

2020-2021 IDAHO CONTENT STANDARDS IN SCIENCE REVISION

## 2018 Idaho Content Standards in Science with Proposed Changes



IDAHO STATE DEPARTMENT OF EDUCATION  
CONTENT AND CURRICULUM | IDAHO CONTENT STANDARDS

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## Table of Contents

Revisions are in red .....	3
Kindergarten .....	3
First Grade.....	7
Second grade .....	13
Third grade .....	17
Fourth grade .....	21
Fifth grade.....	25
Middle School (6-8) Physical Sciences .....	31
Middle School (6-8) Life Sciences .....	38
Middle School (6-8) Earth and Space Sciences .....	45
High School (9-12) Life Sciences .....	51
High School (9-12) Physical Sciences (Chemistry) .....	62
High School (9-12) Physical Sciences (Physics) no revisions proposed .....	68
High School (9-12) Earth and Space Sciences .....	73

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## REVISIONS ARE IN RED

Unresolved comments from specific content teams are in green (Life Science), blue (Physical Science) and brown (Earth and Space Science)

### KINDERGARTEN

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PS1-K-1. 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.	<p>Rewrite: With guidance and support, 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.</p> <p>PS1-K-1. With guidance and support, 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.</p>	We believe that kindergartners need guidance before they can plan and conduct an investigation on their own. This is also in line with ELA kindergarten standards that begin with “With guidance and support...” (e.g., W.K.8)
PS1-K-2. 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.	<p>Rewrite: With guidance and support, analyze data to determine if a design solution works as intended to change the motion of an object with a push or a pull.</p>	Students will need support to analyze data and this is in line with other ELA standards that begin with “With guidance and support...” Additionally, we would like to suggest that a practices continuum (similar to Appendix F in NGSS) is

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	PS1-K-2. <b>guidance and support</b> , analyze data to determine if a design solution works as intended to change the <del>speed</del> <b>or-direction motion</b> of an object with a push or a pull.	added to a supporting document for teachers. Please define motion to include relative speed, distance, and direction in further explanation of standard.
PS2-K-1. Make observations to determine the effect of sunlight on Earth’s surface.	<b>Rewrite: Make observations to determine the effect of the sun’s energy on the Earth’s surface.</b>  PS2-K-1. Make observations to determine the effect of <del>sunlight</del> <b>the sun’s energy on the Earth’s surface.</b>	The word ‘energy’ is key to this standard, to reduce misconceptions between visible light vs. light energy, and to set the foundation that the sun is our original energy source.
PS2-K-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	<b>Rewrite: Design and build a structure that will reduce the warming effect of the sun’s energy on a material.</b>  PS2-K-2. <del>Use tools and materials to</del> Design and build a structure that will reduce the warming effect of <del>sunlight</del> <b>the sun’s energy on an-area a material.</b>	The addition of ‘the sun’s energy’ mirrors the previous standard. We also left the majority of this standard intact because this is one of the few engineering standards at this level. In supporting documentation, may want to discuss the possibility of doing this outdoors. Regarding the further explanation that exists, using an umbrella or canopy (pre-built) is not in the spirit of the standard – consider changing.
LS1-K-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.	<b>Rewrite: Use observations to describe how plants and animals (including humans) are alike and different in terms of how they live and grow.</b>	In supporting content, you could include types of nutrients, light, water, space, etc.

