



Washington Office of Superintendent of
PUBLIC INSTRUCTION

Science Assessment Development

Washington Comprehensive Assessment of Science Test Design and Item Specifications Modifications Log

Test Design Section Modifications: Grade 5, Grade 8, & High School

Page	Description of Change
1	Modified the first bulleted statement: Include authentic stimuli describing scientific phenomena that are grade-level appropriate
3	A new section was added that describes the role of Universal Design principles in WCAS development. Expanded a sentence in the last paragraph: Each item within the cluster aligns to two or three dimensions (2-D, 3-D) from one or more of the PEs in the bundle, and there is at least one item in the cluster that aligns to all three dimensions of each PE in the bundle.
5	A new section was added that describes how color graphics are analyzed to ensure content is discernible for the widest range of viewers.
8	ETC, GI , HT, MC, MS, SIM, TI, and MI items are worth 1 point. SA items are worth 1 or 2 points.
9	Updated the Field Test Items section: Operational test forms contain embedded field test items, which are either a set of items associated with a cluster, a group of standalone items, or a combination of one cluster and one or more standalone items.
12	The Disciplinary Core Ideas section was edited to better reflect the four domains of the standards and was condensed from three paragraphs to two.
13	The NGSS Progressions Appendices section was moved before the Evidence Statements section.
15	References were updated. One reference added: Thompson, S. J., Johnstone, C. J., Anderson, M. E., & Miller, N. A. (2005). <i>Considerations for the development and review of universally designed assessments</i> (Technical Report 42). University of Minnesota, National Center on Educational Outcomes.

Vocabulary List Modifications: Grade 5, Grade 8, & High School

Grade 5, Pages 116-117; Grade 8, Pages 144-146, High School, Pages 168-171

Grade 5 words that have been added

- absorb
- acid
- apparent brightness
- communicate
- condense
- mixture
- pollen
- prey
- refine
- shelter
- source
- sprout
- stationary
- toxin
- validity

Grade 5 words that have been removed

- collide
- direction
- force
- magnetic
- motion
- predict
- sense

Grade 8 words that have been added

- boiling point
- concentration (of a solution)
- durability
- emit
- flammable
- illuminate
- melting point
- proportion
- subduction
- surroundings
- uplift

Grade 8 words that have been removed

- absorb
- altitude
- boundary
- cell
- condensation
- conservation
- durable
- genetic
- geologic force
- hurricane
- organ
- prey
- wave pulse

High School words that have been added

- aqueous
- chemical bond
- degradation
- homeostasis
- irreversible

High School words that have been removed

- boiling point
- bond
- concentration (of a solution)
- core (of Earth)
- emit
- melting point
- proportion

Grade 5 Item Specifications Modifications

Area	Description of Change	January 2019 Version	November 2020 Version
Item Specification 5-PS3-1	Wording change 5-PS3-1.2	Page 39 Develop and/or use a model to describe that the energy and matter in animals' food can be used for life functions .	Page 41 Develop and/or use a model to describe that the energy in animals' food can be used for life functions .
Item Specification 5-PS3-1	Wording change in the Details and Clarification section	Page 39 <ul style="list-style-type: none"> • A model may include, but is NOT limited to: <ul style="list-style-type: none"> ○ diagram ○ flow chart ○ food web ○ description 	Page 41 <ul style="list-style-type: none"> • A model may include, but is NOT limited to: <ul style="list-style-type: none"> ○ diagram ○ flow chart ○ food chain ○ food web ○ description
Item Specification 4-PS4-1	New part added to the Details and Clarification section		Page 49 <ul style="list-style-type: none"> • Examples of waves may include, but are NOT limited to: <ul style="list-style-type: none"> ○ water waves ○ waves made with a rope ○ seismic waves in Earth's crust

