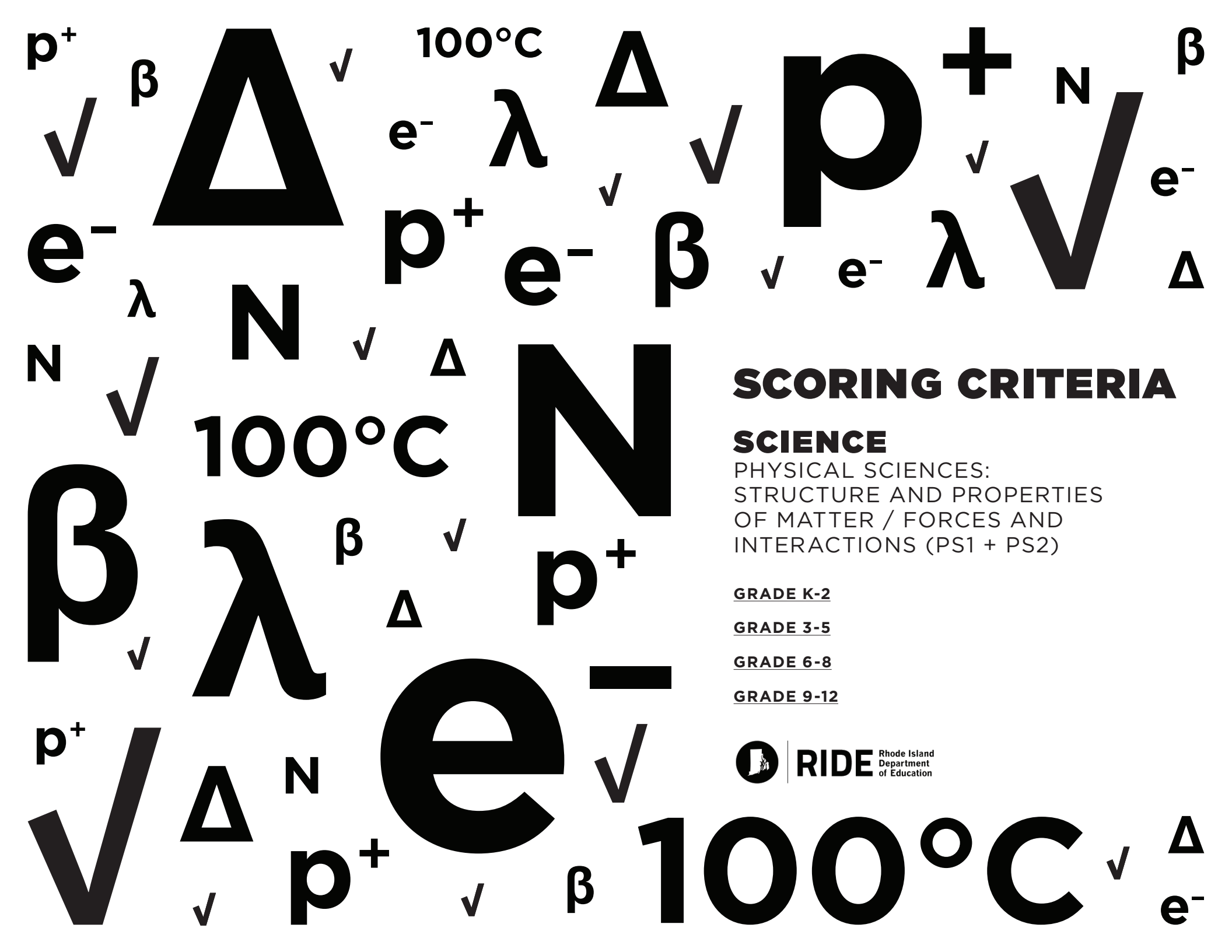


SCORING CRITERIA

SCIENCE

PHYSICAL SCIENCES:
STRUCTURE AND PROPERTIES
OF MATTER / FORCES AND
INTERACTIONS (PS1 + PS2)

GRADE K-2

GRADE 3-5

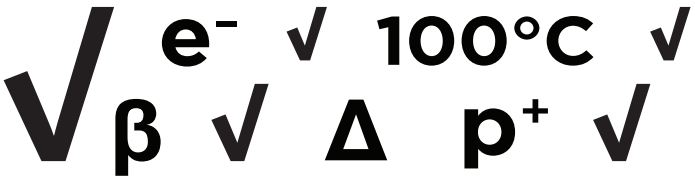
GRADE 6-8

GRADE 9-12

RIDE Rhode Island Department of Education

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | K-2



Students will...
demonstrate an understanding of structure, properties, and interactions of matter (PS1) and explain and predict interactions between objects and within systems of objects (PS2) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. (K-PS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Participate in an investigation to **make** observations about the motion of objects.	**Participate** in an investigation to **identify** the effects of various pushes or pulls on the motion of objects.	**Plan** and **conduct** an investigation to **compare** the effects of different strengths or different directions of pushes and pulls on the motion of an object.	**Plan** and **conduct** an investigation to **explain** why different strengths or directions of pushes and pulls affect the motion of objects.

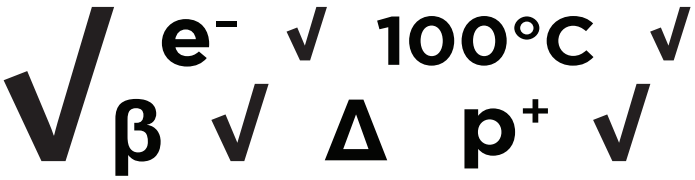
B PERFORMANCE INDICATOR

Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.* (K-PS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Observe and **identify** a change in speed or direction of an object by using data.	**Organize** data to **show** how the push or pull from a design solution changes the speed or direction of an object.	**Analyze** data to **determine** if a design solution works as intended to change the speed or direction of an object with a push or a pull.	**Suggest** improvements to the design solution that would cause a change in speed or direction of an object.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | K-2 *(CONTINUED)*



C PERFORMANCE INDICATOR

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. (2-PS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Participate in an investigation to **make** observations about properties of various materials.	**Participate** in an investigation to **identify** and **classify** observable properties of materials.	**Plan** and **conduct** an investigation to **describe** and **classify** different kinds of materials by their observable properties.	**Plan** and **conduct** an investigation to **compare** and **contrast** different kinds of materials by their observable properties.

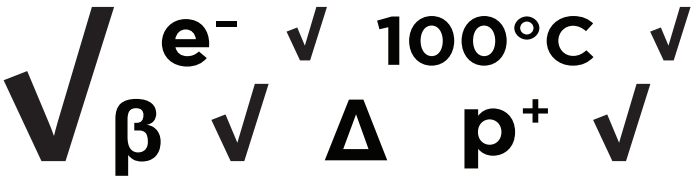
D PERFORMANCE INDICATOR

Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* (2-PS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Use data to **identify** properties of various materials.	**Use** data from testing different materials to **determine** relationships between materials, their properties, and their use.	**Analyze** data obtained from testing different materials to **determine** which materials have the properties that are best suited for an intended purpose.	**Use** data obtained from testing different materials to **justify** selection of materials that are best suited for an intended purpose.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | K-2 *(CONTINUED)*



E PERFORMANCE INDICATOR

Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. (2-PS1-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations to **describe** an object.	**Make** observations to **provide** a detailed description of an object and its parts.	**Make** observations to **construct** an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.	**Use** evidence from observations to **hypothesize** different types of objects that could be made from the same small set of pieces.

F PERFORMANCE INDICATOR

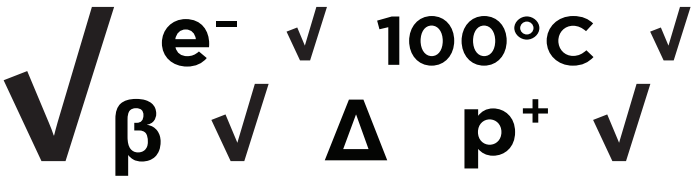
Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. (2-PS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make a claim about what happens when a substance is heated or cooled.	**Describe** evidence supporting a claim about what happens when a substance is heated or cooled.	**Construct** an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	**Predict** what changes will happen to new substances when heated or cooled and whether or not those changes can be reversed.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 3-5



Students will...
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A PERFORMANCE INDICATOR

Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. (3-PS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Participate in an investigation to **make** observations about an object's motion.	**Participate** in an investigation to **identify** the effects of forces on the motion of an object.	**Plan** and **conduct** an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	**Plan** and **conduct** an investigation to **explain** how various balanced and unbalanced forces affect the motion of an object.

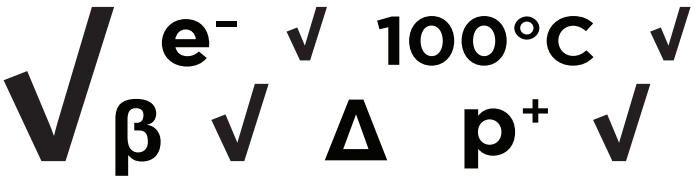
B PERFORMANCE INDICATOR

Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. (3-PS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about the motion of an object over time.	**Make** observations and/or measurements to **identify** patterns in an object's motion over time.	**Use** observations and/or measurements to provide evidence that a pattern can be used to predict future motion.	**Use** observations and/or measurements as evidence to **explain** how patterns can be used to predict future motion.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 3-5 *(CONTINUED)*



C PERFORMANCE INDICATOR

Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. (3-PS2-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about two objects not in contact with each other interacting through electric or magnetic forces.	**Ask** questions that arise from observations of two objects not in contact with each other interacting through electric or magnetic forces.	**Ask** questions to **determine** cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.	**Ask** questions using scientific vocabulary to **determine** cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.

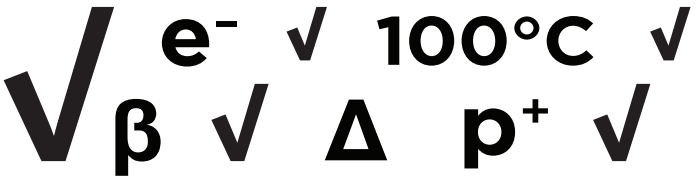
D PERFORMANCE INDICATOR

Define a simple design problem that can be solved by applying scientific ideas about magnets.* (3-PS2-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about magnets.	**Identify** the criteria and constraints of a simple design problem that could be solved using magnets.	**Define** a simple design problem that can be solved by applying scientific ideas about magnets.	**Elaborate** on a simple design problem, **explaining** the criteria and constraints and how and why magnets work to solve this design problem.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 3-5 *(CONTINUED)*



E PERFORMANCE INDICATOR

Develop a model that illustrates matter is made up of particles too small to be seen and then describe how this accounts for observable phenomenon. (5-PS-1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify relevant components of a model that illustrates that matter is made up of particles too small to be seen.	**Describe** the components of a model that illustrates that matter is made up of particles too small to be seen.	**Develop** a model that illustrates matter is made up of particles too small to be seen and then **describe** how this accounts for observable phenomenon.	**Evaluate** the strengths and limitations of a model that shows that matter is made of particles too small to be seen.

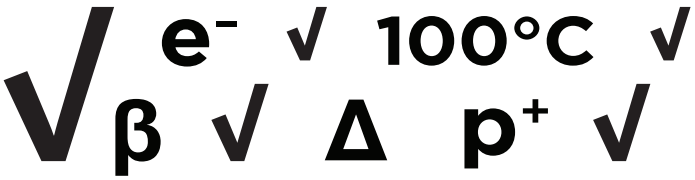
F PERFORMANCE INDICATOR

Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. (5-PS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about the weight of substances before and after they are heated, cooled, and/or mixed.	**Measure** and **graph** the total weight of substances before and after they are heated, cooled, and/or mixed.	**Measure** and **graph** quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.	**Make** a hypothesis based on evidence about what will happen to the total weight of matter when heating, cooling, or mixing new substances.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 3-5 *(CONTINUED)*



G PERFORMANCE INDICATOR

Make observations and measurements to identify materials based on their properties. (5-PS1-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify properties of materials.	**Make** observations and measurements about properties of materials.	**Make** observations and measurements to **identify** materials based on their properties.	**Use** evidence from observations and measurements to **identify** unknown materials.

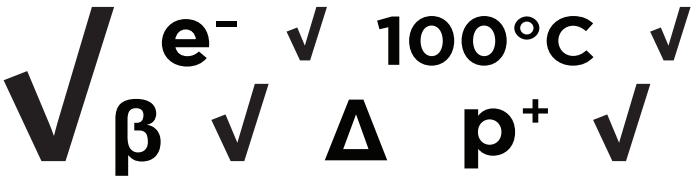
H PERFORMANCE INDICATOR

Conduct an investigation to determine whether the mixing of two or more substances results in new substances. (5-PS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	By participating in an investigation, **describe** the data to be collected about the properties of substances before and after mixing.	**Collect** data on the quantitative and qualitative properties of substances before and after mixing.	**Conduct** an investigation to **determine** whether the mixing of two or more substances results in new substances.	**Make** a hypothesis based on evidence from an investigation about whether mixing two or more unknown substances will result in new substances.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 3-5 *(CONTINUED)*



PERFORMANCE INDICATOR

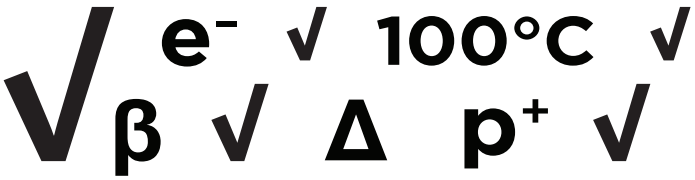
Support an argument that the gravitational force exerted by Earth on objects is directed down. (5-PS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify interactions between the Earth and other objects.	**Describe** evidence that supports an argument that the gravitational force exerted by Earth on objects is directed down.	**Support** an argument that the gravitational force exerted by Earth on objects is directed down.	**Predict** what will happen to various objects based on the argument that the gravitational force exerted by Earth on objects is directed down.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 6-8



Students will...
demonstrate an understanding of structure, properties, and interactions of matter (PS1) and explain and predict interactions between objects and within systems of objects (PS2) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Develop models to describe the atomic composition of simple molecules and extended structures. (MS-PS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify relevant components of a model that would illustrate the atomic composition of simple molecules.	**Describe** relationships between the components of a model that would illustrate the atomic composition of simple molecules.	**Develop** models to **describe** the atomic composition of simple molecules and extended structures.	**Apply** models to **predict** behavior of simple molecules and extended structures.

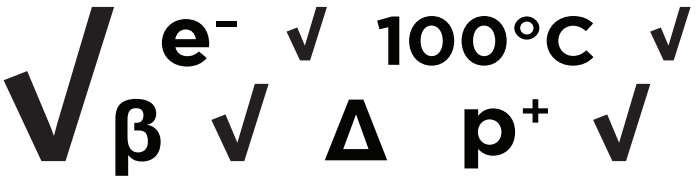
B PERFORMANCE INDICATOR

Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. (MS-PS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the properties of substances before and after the substances interact.	**Describe** patterns and changes in the properties of substances before and after they interact.	**Analyze** and **interpret** data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	**Justify** whether or not a chemical reaction has occurred by **selecting** the most relevant evidence from data on the properties of substances before and after the substances interact.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 6-8 *(CONTINUED)*



C PERFORMANCE INDICATOR

Gather and make sense of information to describe that synthetic materials come from natural resources and impact society. (MS-PS1-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify synthetic materials used in daily life.	**Gather** information about the origin of synthetic materials.	**Gather** and make sense of information to **describe** that synthetic materials come from natural resources and impact society.	**Justify** the decision to use or not use synthetic materials for various products based on their origins and impact on society.

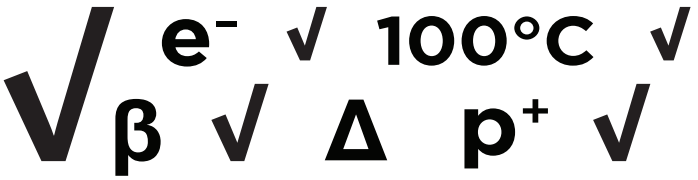
D PERFORMANCE INDICATOR

Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. (MS-PS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify relevant components of a model that would illustrate particle motion.	**Describe** relationships between components of a model of particle motion when thermal energy is added or removed.	**Develop** a model that **predicts** and **describes** changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	**Apply** a model to draw conclusions about what will happen to particle motion, temperature, and state of a pure substance in a larger system when thermal energy is added or removed.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 6-8 *(CONTINUED)*



E PERFORMANCE INDICATOR

Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. (MS-PS1-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify components of a model that would illustrate the law of conservation of mass.	**Describe** the relationship between components of a model that would illustrate the law of conservation of mass.	**Develop** and **use** a model to **describe** how the total number of atoms does not change in a chemical reaction and thus mass is conserved.	**Apply** a model to **predict** what will happen to mass in a variety of chemical reactions.

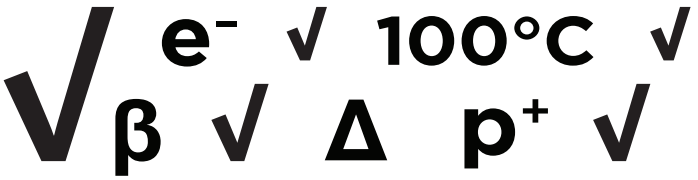
F PERFORMANCE INDICATOR

Construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes using the design process.* (MS-PS1-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components needed for a device that either releases or absorbs thermal energy by chemical processes.	**Construct** and **test** a device that either releases or absorbs thermal energy by chemical processes using the design process.	**Construct**, **test**, and **modify** a device that either releases or absorbs thermal energy by chemical processes using the design process.	**Evaluate** the effectiveness of the device that either releases or absorbs thermal energy by chemical processes and **suggest** additional modifications.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 6-8 *(CONTINUED)*



G PERFORMANCE INDICATOR

Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.* (MS-PS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Explain Newton's Third Law.	**Identify** criteria and constraints of a design solution to a problem involving the motion of two colliding objects.	**Apply** Newton's Third Law to **design** a solution to a problem involving the motion of two colliding objects.	**Evaluate** the design based on the criteria and constraints identified.

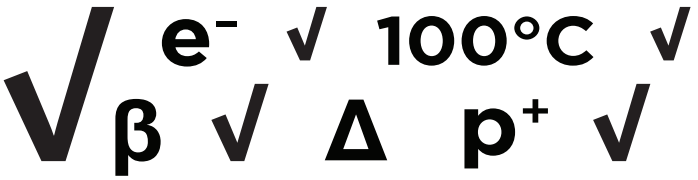
H PERFORMANCE INDICATOR

Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object. (MS-PS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Explain Newton's First and Second Laws.	**Participate** in an investigation and **identify** evidence of each of the forces acting on an object in motion.	**Plan** an investigation to **provide** evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	**Plan** an investigation to **provide** evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object in order to **explain** Newton's First and Second Laws.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 6-8 *(CONTINUED)*



I PERFORMANCE INDICATOR

Ask questions about data to determine the factors that affect the strength of electric and magnetic forces. (MS-PS2-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about the strength of electric and magnetic forces.	**Ask** questions about the strength of electric and magnetic forces based on observations and given data.	**Ask** questions about data to **determine** the factors that affect the strength of electric and magnetic forces.	**Ask** questions about data using scientific vocabulary to **explain** the factors that affect the strength of electric and magnetic forces.

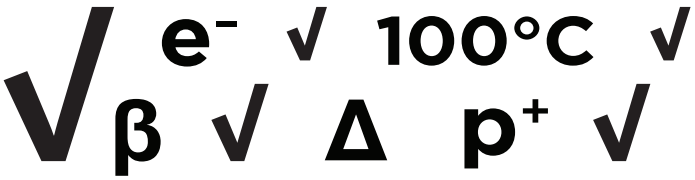
J PERFORMANCE INDICATOR

Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. (MS-PS2-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence to **support** arguments that gravitational interactions are attractive.	**Describe** evidence to **support** arguments that gravitational interactions are attractive and depend on the masses of interacting objects.	**Construct** and **present** arguments using evidence to **support** the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	**Predict** the interactions that are likely to occur between two objects based on the evidence-based argument that gravitational interactions are attractive and depend on the masses of interacting objects.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 6-8 *(CONTINUED)*



K PERFORMANCE INDICATOR

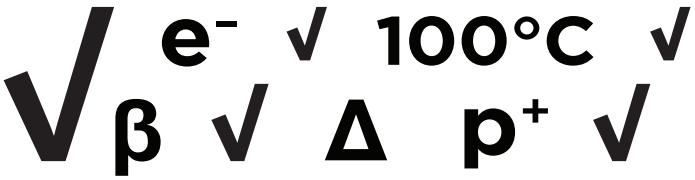
Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact. (MS-PS2-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about interactions between objects exerting forces on each other even though the objects are not in contact.	**Conduct** an investigation to **provide** evidence that fields exist between objects exerting forces on each other even though the objects are not in contact and **explain** the experimental design.	**Conduct** an investigation and **evaluate** the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	**Apply** evidence from an investigation to **predict** interactions between objects exerting forces on each other even though the objects are not in contact.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 9-12



Students will...
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A PERFORMANCE INDICATOR

Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. (HS-PS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the features of the periodic table that illustrate properties of elements.	**Describe** the patterns of properties of elements that contribute to the organization of the periodic table.	**Use** the periodic table as a model to **predict** the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms.	**Compare** relative properties of elements to **make** predictions about the interactions between elements on the periodic table based on the patterns of electrons in the outermost energy level of atoms.