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	<p>LS1-K1. Use observations to describe <del>patterns of what</del> <b>how</b> plants and animals (including humans) <b>are alike and different in terms of how they live and grow.</b> <del>need to survive.</del></p>	<p>add to the Supporting Content that the students need to focus on the patterns of nutrients, light, water, space, etc.</p>
<p>LS1-K-2. Use classification supported by evidence to differentiate between living and non-living items.</p>	<p><b>MOVE</b></p>	<p><b>Move into LS1-1-3 standard on life cycles (either part of the standard or the supporting content for this standard).</b></p> <p>This is a complex topic and needs to be taught in context. This is also not a standard that is listed in any other state we were tasked with observing.</p>
<p>ESS1-K-1. Use and share observations of local weather conditions to describe patterns over time, which includes the 4 seasons.</p>	<p><b>Rewrite: Use and share observations of local weather conditions to describe variations in patterns throughout the year.</b></p> <p>ESS1-K-1. Use and share observations of local weather conditions to describe <b>variations in patterns throughout the year.</b> <del>patterns over time, which includes the 4 seasons.</del></p>	<p>The inclusion of the 4 seasons in the original standard was not in line with other standards across the country, and could lead to misconceptions concerning the cause of the seasons. Additionally, we believe that using the time period of a year is more concrete (kindergartners learn about months and days of week). We are addressing the 4 seasons in 1<sup>st</sup> grade (ESS1-1-2/Earth’s place in the universe)</p>
<p>ESS1-K-2. Construct an argument supported by evidence for how plants and animals (including humans) can</p>	<p><b>Rewrite: Construct an argument supported by evidence for how plants and animals (including humans) interact</b></p>	<p>There was debate around ‘changing’ an environment could imply intent.</p>

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change the environment to meet their needs.	<p>with their environment to meet their needs.</p> <p>ESS1-K-2. Construct an argument supported by evidence for how plants and animals (including humans) <del>can</del> change the interact with their environment to meet their needs.</p> <p>LIFE SCIENCE</p> <p>add “With guidance and support...” to mirror language in other standards.</p>	
ESS2-K-1. Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.	Keep	
ESS2-K-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.	<p>Rewrite: Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, local weather.</p> <p>ESS2-K-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, <del>severe</del> local weather.</p>	‘Local’ is more in line with social studies for this grade level, and in line MA standards. In supporting content, can discuss more ‘typical’ local weather, but then also more severe weather, such as droughts, flooding, thunderstorms, snowstorms, windstorms, etc.

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<p>ESS2-K-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.</p>	<p><b>Rewrite: Communicate solutions that would enable humans to interact in a beneficial way with the land, water, air, and/or other living things in the local environment</b></p> <p>ESS2-K-3. Communicate solutions that would enable humans to interact in a beneficial way with the land, water, air, and/or other living things in the local environment.</p>	<p>In line with ELA standards (SL.K.5, SL.K.6, W.K.2). This rewrite is in line with NE standards and provides a more positive view on this standard.</p>

## FIRST GRADE

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>PS1-1-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.</p>	<p><b>Rewrite: With guidance and support, plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.</b></p> <p>PS1-1-1. <b>With guidance and support,</b> plan and conduct investigations to provide evidence that vibrating</p>	<p>This is in line with ELA standards (and our earlier kindergarten standards) that begin with “With guidance and support...” (W.1.5 through W.1.8) This is also a way to concretely introduce the concept of claims and evidence that will support later ELA and science standards.</p>

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	materials can make sound and that sound can make materials vibrate.	
<p>PS1-1-2. Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.</p>	<p><b>Rewrite: Make observations to construct an evidence-based argument that objects in darkness can be seen only when light is shining on them.</b></p> <p>PS1-1-2. Make observations to construct an evidence-based <del>account</del> <b>argument</b> that objects in darkness can be seen only when <del>illuminated</del> <b>light is shining on them.</b></p> <p><b>LIFE SCIENCE</b></p> <p>Add in “With guidance and support...:”</p> <p>OR</p> <p>Remove “construct and evidence-based argument...”</p> <p>With guidance and support uses similar language from other standards</p> <p>OR</p> <p>Removing “argument” will move the standard to be more in line with Gr1 skillset.</p> <p>add “illuminated” back into the standard based on the logic that transparent, translucent, opaque, and reflective in PS1-1-3.</p>	<p>We believe ‘illuminated’ is not a developmentally appropriate term, and is not a term used in other light-related standards. In the supporting content, we would like to emphasize that the key concept here is that students need to understand that you need light in order to see something. We would like the SDE to provide direction as to what scaffolding would look like for this standard (in terms of argumentation).</p> <p><b>EARTH AND SPACE SCIENCE</b></p> <p>Wondering if the word “argument” developmentally appropriate task for students. Would “explanation” be more appropriate</p> <p>In PS1-1-2 and LS2-1-1. Consider in 2<sup>nd</sup> grade as well PS1-2-3 and PS1-2-4</p>