Area	Description of Change	January 2019 Version	November 2020 Version
Item Specification 3-LS2-1	Wording change in the Details and Clarification section	<p>Page 63</p> <ul style="list-style-type: none"> • A group of animals may include, but is NOT limited to: <ul style="list-style-type: none"> ○ a group of equal individuals (e.g., copepods) ○ a group with dominant members (e.g., elephant herd) ○ small families (e.g., mountain lion mother and cubs) ○ a group of single or mixed gender (e.g., antelope herd) ○ a group composed of individuals similar in age (e.g., duckling crèche) ○ a group that is stable over long periods of time ○ a group with members moving in and/or out (e.g., dolphin pod) ○ a group that assigns specialized tasks to each member (e.g., bee colony, ant colony) ○ a group in which all members perform the same function or a similar range of functions (e.g., schooling anchovies) 	<p>Page 65</p> <ul style="list-style-type: none"> • A group of animals may include, but is NOT limited to: <ul style="list-style-type: none"> ○ a group of equal individuals (e.g., copepods) ○ a group with dominant members (e.g., elephant herd) ○ small families (e.g., mountain lion mother and cubs) ○ a single-sex group or a mixed-sex group ○ a group composed of individuals similar in age (e.g., duckling crèche) ○ a group that is stable over long periods of time ○ a group with members moving in and/or out (e.g., dolphin pod) ○ a group that assigns specialized tasks to each member (e.g., bee colony, ant colony) ○ a group in which all members perform the same function or a similar range of functions (e.g., schooling anchovies)
Item Specification 3-LS4-3	Wording change in the Details and Clarification section	<p>Page 75</p> <ul style="list-style-type: none"> • Measures of survival in a particular habitat may include, but are NOT limited to: <ul style="list-style-type: none"> ○ average lifespan ○ overall health ○ ability to successfully reproduce ○ the size of a population 	<p>Page 77</p> <ul style="list-style-type: none"> • Measures of survival in a particular habitat may include, but are NOT limited to: <ul style="list-style-type: none"> ○ average lifespan ○ overall health ○ ability to successfully reproduce ○ the number of organisms with a specific characteristic
Item Specification 3-5 ETS1-2	Wording change to 3-5 ETS1-2.2	<p>Page 111</p> <p>Compare solutions to a problem based on how well each solution meets criteria for a successful solution and/or how the constraints of each solution could limit success.</p>	<p>Page 113</p> <p>Compare solutions to a problem based on given research and/or test results and/or how well each solution addresses the known criteria and/or the constraints of each solution.</p>

Grade 8 Item Specifications Modifications

Area	Description of Change	August 2019 Version	November 2020 Version
Item Specification MS-PS2-1	Wording change to MS-PS2-1.2	Page 31 Apply Newton’s Third Law, to design a solution to a problem involving the motion of two colliding objects.	Page 33 Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.
Item Specification MS-PS3-4	Wording change to MS-PS3-4.1	Page 47 Plan and/or conduct an investigation to determine the proportional 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.	Page 49 Plan and/or conduct an investigation to determine the proportional relationships among the energy transferred , the type of matter , the mass , and/or the change in the average kinetic energy of the particles as measured by the temperature of the sample.
Item Specification MS-PS3-4	Wording change to MS-PS3-4.2	Page 47 Plan and/or conduct an investigation to determine 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.	Page 49 Plan and/or conduct an investigation to determine the energy transferred , the type of matter , the mass , and/or the change in the average kinetic energy of the particles as measured by the temperature of the sample.
Item Specification MS-PS3-4	Wording change to MS-PS3-4.3	Page 47 Describe proportional relationships among energy transfer , type of matter , mass , and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	Page 49 Describe proportional relationships among energy transfer , type of matter , mass , and/or the change in the average kinetic energy of the particles as measured by the temperature of the sample.
Item Specification MS-PS3-4	Wording change in Details and Clarifications section	Page 47 <ul style="list-style-type: none"> • Proportional relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of particles may include, but are NOT limited to: <ul style="list-style-type: none"> ○ The energy required to change the temperature of one type of matter by a specified number of degrees is different than the energy needed to change the temperature of a different type of matter by the same number of degrees. 	Page 49 <ul style="list-style-type: none"> • Proportional relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of particles may include, but are NOT limited to: <ul style="list-style-type: none"> ○ The energy required to change the temperature of a given amount of one type of matter by a specified number of degrees is different than the energy needed to change the temperature of the same amount of a different type of matter by the same number of degrees.
Item Specification MS-LS1-7	Wording change to MS-LS1-7.4	Page 71 Develop and/or use a model to describe how matter in a chemical process.	Page 73 Develop and/or use a model to describe how matter is conserved during a chemical reaction.

