

# North Dakota Science Content and Achievement Standards

## Standard 3

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### North Dakota Department of Public Instruction

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## Standard 3: Physical Science

Standard 3: Students understand the basic concepts and principles of physical science.				
Benchmark Expectations	PROFICIENCY DESCRIPTOR			
	ADVANCED PROFICIENT	PROFICIENT	PARTIALLY PROFICIENT	NOVICE
<b>Kindergarten</b>				
<b>PROPERTIES OF MATTER</b>				
K.3.1. Identify the materials that make up an object. (e.g., desk is made up of wood and metal, bike is made up of metal, rubber, and plastic)	Students always identify the materials that make up an object.	Students generally identify the materials that make up an object.	Students sometimes identify the materials that make up an object.	Students rarely identify the materials that make up an object.
<b>Grade 1</b>				
<b>PROPERTIES OF MATTER</b>				
1.3.1. Identify matter that can be a liquid or solid (e.g., water)	Students identify with accuracy matter that can be a liquid or solid.	Students identify with no significant errors matter that can be a liquid or solid.	Students identify with a few significant errors matter that can be a liquid or solid.	Students identify with many significant errors matter that can be a liquid or solid.
1.3.2. Identify observable properties (e.g., size, weight, shape, color, movement) of objects	Students identify an extensive variety of observable properties of objects.	Students identify a variety of observable properties of objects.	Students identify some different observable properties of objects.	Students identify few observable properties of objects.
<b>FORCE AND MOTION</b>				
1.3.3. Identify different kinds of motion (e.g., straight, circular, back-and-forth) that objects can have	Students identify an extensive variety of motions that objects can have.	Students identify a variety of motions that objects can have.	Students identify some different motions that objects can have.	Students identify a limited variety of motions that objects can have.
<b>Grade 2</b>				
<b>PROPERTIES OF MATTER</b>				
2.3.1. Identify ways (e.g., mixing, heating, cooling, cutting) to make changes in matter	Students identify an extensive variety of ways to make changes in matter.	Students identify a variety of ways to make changes in matter.	Students identify some different ways to make changes in matter.	Students identify few ways to make changes in matter.

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2.3.2. Explain why water left in an open container disappears, but water in a closed container does not disappear	Students provide an insightful explanation why water left in an open container disappears, but water in a closed container does not disappear.	Students provide a reasonable explanation why water left in an open container disappears, but water in a closed container does not disappear.	Students provide a superficial explanation why water left in an open container disappears, but water in a closed container does not disappear.	Students provide an unreasonable explanation why water left in an open container disappears, but water in a closed container does not disappear.
2.3.3. Sort matter by observable properties (e.g., size, shape, texture, color)	Students sort matter by observable properties with no errors.	Students sort matter by observable properties with no significant errors.	Students sort matter by observable properties with few significant errors.	Students sort matter by observable properties with many significant errors.
<b>FORCE AND MOTION</b>				
2.3.4. Describe an object's location (e.g., further than, beside, under, over) relative to another object	Students describe an object's location relative to another object with no errors.	Students describe an object's location relative to another object with no significant errors.	Students describe an object's location relative to another object with few significant errors.	Students describe an object's location relative to another object with many significant errors.
2.3.5. Describe how objects fall unless something holds them up (e.g., apple on a tree, coat on a hook, pencil rolling off a desk)	Students always describe how objects fall unless something holds them up.	Students consistently describe how objects fall unless something holds them up.	Students sometimes describe how objects fall unless something holds them up.	Students rarely describe how objects fall unless something holds them up.
<b>FORMS OF ENERGY</b>				
2.3.6. Identify whether sources of heat and light are natural or human-made (e.g., sunlight, light bulb)	Students identify with no errors whether sources of heat and light are natural or human-made.	Students identify with no significant errors whether sources of heat and light are natural or human-made.	Students identify with few significant errors whether sources of heat and light are natural or human-made.	Students identify with many significant errors whether sources of heat and light are natural or human-made.
<b>Grade 3</b>				
<b>PROPERTIES OF MATTER</b>				
3.3.1. Identify the physical properties of solids and liquids	Students identify all of the properties of solids and liquids.	Students identify most of the properties of solids and liquids.	Students identify some of the properties of solids and liquids.	Students identify few of the properties of solids and liquids.
<b>FORCE AND MOTION</b>				
3.3.2. Identify a force as push or pull	Students always identify a force as push or pull.	Students consistently identify a force as push or pull.	Students sometimes identify a force as push or pull.	Students rarely identify a force as push or pull.