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	<p>change “argument” to “explanation” to better match other 3D standard’s SEP and matches Gr1 skillset, and can allow more teacher guided discussion.</p> <p>Make observations to construct an evidence-based explanation that objects in darkness can be seen only when illuminated.</p>	
<p>PS1-1-3. Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.</p>	<p><b>Rewrite: With guidance and support, plan and conduct investigations to determine the effect of placing materials in the path of a beam of light that: allow light to pass through them; allow some light to pass through them; block all light; or redirect light.</b></p> <p>PS1-1-3 <b>With guidance and support,</b> plan and conduct investigations to determine the effect of placing <b>objects made with different</b> materials in the path of a beam of light <b>that: allow light to pass through them; allow some light to pass through them; block all light; or redirect light.</b></p>	<p>The addition of the details come from the MA standard. We would encourage the use of vocabulary terms <i>transparent, translucent, opaque,</i> and <i>reflect(ive)</i> in the supporting content.</p> <p>The phrase ‘With guidance and support’ mirrors other standards.</p>
<p>PS1-1-4. Use tools and materials to design and build a device that uses light or sound to solve the</p>	<p><b>Rewrite: Design and build a device that uses light or sound to communicate over a distance.</b></p>	

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problem of communicating over a distance.	<p>PS1-1-4 <del>Use tools and materials to</del> Design and build a device that uses light or sound to <del>solve the problem of communicating</del> communicate over a distance.</p> <p>LIFE SCIENCE</p> <p>add back in “Use tools and materials...” to be explicit, but after the “Design and build a device...”</p>	
LS1-1-1. 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.	<p>Rewrite: Design and build 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.</p> <p>LS1-1-1 <del>Use materials to</del> Design and build 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.</p> <p>PHYSICAL SCIENCE TEAM</p> <p>Keep the original</p>	<p><i>We will return to life science standards to take a bird’s eye view to look at alignment and reduce redundancy in K-2 – may also rephrase to ‘live and grow’ vs. ‘survive, grow, and meet their needs’</i></p> <p>EARTH AND SPACE SCIENCE</p> <p>Is “build” limiting to constructing something? Would “create” still allow for hands-on work, but be more flexible?</p>
LS1-1-2. Read texts and use media to determine patterns in behavior of parents and	<p>Rewrite: Obtain information to identify patterns of behavior in parents and offspring that help offspring thrive.</p>	<p>In supporting content, make sure to include a variety of family structures and types of parents (e.g. seahorse males incubate babies; some</p>

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<p>offspring that help offspring survive.</p>	<p>PHYSICAL SCIENCE TEAM</p> <p>Change thrive back to survive Thriving is also more difficult to define - what evidence could be used to support a claim of thriving can vary widely. LS1-1-2 <del>read texts and use media</del> Obtain information to <del>determine</del> identify patterns <del>in</del> of behavior <del>of in</del> parents and offspring that help offspring thrive <del>survive</del>.</p>	<p>communal nurturing in wolves or cattle, etc.) to reflect the variety of family structures in students.</p> <p>EARTH AND SPACE SCIENCE</p> <p>Is “obtain” age appropriate? Is this asking them to locate their own information vs information provided by the teacher. Ok with leaving standard as is, but want to ensure supporting information to ensure teachers scaffold students to provide them information that they will review. Make sure there is direction to SEP #8.</p>
<p>LS1-1-3. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.</p>	<p>Rewrite: Develop models to demonstrate that living things, although they have unique and diverse life cycles, all have birth, growth, reproduction, and death in common.</p> <p>PHYSICAL SCIENCE TEAM</p> <p>Move back to 3<sup>rd</sup> grade and keep the original language</p> <p>LS1-1-3. Develop models to <del>describe</del> demonstrate that <del>organisms</del> living things, although they have unique and diverse life cycles, <del>but</del> all have <del>in</del></p>	<p>In NGSS, this is a 3<sup>rd</sup> grade standard. We are also attempting to integrate current Idaho LS1-K-2 living/non-living standard.</p> <p>EARTH AND SPACE SCIENCE</p> <p>Want clarity of if this standard was recommended to be moved to 3<sup>rd</sup> grade. Ensuring there is available curriculum and is age appropriate. ESS vertical alignment group in favor of moving to 3<sup>rd</sup> grade.</p>