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Item Specification MS-LS1-7	New part added to the Details and Clarification section		Page 73 <ul style="list-style-type: none"> • Models may include, but are NOT limited to: <ul style="list-style-type: none"> ○ diagrams ○ simulations ○ descriptions
Item Specification MS-LS2-5	Wording change to MS-LS2-5.1	Page 83 Evaluate competing design solutions for maintaining biodiversity and/or ecosystem services and/or show how small changes in one part of an ecosystem may cause large changes in another part.	Page 85 Evaluate given competing design solutions for maintaining biodiversity and/or ecosystem services when changes in one part of an ecosystem cause changes in another part of the ecosystem.
Item Specification MS-LS2-5	Wording change to MS-LS2-5.2	Page 83 Evaluate competing design solutions for maintaining biodiversity and/or ecosystem services .	Page 85 Evaluate given competing design solutions for maintaining biodiversity and/or ecosystem services .
Item Specification MS-LS2-5	Wording change to MS-LS2-5.3	Page 83 Connect small and large changes in an ecosystem to the maintenance of biodiversity and/or ecosystem services for a given ecosystem.	Page 85 Connect changes in an ecosystem to the maintenance of biodiversity and/or ecosystem services for a given ecosystem.
Item Specification MS-LS2-5	Wording change to MS-LS2-5.4	Page 83 Evaluate competing design solutions that address stability and change in a system.	Page 85 Evaluate given competing design solutions that address stability and change in a system.
Item Specification MS-LS2-5	Wording change in Details and Clarifications section	Page 83 <ul style="list-style-type: none"> • Small changes in an ecosystem that may cause large changes may include, but are NOT limited to: <ul style="list-style-type: none"> ○ the removal of trees causing a shift in types and/or numbers of organisms ○ the introduction of new species resulting in the migration of organisms ○ increases in human population causing increases in air and/or water pollution ○ the overuse of resources causing a change in the distribution of a population 	Page 85 <ul style="list-style-type: none"> • Changes in one part of an ecosystem that cause changes in another part of an ecosystem may include, but are NOT limited to: <ul style="list-style-type: none"> ○ the removal of trees causing a shift in types and/or numbers of organisms ○ the introduction of new species resulting in the migration of organisms ○ increases in human population causing increases in air and/or water pollution ○ the overuse of resources causing a change in the distribution of a population

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Item Specification MS-LS3-1	Wording change to MS-LS3-1.1	Page 85 Develop and/or use a model to describe how structural changes to genes may affect the structure and/or function of proteins and/or may result in harmful, beneficial, or neutral effects to the structure and/or function of the organisms.	Page 87 Develop and/or use a model to describe how the structure of genes affects the structure and/or function of proteins and/or how structural changes to genes may result in harmful, beneficial, or neutral effects to the structure and/or function of the organism.
Item Specification MS-LS3-1	Wording change to MS-LS3-1.2	Page 85 Develop and/or use a model to show that genes are located on chromosomes and/or to show how information flows from genes to proteins to traits.	Page 87 Develop and/or use a model to show that genes are located on chromosomes and/or to show how information flows from genes to proteins to traits and/or to show that structural changes can be harmful, beneficial, or neutral.
Item Specification MS-LS3-1	Wording change to MS-LS3-1.3	Page 85 Connect structural changes to genes to the structure and/or function of proteins and/or to the harmful, beneficial, or neutral effects to the structure and/or function of the organism.	Page 87 Connect the structure of genes and/or structural changes to genes to the structure and/or function of proteins and/or to the harmful, beneficial, or neutral effects to the structure and/or function of the organism.
Item Specification MS-LS3-1	Wording change in Details and Clarifications section	Page 85 <ul style="list-style-type: none"> • Models that show how structural changes to genes affect the structure and/or function of other components may include, but are NOT limited to, a diagram, simulation, or description of: <ul style="list-style-type: none"> ○ structural and/or functional relationships between chromosomes, genes, proteins, traits, and/or organisms ○ how a mutation changes the structure and/or function of genes and/or proteins 	Page 87 <ul style="list-style-type: none"> • Models that show how the structure of genes affects the structure and/or function of other components may include, but are NOT limited to, a diagram, simulation, or description of: <ul style="list-style-type: none"> ○ structural and/or functional relationships between chromosomes, genes, proteins, traits, and/or organisms • Models that show how structural changes to genes affect the structure and/or function of other components may include, but are NOT limited to, a diagram, simulation, or description of: <ul style="list-style-type: none"> ○ how a mutation changes the structure and/or function of genes and/or proteins

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Item Specification MS-LS4-1	Wording change to MS-LS4-1.1	Page 89 Analyze and/or interpret data for patterns in the fossil record that document the existence, diversity, extinction, and/or change of life forms throughout history on Earth under the assumption that natural laws operate today as in the past.	Page 91 Analyze and/or interpret data for patterns in the fossil record that document the existence, diversity, extinction, and/or change of life forms throughout history on Earth.
Item Specification MS-LS4-1	Wording change to MS-LS4-1.2	Page 89 Analyze and/or interpret data for evidence that documents the existence, diversity, extinction, and/or change throughout the history of life forms on Earth.	Page 91 Analyze and/or interpret data for evidence that documents the existence, diversity, extinction, and/or change of life forms throughout history on Earth.
Item Specification MS-LS4-1	Wording change to MS-LS4-1.3	Page 89 Describe patterns in the fossil record that document the existence, diversity, extinction, and/or change of life forms on Earth under the assumption that natural laws operate today as in the past.	Page 91 Describe patterns in the fossil record that document the existence, diversity, extinction, and/or change of life forms throughout history on Earth.