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<p>3.3.3. Describe how magnets attract iron and repel or attract other magnets</p> <p>FORMS OF ENERGY</p>	Students describe how, with no errors, magnets attract iron and repel or attract other magnets.	Students describe how, with no significant errors, magnets attract iron and repel or attract other magnets.	Students describe how, with few significant errors, magnets attract iron and repel or attract other magnets.	Students describe how, with many significant errors, magnets attract iron and repel or attract other magnets.
<p>3.3.4. Explain how sound is produced by vibration</p>	Students explain how, with no errors, sound is produced by vibration.	Students explain how, with no significant errors, sound is produced by vibration.	Students explain how, with few significant errors, sound is produced by vibration.	Students explain how, with many significant errors, sound is produced by vibration.
<p>3.3.5. Describe how the path of light tends to maintain its direction and motion until it encounters an object</p>	Students always describe how the path of light tends to maintain its direction and motion until it encounters an object.	Students generally describe how the path of light tends to maintain its direction and motion until it encounters an object.	Students sometimes describe how the path of light tends to maintain its direction and motion until it encounters an object.	Students rarely describe how the path of light tends to maintain its direction and motion until it encounters an object.
<b>Grade 4</b>				
PROPERTIES OF MATTER				
<p>4.3.1. Identify the forms in which water appears when heated and cooled (i.e., water vapor, liquid, solid)</p>	Students identify, with no errors, the forms in which water appears when heated and cooled.	Students identify, with no significant errors, the forms in which water appears when heated and cooled.	Students identify, with few significant errors, the forms in which water appears when heated and cooled.	Students identify, with many significant errors, the forms in which water appears when heated and cooled.
<p>4.3.2. Explain the relationship between the mass of an object and the sum of its parts.</p>	Students explain, with no errors, the relationship between the mass of an object and the sum of its parts.	Students explain, with no significant errors, the relationship between the mass of an object and the sum of its parts.	Students explain, with few significant errors, the relationship between the mass of an object and the sum of its parts.	Students explain, with many significant errors, the relationship between the mass of an object and the sum of its parts.
<p>4.3.3. Explain that matter is made up of parts that are too small to see without magnification</p>	Students explain, with no errors, that matter is made up of parts that are too small to see without magnification.	Students explain, with no significant errors, that matter is made up of parts that are too small to see without magnification.	Students explain, with few significant errors, that matter is made up of parts that are too small to see without magnification.	Students explain with many significant errors, that matter is made up of parts that are too small to see without magnification.

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<p><b>FORCE AND MOTION</b></p> <p>4.3.4. Identify the effects forces may have when applied to objects (i.e., start, stop, change direction)</p> <p><b>FORMS OF ENERGY</b></p> <p>4.3.5. Describe how the path of light changes (i.e., reflected, absorbed, or allowed to pass through) when it encounters a variety of objects</p> <p>4.3.6. Explain how the pitch of a sound is related to the rate of vibrations.</p> <p>4.3.7. Identify ways friction or burning produces heat (e.g., magnifying glass, carpet burn, sunburn)</p>	<p>Students identify, with no errors, the effects forces may have when applied to objects</p> <p>Students describe, with no errors, how the path of light changes when it encounters a variety of objects.</p> <p>Students explain, with no errors, how the pitch of a sound is related to the rate of vibrations.</p> <p>Students identify an extensive variety of ways that heat can be produced by friction or burning.</p>	<p>Students identify, with no significant errors, the effects forces may have when applied to objects.</p> <p>Students describe, with no significant errors, how the path of light changes when it encounters a variety of objects.</p> <p>Students explain, with no significant errors, how the pitch of a sound is related to the rate of vibrations.</p> <p>Students identify many different ways that heat can be produced by friction or burning.</p>	<p>Students identify, with few significant errors, the effects forces may have when applied to objects.</p> <p>Students describe, with few significant errors, how the path of light changes when it encounters a variety of objects.</p> <p>Students explain, with few errors, how the pitch of a sound is related to the rate of vibrations.</p> <p>Students identify some different ways that heat can be produced by friction or burning.</p>	<p>Students identify, with many significant errors, the effects forces may have when applied to objects.</p> <p>Students describe, with many significant errors, how the path of light changes when it encounters a variety of objects.</p> <p>Students explain, with significant errors, how the pitch of a sound is related to the rate of vibrations.</p> <p>Students identify very few ways that heat can be produced by friction or burning.</p>
<b>Grade 5</b>				
<p><b>PROPERTIES OF MATTER</b></p> <p>5.3.1. Identify physical properties of substances before and after they are combined</p> <p>5.3.2. Identify new substances formed in a chemical change (i.e., rusting, burning)</p> <p>5.3.3. Compare and contrast properties of solids, liquids, and gases</p>	<p>Students identify all the physical properties before and after substances are combined.</p> <p>Students identify new substances formed in a chemical change with no errors.</p> <p>Students compare and contrast properties of a variety of solids, liquids, and gases with no errors.</p>	<p>Students identify most of the physical properties before and after substances are combined.</p> <p>Students identify new substances formed in a chemical change with no significant errors.</p> <p>Students compare and contrast properties of a variety of solids, liquids, and gases with no significant errors.</p>	<p>Students identify some of the physical properties before and after substances are combined.</p> <p>Students identify new substances formed in a chemical change with few significant errors.</p> <p>Students compare and contrast properties of a variety of solids, liquids, and gases with few significant errors.</p>	<p>Students identify very few of the physical properties before and after substances are combined.</p> <p>Students identify new substances formed in a chemical change with many significant errors.</p> <p>Students compare and contrast properties of a variety of solids, liquids, and gases.</p>

