed; analyze and interpret complex data sets to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different types of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.
- evaluate the validity and reliability of complex claims about the effects of electromagnetic radiation on matter from a variety of published sources, including complex texts.
- construct, evaluate, make inferences, and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter; predict how temperature or concentration affects the rate of chemical reactions; and define energy and matter in order to design, refine, and evaluate solutions taking into account unanticipated effects around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

Proficient

Students demonstrate mastery with subject matter and exhibit readiness for college and career. In addition to demonstrating understanding and application of all skills in the Basic level, students scoring at the Proficient level typically:

- use patterns and models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.
- use mathematical models and plan and conduct investigations to produce and use reliable data to serve as a basis for evidence to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different types of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.
- evaluate the validity and reliability of claims about the effects of electromagnetic radiation on matter from a variety of published sources.
- construct and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter; explain how temperature or concentration affects the rate of chemical reactions; and define energy and matter in order to design and refine solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

Basic

Students demonstrate partial mastery with subject matter and may not exhibit readiness for college and career. Students scoring at the Basic level typically:

- use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.
- use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different types of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.
- evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.
- identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter; identify how temperature or concentration affects the rate of chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

Below Basic

Students scoring **Below Basic** have not demonstrated they can perform at the Basic level. Students scoring at the Basic level typically**:**

- use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.
- use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different types of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.
- evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.
- identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter; identify how temperature or concentration affects the rate of chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.

PS1.1 **PS3.2**	**Below Basic:** Students have not demonstrated they can perform at the Basic level.	**Basic:** Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course, and that students are not on track to be college- and career- ready (CCR).	**Proficient:** Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on track to be college- and career- ready (CCR).	**Advanced:** Students demonstrate superior performance on challenging subject matter.
Develop and Use Models **DCI** • PS1.A Structure and Properties of Matter • PS3.A Definitions of Energy **CCC** • Patterns • Energy and matter		**Students scoring at the Basic level typically use basic patterns and models to identify and describe components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.**	**Students scoring at the Proficient level typically use patterns and models to predict how components between or within systems related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.**	**Students scoring at the Advanced level typically evaluate multiple patterns to develop and use models to predict how components between or within systems are related to the energy of motion and the structure and properties of matter, and the relationships between energy and matter.**

PS1.7 **PS2.5** **PS3.1** **PS3.4** **PS4.1**	**Below Basic:** Students have not demonstrated they can perform at the Basic level.	**Basic:** Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course, and that students are not on track to be college- and career- ready (CCR).	**Proficient:** Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on track to be college- and career- ready (CCR).	**Advanced:** Students demonstrate superior performance on challenging subject matter.
Planning and Carrying Out Investigations, Using Mathematics and Computational Thinking **DCI** • PS1.B Chemical Reactions • PS2.B Types of Interactions • PS3.A Definitions of Energy • PS3.B Conservation of Energy and Energy Transfer • PS4.A Wave Properties **CCC** • Energy and Matter • Cause and Effect • Systems and System Models		**Students scoring at the Basic level typically use simple mathematical models and conduct investigations to produce data or use provided data to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different types of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.**	**Students scoring at the Proficient level typically use mathematical models and plan and conduct investigations to produce and use reliable data to serve as a basis for evidence to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different types of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.**	**Students scoring at the Advanced level typically use complex mathematical models and plan and conduct investigations to produce and refine reliable data considering the types, amounts, accuracy and limitations of data needed; analyze and interpret complex data sets to support explanations or claims about the conservation of energy and matter during chemical reactions, the effects of different types of interactions, definitions of energy, conservation of energy and energy transfer within a system and/or system model, and how matter affects wave properties.**

PS4.4	**Below Basic:** Students have not demonstrated they can perform at the Basic level.	**Basic:** Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course, and that students are not on track to be college- and career- ready (CCR).	**Proficient:** Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on track to be college- and career- ready (CCR).	**Advanced:** Students demonstrate superior performance on challenging subject matter.
Obtaining, Evaluating, and Communicating Information **DCI** • PS4.B Electromagnetic Radiation **CCC** • Cause and Effect		**Students scoring at the Basic level typically evaluate the validity and/or reliability of a simple claim about the effects of electromagnetic radiation on matter from a published source.**	**Students scoring at the Proficient level typically evaluate the validity and reliability of claims about the effects of electromagnetic radiation on matter from a variety of published source.**	**Students scoring at the Advanced level typically evaluate the validity and reliability of complex claims about the effects of electromagnetic radiation on matter from a variety of published sources, including complex texts.**