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	<del>common</del> birth, growth, reproduction, and death <b>in common.</b>	
Add LS1-1-4 or LS1-1-3 if the current LS1-1-3 is moved.	<b>Moved from Kindergarten</b> <b>LS1-1-4. Use classification supported by evidence to differentiate between living and non-living items.</b>	This is a complex topic and needs to be taught in context. This is also not a standard that is listed in any other state we were tasked with observing.
LS2-1-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.	<b>Rewrite: Make observations to construct an evidence-based argument that offspring are similar to, but not identical to, their parents.</b>  LS2-1-1. Make observations to construct an evidence-based <del>account</del> <b>argument</b> that <del>young plants and animals offspring are like</del> <b>similar to</b> , but not <del>exactly like</del> <b>identical to</b> , their parents.	Rewording to make consistent with other standards that have ‘argument’ and ‘offspring’ in them. In the supporting content, make sure the emphasis is on biology and the genetics between parents and offspring. Additionally, the scale is looking between species rather than within species (dogs vs. birds or mammal vs. reptile rather than breeds of dog).
ESS1-1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.	<b>Rewrite: Use observations of the sun, moon, and stars to describe patterns of the apparent rising, movement in the sky, and setting of these objects.</b>  ESS1-1-1. Use observations of the sun, moon, and stars to describe patterns <b>of the apparent rising, movement in the</b>	This rewrite is in line with the MA standard and includes the existing further explanation. For the supporting document, include that the word ‘apparent’ is included to emphasize that the sun, moon, and stars are not actually moving, but appear to move due to the movement of the Earth. Also emphasize that our Sun <i>is</i> a star.  <b>PHYSICAL SCIENCE</b>

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	<p>sky, and setting of these objects. <del>patterns that can be predicted.</del></p> <p>LIFE SCIENCE</p> <p>Go back to the original to clarify the student is describing patterns “Use observations of the sun, moon, and stars to describe patterns that can be predicted.”</p> <p>OR</p> <p>Add to Supporting Content</p>	The moon and stars are moving.
ESS1-1-2. Make observations at different times of year to relate the amount of daylight to the time of year.	KEEP	

## SECOND GRADE

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PS1-2-1. Plan and conduct an investigation to describe and classify different kinds of	Keep	Including the supporting content properties including but not limited to: color, flexibility, hardness, texture, and absorbcency (see MA). For supporting content: Keep in mind that this might be the first time a student is independently

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materials by their observable properties.		planning and conducting an investigation, that could be a bigger focus in this standard (building on classification ideas in math from earlier grades as well)
PS1-2-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.	Keep	In SDE document – could make ties to ELA writing/communication. Also make sure to define ‘analyze’ at the different grade levels (include a practice progression for each of the practices in a guiding document)
PS1-2-3. 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.	<p><b>Rewrite:</b> Make observations to construct an evidence-based argument that objects, when disassembled, may be used to create new objects using the same set of components.</p> <p>PS1-2-3. Make observations to construct an evidence-based <del>account</del> argument that objects, when disassembled, may be used to create new objects using the same set of components. <del>of how an object made of a small set of pieces can be disassembled and made into a new object.</del></p>	<p>We simplified the language to get at the core of what it was trying to teach, and added ‘argument’ for consistency. Somewhat close to MA standard.</p> <p><b>PHYSICAL SCIENCE</b></p> <p>Make sure to define ‘argument’ at the different grade levels (include a practice progression for each of the practices in a guiding document).</p> <p><b>LIFE SCIENCE</b></p> <p>Clarifying comment: Progression in skillset from explanation (Gr1) to making an argument (Gr2).</p>