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Item Specification MS-LS4-1	Wording change in Details and Clarifications section	<p>Page 89</p> <ul style="list-style-type: none"> • Examples of patterns in the fossil record that document the existence, diversity, extinction, and/or change of life forms on Earth may include, but are NOT limited to: <ul style="list-style-type: none"> ○ sets of sedimentary rock layers and the ages of the layers ○ chronological order of fossil locations in rock layers ○ periods of time showing the presence or absence of organisms and/or specific types of organisms changes in the complexity of anatomical structures over time • Examples of natural laws operating today as in the past may include, but are NOT limited to: <ul style="list-style-type: none"> ○ timing of mass extinctions ○ timing of the emergence of organisms, evolution of organisms, and/or extinction of organisms ○ increase in diversity and/or complexity of organisms over time 	<p>Page 91</p> <ul style="list-style-type: none"> • Examples of patterns in the fossil record that document the existence, diversity, extinction, and/or change of life forms throughout history on Earth may include, but are NOT limited to: <ul style="list-style-type: none"> ○ sets of sedimentary rock layers and the ages of the layers ○ chronological order of fossil locations in rock layers ○ periods of time showing the presence or absence of organisms and/or specific types of organisms ○ changes in the complexity of anatomical structures over time <p>This section was removed.</p>
Item Specification MS-LS4-3	Wording change to MS-LS4-3.1	<p>Page 93</p> <p>Analyze pictorial data to compare patterns in the embryological development across multiple species to identify relationships not evident in the fully-formed anatomies.</p>	<p>Page 95</p> <p>Analyze pictorial data to compare patterns in the embryological development across multiple species to identify evolutionary relationships not evident in the fully formed anatomies.</p>
Item Specification MS-LS4-3	Wording change to MS-LS4-3.2	<p>Page 93</p> <p>Analyze pictorial data to compare embryological development across multiple species to identify relationships not evident in the fully-formed anatomies.</p>	<p>Page 95</p> <p>Analyze pictorial data to compare embryological development across multiple species to identify evolutionary relationships not evident in the fully formed anatomies.</p>

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Item Specification MS-LS4-3	Wording change to MS-LS4-3.3	Page 93 Connect patterns in the embryological development across multiple species to relationships not evident in the fully-formed anatomies.	Page 95 Connect patterns in the embryological development across multiple species to evolutionary relationships not evident in the fully formed anatomies.
Item Specification MS-LS4-3	Wording change in Details and Clarifications section	Page 93 <ul style="list-style-type: none"> • Patterns in the embryological development of different species that reveal relationships not evident in the fully-formed anatomies may include, but are NOT limited to: <ul style="list-style-type: none"> ○ similarities in embryo anatomy (e.g., gill slits and/or tails in early mammal and fish embryos; hind limbs in whale, land animal, and snake embryos) ○ differences in embryo development (e.g., mammal embryos lose gill slits, but the gill slits develop into gills in fish) 	Page 95 <ul style="list-style-type: none"> • Patterns in the embryological development of different species that reveal evolutionary relationships not evident in the fully formed anatomies may include, but are NOT limited to: <ul style="list-style-type: none"> ○ similarities in embryo anatomy (e.g., gill slits and/or tails in early mammal and fish embryos; hind limbs in whale, land animal, and snake embryos) ○ differences in embryo development (e.g., mammal embryos lose gill slits, but the gill slits develop into gills in fish)
Item Specification MS-ESS1-1	Wording change in Details and Clarifications section	Page 103 <ul style="list-style-type: none"> • Models may include, but are NOT limited to a table, diagram, simulation, and/or description of: <ul style="list-style-type: none"> ○ components in a system (e.g., Earth, sun, moon) ○ interactions among components in a system (e.g., motions, orbits, rotations, revolutions, relative distances, relative sizes) • Cyclic patterns that can be used to identify relationships within the Earth-sun-moon system that cause lunar phases may include, but are NOT limited to: <ul style="list-style-type: none"> ○ Half of the moon is always lit by solar energy from the sun. ○ The portion of the lit half of the moon seen from Earth changes in a regular pattern as the moon orbits Earth. ○ The moon rotates at the same rate at which the moon orbits Earth, so the side of the moon that faces Earth is always the same side. 	Page 105 <ul style="list-style-type: none"> • Models may include, but are NOT limited to a table, diagram, simulation, and/or description of: <ul style="list-style-type: none"> ○ components in a system (e.g., Earth, sun, moon) ○ interactions among components in a system (e.g., motions, orbits, rotations, revolutions, relative distances, relative sizes, tilts) • Cyclic patterns that can be used to identify relationships within the Earth-sun-moon system that cause lunar phases may include, but are NOT limited to: <ul style="list-style-type: none"> ○ Half of the moon is always lit by solar energy from the sun. ○ The portion of the lit half of the moon seen from Earth changes in a pattern as the moon orbits Earth. ○ The moon rotates at the same rate at which the moon orbits Earth, so the side of the moon that faces Earth is always the same side.