PS1.2 **PS1.5** **PS3.3**	**Below Basic:** Students have not demonstrated they can perform at the Basic level.	**Basic:** Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course, and that students are not on track to be college- and career- ready (CCR).	**Proficient:** Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on track to be college- and career- ready (CCR).	**Advanced:** Students demonstrate superior performance on challenging subject matter.
Constructing Explanations and Designing Solutions **DCI** • PS1.A Structure and Properties of Matter • PS1.B Chemical Reactions • PS3.A Definitions of Energy • ETS1.A Defining and Delimiting Engineering Problems • ETS2.B Interdependence of Science, Engineering, and Technology **CCC** • Patterns • Cause and Effect • Energy and Matter		**Students scoring at the Basic level typically identify and describe basic relationships and construct explanations based on evidence from a variety of sources about patterns relating to the structure and properties of matter; identify how temperature or concentration affects the rate of chemical reactions; and define energy and matter in order to design solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.**	**Students scoring at the Proficient level typically construct and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter; explain how temperature or concentration affects the rate of chemical reactions; and define energy and matter in order to design and refine solutions around defining and delimiting engineering problems and interdependence of science, engineering, and technology.**	**Students scoring at the Advanced level typically construct, evaluate, make inferences, and revise an explanation based on scientific principles using valid and reliable evidence obtained from a variety of sources to identify patterns relating to the structure and properties of matter; predict how temperature or concentration affects the rate of chemical reactions; and define energy and matter in order to design, refine, and evaluate solutions taking into account unanticipated effects around defining and delimiting engineering problems and interdependence of science, engineering, and technology.**

Oklahoma Grade 11

Life Science

Performance Level Descriptor Tables

Advanced

Students demonstrate superior performance on challenging subject matter and clearly exhibit readiness for college and career. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically:

- develop and use models to interpret and evaluate components and relationships among components within and between complex systems and system models related to structure, function, growth, and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, and/or energy in chemistry processes.
- plan and conduct investigations to produce reliable data considering the types, amounts, and accuracy of data needed; analyze and interpret complex data sets to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of natural selection or adaptation.
- compare multiple pieces of scientific information to communicate an understanding of the patterns that show evidence of common ancestry and diversity, or adaptation.
- ask questions to analyze relationships about the effect of structure and function on inheritance of traits; or support and/or evaluate the merits of arguments to synthesize and communicate understanding and defend them based on empirical evidence about stability and change in ecosystem dynamics, function and resilience, the cause-and-effect relationships of social interactions, group behaviors, adaptation, and variation of traits.
- construct, evaluate, make inferences and revise an explanation based on valid and reliable evidence from a variety of sources regarding the cause-and-effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or evaluate or refine explanations derived from evidence from a variety of sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.

Proficient

Students demonstrate mastery with subject matter and exhibit readiness for college and career. In addition to demonstrating understanding and application of all skills in the Basic Level, students scoring at the Proficient level typically:

- develop and use models describing components and relationships among components of a system, related to structure and function, growth, and development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer In ecosystems, and energy in chemistry processes, including hierarchical structures and inputs and outputs of a system. Use the models to represent basic aspects of phenomena that result from changes in energy and matter.
- plan and conduct investigations to produce reliable data; analyze and interpret provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of natural selection or adaptation.
- evaluate multiple pieces of scientific information to communicate an understanding of the patterns that show evidence of common ancestry and diversity, or adaptation.
- ask questions to clarify relationships about the effect of structure and function on inheritance of traits; or evaluate arguments based on evidence as students synthesize and communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause-and-effect relationships of social interactions, group behaviors, adaptation, and variation of traits.
- construct an explanation based on valid and reliable evidence from sources of the cause-and-effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or construct and revise explanations from evidence from sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.