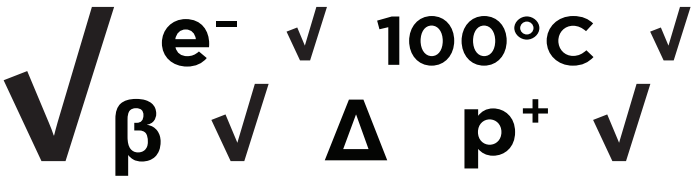
B PERFORMANCE INDICATOR

Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. (HS-PS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence that shows the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	**Construct** an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	**Construct** and **revise** an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	**Evaluate** the strengths and shortcomings of the explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 9-12 *(CONTINUED)*



C PERFORMANCE INDICATOR

Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles. (HS-PS1-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify and **describe** the evidence needed to compare the structure of substances at the bulk scale.	**Participate** in an investigation to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.	**Plan** and **conduct** an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.	**Evaluate** the strengths and limitations of the investigation to compare the structure of substances at the bulk scale to infer the strength of electrical forces between particles.

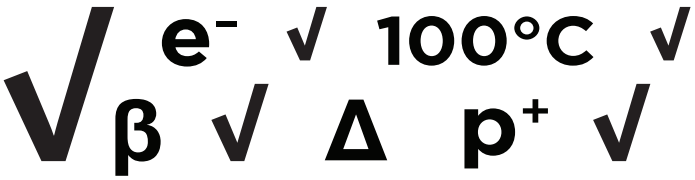
D PERFORMANCE INDICATOR

Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. (HS-PS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model that illustrates the release or absorption of energy from a chemical reaction.	**Describe** the relationship between the components of a model that illustrates the release or absorption of energy from a chemical reaction.	**Develop** a model to **illustrate** that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy.	**Apply** a model to **predict** the release or absorption of energy from a variety of chemical reactions.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 9-12 *(CONTINUED)*



E PERFORMANCE INDICATOR

Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. (HS-PS1-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Collect evidence about the rate at which a reaction occurs when the temperature and concentration are varied.	**Describe** the evidence that shows the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.	**Apply** scientific principles and evidence to **provide** an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.	**Evaluate** the strengths and limitations of the explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.

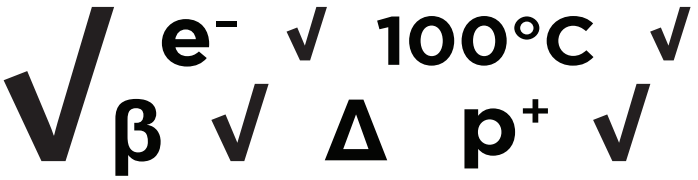
F PERFORMANCE INDICATOR

Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium. (HS-PS1-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a chemical system.	**Describe** the criteria and constraints of the design of a chemical system.	**Refine** the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.	**Evaluate** the reasoning which supports the design of a chemical system.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 9-12 *(CONTINUED)*



G PERFORMANCE INDICATOR

Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. (HS-PS1-7)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify products and reactants in a chemical reaction equation.	**Balance** simple chemical equations.	**Use** mathematical representations to **support** the claim that atoms, and therefore mass, are conserved during a chemical reaction.	**Compare** multiple mathematical representations to **support** the claim that atoms, and therefore mass, are conserved during a chemical reaction.

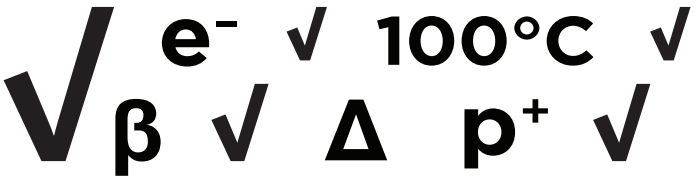
H PERFORMANCE INDICATOR

Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. (HS-PS1-8)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify components of models that illustrate the changes in the composition of the nucleus of the atom and the energy released during fission, fusion, or radioactive decay.	**Describe** relationships between components of models that illustrate the changes in the composition of the nucleus of the atom and the energy released during fission, fusion, and/or radioactive decay.	**Develop** models to **illustrate** the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.	**Apply** models to **compare** the relative energy released during the processes of fission, fusion, and radioactive decay.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 9-12 *(CONTINUED)*



I PERFORMANCE INDICATOR

Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. (HS-PS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize data to identify the components of Newton's second law of motion.	**Identify** relationships within data sets to describe the relationships among the net force on a macroscopic object, its mass, and its acceleration.	**Analyze** data to **support** the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.	**Evaluate** the strengths and limitations of the data to **support** the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

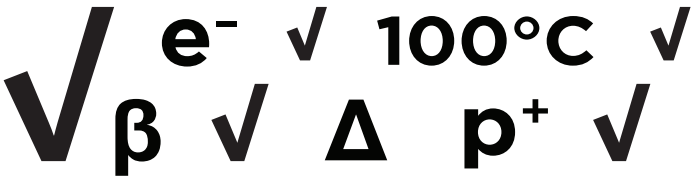
J PERFORMANCE INDICATOR

Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. (HS-PS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify objects in a system and the respective momentum of each object.	**Describe** how the total momentum of a system of objects can be conserved when there is no net force on the system.	**Use** mathematical representations to **support** the claim that the total momentum of a system of objects is conserved when there is no net force on the system.	**Evaluate** the strengths and limitations of the mathematical representations to **support** the claim that the total momentum of a system of objects is conserved when there is no net force on the system.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 9-12 *(CONTINUED)*



K PERFORMANCE INDICATOR

Apply scientific and engineering ideas to design, evaluate and refine a device that minimizes the force on a macroscopic object during a collision.* (HS-PS2-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the criteria and constraints of a device that minimizes the force on a macroscopic object during a collision.	**Apply** scientific and engineering ideas to design a device that minimizes the force on a macroscopic object during a collision.	**Apply** scientific and engineering ideas to design, evaluate and refine a device that minimizes the force on a macroscopic object during a collision.	**Evaluate** the effectiveness of the refinements of a device that minimizes the force on a macroscopic object during a collision based on the criteria and constraints.

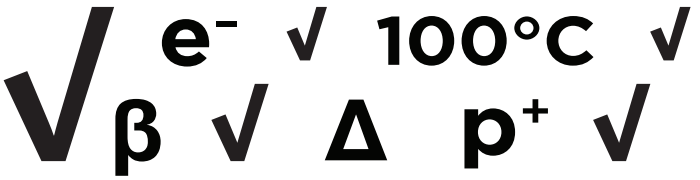
L PERFORMANCE INDICATOR

Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects. (HS-PS2-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe Newton's Law of Gravitation and Coulomb's Law.	**Compare** Newton's Law of Gravitation and Coulomb's Law to describe gravitational and electrostatic forces between objects.	**Use** mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.	**Use** mathematical representations of Newton's Law of Gravitation and Coulomb's Law to justify predictions about the gravitational and electrostatic forces between macroscopic objects.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: STRUCTURE AND PROPERTIES OF MATTER / FORCES AND INTERACTIONS (PS1 + PS2) | 9-12 *(CONTINUED)*



M PERFORMANCE INDICATOR

Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current. (HS-PS2-5)

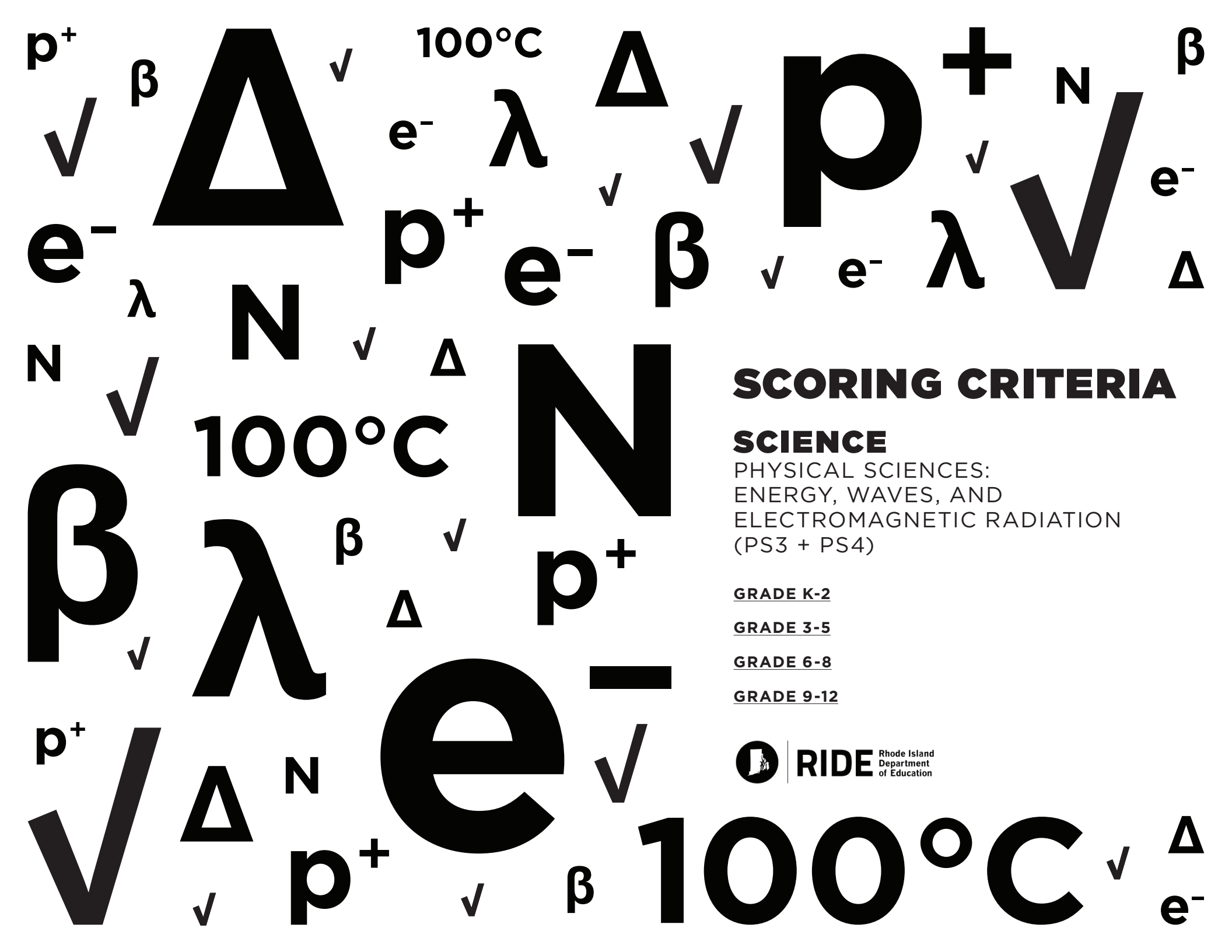
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the phenomenon of electric currents and magnetic fields.	**Participate** in an investigation to **collect** evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.	**Plan** and **conduct** an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.	**Evaluate** the strengths and limitations of the investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.

N PERFORMANCE INDICATOR

Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.* (HS-PS2-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe how specific properties of familiar materials at the molecular level contribute to their function.	**Compare** materials at the molecular level to determine how specific properties create attractive and repulsive forces that contribute to their function.	**Communicate** scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.	**Evaluate** the effectiveness and relevance of scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.



SCORING CRITERIA

SCIENCE

PHYSICAL SCIENCES:
ENERGY, WAVES, AND
ELECTROMAGNETIC RADIATION
(PS3 + PS4)

GRADE K-2

GRADE 3-5

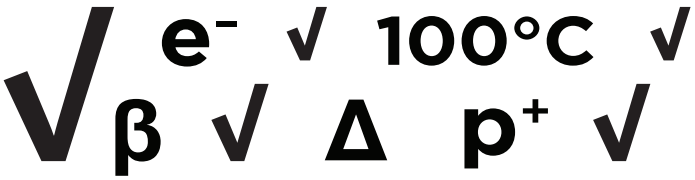
GRADE 6-8

GRADE 9-12

RIDE Rhode Island Department of Education

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | K-2



Students will...
demonstrate an understanding of the characteristics and properties of energy (PS3) and explain how waves are used to transfer energy and information (PS4) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Make observations to determine the effect of sunlight on Earth's surface. (K-PS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Ask and **answer** questions about the effect of sunlight on a known surface.	**Make** observations about the temperature of materials placed in sunlight and in shade.	**Make** observations to **determine** the effect of sunlight on Earth's surface.	**Use** observations to **hypothesize** why sunlight affects the Earth's surface.

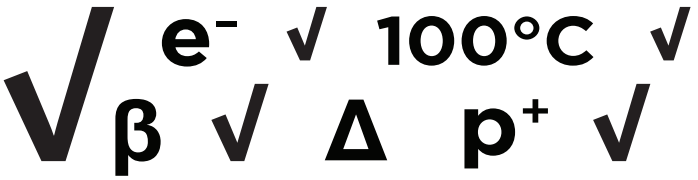
B PERFORMANCE INDICATOR

Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.* (K-PS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify structures that reduce the warming effect of sunlight on an area.	**Use** tools and materials to **identify** features and a structures that reduce the warming effect of sunlight on an area.	**Use** tools and materials to **design** and **build** a structure that will reduce the warming effect of sunlight on an area.	**Explain** how the structure will reduce the warming effect of sunlight on an area.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | K-2 *(CONTINUED)*



C PERFORMANCE INDICATOR

Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. (1-PS4-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about vibrating materials that make sound and that sound can make materials vibrate.	**Participate** in an investigation to **identify** evidence that vibrating materials can make sound and that sound can make materials vibrate.	**Plan** and **conduct** investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	Using evidence from the investigation, **predict** what will happen to materials interacting with sound waves.

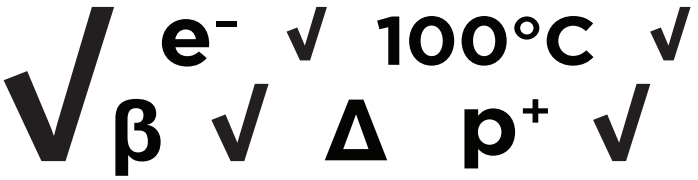
D PERFORMANCE INDICATOR

Make observations to construct an evidence-based account that objects can be seen only when illuminated. (1-PS4-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about what happens to objects in light and in darkness.	**Make** observations to **explain** what happens to objects that can be seen only when illuminated.	**Make** observations to **construct** an evidence-based account that objects can be seen only when illuminated.	**Make** observations to **construct** an evidence-based account of how and why objects can be seen only when illuminated.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | K-2 *(CONTINUED)*



E PERFORMANCE INDICATOR

Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. (1-PS4-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about what happens when different materials are put in the path of a beam of light.	**Participate** in an investigation to **identify** evidence that shows the effect of placing objects made with different materials in the path of a beam of light.	**Plan** and **conduct** an investigation to **determine** the effect of placing objects made with different materials in the path of a beam of light.	Using the observations, **hypothesize** why the path of a beam of light is affected by different materials.

F PERFORMANCE INDICATOR

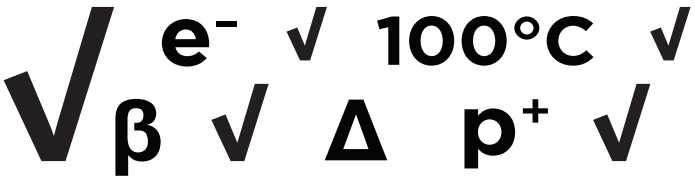
Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* (1-PS4-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify devices that use light or sound to solve the problem of communicating over a distance.	**Use** tools and materials to **identify** the features and structure of a device that uses light or sound to solve the problem of communicating over a distance.	**Use** tools and materials to **design** and **build** a device that uses light or sound to solve the problem of communicating over a distance.	**Explain** how the designed device uses light or sound to solve the problem of communicating over a distance.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 3-5



Students will...
demonstrate an understanding of the characteristics and properties of energy (PS3) and explain how waves are used to transfer energy and information (PS4) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Use evidence to construct an explanation relating the speed of an object to the energy of that object. (4-PS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about the speed of an object.	**Describe** how the speed of an object relates to the energy of that object.	**Use** evidence to **construct** an explanation relating the speed of an object to the energy of that object.	**Apply** an evidence-based explanation to **predict** changes in speed or energy of an object.

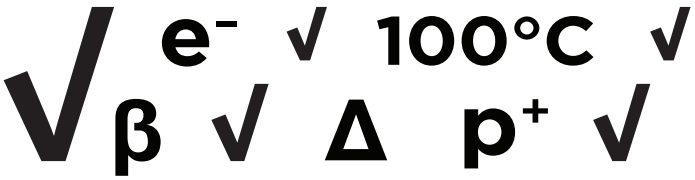
B PERFORMANCE INDICATOR

Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. (4-PS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about sound, light, heat, and electric currents.	**Make** observations to **identify** how energy can be transferred from place to place.	**Make** observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	Using evidence from observations, **hypothesize** how energy can be transferred from place to place.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 3-5 *(CONTINUED)*



C PERFORMANCE INDICATOR

Ask questions and predict outcomes about the changes in energy that occur when objects collide. (4-PS3-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the observable results of objects colliding.	**Ask** questions to **gather** information about the changes in energy that occur when objects collide.	**Ask** questions and **predict** outcomes about the changes in energy that occur when objects collide.	**Predict** outcomes, using new examples, about the changes in energy that occur when objects collide.

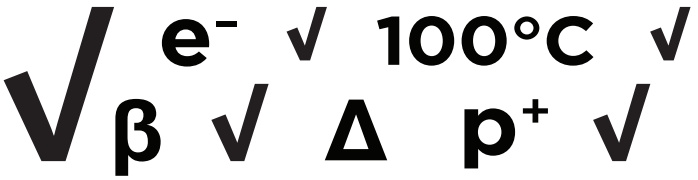
D PERFORMANCE INDICATOR

Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.* (4-PS3-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify a device that converts energy from one form to another.	**Apply** scientific ideas to **design** and **test** a device that converts energy from one form to another.	**Apply** scientific ideas to **design**, **test**, and **refine** a device that converts energy from one form to another.	**Evaluate** the process of designing, testing, and refining a device that converts energy from one form to another.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 3-5 *(CONTINUED)*



E PERFORMANCE INDICATOR

Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. (4-PS4-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant component parts of waves.	**Describe** relationships between component parts of waves.	**Develop** a model of waves to **describe** patterns in terms of amplitude and wavelength and that waves can cause objects to move.	**Compare** wave models to **describe** relationships, patterns, strengths and limitations of models in representing wave motion.

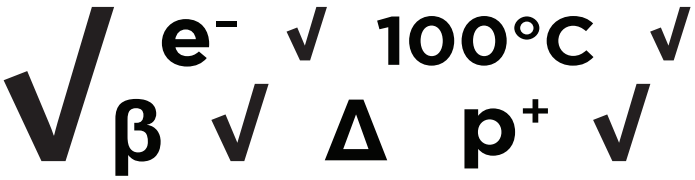
F PERFORMANCE INDICATOR

Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. (4-PS4-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe what happens to the path of light when blocked or reflected.	**Describe** the relationship between components of a model that illustrates light reflecting from objects and entering the eye.	**Develop** a model to **describe** that light reflecting from objects and entering the eye allows objects to be seen.	**Apply** the model to **make** predictions about the way objects will be seen using light sources of varying intensity and direction.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 3-5 *(CONTINUED)*



G PERFORMANCE INDICATOR

Generate and compare multiple solutions that use patterns to transfer information.* (4-PS4-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Generate solutions that use patterns to transfer information.	**Generate** and **describe** multiple solutions that use patterns to transfer information.	**Generate** and **compare** multiple solutions that use patterns to transfer information.	**Evaluate** the effectiveness of generated solutions in how they use patterns to transfer information.