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<b>FORCE AND MOTION</b>				
5.3.4. Identify the effects force and mass have on the motion of an object	Students identify, with no errors, the effects force and mass have on the motion of an object.	Students identify, with no significant errors, the effects force and mass have on the motion of an object.	Students identify, with few significant errors, the effects force and mass have on the motion of an object.	Students identify, with many significant errors, the effects force and mass have on the motion of an object.
5.3.5. Explain why gravity is called an attracting force.	Students explain why, with no errors, gravity is an attracting force.	Students explain why, with no significant errors, gravity is an attracting force.	Students explain why, with few significant errors, gravity is an attracting force.	Students explain why, with many significant errors, gravity is an attracting force.
<b>FORMS OF ENERGY</b>				
5.3.6. Demonstrate a simple electrical circuit by completing a continuous loop (i.e., battery, light, wire)	Students demonstrate a simple electrical circuit by completing a continuous loop with no errors.	Students demonstrate a simple electrical circuit by completing a continuous loop with no significant errors.	Students demonstrate a simple electrical circuit by completing a continuous loop with few significant errors.	Students demonstrate a simple electrical circuit by completing a continuous loop with many significant errors.
5.3.7. Identify materials that are good conductors of heat	Students identify an extensive variety of materials that are good conductors of heat.	Students identify a variety of materials that are good conductors of heat.	Students identify some materials that are good conductors of heat.	Students identify few materials that are good conductors of heat.
<b>Grade 6</b>				
<b>PROPERTIES OF MATTER</b>				
6.3.1. Organize materials according to similar properties (e.g., physical, chemical)	Students group materials with similar properties with no errors.	Students group materials with similar properties with no significant errors.	Students group materials with similar properties with few significant errors.	Students group materials with similar properties with many significant errors.
<b>FORCE AND MOTION</b>				
6.3.2. Use simple machines to change forces	Students use simple machines in innovative ways to change forces.	Students use simple machines in reasonable ways to change forces.	Students use simple machines in superficial ways to change forces.	Students use simple machines in unreasonable ways to change forces.

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<p><b>FORMS OF ENERGY</b></p> <p>6.3.3. Identify different forms of energy (e.g., chemical, mechanical, heat, sound)</p> <p>6.3.4. Identify sources of energy (e.g., sun, wind, moving water, nuclear, fossil fuels, food)</p> <p><b>VIBRATIONS AND WAVES</b></p> <p>6.3.5. Explain how vibrations create wavelike disturbances that spread out from the source</p>	<p>Students identify energy in an extensive variety of forms.</p> <p>Students identify an extensive variety of energy sources.</p> <p>Students give a substantive explanation of how vibrations create wavelike disturbances that spread out from the source.</p>	<p>Students identify energy in many different forms.</p> <p>Students identify many different energy sources.</p> <p>Students give a reasonable explanation of how vibrations create wavelike disturbances that spread out from the source.</p>	<p>Students identify energy in some different forms.</p> <p>Students identify some different energy sources.</p> <p>Students give a superficial explanation of how vibrations create wavelike disturbances that spread out from the source.</p>	<p>Students identify energy in a limited variety of forms.</p> <p>Students identify a limited variety of energy sources.</p> <p>Students give an unreasonable explanation of how vibrations create wavelike disturbances that spread out from the source.</p>
<b>Grade 7</b>				
<p><b>PROPERTIES OF MATTER</b> <i>No benchmark expectations at this level</i></p> <p><b>FORCE AND MOTION</b> <i>No benchmark expectations at this level</i></p> <p><b>FORMS OF ENERGY</b> <i>No benchmark expectations at this level</i></p> <p><b>ENERGY TRANSFER AND TRANSFORMATION</b></p> <p>7.3.1. Explain how forms of energy can be transferred. (e.g., photosynthesis, metabolism, battery)</p> <p><b>VIBRATIONS AND WAVES</b> <i>No benchmark expectations at this level</i></p>	<p>Students explain an extensive variety of energy transfers.</p>	<p>Students explain a variety of energy transfers.</p>	<p>Students explain some different energy transfers.</p>	<p>Students explain a limited variety of energy transfers.</p>