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Item Specification MS-ESS1-3	Wording change in Details and Clarifications section	Page 107 <ul style="list-style-type: none"> • Features of objects in the solar system may include, but are NOT limited to: <ul style="list-style-type: none"> ○ location relative to other objects ○ orbital shape and/or size ○ the relative or absolute measurements of overall size ○ the presence, absence, arrangement, abundance, and/or sizes of surface features ○ physical composition and/or makeup 	Page 109 <ul style="list-style-type: none"> • Features of objects in the solar system may include, but are NOT limited to: <ul style="list-style-type: none"> ○ location relative to other objects ○ orbital shape and/or size ○ the relative or absolute measurements of overall size ○ the presence, absence, arrangement, abundance, and/or sizes of surface features ○ physical composition and/or makeup ○ the gravitational attraction between the sun and an object
Item Specification MS-ESS2-2	Wording change in Details and Clarifications section	Page 113 <ul style="list-style-type: none"> • Evidence of geoscience processes that change Earth’s surface features may include, but is NOT limited to: <ul style="list-style-type: none"> ○ stream tables to model erosion and/or deposition ○ maps and/or models that track the motion of tectonic plates ○ maps to show the locations of earthquakes and/or volcanoes 	Page 115 <ul style="list-style-type: none"> • Evidence of geoscience processes that change Earth’s surface features may include, but is NOT limited to: <ul style="list-style-type: none"> ○ stream tables to model erosion and/or deposition ○ maps and/or models that track the motion of tectonic plates/damage from moving water ○ maps to show the locations of earthquakes and/or volcanoes
Item Specification MS-ESS2-4	Wording change to MS-ESS2-4.1	Page 117 Develop and/or use a model to describe how transfers of energy drive the processes that result in the cycling of water among reservoirs .	Page 119 Develop and/or use a model to describe how transfers of energy drive the processes that result in the cycling of water through Earth systems .
Item Specification MS-ESS2-4	Wording change to MS-ESS2-4.2	Page 117 Develop and/or use a model to describe characteristics of reservoirs .	Page 119 Develop and/or use a model to describe characteristics of Earth systems .
Item Specification MS-ESS2-4	Wording change to MS-ESS2-4.3	Page 117 Use the concept of energy transfer to connect the cycling of water among reservoirs to processes that drive the cycling.	Page 119 Use the concept of energy transfer to connect the cycling of water through Earth systems to processes that drive the cycling.

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Item Specification MS-ESS2-4	Wording change in Details and Clarifications section	Page 117 <ul style="list-style-type: none"> • Reservoirs may include, but are NOT limited to: <ul style="list-style-type: none"> ○ living things ○ groundwater ○ rivers, streams, lakes, ponds, and/or oceans ○ clouds, fog, and/or water vapor ○ glacial ice, ice sheets, and/or snow 	Page 119 <ul style="list-style-type: none"> • Components of Earth systems may include, but are NOT limited to: <ul style="list-style-type: none"> ○ living things ○ groundwater ○ rivers, streams, lakes, ponds, and/or oceans ○ clouds, fog, and/or water vapor ○ glacial ice, ice sheets, and/or snow
Item Specification MS-ESS3-3	Wording change in Details and Clarifications section	Page 127 <ul style="list-style-type: none"> • Methods for minimizing impacts may include, but are NOT limited to: <ul style="list-style-type: none"> ○ a process for treating sewage ○ a process for reducing the use of natural resources ○ a process for reducing the amount of waste in landfills 	Page 129 <ul style="list-style-type: none"> • Methods for minimizing impacts may include, but are NOT limited to: <ul style="list-style-type: none"> ○ a process for treating sewage ○ a process for reducing the use of natural resources ○ a process for reducing the amount of waste in landfills ○ a process for reintroducing or preserving native species in an ecosystem
Item Specification MS-ESS3-5	Wording change in Details and Clarifications section	Page 131 <ul style="list-style-type: none"> • Examples of evidence of the factors that cause changes in global temperatures may include, but are NOT limited to, tables, graphs, and/or maps showing: <ul style="list-style-type: none"> ○ changes in global and/or regional surface temperatures ○ changes in atmospheric concentrations of greenhouse gases (e.g., carbon dioxide, methane) ○ changes in global and/or regional human populations ○ occurrences of major volcanic events ○ changes in the volume of glacial and/or sea ice ○ seasonal movements and/or behavior of plants and/or animals 	Page 133 <ul style="list-style-type: none"> • Examples of evidence of the factors that cause changes in global temperatures may include, but are NOT limited to, tables, graphs, and/or maps showing: <ul style="list-style-type: none"> ○ changes in global and/or regional surface temperatures ○ changes in atmospheric concentrations of greenhouse gases (e.g., carbon dioxide, methane) ○ changes in global and/or regional human populations ○ occurrences of major volcanic events ○ changes in the volume of glacial and/or sea ice ○ seasonal movements and/or behavior of plants and/or animals ○ changes in human activities (e.g., use of fossil fuels, development of land)