H PERFORMANCE INDICATOR

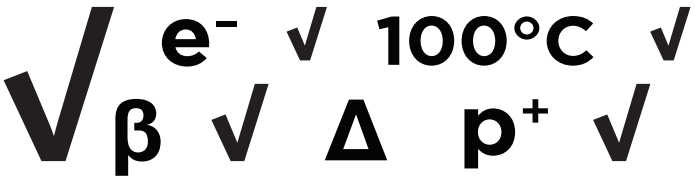
Use models to describe that energy in animals' food (used for bodily function) was once energy from the sun. (5-PS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components that are relevant to a model that connects energy in animals' food to energy from the sun.	**Describe** the relationship between energy in animals' food and energy from the sun.	**Use** models to **describe** that energy in animals' food (used for bodily function) was once energy from the sun.	**Evaluate** various models and **explain** which is the most effective at showing that energy in animals' food was once energy from the sun.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 6-8



Students will...
demonstrate an understanding of the characteristics and properties of energy (PS3) and explain how waves are used to transfer energy and information (PS4) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. (MS-PS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize data about kinetic energy and the mass and speed on an object.	**Construct** graphical displays of data to **represent** the relationships of kinetic energy to the mass of an object and to the speed of an object.	**Construct** and **interpret** graphical displays of data to **describe** the relationships of kinetic energy to the mass of an object and to the speed of an object.	**Evaluate** the effectiveness of the graphical display to **describe** the relationships of kinetic energy to the mass of an object and to the speed of an object.

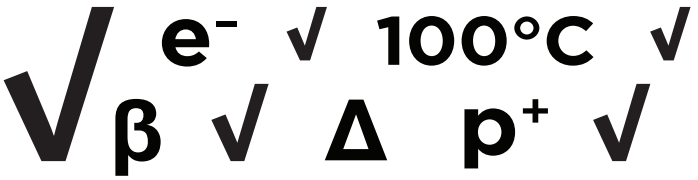
B PERFORMANCE INDICATOR

Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system. (MS-PS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model illustrating the relationship between arrangement of objects and potential energy.	**Describe** the relationship between the components of the model illustrating the relationship between arrangement of objects and potential energy.	**Develop** a model to **describe** that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.	**Apply** a model to **determine** the relative amounts of potential energy stored in a system when distances between objects in the system change.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 6-8 *(CONTINUED)*



C PERFORMANCE INDICATOR

Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.* (MS-PS3-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify criteria and constraints for a design of a device that either minimizes or maximizes thermal energy transfer.	**Apply** scientific principles to **design** and **construct** a device that either minimizes or maximizes thermal energy transfer.	**Apply** scientific principles to **design**, **construct**, and **test** a device that either minimizes or maximizes thermal energy transfer.	**Evaluate** the strengths and limitations of the device design against the criteria and constraints.

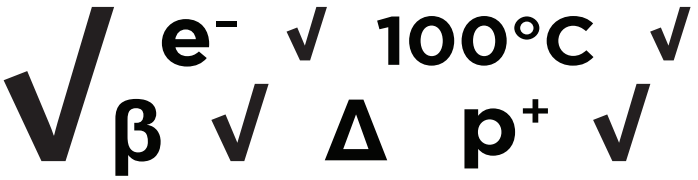
D PERFORMANCE INDICATOR

Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. (MS-PS3-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about the relationship between kinetic energy and temperature.	**Participate** in an investigation to **identify** patterns in relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	**Plan** an investigation to **determine** the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	**Plan** an investigation to **justify** claims regarding the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 6-8 *(CONTINUED)*



E PERFORMANCE INDICATOR

Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. (MS-PS3-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence to **support** the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	**Describe** evidence to **support** the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	**Construct, use**, and **present** arguments to **support** the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	**Apply** evidence-based arguments to **make** predictions about changes in kinetic energy of an object and energy transfer from one object to another.

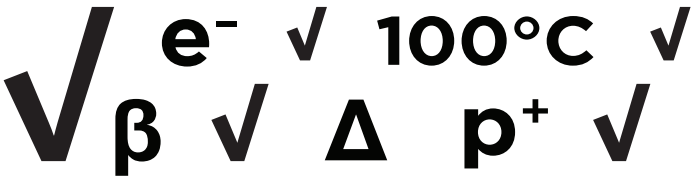
F PERFORMANCE INDICATOR

Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. (MS-PS4-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the characteristics of a mathematical wave model.	**Identify** how the wave model characteristics relate to physical observations.	**Use** mathematical representations to **describe** a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.	**Use** the mathematical model to **predict** the change in energy of the wave if any one of the parameters of the wave is changed.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 6-8 *(CONTINUED)*



G PERFORMANCE INDICATOR

Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. (MS-PS4-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model that illustrates wave behavior through various materials.	**Describe** the relationship between the components of a model that illustrates wave behavior through various materials.	**Develop** and **use** a model to **describe** that waves are reflected, absorbed, or transmitted through various materials.	**Apply** a model to **predict** how waves will be reflected, absorbed, or transmitted in real world situations.

H PERFORMANCE INDICATOR

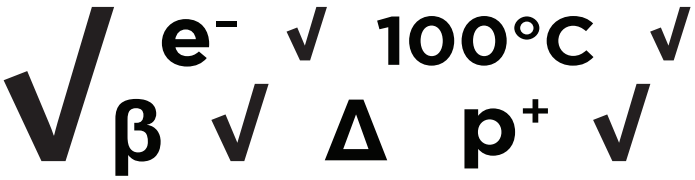
Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals. (MS-PS4-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Use provided materials to **make** observations about the differences between digitized and analog signals.	**Identify** qualitative scientific and technical information relevant to the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	**Integrate** qualitative scientific and technical information to **support** the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	**Evaluate** the effectiveness of the evidence to **support** the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 9-12



Students will...
demonstrate an understanding of the characteristics and properties of energy (PS3) and explain how waves are used to transfer energy and information (PS4) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Create a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. (HS-PS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant components of a system where energy flows in and out.	**Describe** the relationship between the components of a system where energy flows in and out.	**Create** a computational model to **calculate** the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known.	**Apply** the model to **calculate** and **compare** the change in energy in a variety of systems.

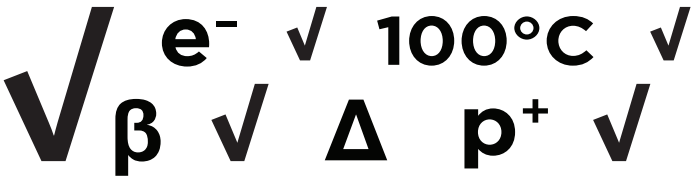
B PERFORMANCE INDICATOR

Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields. (HS-PS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model that illustrates energy at the macroscopic scale.	**Describe** the relationship between components of a model that illustrates that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields.	**Develop** and **use** models to **illustrate** that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields.	**Evaluate** the strengths and limitations of models that illustrate that energy at the macroscopic scale can be accounted for as either motions of particles or energy stored in fields.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 9-12 *(CONTINUED)*



C PERFORMANCE INDICATOR

Design, build and refine a device that works within given constraints to convert one form of energy into another form of energy.* (HS-PS3-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the conversion of energy from one form to another.	**Design** and **build** a device that works within given constraints to convert one form of energy into another form of energy.	**Design**, **build**, and **refine** a device that works within given constraints to convert one form of energy into another form of energy.	**Evaluate** the strengths and limitations of the refinements of a device to convert one form of energy into another form of energy within given constraints.

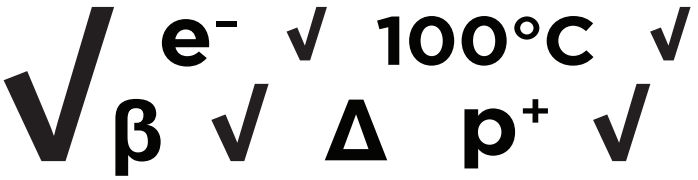
D PERFORMANCE INDICATOR

Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). (HS-PS3-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the evidence needed to show that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	**Plan** an investigation to **collect** evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	**Plan** and **conduct** an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).	**Evaluate** the strengths and limitations of the investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics).

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 9-12 *(CONTINUED)*



E PERFORMANCE INDICATOR

Develop and use a model of two objects interacting through electric or magnetic fields to illustrate the forces between objects and the changes in energy of the objects due to the interaction. (HS-PS3-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model of two objects interacting through electric or magnetic fields.	**Describe** the interaction and forces between two objects interacting through electric or magnetic fields.	**Develop** and **use** a model of two objects interacting through electric or magnetic fields to **illustrate** the forces between objects and the changes in energy of the objects due to the interaction.	**Apply** a model to **make predictions** about interactions of two or more objects through electric or magnetic fields.

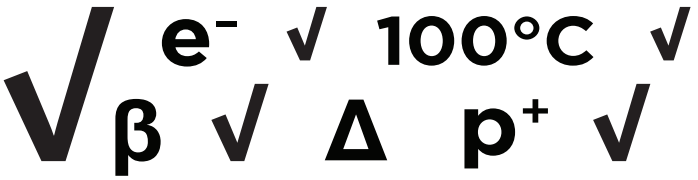
F PERFORMANCE INDICATOR

Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. (HS-PS4-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant components of mathematical representations regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	**Describe** mathematical relationships among the frequency, wavelength, and speed of waves traveling in various media.	**Use** mathematical representations to **support** a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	**Use** mathematical representations to **evaluate** claims regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 9-12 *(CONTINUED)*



G PERFORMANCE INDICATOR

Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other. (HS-PS4-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe electromagnetic radiation as a wave model and a particle model.	**Explain** how evidence and reasoning supports the claim that electromagnetic radiation can be described either by a wave model or a particle model.	**Evaluate** the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described either by a wave model or a particle model, and that for some situations one model is more useful than the other.	**Apply** the wave or particle model to a new scenario and justify its usefulness

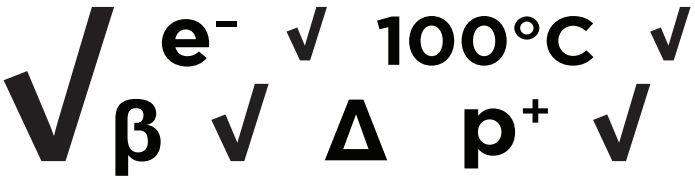
H PERFORMANCE INDICATOR

Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter. (HS-PS4-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.	**Analyze** the claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.	**Evaluate** the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.	**Evaluate** and **compare** the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.

SCORING CRITERIA

SCIENCE | PHYSICAL SCIENCES: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION (PS3 + PS4) | 9-12 *(CONTINUED)*

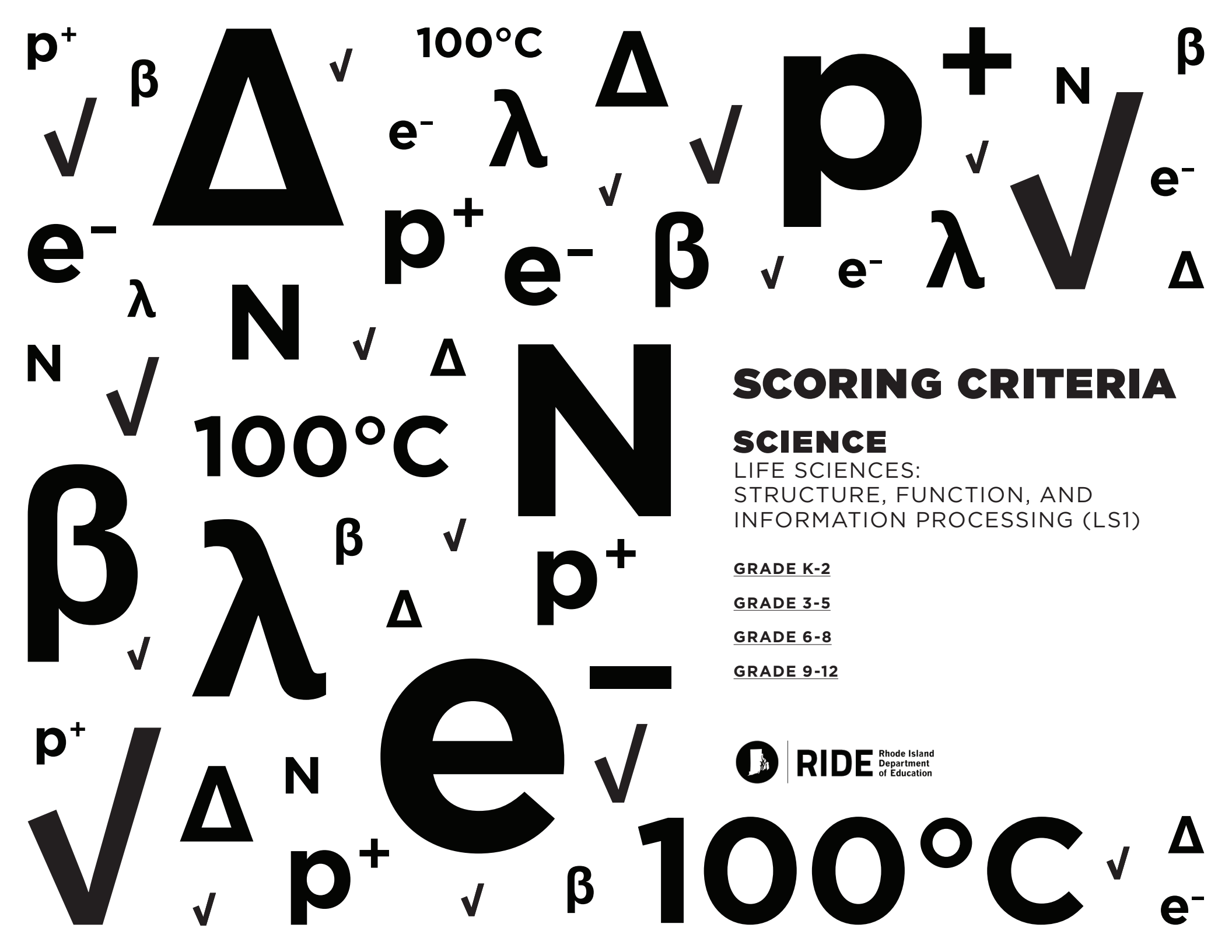


PERFORMANCE INDICATOR

Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.* (HS-PS4-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.	**Analyze** technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.	**Communicate** technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.	**Evaluate** the effectiveness of the communication of technical information to explain to the audience how technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.



SCORING CRITERIA

SCIENCE

LIFE SCIENCES:
STRUCTURE, FUNCTION, AND
INFORMATION PROCESSING (LS1)

GRADE K-2

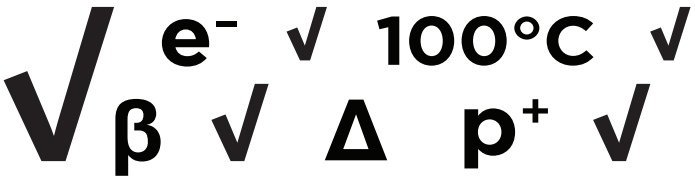
GRADE 3-5

GRADE 6-8

GRADE 9-12

RIDE Rhode Island Department of Education

SCORING CRITERIA
SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | K-2



Students will...
demonstrate an understanding of how organisms live, grow, respond to their environment, and reproduce using molecular, structural, and chemical biology (LS1) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR
Use observations to describe patterns of what plants and animals (including humans) need to survive. (K-LS1-1)

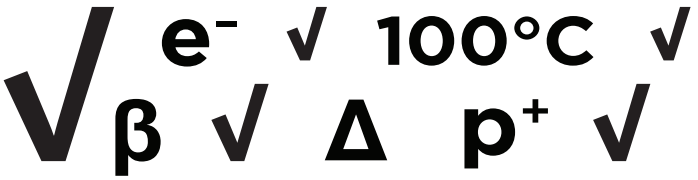
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify characteristics of plants and animals.	**Use** observations to **identify** the survival needs of plants and animals.	**Use** observations to **describe** patterns of what plants and animals (including humans) need to survive.	**Use** observations to **identify** similarities in patterns of what plants and animals need to survive.

B PERFORMANCE INDICATOR
Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* (1-LS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Ask and **answer** questions about how plants and/or animals use their external parts to help them survive, grow, and meet their needs.	**Explain** how plants and/or animals use their external parts to help them survive, grow, and meet their needs and how this information can be used to solve a human problem.	**Use** materials to **design** a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.	**Explain** the strengths and/or limitations of the solution to the human problem.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | K-2 *(CONTINUED)*



C PERFORMANCE INDICATOR

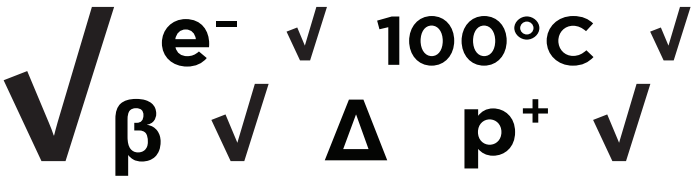
Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. (1-LS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify a behavior of a parent/offspring that help offspring survive.	**Read** texts and **use** media to **identify** behavior of parents and offspring that help offspring survive.	**Read** texts and **use** media to **determine** patterns in behavior of parents and offspring that help offspring survive.	**Describe** how patterns of behavior of parents and offspring help offspring survive.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 3-5



Students will...
demonstrate an understanding of how organisms live, grow, respond to their environment, and reproduce using molecular, structural, and chemical biology (LS1) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. (3-LS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of an organism's life cycle.	**Describe** the relationship between components of organisms' life cycles.	**Develop** models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	**Evaluate** the strengths and limitations of the models to describe that organisms have unique and diverse life cycles.

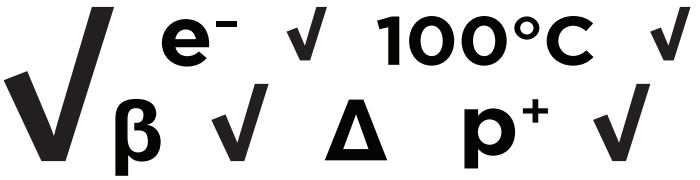
B PERFORMANCE INDICATOR

Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. (4-LS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make a claim about the function of internal and external structures of plants and animals.	**Describe** evidence to support a claim about the function of internal and external structures of plants and animals.	**Construct** an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	**Predict** how internal and external structures of plants and animals may evolve in the future to support survival, growth, behavior, and reproduction.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 3-5 *(CONTINUED)*



C PERFORMANCE INDICATOR

Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways. (4-LS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify relevant components of a model that illustrates how animals receive, process, and respond to information.	**Describe** the relationships between components of a model that illustrates how animals receive, process, and respond to information.	**Use** a model to **describe** that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.	**Apply** your understanding of the model to test interactions involving sensory perception and its influence on animal behavior within a natural system.

D PERFORMANCE INDICATOR

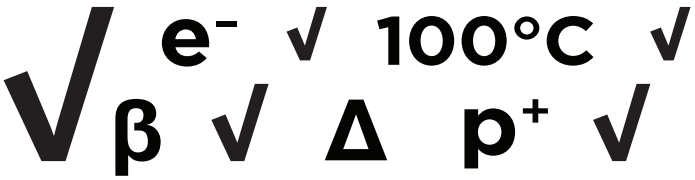
Support an argument that plants get the materials they need for growth chiefly from air and water. (5-LS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make a claim about how plants get the materials they need for growth.	**Identify** evidence about how plants get the materials they need for growth chiefly from air and water.	**Support** an argument that plants get the materials they need for growth chiefly from air and water.	**Apply** an evidence-based argument to predict what will happen when changes are made that affect the materials plants need for growth.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 6-8



Students will...
demonstrate an understanding of how organisms live, grow, respond to their environment, and reproduce using molecular, structural, and chemical biology (LS1) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. (MS-LS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Recall that living things are made of cells.	**Make** and **record** observations to **identify** evidence that living things are made of either one cell or many different numbers and types of cells.	**Conduct** an investigation to **provide** evidence that living things are made of cells; either one cell or many different numbers and types of cells.	**Analyze** and **draw** conclusions from an investigation to **explain** that living things are made of cells; either one cell or many different numbers and types of cells.