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<b>Grade 8</b>				
<b>PROPERTIES OF MATTER</b>				
8.3.1. Identify elements and compounds	Students identify elements and compounds with no errors.	Students identify elements and compounds with no significant errors.	Students identify elements and compounds with few significant errors.	Students identify elements and compounds with many significant errors.
8.3.2. Explain the relationship between phases of matter and temperature	Students explain the relationship between phases of matter and temperature with no errors.	Students explain the relationship between phases of matter and temperature with no significant errors.	Students explain the relationship between phases of matter and temperature with few significant errors.	Students explain the relationship between phases of matter and temperature with many significant errors.
<b>FORCE AND MOTION</b>				
8.3.3. Interpret the effect of balanced and unbalanced forces on the motion of an object (e.g., convection currents, orbital motion, tides)	Students interpret the effect of balanced and unbalanced forces with no errors.	Students interpret the effect of balanced and unbalanced forces with no significant errors.	Students interpret the effect of balanced and unbalanced forces with few significant errors.	Students interpret the effect of balanced and unbalanced forces with many significant errors.
8.3.4. Explain how all objects exert gravitational force and this force is affected by the distance between the masses of the objects	Students explain, with no errors, the relationship among gravitational force, mass, and distance.	Students explain, with no significant errors, the relationship among gravitational force, mass, and distance.	Students explain, with few significant errors, the relationship among gravitational force, mass, and distance.	Students explain, with many significant errors, the relationship among gravitational force, mass, and distance.
<b>ENERGY TRANSFER AND TRANSFORMATION</b>				
8.3.5. Identify when heat can be transferred by conduction, convection, or radiation.	Students identify with no errors when heat can be transferred by conduction, convection, or radiation.	Students identify with no significant errors when heat can be transferred by conduction, convection, or radiation.	Students identify with few significant errors when heat can be transferred by conduction, convection, or radiation.	Students identify with significant errors when heat can be transferred by conduction, convection, or radiation..
<b>VIBRATIONS AND WAVES</b>				
8.3.6. Explain the characteristic properties (e.g., wavelength, frequency) and behaviors (e.g., reflection, refraction) of waves	Students explain an extensive variety of wave properties and behaviors.	Students explain many different wave properties and behaviors.	Students explain some different wave properties and behaviors.	Students explain limited variety of wave properties and behaviors.

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<b>Grade 9-10</b>				
<b>PROPERTIES OF MATTER</b>				
9-10.3.1. Classify elements according to similar properties. (e.g., metal, nonmetal, solids, liquids, gases)	Students classify elements according to similar properties with no errors.	Students classify elements according to similar properties with no significant errors.	Students classify elements according to similar properties with few significant errors.	Students classify elements according to similar properties with many significant errors.
9-10.3.2. Classify changes in matter as physical or chemical	Students classify changes in matter as physical or chemical with no errors.	Students classify changes in matter as physical or chemical with no significant errors.	Students classify changes in matter as physical or chemical with few significant errors.	Students classify changes in matter as physical or chemical with many significant errors.
9-10.3.3. Identify the Law of Conservation of Matter in physical and chemical changes	Students identify the Law of Conservation of Matter in an extensive variety of physical and chemical changes.	Students identify the Law of Conservation of Matter in many different physical and chemical changes.	Students identify the Law of Conservation of Matter in some different physical and chemical changes.	Students identify the Law of Conservation of Matter in a limited variety of physical and chemical changes.
<b>ATOMS AND MOLECULES</b>				
9-10.3.4. Construct a model of an atom (e.g., protons, neutrons, electrons, nucleus, electron cloud)	Students construct a model of an atom identifying all of the significant details.	Students construct a model of an atom identifying most of the significant details.	Students construct a model of an atom identifying some of the significant details.	Students construct a model of an atom identifying very few of the significant details.
<b>CHEMICAL REACTIONS</b>				
9-10.3.5. Identify the reactants and products in a chemical reaction	Students identify the reactants and products in a chemical reaction with no errors.	Students identify the reactants and products in a chemical reaction with no significant errors.	Students identify the reactants and products in a chemical reaction with few significant errors.	Students identify the reactants and products in a chemical reaction with many significant errors.
9-10.3.6. Distinguish between balanced and unbalanced chemical equations	Students distinguish between balanced and unbalanced chemical equations with no errors.	Students distinguish between balanced and unbalanced chemical equations with no significant errors.	Students distinguish between balanced and unbalanced chemical equations with few significant errors.	Students distinguish between balanced and unbalanced chemical equations with many significant errors.