Basic

Students demonstrate partial mastery with subject matter and may not exhibit readiness for college and career. Students scoring at the Basic level typically:

- identify or describe basic components or relationships among components within systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, or energy in chemistry processes.
- conduct investigations to produce data; use provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of natural selection or adaptation.
- synthesize scientific information to communicate using a partial understanding of the patterns that show evidence of common ancestry, diversity, or adaptation.
- ask questions to identify relationships about the effect of structure and function on inheritance of traits; or describe arguments based on evidence to communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause-and-effect relationships of social interactions, group behaviors, adaptation, and variation of traits.
- identify and describe basic relationships based on evidence of the cause-and-effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or identify and describe explanations from evidence for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.

Below Basic

Students scoring **Below Basic** have not demonstrated they can perform at the Basic level. Students scoring at the Basic level typically**:**

- identify or describe basic components or relationships among components within systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, or energy in chemistry processes.
- conduct investigations to produce data; use provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of natural selection or adaptation.
- synthesize scientific information to communicate using a partial understanding of the patterns that show evidence of common ancestry, diversity, or adaptation.
- ask questions to identify relationships about the effect of structure and function on inheritance of traits; or describe arguments based on evidence to communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause-and-effect relationships of social interactions, group behaviors, adaptation, and variation of traits.
- identify and describe basic relationships based on evidence of the cause-and-effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or identify and describe explanations from evidence for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.

LS1.2 **LS1.4** **LS1.5** **LS1.7** **LS2.5**	**Below Basic**: Students have not demonstrated they can perform at the Basic level.	**Basic:** Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course, and that students are not on track to be college-and career-ready (CCR).	**Proficient:** Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on track to be college-and career-ready (CCR).	**Advanced:** Students demonstrate superior performance on challenging subject matter.
Develop and Use Models **DCI** • LS1.A Structure and function • LS1.B Growth and Development of Organisms • LS1.C Organization for Matter and Energy Flow in Organisms • LS2.B Cycles of Matter and Energy Transfer In Ecosystems • PS3.D Energy in Chemistry Processes **CCC** • Systems and System Models • Energy and Matter		**Students scoring at the Basic level typically identify or describe basic components or relationships among components within systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, or energy in chemistry processes.**	**Students scoring at the Proficient level typically develop and use models describing components and relationships among components of a system, related to structure and function, growth and development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer In ecosystems, and energy in chemistry processes, including hierarchical structures and inputs and outputs of a system. Use the models to represent basic aspects of phenomena that result from changes in energy and matter.**	**Students scoring at the Advanced level typically develop and use models to interpret and evaluate components and relationships among components within and between complex systems and system models related to structure, function, growth and/or development of organisms, organization of matter and energy flow in organisms, cycles of matter and energy transfer in ecosystems, and/or energy in chemistry processes.**

LS1.3 **LS2.1** **LS2.2** **LS2.4** **LS3.3** **LS4.3**	**Below Basic**: Students have not demonstrated they can perform at the Basic level.	**Basic:** Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course, and that students are not on track to be college-and career-ready (CCR).	**Proficient:** Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on track to be college-and career-ready (CCR).	**Advanced:** Students demonstrate superior performance on challenging subject matter.
Planning and Carrying Out Investigations, Using Mathematics and Computational Thinking, Analyzing and Interpreting Data **DCI** • LS1.A Structure and Function • LS2.A Interdependent Relationships in Ecosystems • LS2.B Cycles of Matter and Energy Transfer in Ecosystems • LS2.C Ecosystem Dynamics, Functioning and Resilience • LS3.B Variation of Traits • LS4.B Natural Selection • LS4.C Adaptation **CCC** • Patterns • Scale, Proportion, and Quantity • Energy and Matter • Stability and Change		**Students scoring at the Basic level typically conduct investigations to produce data; use provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of natural selection or adaptation.**	**Students scoring at the Proficient level typically plan and conduct investigations to produce reliable data; analyze and interpret provided data to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of natural selection or adaptation.**	**Students scoring at the Advanced level typically plan and conduct investigations; produce reliable data considering the types, amounts, and accuracy of data needed; analyze and interpret complex data sets to support explanations or claims about the stability related to structure and function of organisms, interdependent relationships in ecosystems at different scales, the cycling of matter and flow of energy among organisms in an ecosystem, the effect variation of traits has in a population, patterns that show evidence of natural selection or adaptation.**