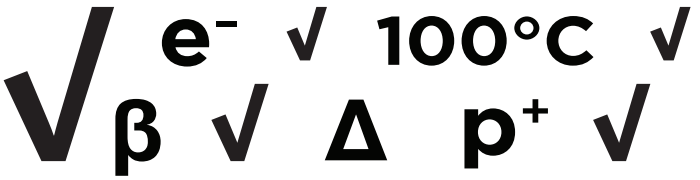
B PERFORMANCE INDICATOR

Develop and use a model to identify parts of a cell, describe the function of a cell as a whole, and explain how parts of a cell contribute to the function. (MS-LS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify types and structures (organelles) of a cell.	**Describe** the relationship between cell structures and functions.	**Develop** and use a model to **identify** parts of a cell, **describe** the function of a cell as a whole, and **explain** how parts of a cell contribute to the function.	**Create** an analogy that relates cellular structures and functions to another type of system (e.g., school, stadium, mall, family).

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 6-8 *(CONTINUED)*



C PERFORMANCE INDICATOR

Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells. (MS-LS1-3)

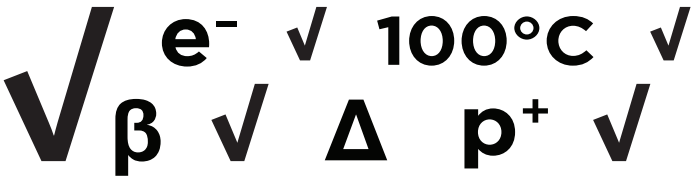
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make a claim about how the body is a system of interacting subsystems composed of groups of cells.	**Describe** evidence of how the body is a system of interacting subsystems composed of groups of cells.	**Use** argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	**Apply** an evidence-based argument to **predict** how a change in cells in one body subsystem could influence another subsystem.

D PERFORMANCE INDICATOR

Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively. (MS-LS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify characteristic animal behaviors or specialized plant structures that affect the probability of successful reproduction.	**Gather** evidence relevant to a claim about how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	**Use** argument based on empirical evidence and scientific reasoning to **support** an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	**Evaluate** the effectiveness of the evidence used to **support** the explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

SCORING CRITERIA
SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 6-8 *(CONTINUED)*



E PERFORMANCE INDICATOR
Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. (MS-LS1-5)

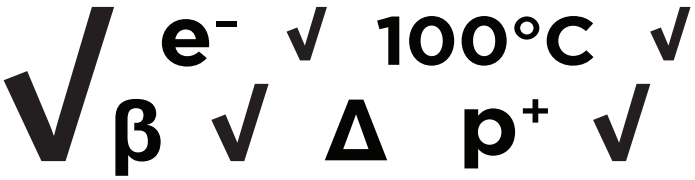
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify environmental and genetic factors that influence the growth of organisms.	**Gather** relevant evidence for how environmental and genetic factors influence the growth of organisms.	**Construct** a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	**Evaluate** the effectiveness of the scientific explanation to **show** how environmental and genetic factors influence the growth of organisms.

F PERFORMANCE INDICATOR
Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. (MS-LS1-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify a claim about the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	**Describe** evidence supporting a claim about the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	**Construct** a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	**Apply** a scientific explanation to **predict** how changes in photosynthesis would result in changes in the cycling of matter and flow of energy into and out of organisms.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 6-8 *(CONTINUED)*



G PERFORMANCE INDICATOR

Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism. (MS-LS1-7)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify components of a model that describes how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	**Describe** the relationship between components of a model that describes how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	**Develop** a model to **describe** how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.	**Evaluate** strengths and limitations of models that describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through organisms.

H PERFORMANCE INDICATOR

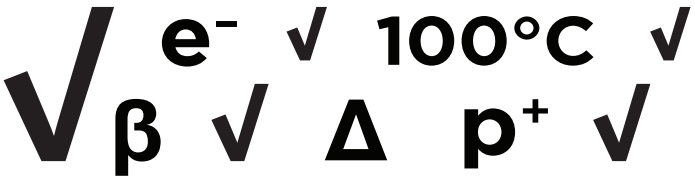
Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. (MS-LS1-8)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Gather information about sensory receptors and how they respond to stimuli.	**Gather** and **summarize** information about sensory receptors and how they respond to stimuli.	**Gather** and **synthesize** information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	**Communicate** synthesized information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 9-12



Students will...
demonstrate an understanding of how organisms live, grow, respond to their environment, and reproduce using molecular, structural, and chemical biology (LS1) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells. (HS-LS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the location and structure of DNA including genes.	**Describe** the role of proteins in specialized cells (tissues) and describe genes' function in DNA.	**Construct** an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.	**Critique** an explanation of how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.

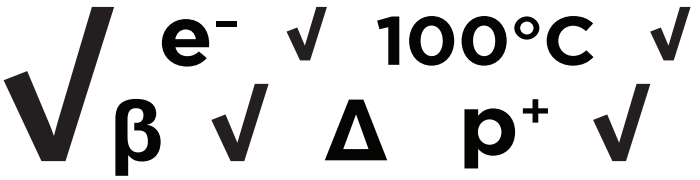
B PERFORMANCE INDICATOR

Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (HS-LS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model that illustrates the systems in multicellular organisms.	**Describe** the relationships between components of a model that explains the function(s) of the systems in multicellular organisms.	**Develop** and **use** a model to **illustrate** the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	**Apply** the model to **analyze** the relationships between the components and how systems interact to provide functions in multicellular organisms.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 9-12 *(CONTINUED)*



C PERFORMANCE INDICATOR

Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. (HS-LS1-3)

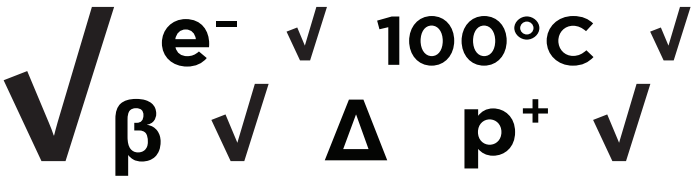
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe feedback mechanisms and **determine** data necessary to conduct an investigation.	**Plan** an investigation to **collect** evidence that identifies and measures internal and external environmental conditions.	**Plan** and **conduct** an investigation to provide evidence that feedback mechanisms maintain homeostasis.	**Predict** how feedback mechanisms maintain homeostasis in different living systems.

D PERFORMANCE INDICATOR

Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. (HS-LS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the component parts involved in cellular division.	**Describe** the process of cellular division (mitosis) and the relationship between the component parts.	**Use** a model to **illustrate** the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	**Evaluate** the effectiveness of a model to **illustrate** the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.

SCORING CRITERIA
SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 9-12 *(CONTINUED)*



E PERFORMANCE INDICATOR
Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. (HS-LS1-5)

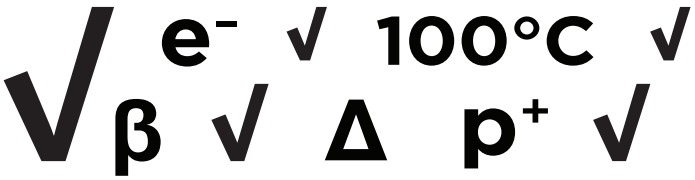
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify components of photosynthesis as it transforms light energy into stored chemical energy.	**Describe** relationships between components of photosynthesis as it transforms light energy into stored chemical energy.	**Use** a model to **illustrate** how photosynthesis transforms light energy into stored chemical energy.	**Evaluate** the effectiveness of a model that illustrates how photosynthesis transforms light energy into stored chemical energy.

F PERFORMANCE INDICATOR
Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. (HS-LS1-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence that shows how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	**Construct** an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	**Construct** and **revise** an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	**Evaluate** the effectiveness of the revised explanation to show how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: STRUCTURE, FUNCTION, AND INFORMATION PROCESSING (LS1) | 9-12 *(CONTINUED)*

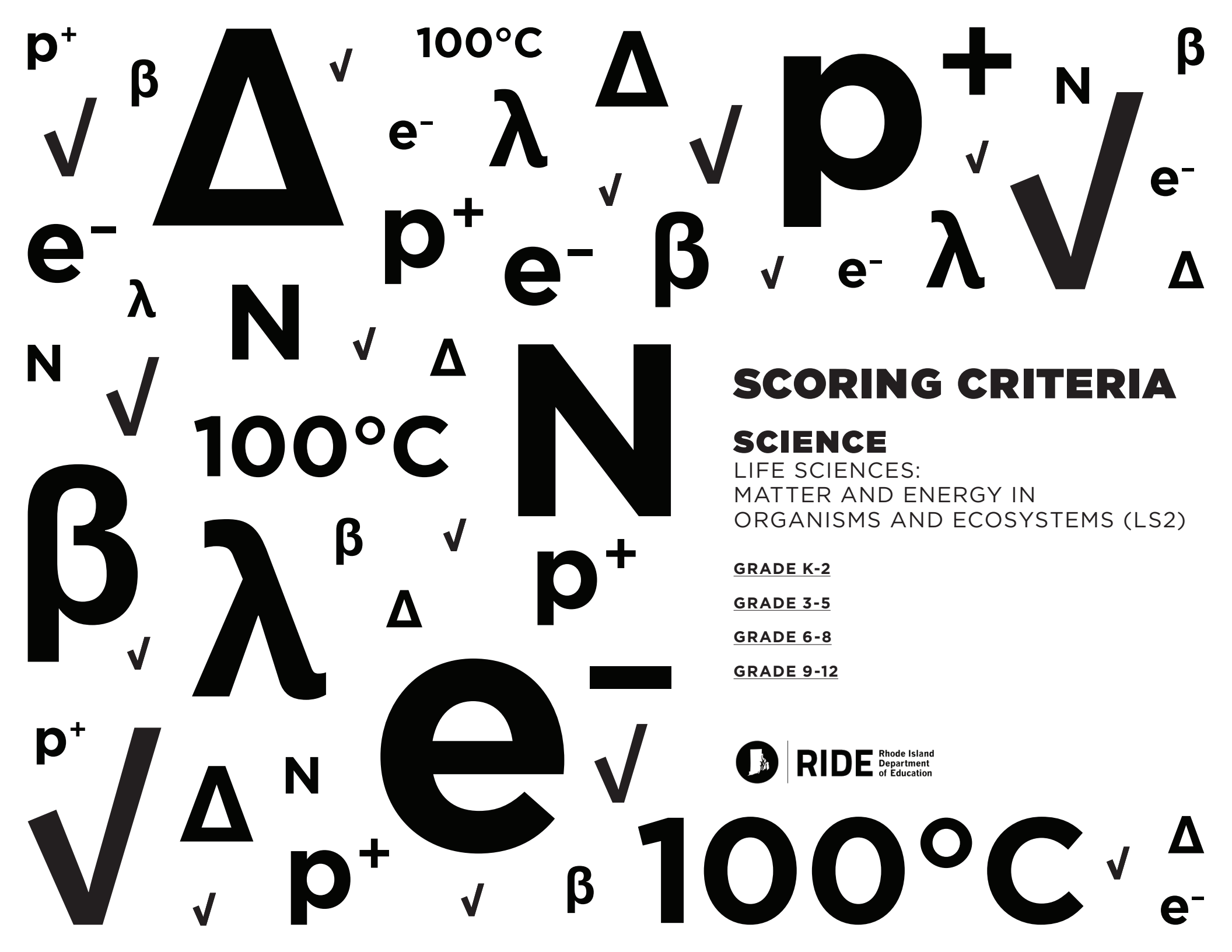


G PERFORMANCE INDICATOR

Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. (HS-LS1-7)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify component parts of a model of cellular respiration.	**Describe** the relationship between the components of a model of cellular respiration.	**Use** a model to **illustrate** that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.	**Evaluate** the strengths and limitations of a model that illustrates that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.



SCORING CRITERIA

SCIENCE

LIFE SCIENCES:
MATTER AND ENERGY IN
ORGANISMS AND ECOSYSTEMS (LS2)

GRADE K-2

GRADE 3-5

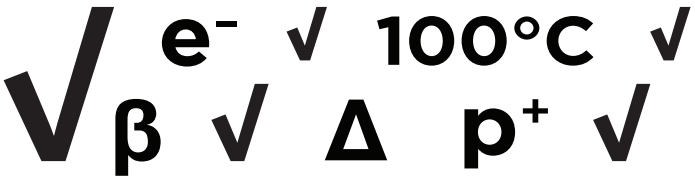
GRADE 6-8

GRADE 9-12

RIDE Rhode Island Department of Education

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS (LS2) | K-2



Students will...
demonstrate an understanding of the characteristics, functions, and behavioral interactions within an ecosystem (LS2) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Plan and conduct an investigation to determine if plants need sunlight and water to grow. (2-LS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Participate in an investigation to **make** observations about the relationship between plants and sunlight/water.	Participate in an investigation to **identify** evidence to show if plants need sunlight and water to grow.	**Plan** and **conduct** an investigation to **determine** if plants need sunlight and water to grow.	**Plan** and **conduct** an investigation to **hypothesize** why plants need sunlight and water to grow.

B PERFORMANCE INDICATOR

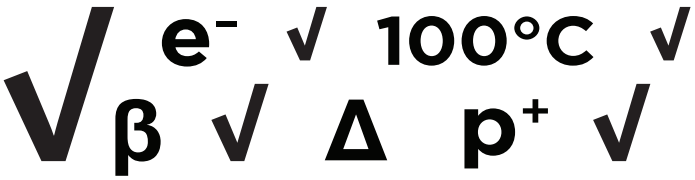
Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.* (2-LS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify relevant structures of plants and animals that aid in seed dispersal or plant pollination.	**Describe** how structures of plants and animals aid in seed dispersal or plant pollination.	**Develop** a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	**Suggest** improvements to the model so that it would better mimic the natural world.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS (LS2) | 3-5



Students will...
demonstrate an understanding of the characteristics, functions, and behavioral interactions within an ecosystem (LS2) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Construct an argument that some animals form groups that help members survive. (3-LS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make a claim about how some animals form groups.	**Describe** relevant evidence to support the argument that some animals form groups that help members survive.	**Construct** an argument that some animals form groups that help members survive.	**Predict** how various ways that animals group themselves can impact rates of survival.

B PERFORMANCE INDICATOR

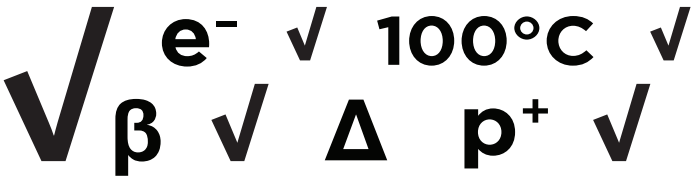
Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (5-LS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model that would describe the movement of matter.	**Describe** the relationships between components in a model that are relevant for describing the movement of matter among plants, animals, decomposers, and the environment.	**Develop** a model to **describe** the movement of matter among plants, animals, decomposers, and the environment.	**Apply** the model to **make** predictions about how changes in the movement of matter would influence plants, animals, decomposers, and the environment.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS (LS2) | 6-8



Students will...
demonstrate an understanding of the characteristics, functions, and behavioral interactions within an ecosystem (LS2) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. (MS-LS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	**Describe** the given data to **provide** evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	**Analyze** and **interpret** data to **provide** evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	**Use** the analysis and interpretation to **explain** the importance of resource availability on organisms and populations of organisms in an ecosystem.

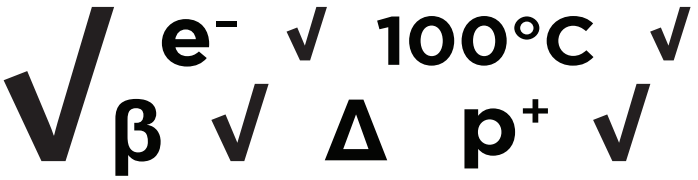
B PERFORMANCE INDICATOR

Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. (MS-LS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence of patterns of interactions among organisms across multiple ecosystems.	**Explain** the patterns of interactions among organisms across multiple ecosystems.	**Construct** an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	**Evaluate** the effectiveness of the explanation that predicts patterns of interactions among organisms across multiple ecosystems.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS (LS2) | 6-8 *(CONTINUED)*



C PERFORMANCE INDICATOR

Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. (MS-LS2-3)

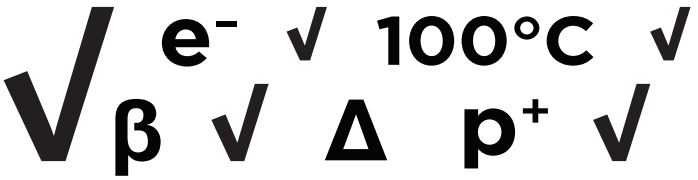
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model that describes the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	**Describe** the relationship between the components of a model that describes the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	**Develop** a model to **describe** the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	**Apply** a model to **make** predictions about how variations in the cycling of matter and flow of energy affect living and nonliving parts of an ecosystem.

D PERFORMANCE INDICATOR

Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. (MS-LS2-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make a claim about how changes to physical or biological components of an ecosystem affect populations.	**Describe** empirical evidence that supports a claim that changes to physical or biological components of an ecosystem affect populations	**Construct** an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	**Predict** how changes to physical or biological components of an ecosystem may affect populations in the future.

SCORING CRITERIA
SCIENCE | LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS (LS2) | 6-8 *(CONTINUED)*



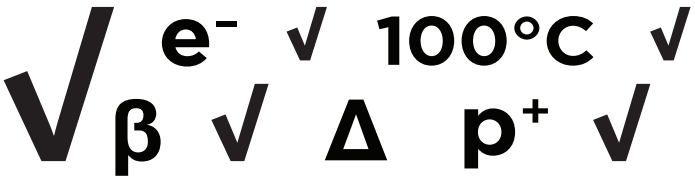
E PERFORMANCE INDICATOR
Evaluate competing design solutions for maintaining biodiversity and ecosystem services.* (MS-LS2-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the given design solutions and the problem of maintaining biodiversity and ecosystem services.	**Identify** criteria and constraints of given design solutions for maintaining biodiversity and ecosystem services.	**Evaluate** competing design solutions for maintaining biodiversity and ecosystem services.	**Use** evaluation of competing design solutions to **suggest** improvements to better maintain biodiversity and ecosystem services.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS (LS2) | 9-12



Students will...
demonstrate an understanding of the characteristics, functions, and behavioral interactions within an ecosystem (LS2) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. (HS-LS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the relevant factors that affect carrying capacity of ecosystems at different scales.	**Organize** information into an explanation of factors that affect carrying capacity of ecosystems at different scales.	**Use** mathematical and/or computational representations to **support** explanations of factors that affect carrying capacity of ecosystems at different scales.	**Critique** the effectiveness of the mathematical and/or computational representations to **support** explanations of factors that affect carrying capacity of ecosystems at different scales.

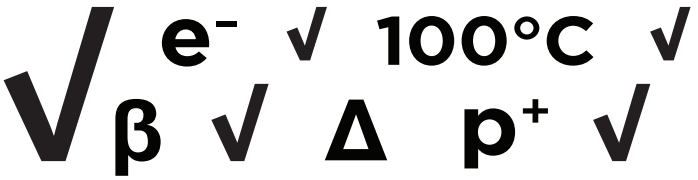
B PERFORMANCE INDICATOR

Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. (HS-LS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the factors affecting biodiversity and populations in ecosystems of different scales.	**Organize** information to **support** explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.	**Use** mathematical representations to **support** and **revise** explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.	**Evaluate** the effectiveness of the mathematical representations to **support** and **revise** explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS (LS2) | 9-12 *(CONTINUED)*



C PERFORMANCE INDICATOR

Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. (HS-LS2-3)

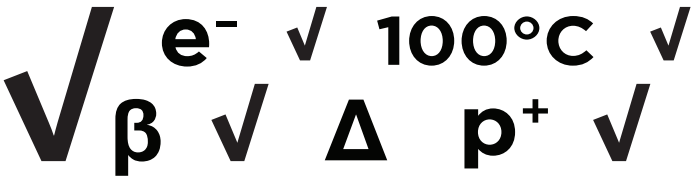
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	**Construct** an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	**Construct** and **revise** an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	**Evaluate** the effectiveness of the revised explanation for the cycling of matter and flow of energy in aerobic and anaerobic conditions.

D PERFORMANCE INDICATOR

Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. (HS-LS2-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the cycling of matter and flow of energy among organisms in an ecosystem.	**Create** mathematical representations to **support** claims for the cycling of matter and flow of energy among organisms in an ecosystem.	**Use** mathematical representations to **support** claims for the cycling of matter and flow of energy among organisms in an ecosystem.	**Evaluate** the effectiveness of the mathematical representations to **support** claims for the cycling of matter and flow of energy among organisms in an ecosystem.