High School Item Specifications Modifications

Area	Description of Change	August 2019 Version	November 2020 Version
Item Specification HS-PS1-1	Wording change in Details and Clarifications section	<p>Page 19</p> <ul style="list-style-type: none"> • Components of the periodic table as a model may include, but are NOT limited to: <ul style="list-style-type: none"> ○ elements in rows having increasing numbers of protons ○ elements in columns having the same number of valence electrons 	<p>Page 21</p> <ul style="list-style-type: none"> • Components of the periodic table as a model may include, but are NOT limited to: <ul style="list-style-type: none"> ○ elements having a positively charged nucleus with both protons and neutrons, surrounded by negatively charged electrons ○ elements in rows having increasing numbers of protons ○ elements in columns having the same number of valence electrons
Item Specification HS-PS1-3	Wording change to HS-PS1-3.1	<p>Page 23</p> <p>Plan and/or conduct an investigation to gather evidence of patterns among the structures and/or properties of substances at the bulk scale and the strength of electrical forces between particles.</p>	<p>Page 25</p> <p>Plan and/or conduct an investigation to gather evidence of patterns among the structures and/or properties of substances at the bulk scale and/or the strength of electrical forces between particles.</p>
Item Specification HS-PS1-3	Wording change to HS-PS1-3.2	<p>Page 23</p> <p>Plan and/or conduct an investigation to gather evidence of the structures and/or properties of substances at the bulk scale and the strength of electrical forces between particles.</p>	<p>Page 25</p> <p>Plan and/or conduct an investigation to gather evidence of the structures and/or properties of substances at the bulk scale and/or the strength of electrical forces between particles.</p>
Item Specification HS-PS1-3	Wording change to HS-PS1-3.3	<p>Page 23</p> <p>Connect patterns among the structures and/or properties of substances at the bulk scale and the strength of electrical forces between particles.</p>	<p>Page 25</p> <p>Connect patterns among the structures and/or properties of substances at the bulk scale and/or the strength of electrical forces between particles.</p>

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Item Specification HS-PS1-3	Wording change in Details and Clarifications section	Page 23 <ul style="list-style-type: none"> • Examples of patterns may include, but are NOT limited to: <ul style="list-style-type: none"> ○ liquids with relatively strong bonds between molecules having relatively high surface tension ○ substances with relatively weak bonds between molecules having relatively low boiling points ○ the addition of thermal energy to a substance increasing the distance between particles and/or decreasing the attraction between particles that keeps particles close together 	Page 25 <ul style="list-style-type: none"> • Examples of patterns may include, but are NOT limited to: <ul style="list-style-type: none"> ○ liquids with relatively strong intermolecular forces between molecules having relatively high surface tension ○ substances with relatively weak intermolecular forces between molecules having relatively low boiling points ○ the addition of thermal energy to a substance increasing the distance between particles and/or decreasing the attraction between particles that keeps particles close together
Item Specification HS-PS1-6	New part added to the Details and Clarification section		Page 31 <ul style="list-style-type: none"> • Examples of the conditions of a system at equilibrium may include, but are NOT limited to: <ul style="list-style-type: none"> ○ the concentrations of reactants and products are constant ○ the rate of the forward reaction equals the rate of the reverse reaction
Item Specification HS-PS2-6	Wording change in Details and Clarifications section	Page 45 <ul style="list-style-type: none"> • Examples of attraction and/or repulsion may include, but are NOT limited to: <ul style="list-style-type: none"> ○ attractive and/or repulsive electrical (i.e. electrostatic) forces between molecules ○ attraction and/or repulsion among electric charges among atoms within a molecule 	Page 47 <ul style="list-style-type: none"> • Examples of attraction and/or repulsion may include, but are NOT limited to: <ul style="list-style-type: none"> ○ attractive and/or repulsive electrical forces between molecules (e.g., intermolecular forces) ○ attraction and/or repulsion among electric charges among atoms within a molecule (e.g., chemical bonds)