LS4.1	**Below Basic**: Students have not demonstrated they can perform at the Basic level.	**Basic:** Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course, and that students are not on track to be college-and career-ready (CCR).	**Proficient:** Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on track to be college-and career-ready (CCR).	**Advanced:** Students demonstrate superior performance on challenging subject matter.
Obtaining, Evaluating, and Communicating Information **DCI** • LS4.A Evidence of Common Ancestry and Diversity • LS4.C: Adaptation **CCC** • Patterns		**Students scoring at the Basic level typically synthesize scientific information to communicate using a partial understanding of the patterns that show evidence of common ancestry, diversity, or adaptation.**	**Students scoring at the Proficient level typically evaluate multiple pieces of scientific information to communicate an understanding of the patterns that show evidence of common ancestry and diversity, or adaptation.**	**Students scoring at the Advanced level typically compare multiple pieces of scientific information to communicate an understanding of the patterns that show evidence of common ancestry and diversity, or adaptation.**

LS2.6 **LS2.8** **LS3.1** **LS3.2** **LS4.5**	**Below Basic**: Students have not demonstrated they can perform at the Basic level.	**Basic:** Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course, and that students are not on track to be college- and career-ready (CCR).	**Proficient:** Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on track to be college- and career-ready.	**Advanced:** Students demonstrate superior performance on challenging subject matter.
Asking Questions, Engaging in Argument from Evidence (make and defend a claim, evaluate a claim) **DCI** • LS2.C Ecosystem Dynamics, Functioning and Resilience • LS2.D Social Interactions and Group Behavior • LS3.A Inheritance of Traits • LS1.A Structure and Function • LS3.B Variation of Traits • LS4.C Adaptation **CCC** • Stability and Change • Cause and Effect		**Students scoring at the Basic level typically ask questions to identify relationships about the effect of structure and function on inheritance of traits; or describe arguments based on evidence to communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause-and-effect relationships of social interactions, group behaviors, adaptation, and variation of traits.**	**Students scoring at the Proficient level typically ask questions to clarify relationships about the effect of structure and function on inheritance of traits; or evaluate arguments based on evidence as students synthesize and communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause-and-effect relationships of social interactions, group behaviors, adaptation, and variation of traits.**	**Students scoring at the Advanced level typically ask questions to analyze relationships about the effect of structure and function on inheritance of traits; or support, evaluate, and defend arguments based on evidence as students synthesize and communicate understanding of stability and change in ecosystem dynamics, function and resilience, the cause-and-effect relationships of social interactions, group behaviors, adaptation, and variation of traits.**

LS1.1 **LS1.6** **LS2.3** **LS4.2** **LS4.4**	**Below Basic**: Students have not demonstrated they can perform at the Basic level.	**Basic:** Students demonstrate partial mastery of the essential knowledge and skills that are foundational for proficient work at their grade level or course, and that students are not on track to be college- and career-ready (CCR).	**Proficient:** Students demonstrate mastery over challenging grade-level subject matter, can analyze and apply such knowledge to real-world situations, are ready for the next grade, course, or level, and are on track to be college- and career-ready.	**Advanced:** Students demonstrate superior performance on challenging subject matter.
Constructing Explanations **DCI** • LS1.A Structure and Function • LS1.C Organization for Matter and Energy Flow in Organisms • LS2.B Cycles of Matter and Energy Transfer in Ecosystems • LS4.B Natural Selection • LS4.C Adaptation **CCC** • Structure and Function • Energy and Matter • Cause and Effect		**Students scoring at the Basic level typically identify and describe basic relationships based on evidence of the cause-and-effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or identify and describe explanations from evidence for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.**	**Students scoring at the Proficient level typically construct an explanation based on valid and reliable evidence from sources of the cause-and-effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or construct and revise explanations from evidence from sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.**	**Students scoring at the Advanced level typically construct, evaluate, or draw inferences from an explanation based on valid and reliable evidence from a variety of sources of the cause-and-effect relationships in natural selection, adaptation, and how the structure of DNA determines protein structure and impacts the function of the cell; or evaluate or refine explanations from evidence from a variety of sources for how matter and energy is organized, cycled, and transferred within an organism or ecosystem.**