SCORING CRITERIA
SCIENCE | LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS (LS2) | 9-12 *(CONTINUED)*



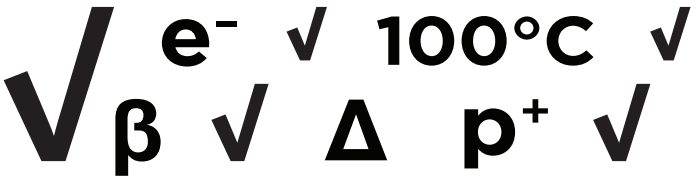
E PERFORMANCE INDICATOR
Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. (HS-LS2-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify components of a model illustrating the processes of photosynthesis and cellular respiration.	**Describe** the relationship between photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	**Develop** a model to **illustrate** the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	**Apply** a model to **predict** how changes in photosynthesis and cellular respiration affect the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.

F PERFORMANCE INDICATOR
Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. (HS-LS2-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	**Explain** how evidence and reasoning **support** the claims that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	**Evaluate** the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	**Evaluate** the claims, evidence and/or reasoning for bias to **improve** the argument that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.

SCORING CRITERIA
SCIENCE | LIFE SCIENCES: MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS (LS2) | 9-12 *(CONTINUED)*



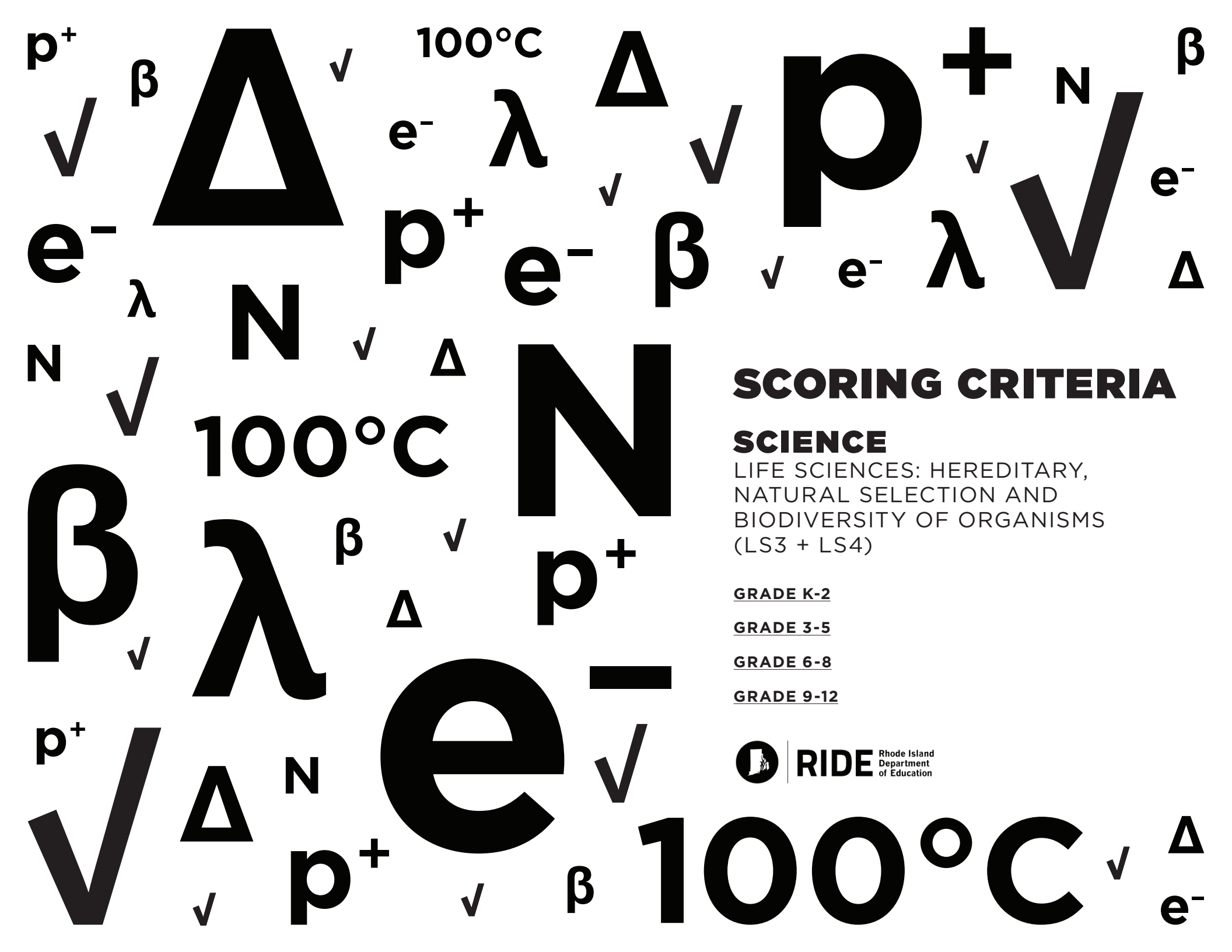
G PERFORMANCE INDICATOR
Design, evaluate and refine a solution for reducing the impacts of human activity on the environment and biodiversity.* (HS-LS2-7)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the criteria and constraints for a design solution for reducing the impacts of human activity on the environment and biodiversity.	**Design** a solution for reducing the impacts of human activity on the environment and biodiversity.	**Design**, **evaluate** and **refine** a solution for reducing the impacts of human activity on the environment and biodiversity.	**Evaluate** the effectiveness of the refined design solution for reducing the impacts of human activity on the environment and biodiversity based on the criteria and constraints.

H PERFORMANCE INDICATOR
Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce. (HS-LS2-8)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence for the role of group behavior on individual and species' chances to survive and reproduce.	**Explain** the evidence for the role of group behavior on individual and species' chances to survive and reproduce and **identify** any additional evidence.	**Evaluate** the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	**Predict** the effect of a change in group behavior and how it would impact chances of the individual or species to survive and reproduce.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.



SCORING CRITERIA

SCIENCE

LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4)

GRADE K-2

GRADE 3-5

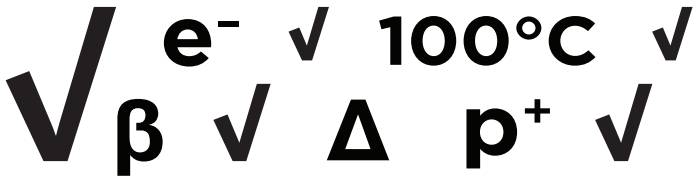
GRADE 6-8

GRADE 9-12

RIDE Rhode Island Department of Education

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | K-2



Students will...
demonstrate an understanding of genetics, variation of traits (LS3), adaptation, natural selection, and biodiversity (LS4) through the integration of scientific and engineering practices, and crosscutting concepts.

A PERFORMANCE INDICATOR

Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. (1-LS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations regarding traits of parents and offspring.	**Gather** evidence that young plants and animals are like, but not exactly like, their parents.	**Make** observations to **construct** an evidence-based account that young plants and animals are like, but not exactly like, their parents.	**Generalize** observations to **make** predictions about other patterns regarding traits of parents and offspring.

B PERFORMANCE INDICATOR

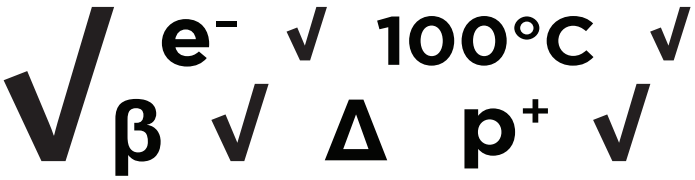
Make observations of plants and animals to compare the diversity of life in different habitats. (2-LS4-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify habitats where plants and animals can live.	**Make** observations about characteristics of plants and animals in different habitats.	**Make** observations of plants and animals to **compare** the diversity of life in different habitats.	**Generalize** observations to **make** predictions about other patterns regarding plants and animals in various habitats.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 3-5



Students will...
demonstrate an understanding of genetics, variation of traits (LS3), adaptation, natural selection, and biodiversity (LS4) through the integration of scientific and engineering practices, and crosscutting concepts.

A PERFORMANCE INDICATOR

Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. (3-LS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify inherited traits of similar organisms.	**Gather** relevant evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.	**Analyze** and **interpret** data to **provide** evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.	**Use** data to **hypothesize** and **draw** conclusions about inherited traits of similar organisms.

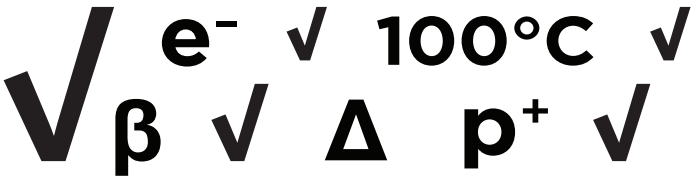
B PERFORMANCE INDICATOR

Use evidence to support the explanation that traits can be influenced by the environment. (3-LS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify traits that can be influenced by the environment.	**Select** relevant evidence that supports the explanation that traits can be influenced by the environment.	**Use** evidence to **support** the explanation that traits can be influenced by the environment.	**Evaluate** the effectiveness of your chain of reasoning by critiquing the relevancy or sufficiency of your evidence.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 3-5 *(CONTINUED)*



C PERFORMANCE INDICATOR

Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. (3-LS4-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify data from fossils to **provide** evidence of the organisms and the environments in which they lived long ago.	**Describe** the relationships in the data from fossils to **provide** evidence of the organisms and the environments in which they lived long ago.	**Analyze** and **interpret** data from fossils to **provide** evidence of the organisms and the environments in which they lived long ago.	**Compare** fossil evidence to **make** predictions about the differing environments in which they lived long ago.

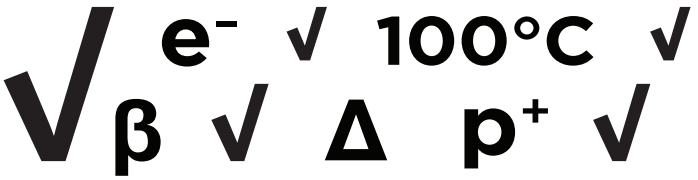
D PERFORMANCE INDICATOR

Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify a claim about how the variations in characteristics among individuals of the same species may provide advantages.	**Describe** evidence that explains how the variations in characteristics among individuals of the same species may provide advantages.	**Use** evidence to **construct** an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.	**Evaluate** the effectiveness of your chain of reasoning by critiquing the relevancy or sufficiency of your evidence.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 3-5 *(CONTINUED)*



E PERFORMANCE INDICATOR

Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make a claim about how a specific habitat allows some organisms to thrive.	**Describe** evidence that supports a claim about how a specific habitat allows some organisms to thrive while others cannot survive at all.	**Construct** an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.	**Predict** how future changes in a habitat will impact how well organisms within that habitat can survive.

F PERFORMANCE INDICATOR

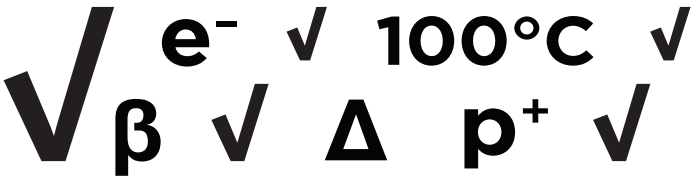
Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.* (3-LS4-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify examples of environmental changes that have led to a change in the types of plants and animals that live there.	**Describe** specific evidence of solutions to a problem caused when the environment changes and the types of plants and animals that live there change.	**Make** a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	**Critique** your claim against others to **evaluate** the effectiveness of your criteria and evidence.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 6-8



Students will...
demonstrate an understanding of genetics, variation of traits (LS3), adaptation, natural selection, and biodiversity (LS4) through the integration of scientific and engineering practices, and crosscutting concepts.

A PERFORMANCE INDICATOR

Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. (MS-LS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify how mutations can cause/create harmful, beneficial, and/or neutral changes to an organism.	**Describe** the relationship between genetic information and the structure and function of the organism.	**Develop** and **use** a model to **describe** why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	**Apply** models to **make** predictions about how specific changes at the molecular level may affect proteins and result in either harmful, beneficial or neutral effects to the structure and function of the organism.

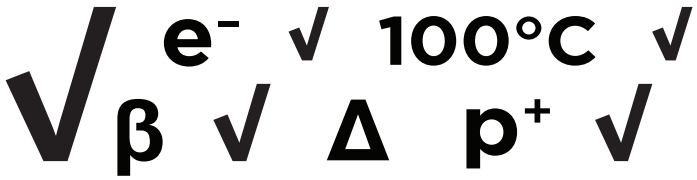
B PERFORMANCE INDICATOR

Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. (MS-LS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant components of a model of reproduction.	**Describe** the relationship between components of a model of reproduction.	**Develop** and **use** a model to **describe** why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	**Critique** various models and **suggest** improvements to more accurately **describe** why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 6-8 *(CONTINUED)*



C PERFORMANCE INDICATOR

Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. (MS-LS4-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize given data to **explain** patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	**Analyze** the given data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	**Analyze** and **interpret** data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	**Synthesize** information from analysis and interpretation of data to **hypothesize** and **draw** conclusions about how natural laws will operate in the future.

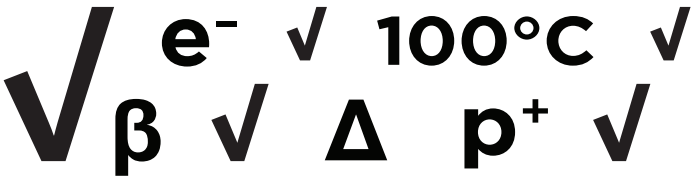
D PERFORMANCE INDICATOR

Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships. (MS-LS4-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to **infer** evolutionary relationships.	**Describe** the anatomical similarities and differences among modern organisms and between modern and fossil organisms to **infer** evolutionary relationships.	**Apply** scientific ideas to **construct** an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to **infer** evolutionary relationships.	**Evaluate** the effectiveness of your explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to **infer** evolutionary relationships.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 6-8 *(CONTINUED)*



E PERFORMANCE INDICATOR

Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy. (MS-LS4-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify patterns in pictorial data of similarities in the embryological development across multiple species.	**Explain** patterns in pictorial data of similarities in the embryological development across multiple species to **identify** relationships not evident in the fully formed anatomy.	**Analyze** displays of pictorial data to **compare** patterns of similarities in the embryological development across multiple species to **identify** relationships not evident in the fully formed anatomy.	**Analyze** displays of pictorial data to **hypothesize** or **draw** conclusions about embryological development across multiple species and why relationships are not evident in the fully formed anatomy.

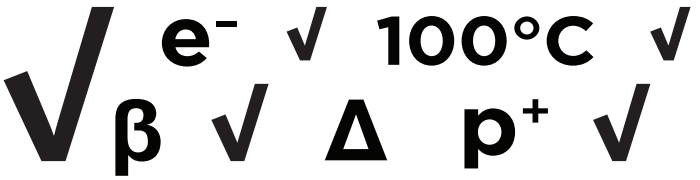
F PERFORMANCE INDICATOR

Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. (MS-LS4-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify and **organize** given evidence about how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	**Describe** how evidence relates to genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	**Construct** an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	**Evaluate** the effectiveness of the explanation to describe how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 6-8 *(CONTINUED)*



G PERFORMANCE INDICATOR

Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms. (MS-LS4-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Gather information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	**Gather** and **summarize** information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	**Gather** and **synthesize** information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	**Evaluate** the quality of information synthesized about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

H PERFORMANCE INDICATOR

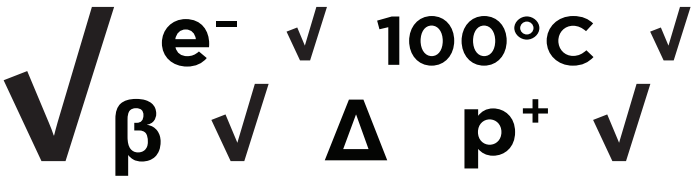
Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. (MS-LS4-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify relevant components from given mathematical representations to **show** how natural selection may lead to increases and decreases of specific traits in populations over time.	**Use** mathematical representations to **identify** relationships in the data about how natural selection may lead to increases and decreases of specific traits in populations over time.	**Use** mathematical representations to **support** explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	**Use** mathematical representations to **critique** the explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 9-12



Students will...
demonstrate an understanding of genetics, variation of traits (LS3), adaptation, natural selection, and biodiversity (LS4) through the integration of scientific and engineering practices, and crosscutting concepts.

A PERFORMANCE INDICATOR

Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. (HS-LS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the basic structure of DNA and **identify** components of empirically testable questions.	**Develop** questions about DNA structure and function.	**Ask** questions to **clarify** relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	**Develop** investigations to **test** questions about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.

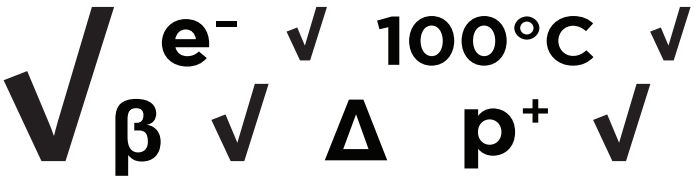
B PERFORMANCE INDICATOR

Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. (HS-LS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe evidence that supports claims about inheritable genetic variations.	**Identify** strengths and weaknesses of the evidence to **support** the claim that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.	**Make** and **defend** a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.	**Evaluate** the claim and evidence for bias.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 9-12 *(CONTINUED)*



C PERFORMANCE INDICATOR

Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. (HS-LS3-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize the given data by frequency, distribution and variation of expressed traits in a population.	**Use** appropriate statistical analysis of data to **determine** the relationship between a trait's occurrence within a population and environmental factors.	**Apply** concepts of statistics and probability to **explain** the variation and distribution of expressed traits in a population.	**Identify** variables not considered within the statistical model that could impact real world observations.

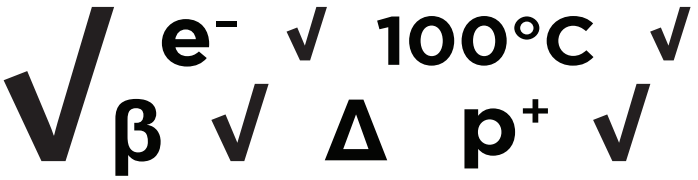
D PERFORMANCE INDICATOR

Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. (HS-LS4-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	**Organize** information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	**Communicate** scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	**Evaluate** the effectiveness of the communication of scientific information to an audience to explain that common ancestry and biological evolution are supported by multiple lines of empirical evidence.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 9-12 *(CONTINUED)*



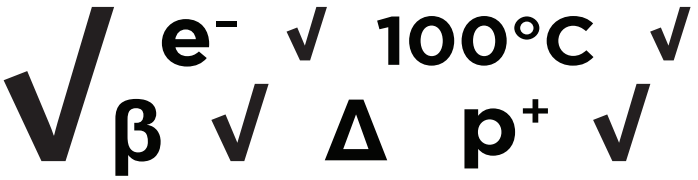
E PERFORMANCE INDICATOR

Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. (HS-LS4-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify how the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	**Describe** evidence to be used to **support** an explanation of how the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	**Construct** an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.	**Evaluate** the effectiveness of the explanation that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 9-12 *(CONTINUED)*



F PERFORMANCE INDICATOR

Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. (HS-LS4-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize and **describe** the data sets that help support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	**Analyze** what each data set represents in relation to the idea that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	**Apply** concepts of statistics and probability to **support** explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	**Evaluate** the explanation that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.

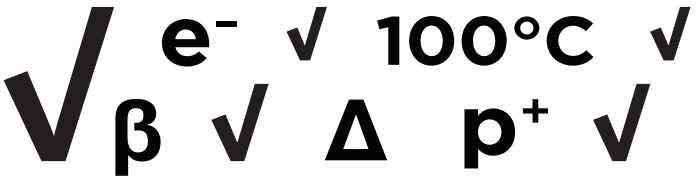
G PERFORMANCE INDICATOR

Construct an explanation based on evidence for how natural selection leads to adaptation of populations. (HS-LS4-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence for how natural selection leads to adaptation of populations.	**Describe** evidence for how natural selection leads to adaptation of populations.	**Construct** an explanation based on evidence for how natural selection leads to adaptation of populations.	**Evaluate** the effectiveness of the explanation for how natural selection leads to adaptation of populations.