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PS1-2-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	Keep	It is very straight-forward and aligns with the previous physical science standards. Also identical with NE and MA standards
LS1-2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.	<p><b>Rewrite: Plan and conduct an investigation to determine the impact of light and water on the growth of plants.</b></p> <p>LS1-2-1. Plan and conduct an investigation to determine <del>if plants need the impact of sunlight and water on the growth of plants. to grow.</del></p>	<p><i>May address later with vertical alignment</i></p> <p>In supporting content, note that the key concept is for students to see the necessity of light and water for plants. They could then expand to other variables. This could also make connections to LS1-K-1 and PS1-1-3.</p>
LS1-2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	<p><b>Rewrite: Develop a model that demonstrates how plants depend on animals for pollination or the dispersal of seeds.</b></p> <p>LS1-2-2 Develop a model that <b>demonstrates how plants depend on animals for mimics the function of an animal in dispersing pollination or the dispersal of seeds. or pollinating plants.</b></p>	<p><i>May address later with vertical alignment</i></p> <p>remove “simple” to allow teacher to decide on the complexity and type of model.</p> <p>Change “and” to “or” because those are two different actions, not necessarily carried out together, and in the original is an “or”.</p> <p><b>EARTH AND SPACE SCIENCE</b></p> <p>This standard is focused on interactions between different species. ESS vertical alignment group recommends considering the original language as the revision changes the focus from animals to</p>

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		plants. Concern over misconceptions that animals are the only driver of pollination and dispersal of seeds.
LS2-2-1. Make observations of plants and animals to compare the diversity of life in different habitats.	<p>KEEP</p> <p><del>Rewrite: Obtain information to compare the biodiversity of different habitats.</del></p> <p><del>LS2-2-1. Make observations of plants and animals to compare the diversity of life in different habitats.</del></p>	<p>PHYSICAL SCIENCE</p> <p>supporting documents should clarify that students are comparing animals in different habitats.</p>
ESS1-2-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	<p>Keep</p> <p><del>ESS1-2-1. Obtain information from several sources to provide evidence that Earth events can occur quickly or slowly.</del></p>	<p><del>Rephrased to add 'obtain' to make consistent with other standards. In supporting document, emphasize tie ins with ELA standards (e.g., W.2.8)</del></p>
ESS2-2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	Keep	In supporting document: 'Solutions' could be media, graphics, models, student-designed solutions, etc.
ESS2-2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.	Keep	This is in line with social studies standards for this grade level. Include in supporting document the fact that this does not include quantitative scaling in models.



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<p>ESS2-2-3. Obtain information to identify where water is found on Earth and that it can be solid, liquid or gas.</p>	<p><b>Rewrite: Obtain information to identify where water is found on Earth and that it can be solid or liquid.</b></p> <p>ESS2-2-3. Obtain information to identify where water is found on Earth and that it can be solid <b>or</b> liquid.</p>	<p>Physical Science Group reviewed and determined “gas” was not in alignment and should not be included. The concept of “gas” could be clarified in a guidance document, that it could be addressed but need not be stressed.</p> <p>The relation of this standard to the surrounding standards needs to be made clear.</p> <p>Note that this is connected to PS1-2-4. The removal of ‘gas’ is consistent with NE and MA. An advanced conversation could include the discussion of gasses and the water cycle.</p>

### THIRD GRADE

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>PS1-3-1. Plan and conduct an investigation to provide evidence of the effects of</p>	<p>Keep</p>	<p>Forces and Interactions is introduced in Kindergarten. Within grades K-2, students have opportunities to plan and conduct investigations.</p>