Area	Description of Change	August 2019 Version	November 2020 Version
Item Specification HS-PS3-3	Wording change in Details and Clarifications section	Page 51 <ul style="list-style-type: none"> • Criteria for determining the success of the device may include, but are NOT limited to: <ul style="list-style-type: none"> ○ minimizes transfer of energy out of a given system ○ uses materials with desired and/or required properties ○ provides a specific benefit to civilization ○ low impact on the environment ○ low risk of injury ○ ready availability of technology ○ effective in solving specific aspects of the given problem 	Page 53 <ul style="list-style-type: none"> • Criteria for determining the success of the device may include, but are NOT limited to: <ul style="list-style-type: none"> ○ minimizes transfer of energy out of a given system ○ uses materials with desired and/or required properties ○ provides a specific benefit to civilization ○ low impact on the environment ○ low risk of injury ○ effective in solving specific aspects of the given problem
Item Specification HS-PS3-5	Wording change to HS-PS3-5.1	Page 55 Develop and/or use a model to illustrate the cause and effect relationships between force and changes in position and/or energy for two objects interacting in a magnetic or electric field.	Page 57 Develop and/or use a model to illustrate the cause and effect relationships between force , changes in position , and/or changes in energy for two objects interacting in a magnetic or electric field.
Item Specification HS-PS3-5	Wording change to HS-PS3-5.2	Page 55 Develop and/or use a model to illustrate the forces , changes in position , and/or energies of two objects in a magnetic or electric field.	Page 57 Develop and/or use a model to illustrate the forces , changes in position , and/or changes in energy for two objects in a magnetic or electric field.
Item Specification HS-PS3-5	Wording change to HS-PS3-5.3	Page 55 Use cause and effect relationships to connect force to changes in position and/or energy for two objects interacting in a magnetic or electric field.	Page 57 Use cause and effect relationships to connect force to changes in position and/or changes in energy for two objects interacting in a magnetic or electric field.

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Item Specification HS-PS3-5	Wording change in Details and Clarifications section	Page 55 <ul style="list-style-type: none"> • Cause and effect relationships between force and changes in position and/or energy may include, but are NOT limited to: <ul style="list-style-type: none"> ○ When two objects interact in a field, energy is transferred from one object to the second object. ○ When two objects change their relative positions, the energy stored in a field changes. ○ When forces exerted on objects change, energy changes. 	Page 57 <ul style="list-style-type: none"> • Cause and effect relationships between force and changes in position and/or changes in energy may include, but are NOT limited to: <ul style="list-style-type: none"> ○ When two objects interact in a field, energy is transferred from one object to the second object. ○ When two objects change their relative positions, the energy stored in a field changes. ○ When forces exerted on objects change, energy changes.
Item Specification HS-PS4-1	Wording change in Details and Clarifications section	Page 57 <ul style="list-style-type: none"> • Mathematical representations may include, but are NOT limited to: <ul style="list-style-type: none"> ○ mathematical relationships between speed, frequency, and/or wavelength for waves traveling in a specific medium, based on the given formula: $v = f \lambda$ ○ mathematical comparison of speed, frequency, and/or wavelength for different waves traveling through different media ○ data showing changes in wave speed as a result of changes in medium ○ a simulation showing relationships between speed, frequency, and/or wavelength for wave traveling through various media 	Page 59 <ul style="list-style-type: none"> • Mathematical representations may include, but are NOT limited to: <ul style="list-style-type: none"> ○ mathematical relationships between speed, frequency, and/or wavelength for waves traveling in a specific medium, based on the given formula: $v = \lambda f$ ○ mathematical comparison of speed, frequency, and/or wavelength for different waves traveling through different media ○ data showing changes in wave speed as a result of changes in medium ○ a simulation showing relationships between speed, frequency, and/or wavelength for wave traveling through various media
Item Specification HS-PS4-2	Wording change to HS-PS4-2.1	Page 59 Ask and/or evaluate questions about the advantages and/or disadvantages of using digital transmission and/or storage of information.	Page 61 Ask and/or evaluate questions about the advantages and/or disadvantages of using digital transmission and/or digital storage of information.
Item Specification HS-PS4-2	Wording change to HS-PS4-2.2	Page 59 Ask and/or evaluate questions about using digital transmission and/or storage of information.	Page 61 Ask and/or evaluate questions about using digital transmission and/or storage of information.
Item Specification HS-PS4-2	Wording change to HS-PS4-2.3	Page 59 Connect advantages and/or disadvantages to using digital transmission and/or storage of information.	Page 61 Connect advantages and/or disadvantages to using digital transmission and/or storage of information.

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Item Specification HS-PS4-2	Wording change in Details and Clarifications section	<p>Page 59</p> <ul style="list-style-type: none"> • Advantages of using a digital transmission and/or storage of information may include, but are NOT limited to: <ul style="list-style-type: none"> ○ relatively less degradation over time ○ relatively fast transfer of information ○ relatively rapid copying and sharing ○ relatively broad access ○ relatively large data storage ○ relatively less susceptibility to interference • Disadvantages of using a digital transmission and/or storage of information may include, but are NOT limited to: <ul style="list-style-type: none"> ○ increased chance of accidental deletion ○ increased chance of theft through copying 	<p>Page 61</p> <ul style="list-style-type: none"> • Advantages of using a digital transmission and/or digital storage of information may include, but are NOT limited to: <ul style="list-style-type: none"> ○ relatively less degradation over time ○ relatively fast transfer of information ○ relatively rapid copying and sharing ○ relatively broad access ○ relatively large data storage ○ relatively less susceptibility to interference • Disadvantages of using a digital transmission and/or digital storage of information may include, but are NOT limited to: <ul style="list-style-type: none"> ○ increased chance of accidental deletion ○ increased chance of theft through copying