SCORING CRITERIA

SCIENCE | LIFE SCIENCES: HEREDITARY, NATURAL SELECTION AND BIODIVERSITY OF ORGANISMS (LS3 + LS4) | 9-12 *(CONTINUED)*



H PERFORMANCE INDICATOR

Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. (HS-LS4-5)

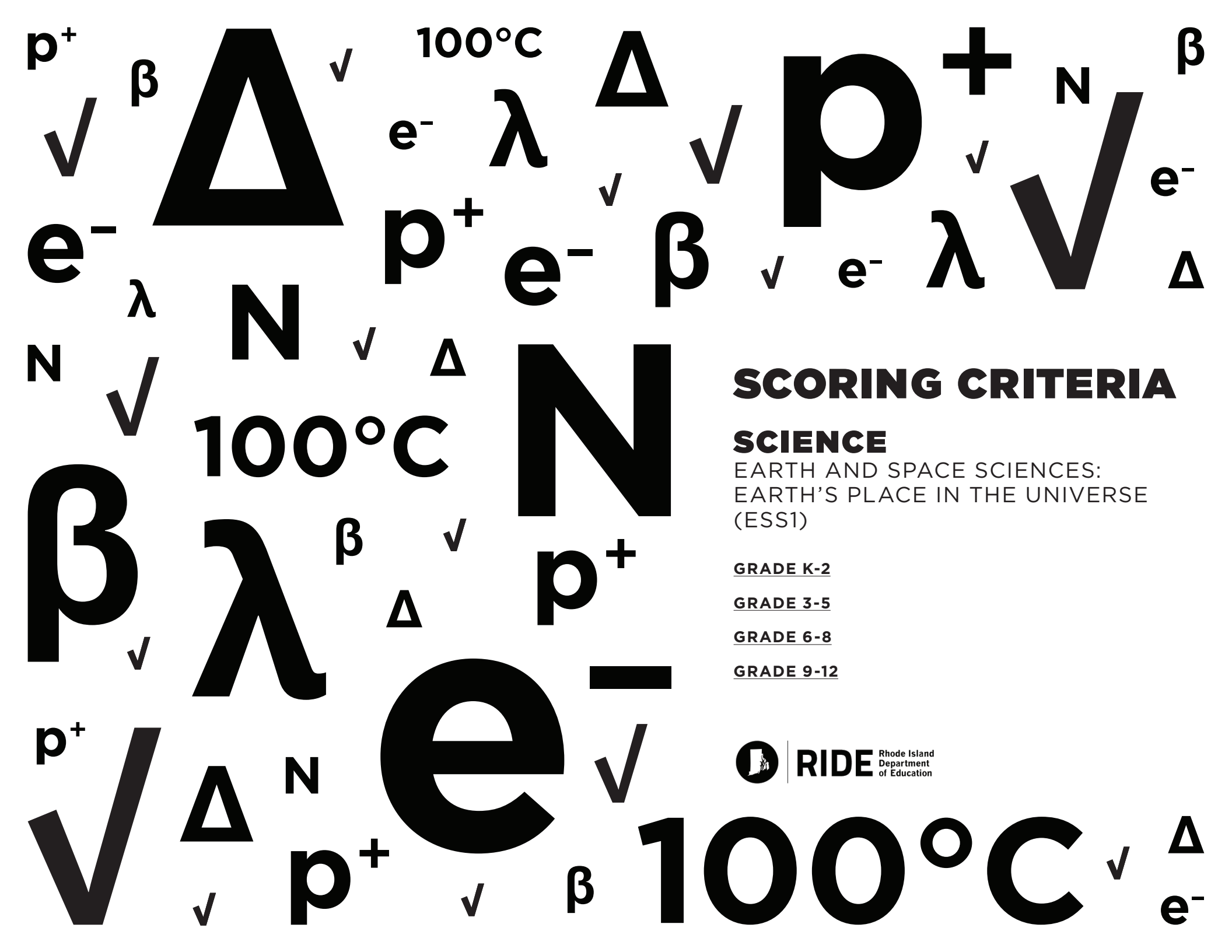
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	**Explain** how the evidence supports claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	**Evaluate** the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	**Identify** additional evidence to further support claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.

I PERFORMANCE INDICATOR

Revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.* (HS-LS4-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the criteria and constraints of a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	**Describe** the components of a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	**Revise** a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	**Evaluate** the effectiveness of the revised simulation to test a solution to mitigate adverse impacts of human activity on biodiversity based on criteria and constraints.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.



SCORING CRITERIA

SCIENCE

EARTH AND SPACE SCIENCES:
EARTH'S PLACE IN THE UNIVERSE
(ESS1)

GRADE K-2

GRADE 3-5

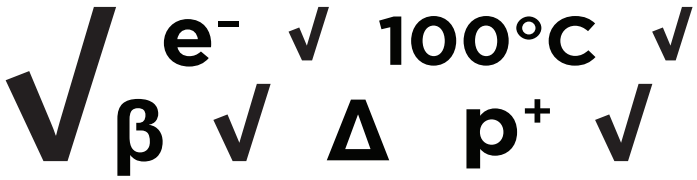
GRADE 6-8

GRADE 9-12

RIDE Rhode Island Department of Education

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH'S PLACE IN THE UNIVERSE (ESS1) | K-2



Students will...
demonstrate an understanding of the origins, interactions and relationships between and among the Earth, our solar system, and the Universe (ESS1) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Use observations of the sun, moon, and stars to describe patterns that can be predicted. (1-ESS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize data in graphical displays from given observations of the sun, moon, and stars.	**Identify** patterns in observations of the sun, moon, and stars.	**Use** observations of the sun, moon, and stars to **describe** patterns that can be predicted.	**Compare** the predictions with those of peers to **determine** similarities and difference.

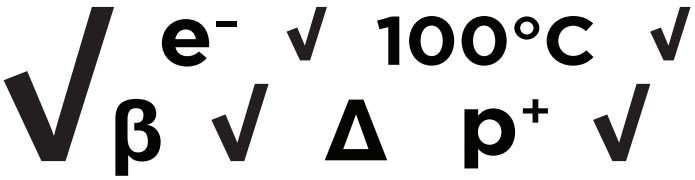
B PERFORMANCE INDICATOR

Make observations at different times of year to relate the amount of daylight to the time of year. (1-ESS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the data and evidence that will result from the investigation relating the amount of daylight to the time of year.	**Describe** how observations could reveal the pattern between the amount of daylight and the time of the year.	**Make** observations at different times of year to **relate** the amount of daylight to the time of year.	**Make** predictions about the amount of daylight at specified times during the year.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH'S PLACE IN THE UNIVERSE (ESS1) | K-2 *(CONTINUED)*



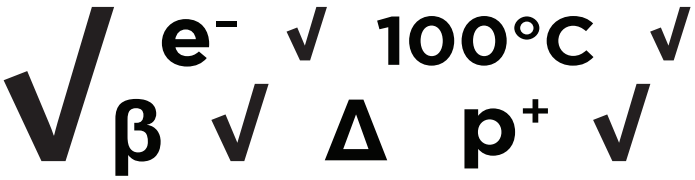
C PERFORMANCE INDICATOR

Use information from several sources to provide evidence that Earth events can occur quickly or slowly. (2-ESS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify examples of things that occur quickly or slowly.	**Use** sources to **gather** information about Earth events that can occur quickly or slowly.	**Use** information from several sources to **provide** evidence that Earth events can occur quickly or slowly.	**Evaluate** the effectiveness of your evidence to show that Earth events can occur quickly or slowly.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH'S PLACE IN THE UNIVERSE (ESS1) | 3-5



Students will...
demonstrate an understanding of the origins, interactions and relationships between and among the Earth, our solar system, and the Universe (ESS1) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. (4-ESS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations from patterns in rock formation and fossils in rock layers.	**Describe** specific evidence from observations of patterns in rock formation and fossils in rock layers that connect to changing landscapes.	**Identify** evidence from patterns in rock formations and fossils in rock layers to **support** an explanation for changes in a landscape over time.	**Evaluate** the effectiveness of your evidence to **support** an explanation for changes in landscape over time.

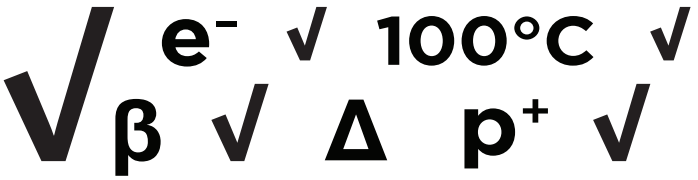
B PERFORMANCE INDICATOR

Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth. (5-ESS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify reasons for the sun's brightness compared to that of other stars.	**Identify** and **describe** evidence that relates to the sun's brightness compared to other stars.	**Support** an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from the Earth.	**Evaluate** the effectiveness of your argument by **critiquing** the relevancy or sufficiency of your evidence.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH'S PLACE IN THE UNIVERSE (ESS1) | 3-5 *(CONTINUED)*



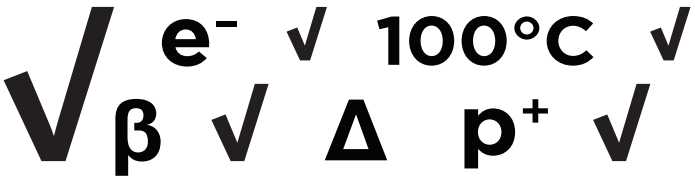
C PERFORMANCE INDICATOR

Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. (5-ESS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize data about the daily and seasonal changes caused by the Earth's rotation and orbit around the sun.	**Describe** the relationships within and across data sets that relate to the daily and seasonal changes caused by the Earth's rotation and orbit around the sun.	**Represent** data in graphical displays to **reveal** patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	Using your findings, **hypothesize** explanations for the patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH'S PLACE IN THE UNIVERSE (ESS1) | 6-8



Students will...
demonstrate an understanding of the origins, interactions and relationships between and among the Earth, our solar system, and the Universe (ESS1) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. (MS-ESS1-1)

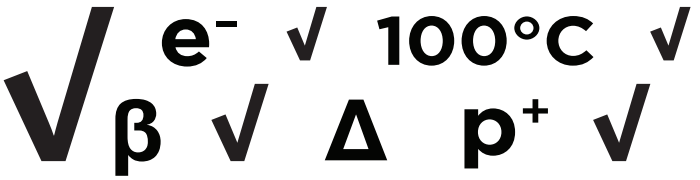
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant components of the Earth-sun-moon system.	**Describe** the relationship between the relevant components of the Earth-sun-moon system.	**Develop** and **use** a model of the Earth-sun-moon system to **describe** the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.	**Apply** the Earth-sun-moon model to other planet-moon systems to **predict** causal events (e.g., seasons on Mars).

B PERFORMANCE INDICATOR

Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. (MS-ESS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant components of a model of galaxies and the solar system.	**Describe** the relationships and interactions of the relevant components of a model of galaxies and the solar system.	**Develop** and **use** a model to **describe** the role of gravity in the motions within galaxies and the solar system.	**Evaluate** the strengths and limitations of a model that describes the role of gravity in the motions within galaxies and the solar system.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH'S PLACE IN THE UNIVERSE (ESS1) | 6-8 *(CONTINUED)*



C PERFORMANCE INDICATOR
Analyze and interpret data to determine scale properties of objects in the solar system. (MS-ESS1-3)

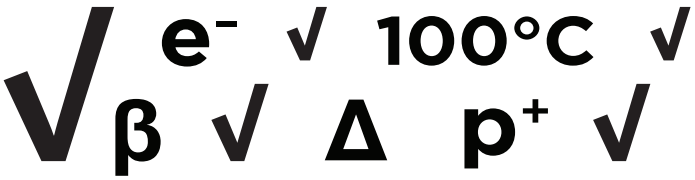
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Explain given data about the properties of objects in the solar system at different scales.	**Analyze** given data to **identify** relationships and/or patterns to **determine** scale properties of objects in the solar system.	**Analyze** and **interpret** given data to **determine** scale properties of objects in the solar system.	**Critique** the effectiveness of the given data in determining scale properties of objects in the solar system.

D PERFORMANCE INDICATOR
Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history. (MS-ESS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence from rock strata that relate to the geologic time scale.	**Describe** how the evidence from rock strata relate to how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.	**Construct** a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.	**Evaluate** the effectiveness of the explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH'S PLACE IN THE UNIVERSE (ESS1) | 9-12



Students will...
demonstrate an understanding of the origins, interactions and relationships between and among the Earth, our solar system, and the Universe (ESS1) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Develop a model based on evidence to illustrate the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation. (HS-ESS1-1)

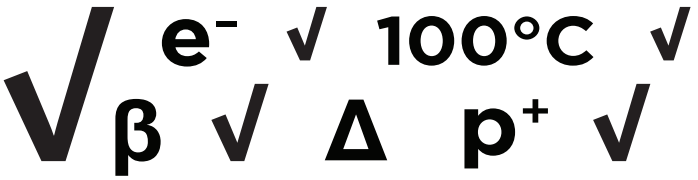
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model that would illustrate the life span of the sun and the process by which energy from the sun reaches Earth.	**Describe** the relationship between the component parts of a model that would illustrate the life span of the sun and the process by which energy from the sun reaches Earth.	**Develop** a model based on evidence to **illustrate** the life span of the sun and the role of nuclear fusion in the sun's core to release energy that eventually reaches Earth in the form of radiation.	**Apply** a model to **draw** conclusions about the life span of stars in comparison to the sun and the role of nuclear fusion in releasing energy in those stars.

B PERFORMANCE INDICATOR

Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. (HS-ESS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.	**Describe** how astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe helps support the Big Bang theory.	**Construct** an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.	**Evaluate** the effectiveness of the astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe to explain the Big Bang theory.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH'S PLACE IN THE UNIVERSE (ESS1) | 9-12 *(CONTINUED)*



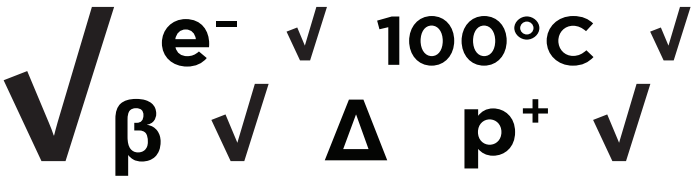
C PERFORMANCE INDICATOR
Communicate scientific ideas about the way stars, over their life cycle, produce elements. (HS-ESS1-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize evidence about the way stars, over their life cycle, produce elements.	**Describe** how evidence shows the way stars, over their life cycle, produce elements.	**Communicate** scientific ideas about the way stars, over their life cycle, produce elements.	**Evaluate** the effectiveness of the communication of scientific ideas to an audience about the way stars, over their life cycle, produce elements.

D PERFORMANCE INDICATOR
Use mathematical or computational representations to predict the motion of orbiting objects in the solar system. (HS-ESS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant components of mathematical or computational representations to **predict** the motion of orbiting objects in the solar system.	**Explain** the relevant components of mathematical or computational representations to **predict** the motion of orbiting objects in the solar system.	**Use** mathematical or computational representations to **predict** the motion of orbiting objects in the solar system.	**Apply** predictions regarding the motion of orbiting objects in the solar system to real world situations.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH'S PLACE IN THE UNIVERSE (ESS1) | 9-12 *(CONTINUED)*

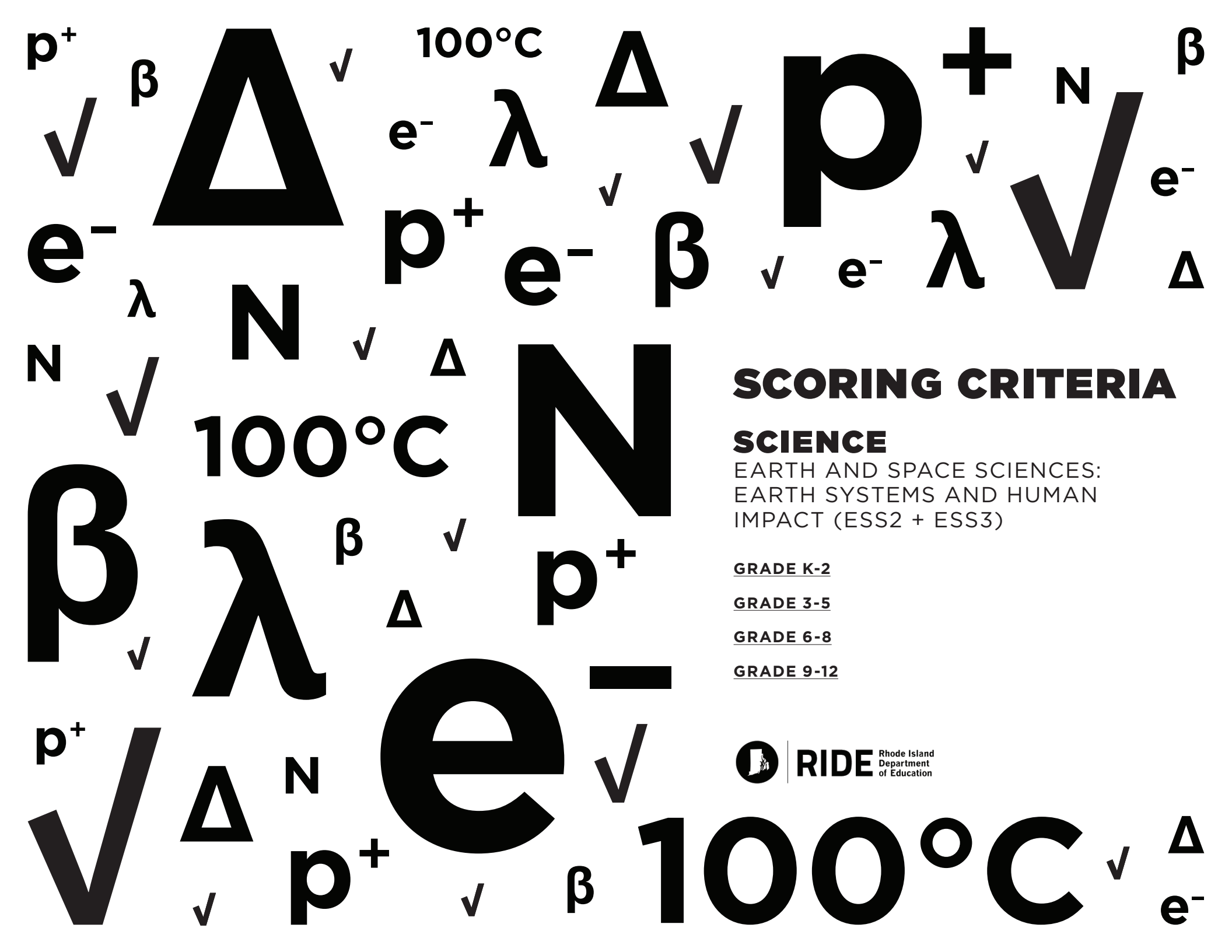


E PERFORMANCE INDICATOR
Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. (HS-ESS1-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to **explain** the ages of crustal rocks.	**Explain** how the evidence shows the past and current movements of continental and oceanic crust and the theory of plate tectonics to **explain** the ages of crustal rocks.	**Evaluate** evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to **explain** the ages of crustal rocks.	**Identify** changes to the evidence to better support the idea that the past and current movements of continental and oceanic crust and the theory of plate tectonics to **explain** the ages of crustal rocks.

F PERFORMANCE INDICATOR
Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. (HS-ESS1-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the evidence needed from ancient Earth materials, meteorites, and other planetary surfaces to **construct** an account of Earth's formation and early history.	**Describe** the evidence from ancient Earth materials, meteorites, and other planetary surfaces as it relates to Earth's formation and early history.	**Apply** scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to **construct** an account of Earth's formation and early history.	**Evaluate** the effectiveness of the scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces in the construction of an account of Earth's formation and early history.