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balanced and unbalanced forces on the motion of an object.		Supporting documents can provide clarification for teachers and other stakeholders.
PS1-3-2. Make observations and/or measurements of an object’s motion to provide evidence that a pattern can be used to predict future motion.	Keep <b>LIFE SCIENCE</b> Redundant. Observations include measurements. OR make a parenthetical OR replace the “and/or” with “and”	Making observations and measurements are developmentally appropriate. Students observe and replicated patterns from kindergarten forward.
PS1-3-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.	<b>Rewrite: Ask questions to determine cause and effect relationships of static electricity or magnetic interactions between two objects not in contact with each other.</b>  PS1-3-3. Ask questions to determine cause and effect relationships of <b>static electricity electric</b> or magnetic interactions between two objects not in contact with each other.	Clarification addresses age-appropriateness because static electricity is observable (students can see and feel it) and concrete for students at this grade level. This change assures performance expectation is developmentally appropriate.  <b>LIFE SCIENCE</b> Could be limiting if defined as “static electricity”.
PS1-3-4. Define a simple design problem that can be solved by	<b>Rewrite: Define a problem that can be solved by applying scientific ideas about magnets.</b>	This revision is due to age appropriateness. Students who can and want to consider more

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applying scientific ideas about magnets.	<p>PS1-3-4. Define a problem that can be solved by applying scientific ideas about magnets.</p> <p><b>LIFE SCIENCE</b></p> <p>Suggest “Define a problem and design a simple design solution to...”</p>	<p>complex design problems may have that opportunity.</p> <p>removed “design” for language simplicity but it should be included in support documents that this is part of the engineering process.</p> <p>It should be included in the support documents an explanation that "define" is part of the engineering process.</p>
LS1-3-1. Construct an argument that some animals form groups that help members survive.	<p><b>KEEP</b></p> <p><del>Provide evidence to support construct an argument that some animals form groups that help members survive.</del></p>	<p>Changes made to address age appropriateness.</p> <p><b>LIFE SCIENCE</b></p> <p>Change back to original because the scaffold has been constructed with argumentation in Gr1 and Gr2.</p>
LS2-3-1. 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.	<p>Keep</p>	<p>Standard is age appropriate, is supported learning from previous grade levels and follows the guidelines from our re-write protocol.</p>
LS2-3-2. Use evidence to support the explanation that traits can be influenced by the environment.	<p>KEEP</p> <p><del>LS2-3-2.</del></p>	

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ADD LS2-3-3	<p>Moved from 5<sup>th</sup> grade</p> <p>LS2-5-3. 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.</p>	<p>Move this standard to third grade to create a spiraling effect of similar standards that will be realized at later grades.</p>
ESS1-3-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	Keep	Standard is supported with prior learning from grades K-2 and is age-appropriate.
ESS1-3-2. Obtain and combine information to describe climates in different regions of the world.	Keep	Standard is clear as written, aligns with other content areas and is age appropriate.
ESS2-3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.	Keep	Standard is clear as written, aligns with other content areas and is age appropriate.

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

## FOURTH GRADE

2018 Standard	Proposed revision <b>Revisions are in red text.</b>	Rationale for revision
PS1-4-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.	Keep	Standard is developmentally appropriate for fourth grade students and is clear in its expectation. This builds from prior learning.
PS1-4-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	<p><b>Rewrite: Make observations to provide evidence that energy can be transferred by heat, sound, light, and electric currents.</b></p> <p>PS1-4-2. Make observations to provide evidence that energy can be transferred by <b>heat</b>, sound, light, and electric currents.</p> <p><del>KEEP</del></p>	<b>EARTH AND SPACE SCIENCE</b> Clarify this wording
PS1-4-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.	Keep	Standard is developmentally appropriate and learning is accessible for students at this grade level.
PS1-4-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	Keep	Standard is developmentally appropriate for fourth grade students and is clear in its expectation. This builds from prior learning.