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Item Specification HS-LS1-1	Wording change in Details and Clarifications section	<p>Page 69</p> <ul style="list-style-type: none"> • Examples of evidence may include, but are NOT limited to: <ul style="list-style-type: none"> ○ All cells contain DNA. ○ DNA is made of genes. ○ The sequence of genes in DNA codes for a specific protein. ○ Proteins are composed of amino acids. • Examples of how the structure of DNA determines the structure of proteins may include, but are NOT limited to: <ul style="list-style-type: none"> ○ The sequence of genes in DNA determines the sequence of amino acids in proteins. ○ A mutation in a gene alters the sequence of amino acids in and/or the shape of a protein. • Examples of how systems of specialized cells use proteins to carry essential life functions may include, but are NOT limited to: <ul style="list-style-type: none"> ○ enzymes combining with other molecules inside or outside a cell to catalyze reactions ○ protein hormones regulating the function of a tissue and/or a cell ○ cells producing the structural proteins that are components of cells and/or tissues 	<p>Page 71</p> <ul style="list-style-type: none"> • Examples of evidence may include, but are NOT limited to: <ul style="list-style-type: none"> ○ All cells contain DNA. ○ DNA is made of genes. ○ The DNA sequence in a gene codes for a specific protein. ○ Proteins are composed of amino acids. • Examples of how the structure of DNA determines the structure of proteins may include, but are NOT limited to: <ul style="list-style-type: none"> ○ The sequence of nucleotides in a gene determines the sequence of amino acids in proteins. ○ A mutation in a gene may alter the sequence of amino acids in and/or the shape of a protein. • Examples of how systems of specialized cells use proteins to carry essential life functions may include, but are NOT limited to: <ul style="list-style-type: none"> ○ enzymes combining with other molecules inside or outside a cell to catalyze reactions ○ protein hormones regulating the function of a tissue and/or a cell ○ cells producing the structural proteins that are components of cells and/or tissues ○ different proteins being produced in different specialized cells

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Item Specification HS-ESS1-4	Wording change in Details and Clarifications section	<p>Page 125</p> <ul style="list-style-type: none"> • Mathematical and/or computational representations may include, but are NOT limited to: <ul style="list-style-type: none"> ○ Kepler's first law of planetary motion: $e = f/d$; where e is eccentricity, f is the distance between foci of an ellipse, and d is the ellipse's major axis length ○ Kepler's second law of planetary motion ○ Kepler's third law of planetary motion: $T^2 \propto R^3$; where T is the orbital period and R is the semi-major axis of the orbit ○ Newton's law of gravitation: $F_g = -G \frac{m_1 m_2}{d^2}$; where F_g is gravitational force, G is the universal gravitation constant, m_1 and m_2 are masses for two objects, and d is the distance between the two objects. ○ Newton's third law of motion 	<p>Page 127</p> <ul style="list-style-type: none"> • Mathematical and/or computational representations may include, but are NOT limited to: <ul style="list-style-type: none"> ○ Kepler's first law of planetary motion: $e = f/d$; where e is eccentricity, f is the distance between foci of an ellipse, and d is the ellipse's major axis length ○ Kepler's second law of planetary motion ○ Kepler's third law of planetary motion: T^2 is proportional to R^3; where T is the orbital period and R is the semi-major axis of the orbit ○ Newton's law of gravitation: $F_g = -G \frac{m_1 m_2}{d^2}$; where F_g is gravitational force, G is the universal gravitation constant, m_1 and m_2 are masses for two objects, and d is the distance between the two objects. ○ Newton's third law of motion
Item Specification HS-ESS2-4	Wording change to HS-ESS2-4.2	<p>Page 137</p> <p>Develop and/or use a model to describe variations in the flow of energy into and/or out of Earth systems and/or changes in climate.</p>	<p>Page 139</p> <p>Develop and/or use a model to describe variations in the flow of energy into and/or out of Earth systems and/or to describe changes in climate.</p>
Item Specification HS-ESS2-4	Wording change in Details and Clarifications section	<p>Page 137</p> <ul style="list-style-type: none"> • Evidence of changes in climate may include, but is NOT limited to: <ul style="list-style-type: none"> ○ significant changes in average global temperature ○ significant rises in sea levels or changes in ocean temperature ○ significant changes in weather (e.g., drought, flooding) 	<p>Page 139</p> <ul style="list-style-type: none"> • Evidence of changes in climate may include, but is NOT limited to: <ul style="list-style-type: none"> ○ significant changes in average global temperature ○ significant rises in sea levels or changes in ocean temperature ○ significant changes in weather patterns

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