SCORING CRITERIA

SCIENCE

EARTH AND SPACE SCIENCES:
EARTH SYSTEMS AND HUMAN
IMPACT (ESS2 + ESS3)

GRADE K-2

GRADE 3-5

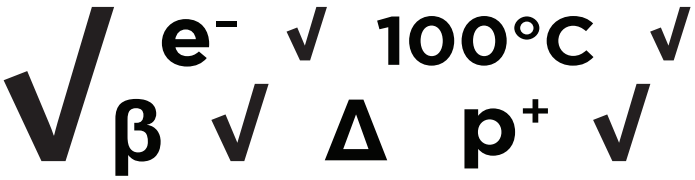
GRADE 6-8

GRADE 9-12

RIDE Rhode Island Department of Education

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | K-2



Students will...
demonstrate an understanding of how and why Earth is constantly changing (ESS2) and how Earth's surface processes and human activities affect each other (ESS3) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Use and share observations of local weather conditions to describe patterns over time. (K-ESS2-1)

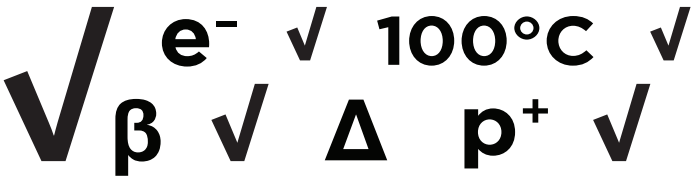
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations to identify local weather conditions.	**Use** observations of local weather conditions to describe patterns over time.	**Use** and **share** observations of local weather conditions to describe patterns over time.	**Use** observations of patterns in local weather conditions in order to **make** predictions about future weather conditions.

B PERFORMANCE INDICATOR

Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. (K-ESS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations about how plants and animals (including humans) change their environment.	**Describe** relevant evidence to **support** that plants and animals (including humans) can change the environment to meet their needs.	**Construct** an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	**Communicate** a scientific, evidence-based argument for how plants and animals (including humans) can change the environment to meet their needs.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | K-2 *(CONTINUED)*



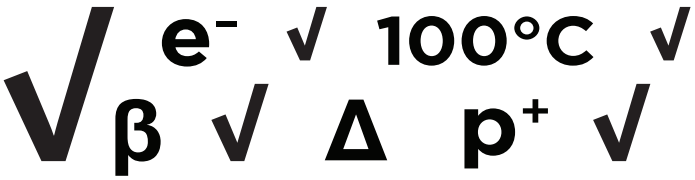
C PERFORMANCE INDICATOR
Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. (K-ESS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the survival needs of various plants and animals.	**Describe** the relationship between the needs of various plants and animals and their environment.	**Use** a model to **represent** the relationship between the needs of different plants or animals (including humans) and the places they live.	**Predict** the impact of changing environmental characteristics on the ability of a plant or animal to survive.

D PERFORMANCE INDICATOR
Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.* (K-ESS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Ask questions about severe weather events.	**Ask** questions about the purpose of forecasting severe weather.	**Ask** questions to **obtain** information about the purpose of weather forecasting to prepare for, and respond to, severe weather.	**Use** information obtained to explain why weather forecasting is needed.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | K-2 *(CONTINUED)*



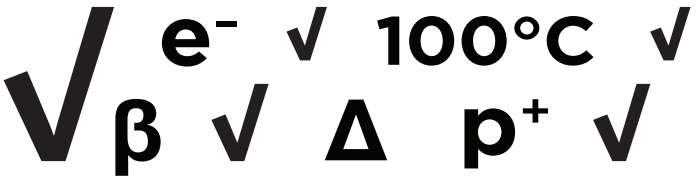
E PERFORMANCE INDICATOR
Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.* (K-ESS3-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Explain the impact of humans on the land, water, air, and/or other living things in the local environment.	**Explain** the impact of humans on the land, water, air, and/or other living things in the local environment and **generate** solutions that reduce that impact.	**Communicate** solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.	**Explain** how the solutions will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

F PERFORMANCE INDICATOR
Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.* (2-ESS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the features needed for a solution to slow or prevent wind or water from changing the shape of the land.	**Describe** how multiple solutions are designed to slow or prevent wind or water from changing the shape of the land.	**Compare** multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	**Identify** a solution and **explain** why it is the most effective design to slow or prevent wind or water from changing the shape of the land.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | K-2 *(CONTINUED)*



G PERFORMANCE INDICATOR
Develop a model to represent the shapes and kinds of land and bodies of water in an area. (2-ESS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	List the shapes and kinds of land and bodies of water in an area.	**Identify** and **describe** the relationships between similar (land to land) and different (land to water) components.	**Develop** a model to **represent** the shapes and kinds of land and bodies of water in an area.	**Evaluate** the effectiveness of the model to accurately represent the natural world.

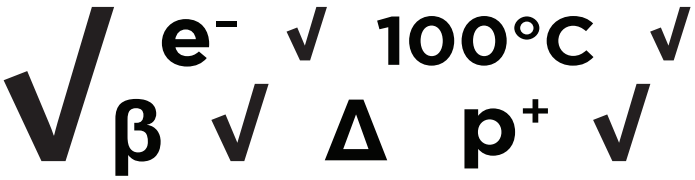
H PERFORMANCE INDICATOR
Obtain information to identify where water is found on Earth and that it can be solid or liquid. (2-ESS2-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify examples of water in liquid and solid form.	**Identify** sources to obtain information where water is found on Earth.	**Obtain** information to **identify** where water is found on Earth and that it can be solid or liquid.	**Evaluate** the accuracy and usefulness of the sources used to identify where water is found on Earth and that it can be solid or liquid.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 3-5



Students will...
demonstrate an understanding of how and why Earth is constantly changing (ESS2) and how Earth's surface processes and human activities affect each other (ESS3) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. (3-ESS2-1)

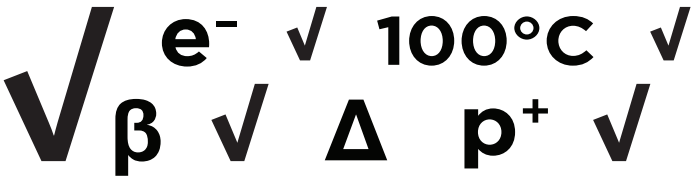
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize data about typical weather conditions during a particular season.	**Represent** data in tables and/or graphical displays about typical weather conditions during a particular season.	**Represent** data in tables and graphical displays to **describe** typical weather conditions expected during a particular season.	**Evaluate** the accuracy of the tables and graphical displays to describe typical weather conditions expected during a particular season.

B PERFORMANCE INDICATOR

Obtain and combine information to describe climates in different regions of the world. (3-ESS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe climates in different regions of the world.	**Obtain** information to **describe** climates in different regions of the world.	**Obtain** and **combine** information to **describe** climates in different regions of the world.	**Evaluate** the accuracy and usefulness of the information to describe climate in different regions of the world.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 3-5 *(CONTINUED)*



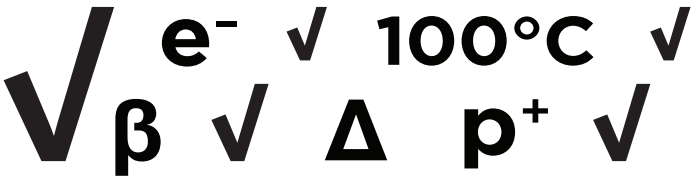
C PERFORMANCE INDICATOR
Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.* (3-ESS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Explain the impacts of a weather-related hazard.	**Explain** the design solution that reduces the impacts of a weather-related hazard.	**Make** a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.	**Explain** the claim regarding the merit of a design solution that reduces the impacts of a weather-related hazard.

D PERFORMANCE INDICATOR
Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. (4-ESS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations of weathering and/or erosion.	**Make** observations and/or measurements to **provide** evidence of weathering and/or erosion.	**Make** observations and/or measurements to **provide** evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	**Use** observations and/or measurement to **explain** the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 3-5 *(CONTINUED)*



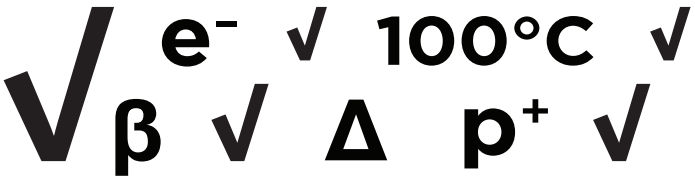
E PERFORMANCE INDICATOR
Analyze and interpret data from maps to describe patterns of Earth's features. (4-ESS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Use data from a map to **identify** patterns of Earth's features.	**Interpret** data from maps to **describe** patterns of Earth's features.	**Analyze** and **interpret** data from maps to **describe** patterns of Earth's features.	Using data from maps, **hypothesize** why patterns exist for the Earth's features.

F PERFORMANCE INDICATOR
Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. (4-ESS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe that energy and fuels are derived from natural resources.	**Obtain** information to **describe** that energy and fuels are derived from natural resources and their uses affect the environment.	**Obtain** and **combine** information to **describe** that energy and fuels are derived from natural resources and their uses affect the environment.	**Evaluate** the accuracy and usefulness of the information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 3-5 *(CONTINUED)*



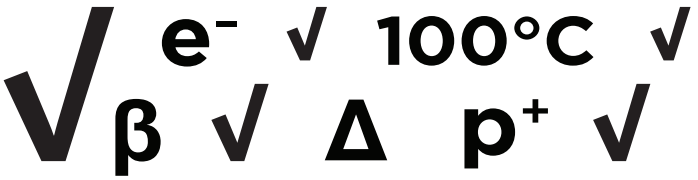
G PERFORMANCE INDICATOR
Generate and compare multiple solutions to reduce the impacts of natural earth processes on humans.* (4-ESS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Generate solution(s) related to the impacts of natural earth processes on humans.	**Generate** and **describe** multiple solutions to reduce the impacts of natural earth processes on humans based on scientific information.	**Generate** and **compare** multiple solutions to reduce the impacts of natural earth processes on humans.	**Evaluate** the effectiveness of generated solutions to reduce the impacts of natural earth processes on humans.

H PERFORMANCE INDICATOR
Develop a model, using an example, to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. (5-ESS2-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the components of a model that would describe the ways different spheres of the Earth interact.	**Describe** specific interactions between the spheres of the Earth.	**Develop** a model, using an example, to **describe** ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	**Apply** the model to **predict** how changes in one sphere of the Earth will cause changes in other spheres.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 3-5 *(CONTINUED)*



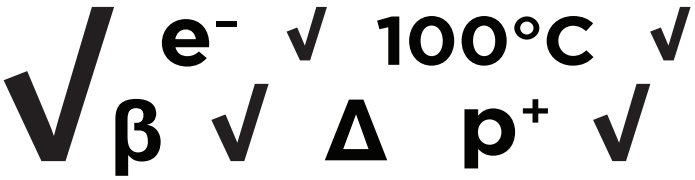
PERFORMANCE INDICATOR
Describe and graph the amounts and percentages of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. (5-ESS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the differences in salt water and fresh water in various reservoirs.	**Graph** data on the amounts and percentages of salt water and fresh water in various reservoirs to **demonstrate** the distribution of water on Earth.	**Describe** and **graph** the amounts and percentages of salt water and fresh water in various reservoirs to **provide** evidence about the distribution of water on Earth.	**Evaluate** the accuracy of the graph to describe the amounts and percentages of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 6-8



Students will...
demonstrate an understanding of how and why Earth is constantly changing (ESS2) and how Earth's surface processes and human activities affect each other (ESS3) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. (MS-ESS2-1)

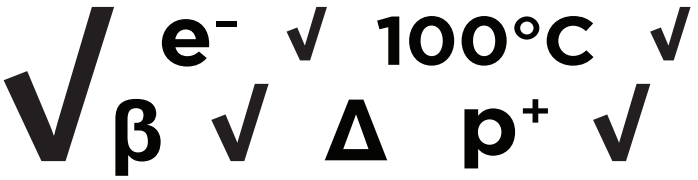
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant components of a model illustrating the cycling of Earth's materials.	**Describe** the relationships between the components of a model illustrating the cycling of Earth's materials and the flow of energy that drives the process.	**Develop** a model to **describe** the cycling of Earth's materials and the flow of energy that drives this process.	**Apply** a model to **explain** the formation of a specific type of Earth material over time.

B PERFORMANCE INDICATOR

Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (MS-ESS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence that shows how geoscience processes have changed Earth's surface at varying time and spatial scales.	**Describe** how evidence shows how geoscience processes have changed Earth's surface at varying time and spatial scales.	**Construct** an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	**Predict** how geoscience processes may change Earth's surface at varying time and spatial scales in the future.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 6-8 *(CONTINUED)*



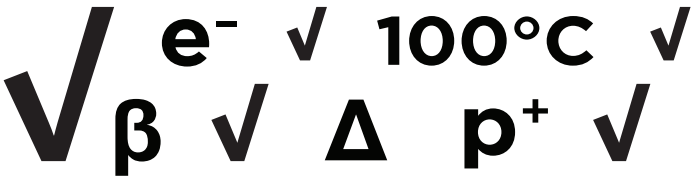
C PERFORMANCE INDICATOR
Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. (MS-ESS2-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Use data to **explain** the distribution of fossils and rocks, continental shapes, and seafloor structures.	**Analyze** data on the distribution of fossils and rocks, continental shapes, and seafloor structures to **show** the past plate motions.	**Analyze** and **interpret** data on the distribution of fossils and rocks, continental shapes, and seafloor structures to **provide** evidence of the past plate motions.	**Use** analysis and interpretations to **explain** the reasons for past plate motions.

D PERFORMANCE INDICATOR
Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity. (MS-ESS2-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant components of the water cycle.	**Describe** the relationships among the components of the water cycle, including energy transfer.	**Develop** a model to **describe** the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	**Apply** the model to **predict** how changes in energy transfer would influence the water cycle and affect living organisms.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 6-8 *(CONTINUED)*



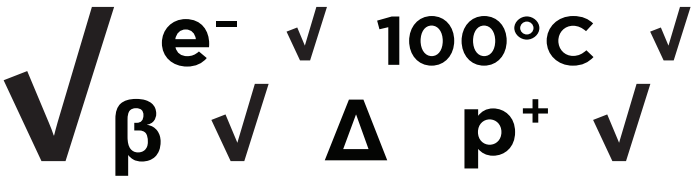
E PERFORMANCE INDICATOR
Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions. (MS-ESS2-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify data related to how the motions and complex interactions of air masses results in changes in weather conditions.	**Collect** data about how the motions and complex interactions of air masses results in changes in weather conditions.	**Collect** data to **provide** evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	**Evaluate** the effectiveness of the data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.

F PERFORMANCE INDICATOR
Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates. (MS-ESS2-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the relevant components of a model that would illustrate the unequal heating and rotation of the Earth.	**Describe** the relationship between the components of the model, including the role of solar energy and temperature, motion of ocean water and air masses, motion of wind and currents, and thermal energy transfer.	**Develop** and **use** a model to **describe** how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	**Apply** the model to **predict** how changes in the heating of Earth's surface could cause changes in air and ocean circulation and patterns of climate in the future.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 6-8 *(CONTINUED)*



G PERFORMANCE INDICATOR

Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. (MS-ESS3-1)

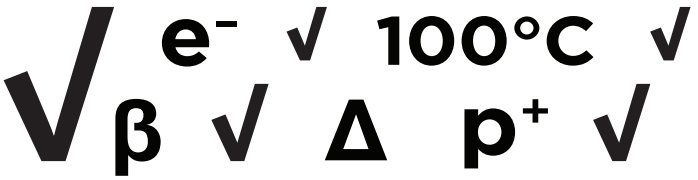
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify evidence to **show** how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	**Describe** how evidence demonstrates the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	**Construct** a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.	**Evaluate** the effectiveness of the explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

H PERFORMANCE INDICATOR

Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. (MS-ESS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Use data to **explain** how natural hazards can be used to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	**Analyze** data on natural hazards to **forecast** future catastrophic events and inform the development of technologies to mitigate their effects.	**Analyze** and **interpret** data on natural hazards to **forecast** future catastrophic events and inform the development of technologies to mitigate their effects.	**Evaluate** the effectiveness of the data on natural disasters to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 6-8 *(CONTINUED)*



I PERFORMANCE INDICATOR

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* (MS-ESS3-3)

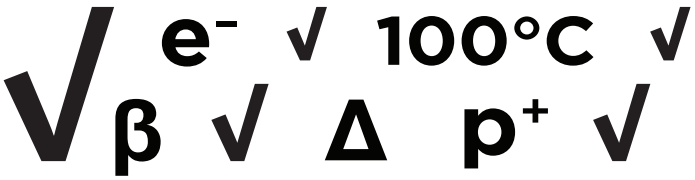
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the scientific principles related to monitoring and minimizing a human impact on the environment.	**Use** scientific principles to **identify** criteria and constraints of a design method for monitoring and minimizing a human impact on the environment.	**Apply** scientific principles to **design** a method for monitoring and minimizing a human impact on the environment.	**Evaluate** the effectiveness of the design method to monitor and minimize a human impact on the environment using criteria and constraints.

J PERFORMANCE INDICATOR

Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. (MS-ESS3-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make a claim about how increases in human population and consumption of natural resources impact Earth's systems.	**Describe** evidence to **support** a claim about how increases in human population and consumption of natural resources impact Earth's systems.	**Construct** an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	**Predict** how increases in human population and per-capita consumption of natural resources will impact Earth's systems in the future.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 6-8 *(CONTINUED)*



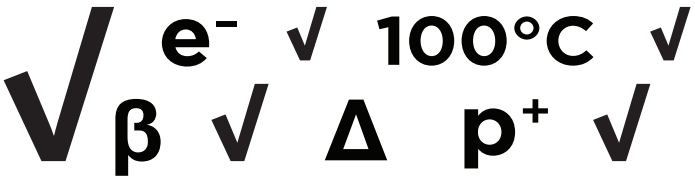
K PERFORMANCE INDICATOR
Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century. (MS-ESS3-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify factors that have caused the rise in global temperatures over the past century.	**Ask** questions about the factors that have caused the rise in global temperatures over the past century.	**Ask** questions to **clarify** evidence of the factors that have caused the rise in global temperatures over the past century.	**Critique** the quality of the questions to clarify the evidence of the factors that have caused the rise in global temperatures over the past century.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 9-12



Students will...
demonstrate an understanding of how and why Earth is constantly changing (ESS2) and how Earth's surface processes and human activities affect each other (ESS3) through the integration of scientific and engineering practices and crosscutting concepts.

A PERFORMANCE INDICATOR

Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. (HS-ESS2-1)

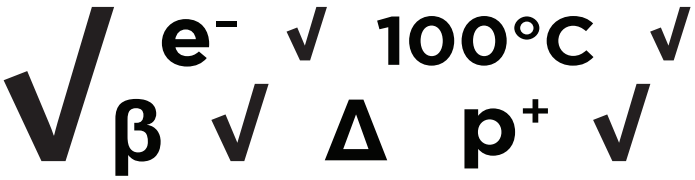
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the component parts of Earth's interior and surface that form continental and ocean-floor features.	**Describe** the interactions between component parts of Earth's interior and surface that form continental and ocean-floor features.	**Develop** a model to **illustrate** how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features.	**Apply** a model to **predict** future continental and ocean-floor features based on Earth's current internal and surface processes.

B PERFORMANCE INDICATOR

Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. (HS-ESS2-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Organize geoscience data needed to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.	**Describe** relevant geoscience data that support the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.	**Analyze** geoscience data to **make** the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.	**Predict** how multiple changes to the Earth's surfaces might create feedback that cause changes to other Earth systems.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 9-12 *(CONTINUED)*



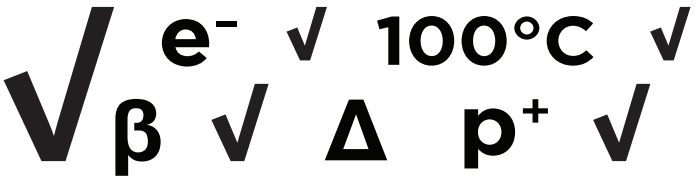
C PERFORMANCE INDICATOR
Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection. (HS-ESS2-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the component parts of Earth's interior involved in the cycling of matter by thermal convection.	**Describe** the relationship between the component parts of Earth's interior involved in the cycling of matter by thermal convection.	**Develop** a model based on evidence of Earth's interior to **describe** the cycling of matter by thermal convection.	**Evaluate** the strengths and limitations of an evidence-based model that describes the cycling of matter by thermal convection.

D PERFORMANCE INDICATOR
Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. (HS-ESS2-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify factors that affect the flow of energy in Earth's systems.	**Describe** the relationships between the factors that affect the flow of energy in Earth's systems.	**Use** a model to **describe** how variations in the flow of energy into and out of Earth's systems result in changes in climate.	**Apply** a model to **predict** future changes in climate due to the variations in the flow of energy into and out of Earth's systems.

SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 9-12 *(CONTINUED)*



E PERFORMANCE INDICATOR
Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. (HS-ESS2-5)

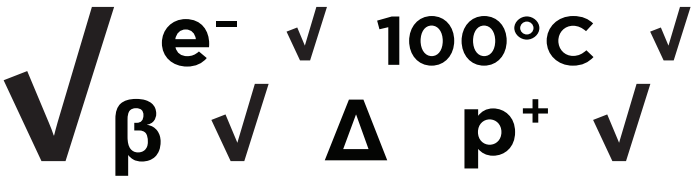
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the evidence needed in an investigation of the properties of water and its effects on Earth materials and surface processes.	**Plan** an investigation of the properties of water and its effects on Earth materials and surface processes.	**Plan** and **conduct** an investigation of the properties of water and its effects on Earth materials and surface processes.	**Propose** investigatable questions based on data collected to open other avenues of inquiry.

F PERFORMANCE INDICATOR
Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. (HS-ESS2-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the component parts of the carbon cycle.	**Describe** the relationship between various components in the carbon cycle.	**Develop** a quantitative model to **describe** the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	**Apply** a quantitative model to **predict** the effects of a disruption to the cycling of carbon among Earth's systems.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 9-12 *(CONTINUED)*



G PERFORMANCE INDICATOR

Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. (HS-ESS2-7)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify a claim about the simultaneous coevolution of Earth's systems and life on Earth.	**Describe** the evidence supporting a claim about the simultaneous coevolution of Earth's systems and life on Earth.	**Construct** an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.	**Predict** how current changes to Earth's systems (e.g., climate change, moving of the magnetic poles, holes in the ozone) might affect future systems and life on Earth.

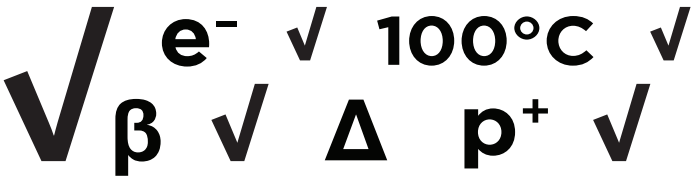
H PERFORMANCE INDICATOR

Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. (HS-ESS3-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the evidence needed to **show** how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	**Describe** the evidence to **show** how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	**Construct** an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity.	**Predict** how the availability of natural resources, occurrence of natural hazards, and changes in climate will influence human activity in the future.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 9-12 *(CONTINUED)*



I PERFORMANCE INDICATOR

Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.* (HS-ESS3-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the problem each design solution addresses for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	**Identify** criteria and constraints of design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	**Evaluate** competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	**Predict** how design solutions might change based on future events or technological advances.

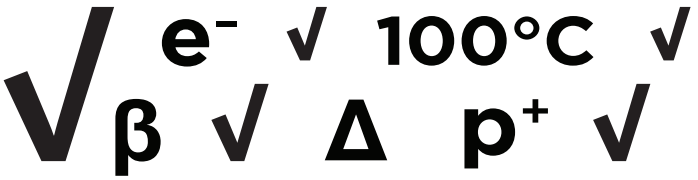
J PERFORMANCE INDICATOR

Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations and biodiversity. (HS-ESS3-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify factors that affect management of natural resources, the sustainability of human populations, and biodiversity.	**Select** and **organize** factors to include in a computational simulation that illustrates the relationships among management of natural resources, the sustainability of human populations and biodiversity.	**Create** a computational simulation to **illustrate** the relationships among management of natural resources, the sustainability of human populations and biodiversity.	**Apply** the simulation to **analyze** current real world problems in the management of natural resources, the sustainability of human populations and biodiversity.

SCORING CRITERIA

SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 9-12 *(CONTINUED)*



K PERFORMANCE INDICATOR

Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.* (HS-ESS3-4)

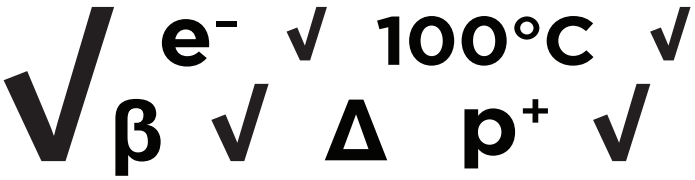
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the criteria and constraints of the problem in order to **select** a technological solution that would reduce impacts of human activities on natural systems.	**Generate** refinements to a possible technological solution that could reduce impacts of human activities on natural systems.	**Evaluate** or **refine** a technological solution that reduces impacts of human activities on natural systems.	**Predict** how advances in technological solutions may reduce impacts of human activities on natural systems.

L PERFORMANCE INDICATOR

Analyze geoscience data and the results from global climate models to make an evidence based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. (HS-ESS3-5)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the geoscience data and results from global climate models related to the current rate of global or regional climate change and associated future impacts to Earth systems.	**Organize** and **describe** the relationships within the geoscience data and results from global climate models related to the current rate of global or regional climate change and associated future impacts to Earth systems.	**Analyze** geoscience data and the results from global climate models to **make** an evidence based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems.	**Propose** and **defend** ways that the forecast might be used to make changes today that could impact the current rate of global or regional climate change and associated future impacts to Earth systems.

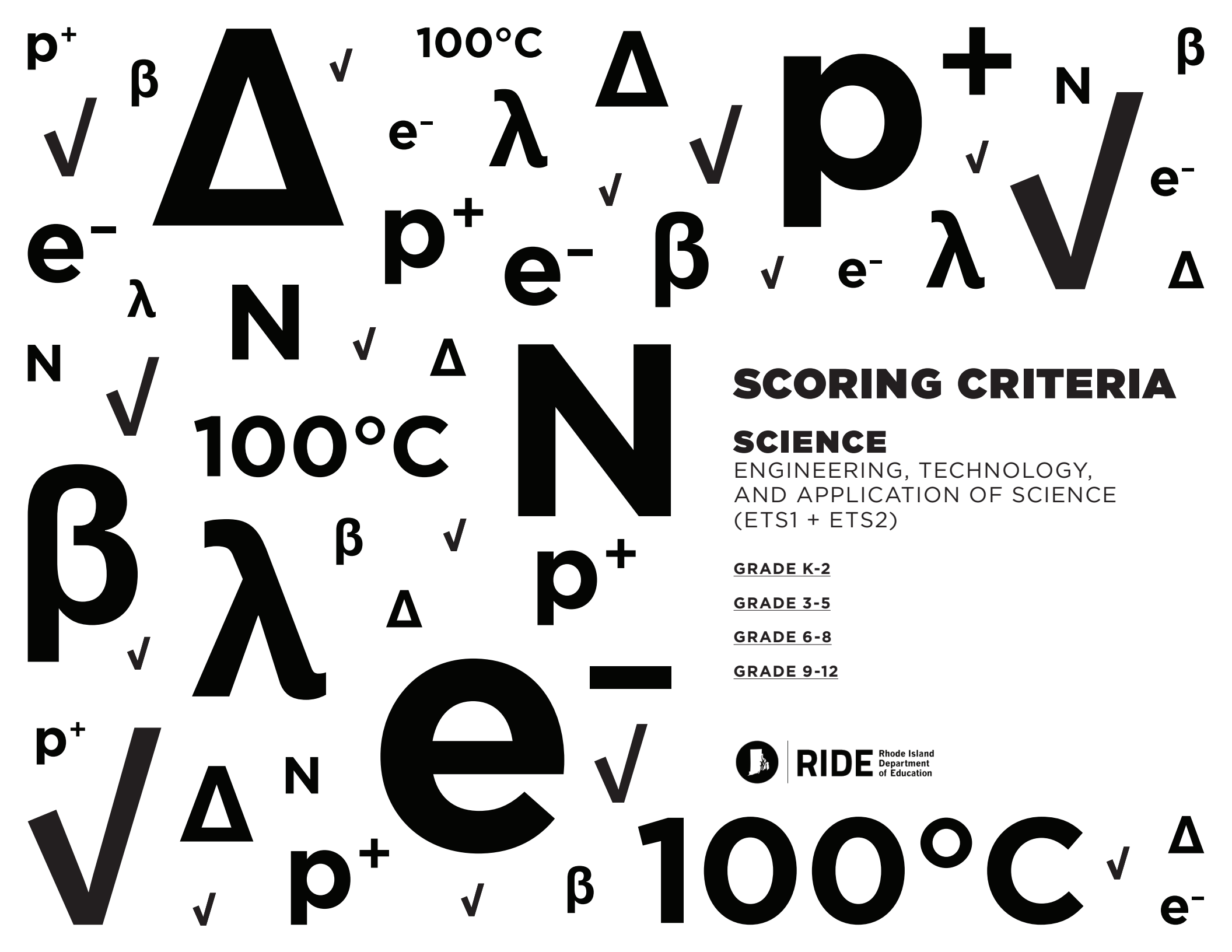
SCORING CRITERIA
SCIENCE | EARTH AND SPACE SCIENCES: EARTH SYSTEMS AND HUMAN IMPACT (ESS2 + ESS3) | 9-12 *(CONTINUED)*



M PERFORMANCE INDICATOR
Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. (HS-ESS3-6)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the relevant components of the computational representation of the Earth systems.	**Use** a computational representation to **describe** the relationships among at least two Earth systems.	**Use** a computational representation to **illustrate** the relationships among Earth systems and how those relationships are being modified due to human activity.	**Evaluate** the effectiveness of a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.

Note: Letters in parentheses reflect the performance expectations in NGSS. The performance indicators marked with an asterisk (*) integrate traditional science content with engineering through a Practice or Disciplinary Core Idea.



SCORING CRITERIA

SCIENCE

ENGINEERING, TECHNOLOGY,
AND APPLICATION OF SCIENCE
(ETS1 + ETS2)

GRADE K-2

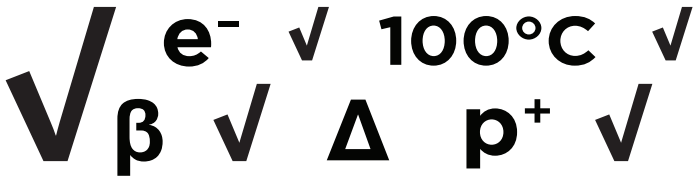
GRADE 3-5

GRADE 6-8

GRADE 9-12

RIDE Rhode Island Department of Education

SCORING CRITERIA
SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | K-2

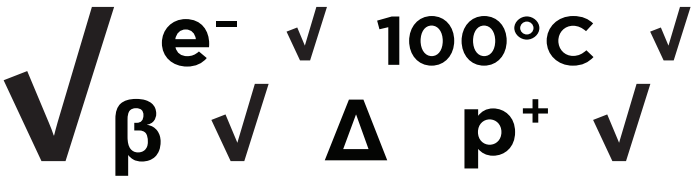


Students will...
apply the engineering design process to define, develop and optimize a solution to a real world problem and demonstrate understanding of how engineering, technology, science, and society are interconnected (ETS) through the integration of science and engineering practices, crosscutting concepts and disciplinary core ideas.

A PERFORMANCE INDICATOR
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. (K-2-ETS-1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Make observations and **ask** questions about a situation people want to change.	**Use** observations and questions to **gather** information about a situation people want to change.	**Ask** questions, **make** observations, and **gather** information about a situation people want to change to **define** a simple problem that can be solved through the development of a new or improved object or tool.	**Ask** questions, **make** observations, and **gather** information in order to **explain** a simple problem or situation that people want to change. **Suggest** new or improved objects or tools as potential solutions.

SCORING CRITERIA
SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | K-2 *(CONTINUED)*



B PERFORMANCE INDICATOR
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. (K-2-ETS-1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe the shape of an object.	**Develop** a simple sketch, drawing, or physical model to solve a given problem.	**Develop** a simple sketch, drawing, or physical model to **illustrate** how the shape of an object helps it function as needed to solve a given problem.	**Evaluate** the effectiveness of the shape of the object to solve a given problem.

C PERFORMANCE INDICATOR
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. (K-2-ETS-1-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Using data, **identify** the strengths within the tests of two objects designed to solve the same problem.	**Explain** the data from the tests of two objects designed to solve the same problem including the strengths of how each performs.	**Analyze** data from tests of two objects designed to solve the same problem to **compare** the strengths and weaknesses of how each performs.	Using evidence from the data, **construct** an argument for which object best solved the problem.

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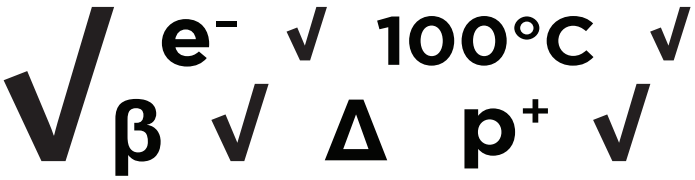
SCORING CRITERIA
SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | 3-5

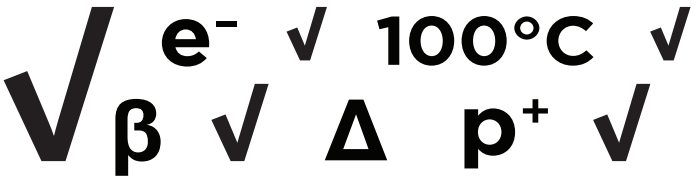


Students will...
apply the engineering design process to define, develop and optimize a solution to a real world problem and demonstrate understanding of how engineering, technology, science, and society are interconnected (ETS) through the integration of science and engineering practices, crosscutting concepts and disciplinary core ideas.

A PERFORMANCE INDICATOR
Define a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time and cost. (3-5-ETS-1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify a need or want.	**Identify** a need or want that includes specified criteria for success and constraints on materials, time and cost.	**Define** a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time and cost.	**Define** a simple design problem, including an explanation of a need or want that includes specified criteria for success and constraints on materials, time and cost.

SCORING CRITERIA
SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | 3-5 *(CONTINUED)*



B PERFORMANCE INDICATOR

Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. (3-5-ETS-1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the criteria and constraints of solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem	**Generate** multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	**Generate** and **compare** multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	**Explain** using evidence which solutions are best based on how well each is likely to meet the criteria and constraints of the problem.

C PERFORMANCE INDICATOR

Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved. (3-5-ETS-1-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify variables to be controlled in fair tests.	**Plan** fair tests in which variables are controlled and **identify** potential failure points.	**Plan** and **carry out** fair tests in which variables are controlled and failure points are considered to **identify** aspects of a model or prototype that can be improved.	Using results from tests, **explain** how aspects of a model or prototype can be improved.

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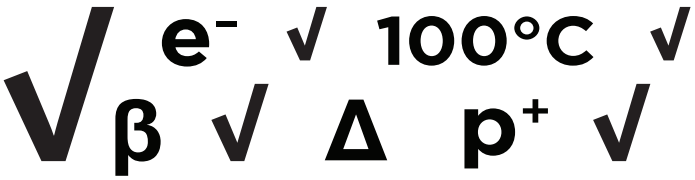
SCORING CRITERIA
SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | 6-8

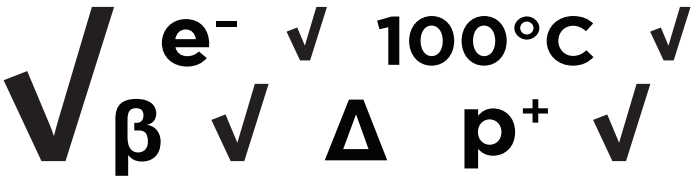


Students will...
apply the engineering design process to define, develop and optimize a solution to a real world problem and demonstrate understanding of how engineering, technology, science, and society are interconnected (ETS) through the integration of science and engineering practices, crosscutting concepts and disciplinary core ideas.

A PERFORMANCE INDICATOR
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions. (MS-ETS1-1)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify a problem to be solved through design.	**Identify** the scientific principles relevant to the problem and the potential impacts on people and the natural environment that may limit possible solutions.	**Define** the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	**Explain** how the criteria and constraints take into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

SCORING CRITERIA
SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | 6-8 *(CONTINUED)*



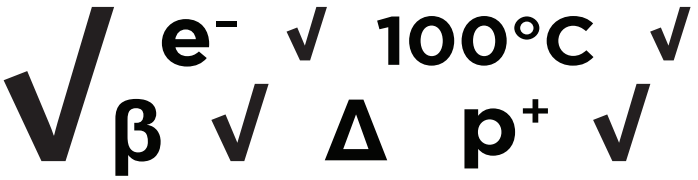
B PERFORMANCE INDICATOR
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (MS-ETS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify how each design solution would solve the problem.	**Describe** how design solutions meet the criteria and constraints of the problem.	**Evaluate** competing design solutions using a systematic process to **determine** how well they meet the criteria and constraints of the problem.	**Explain** the importance of specific criteria and constraints in solving the problem.

C PERFORMANCE INDICATOR
Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success. (MS-ETS1-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify relationships within given data.	**Explain** given data to **show** similarities and differences among several design solutions.	**Analyze** data from tests to **determine** similarities and differences among several design solutions to **identify** the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	Based on analysis, **propose** a new design solution to better meet the criteria for success.

SCORING CRITERIA
SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | 6-8 *(CONTINUED)*



D PERFORMANCE INDICATOR

Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved. (MS-ETS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify relevant components of a model for testing.	**Describe** relationships between relevant components of a model.	**Develop** a model to **generate** data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	**Apply** and **adapt** a model for a related but different object, tool or process.

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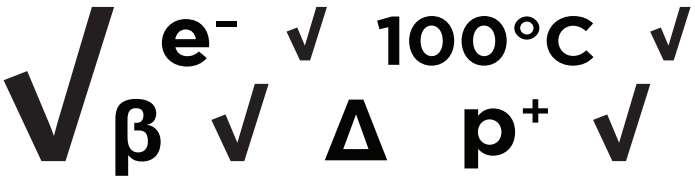
SCORING CRITERIA

SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | 9-12



Students will...
apply the engineering design process to define, develop and optimize a solution to a real world problem and demonstrate understanding of how engineering, technology, science, and society are interconnected (ETS) through the integration of science and engineering practices, crosscutting concepts and disciplinary core ideas.

A PERFORMANCE INDICATOR

Analyze a major global challenge to specify qualitative criteria and constraints for solutions that account for societal needs and wants. (HS-ETS1-1)

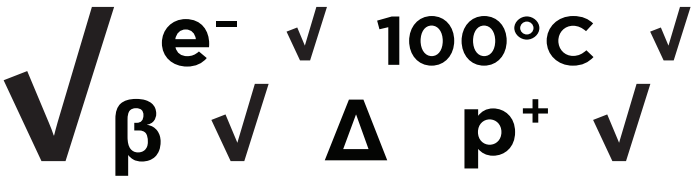
SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe with rationale a major global challenge.	**Explain** the physical system in which the problem is embedded and **identify** the societal needs and wants relative to the problem.	**Analyze** a major global challenge to **specify** qualitative criteria and constraints for solutions that account for societal needs and wants.	**Analyze** a major global challenge to **prioritize** qualitative criteria and constraints for solutions that account for societal needs and wants.

B PERFORMANCE INDICATOR

Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. (HS-ETS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Describe a complex real-world problem and **identify** smaller, more manageable problems within it.	**Describe** the criteria and constraints of a solution to a complex real-world problem that can be solved through engineering.	**Design** a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	**Evaluate** the effectiveness of the solution to a complex real-world problem based on the criteria and constraints.

SCORING CRITERIA
SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | 9-12 *(CONTINUED)*



C PERFORMANCE INDICATOR
Evaluate a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. (HS-ETS1-2)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Explain the solution to a complex real-world problem and **identify** the smaller, more manageable problems within in.	**Describe** the criteria and constraints of a solution to a complex real-world problem that can be solved through engineering.	**Evaluate** a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	**Propose** a design solution for parts of the real-world problems that may remain once the proposed solution is implemented.

D PERFORMANCE INDICATOR
Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including costs, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts. (HS-ETS1-3)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Generate and prioritize criteria and constraints of a solution to a complex real-world problem.	**Generate** multiple solutions to the complex real-world problem.	**Evaluate** a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including costs, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.	**Propose** a design solution for parts of the real-world problem that may remain once the proposed solution is implemented.

SCORING CRITERIA
SCIENCE | ENGINEERING, TECHNOLOGY, AND APPLICATION OF SCIENCE (ETS1 + ETS2) | 9-12 *(CONTINUED)*

E PERFORMANCE INDICATOR
Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. (HS-ETS1-4)

SCORING CRITERIA	BEGINNING	DEVELOPING	PROFICIENT	EXPANDING
	Identify the component parts of a model that would illustrate the impact of proposed solutions to a complex real-world problem.	**Describe** the relationship between the parts of a model and the criteria and constraints inherent in the real-world problem.	**Use** a computer simulation to **model** the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	**Evaluate** the strengths and limitations of a computer simulation that models the impact of proposed solutions to a complex, real-world problem.

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