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<p><b>FORCE AND MOTION</b></p> <p>9-10.3.7. Use Newton's Laws to describe the motion of an object</p>	<p>Students use Newton's laws to provide a description of the motion of an object with no errors.</p>	<p>Students use Newton's laws to provide a description of the motion of an object with no significant errors.</p>	<p>Students use Newton's laws to provide a description of the motion of an object with few significant errors.</p>	<p>Students use Newton's laws to provide a description of the motion of an object with many significant errors.</p>
<p><b>ENERGY TRANSFER AND TRANSFORMATION</b></p> <p>9-10.3.8. Describe the relationships between kinetic and potential energy in basic transformations (e.g., physical and chemical changes)</p>	<p>Students describe the relationships between kinetic and potential energy in an extensive variety of basic transformations.</p>	<p>Students describe the relationships between kinetic and potential energy in a variety of basic transformations.</p>	<p>Students describe the relationships between kinetic and potential energy in some different basic transformations.</p>	<p>Students describe the relationships between kinetic and potential energy in few basic transformations.</p>
<p><b>VIBRATIONS AND WAVES</b></p> <p>9-10.3.9. Compare and contrast electromagnetic and mechanical waves (i.e. energy, energy transfer, medium)</p>	<p>Students compare and contrast electromagnetic and mechanical waves identifying all of the significant details.</p>	<p>Students compare and contrast electromagnetic and mechanical waves identifying most of the significant details.</p>	<p>Students compare and contrast electromagnetic and mechanical waves identifying some of the significant details.</p>	<p>Students compare and contrast electromagnetic and mechanical waves identifying few of the significant details.</p>
<p><b>ELECTRICITY AND MAGNETISM</b></p> <p>9-10.3.10. Describe the differences between series and parallel circuits</p>	<p>Students describe the differences between series and parallel circuits with no errors.</p>	<p>Students describe the differences between series and parallel circuits with no significant errors.</p>	<p>Students describe the differences between series and parallel circuits with few significant errors.</p>	<p>Students describe the differences between series and parallel circuits with many significant errors.</p>

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<b>Grade 11-12</b>				
<b>PROPERTIES OF MATTER</b> <i>No benchmark expectations at this level</i> <b>ATOMIC STRUCTURE AND PROPERTIES</b>				
11-12.3.1. Explain how the structure of an atom, isotope, or ion relates to its properties	Students explain how the structure of an atom, isotope, or ion relates to its properties with no errors.	Students explain how the structure of an atom, isotope, or ion relates to its properties with no significant errors.	Students explain how the structure of an atom, isotope, or ion relates to its properties with few significant errors.	Students explain how the structure of an atom, isotope, or ion relates to its properties with many significant errors.
11-12.3.2. Identify the basic organization of the periodic table (e.g., elements are listed according to the number of protons [atomic number]; repeating patterns of physical and chemical properties	Students identify the organization of the periodic table with no errors.	Students identify the organization of the periodic table with no significant errors.	Students identify the organization of the periodic table with few significant errors.	Students identify the organization of the periodic table with many significant errors.
<b>ATOMS AND MOLECULES</b>				
11-12.3.3. Compare and contrast the role of electrons in ionic and covalent bonding	Students compare and contrast the role of electrons in ionic and covalent bonding with no errors.	Students compare and contrast the role of electrons in ionic and covalent bonding with no significant errors.	Students compare and contrast the role of electrons in ionic and covalent bonding with few significant errors.	Students compare and contrast the role of electrons in ionic and covalent bonding with many significant errors.
11-12.3.4. Identify the basic bonding characteristics of carbon which lead to a large variety of structures	Students identify the basic bonding characteristics of carbon which lead to a large variety of structures with no errors.	Students identify the basic bonding characteristics of carbon which lead to a large variety of structures with no significant errors.	Students identify the basic bonding characteristics of carbon which lead to a large variety of structures with few significant errors.	Students identify the basic bonding characteristics of carbon which lead to a large variety of structures with many significant errors.