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PS2-4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	<p>Rewrite: Develop a model of a simple mechanical wave to describe patterns of amplitude and wavelength and that waves can cause objects to move.</p> <p>PS2-4-1. Develop a model of a simple mechanical wave to describe patterns of amplitude and wavelength and that waves can cause objects to move.</p>	<p>Used the language of the Massachusetts standard based on its clarity and age appropriateness.</p> <p>This wording gives clarity to the simple mechanical wave model and strengthens the vertical alignment with middle school. It also articulates that it is the characteristics of amplitude and wavelength that are most important in 4th grade.</p>
PS2-4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	Keep	Standard is developmentally appropriate for fourth grade students and is clear in its expectation. This builds from prior learning from earlier grade levels.
PS2-4-3. Generate and compare multiple solutions that use patterns to transfer information.	Keep	Standard is developmentally appropriate and learning is accessible for students at this grade level.
LS1-4-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	Keep	Standard is clear about content and student expectations are developmentally appropriate.
LS1-4-2. Use a model to describe that animals receive different	Rewrite: Use a model to describe how animals receive different types of	EARTH AND SPACE SCIENCE

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
types of information through their senses, process the information in their brain, and respond to the information in different ways.	<p>information through their senses, process the information in their brain, and respond to the information in different ways.</p> <p>LS1-4-2. Use a model to describe how animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.</p>	<p>Changing to “how” exceeds the content limit description from 2018. Changes focus more to anatomy vs sensory input. Returning to “that” may be more appropriate</p>
LS2-4-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	<p><del>Keep</del></p> <p><b>MOVE</b></p>	<p><del>Standard is clear and connects to prior learning. Learning is accessible to fourth grade students and is developmentally appropriate.</del></p> <p><del>Further explanation may need some editing for clarity</del></p> <p>Move to Grade 5 to better align with how matter is taught in Grade 5.</p> <p>Further explanation may need some editing for clarity.</p> <p><b>EARTH AND SPACE SCIENCE</b></p> <p>ESS vertical alignment team want to ensure this does not overload amount of content to be covered in 5<sup>th</sup> grade</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
ESS1-4-1. Identify evidence from patterns in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time.	Keep	Students have multiple opportunities in prior grades to observe and use patterns and use evidence to support an explanation. Standard is developmentally appropriate.
ESS2-4-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	Keep	Standard connects well to prior learning and is clear. Standard is grade-level appropriate.
ESS2-4-2. Analyze and interpret data from maps to describe patterns of Earth’s features.	Keep	Standard connects to prior learning about landforms and patterns. Standard is clear and developmentally appropriate.
ESS3-4-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	Keep	Standard is clear and developmentally appropriate. No conclusionary language is contained in the standard.  In Further explanation, consider removing “negative” from description to avoid conclusionary language.



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2018 Standard	Proposed revision <b>Revisions are in red text.</b>	Rationale for revision
ESS3-4-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	Keep	Standard connects to prior learning and learning within the grade band. Standard is clear and developmentally appropriate.

#### EARTH AND SPACE SCIENCE

ESS vertical alignment group has concern about adding additional standards to 5<sup>th</sup> grade. Not only in the ability to cover all standards, but is particularly inhibiting for teachers to find commercial materials to support implementation of standards.