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<b>CHEMICAL REACTIONS</b>				
11-12.3.5. Identify the effect of concentration, temperature, surface area, pressure, and catalysts on reaction rates as it relates to the Kinetic Theory.	Students identify the effect of concentration, temperature, surface area, pressure, and catalysts on reaction rates as it relates to the Kinetic Theory with no errors.	Students identify the effect of concentration, temperature, surface area, pressure, and catalysts on reaction rates as it relates to the Kinetic Theory with no significant errors.	Students identify the effect of concentration, temperature, surface area, pressure, and catalysts on reaction rates as it relates to the Kinetic Theory with few significant errors.	Students identify the effect of concentration, temperature, surface area, pressure, and catalysts on reaction rates as it relates to the Kinetic Theory with many significant errors.
11-12.3.6. Write the chemical formula and name for compounds using a table of element names, symbols, and oxidation numbers	Students write the chemical formula and name for an extensive variety of compounds using a table of element names, symbols, and oxidation numbers.	Students write the chemical formula and name for many different compounds using a table of element names, symbols, and oxidation numbers.	Students write the chemical formula and name for some different compounds using a table of element names, symbols, and oxidation numbers.	Students write the chemical formula and name for very few compounds using a table of element names, symbols, and oxidation numbers.
11-12.3.7. Balance chemical equations	Students balance chemical equations with no errors.	Students balance chemical equations with no significant errors.	Students balance chemical equations with few significant errors.	Students balance chemical equations with many significant errors.
<b>FORCE AND MOTION</b>				
11-12.3.8. Identify the principles and relationships influencing forces and motion (e.g., gravitational force, vectors, velocity, friction)	Students identify an extensive variety of principles and relationships influencing forces and motion.	Students identify a variety of principles and relationships influencing forces and motion.	Students identify some different principles and relationships influencing forces and motion.	Students identify very few principles and relationships influencing forces and motion.

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<p><b>FORMS OF ENERGY</b></p> <p>11-12.3.9. Explain the relationship among thermal energy, temperature, and the motion of particles</p>	<p>Students explain the relationship among thermal energy, temperature, and the motion of particles with no errors.</p>	<p>Students explain the relationship among thermal energy, temperature, and the motion of particles with no significant errors.</p>	<p>Students explain the relationship among thermal energy, temperature, and the motion of particles with few significant errors.</p>	<p>Students explain the relationship among thermal energy, temperature, and the motion of particles with many significant errors.</p>
<p><b>ENERGY TRANSFER AND TRANSFORMATION</b></p> <p>11-12.3.10. Apply the law of conservation of energy to a variety of situations</p> <p>11-12.3.11. Explain how energy is related to physical changes of matter (e.g., phase changes, temperature changes)</p>	<p>Students apply the law of conservation of energy to an extensive variety of situations. Students explain all of the significant details relating energy to physical changes.</p>	<p>Students apply the law of conservation of energy to a variety of situations. Students explain most of the significant details relating energy to physical changes.</p>	<p>Students apply the law of conservation of energy to some different situations. Students explain some of the significant details relating energy to physical changes.</p>	<p>Students apply the law of conservation of energy to very few situations. Students explain very few of the significant details relating energy to physical changes.</p>
<p><b>VIBRATIONS AND WAVES</b></p> <p>11-12.3.12. Relate wave energy to wavelength and frequency</p>	<p>Students relate wave energy to wavelength and frequency with no errors.</p>	<p>Students relate wave energy to wavelength and frequency with no significant errors.</p>	<p>Students relate wave energy to wavelength and frequency with few significant errors.</p>	<p>Students relate wave energy to wavelength and frequency with many significant errors.</p>
<p><b>ELECTRICITY AND MAGNETISM</b></p> <p>11-12.3.13. Explain how magnetic forces relate to electric forces</p>	<p>Students explain how magnetic forces relate to electric forces with no errors.</p>	<p>Students explain how magnetic forces relate to electric forces with no significant errors.</p>	<p>Students explain how magnetic forces relate to electric forces with few significant errors.</p>	<p>Students explain how magnetic forces relate to electric forces with many significant errors.</p>