#### FIFTH GRADE

2018 Standard	Proposed revision <b>Revisions are in red text.</b>	Rationale for revision
PS1-5-1. Develop a model to describe that matter is made of particles too small to be seen.	Keep	Standard connect to students' prior learning using models and is developmentally appropriate.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PS1-5-2. 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.	Keep	Standard is grade level appropriate and is clear in its expectations.
PS1-5-3. Make observations and measurements to identify materials based on their properties.	Keep	Standard connects to prior learning and is developmentally appropriate.
PS1-5-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	Keep	Standard is clear and developmentally appropriate.  Documents like cross-cutting concepts maps and Evidence Statements (like for NGSS) would be helpful and should be easy to find on the state website.
PS2-5-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.	<p>Rewrite: Support an argument that the gravitational force exerted by Earth on objects is directed downward.</p> <p>PS2-5-1. Support an argument that the gravitational force exerted by Earth on objects is directed downward.</p>	Standard connect to students' prior learning and is developmentally appropriate.  Further explanation needs revisions  Downward sounds better.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>PS3-5-1. Use models to describe that energy in animals’ food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.</p>	<p>Keep</p>	<p>Standard connect to students’ prior learning and is developmentally appropriate.</p>
<p>LS1-5-1. Support an argument that plants get the materials they need for growth chiefly from air and water.</p>	<p><b>Rewrite: Support an argument that plants get what they need for growth chiefly from air, water, and energy from the sun.</b></p> <p>LS1-5-1. Support an argument that plants get <b>what</b> they need for growth chiefly from air, water, <b>and energy from the sun.</b></p>	<p>Standard builds on students’ prior experiences with supporting arguments. Standard is clear and developmentally appropriate.</p> <p><b>PHYSICAL SCIENCE</b></p> <p>Students need to understand that plants also need minerals for growth.</p>
<p>LS2-5-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.</p>	<p><b>Rewrite: Analyze and interpret fossils to provide evidence of the types of organisms and the environments that existed long ago and compare those to living organisms and their environments.</b></p> <p>LS2-5-1. Analyze and <b>interpret-data from</b> fossils to provide evidence of the <b>types of organisms and the</b></p>	<p>Used partial language of the Massachusetts standard based on its clarity and age appropriateness. This standard is in third grade in some places, so we used language to address fifth grade complexity expectations for consistency.</p> <p><b>Add to Further Explanation: Some kinds of plants and animals that once lived on Earth (e.g., dinosaurs) are no longer found anywhere,</b></p>

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2018 Standard	Proposed revision <b>Revisions are in red text.</b>	Rationale for revision
	<p>environments <del>in which they lived that existed</del> long ago and compare those to living organisms and their environments.</p> <p>PHYSICAL SCIENCE</p> <p>Keep “data from” grammar</p>	<p>although others now living (e.g., lizards) resemble them in some ways.</p> <p>EARTH AND SPACE SCIENCE</p> <p>Consider moving 5-2 and 5-1 back to 3<sup>rd</sup> grade. Using original language</p>
<p>LS2-5-2. 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.</p>	<p><b>Rewrite: Construct an argument with evidence for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.</b></p> <p>LS2-5-2. <del>Use evidence to</del> Construct an <del>explanation</del> <b>argument with evidence</b> for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.</p>	<p>This standard is in third grade in some places, so we used language to address fifth grade complexity expectations for consistency.</p> <p>EARTH AND SPACE SCIENCE</p> <p>Consider moving 5-2 and 5-1 back to 3<sup>rd</sup> grade. Using original language</p>
<p>LS2-5-3. 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.</p>	<p><b>MOVE</b></p>	<p><b>Move this standard to third grade to create a spiraling effect of similar standards that will be realized at later grades.</b></p> <p>Committee debated this standard’s ambiguity of “less well”, and determined that was part of the</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
		<p>purpose of an argument. Standard is developmentally appropriate.</p> <p>Perhaps include examples on what it means to survive well, survive less well.</p>
<p>LS2-5-4. 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.</p>	<p><b>Rewrite: Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals living there may change.</b></p> <p>LS2-5-4. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals <b>living there may change.</b></p>	<p>Change to improve grammar.</p> <p>Standard is developmentally appropriate and clarity is enhanced by the further explanation.</p> <p>The further explanation is <b>really important</b> to this standard implementation – is there a way to make sure this is available and noted?</p>
<p>ADD LS2-5-5</p>	<p><b>Add from fourth grade</b></p> <p><b>LS2-5-5. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</b></p>	<p>Move to Grade 5 to better align with how matter is taught in Grade 5.</p> <p>Further explanation may need some editing for clarity</p>
<p>ESS1-5-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their</p>	<p>Keep</p>	<p>Standard connect to students’ prior learning concerning supporting argumentation and is developmentally appropriate.</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
relative distances from the Earth.		
ESS1-5-2. 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.	Keep	Standard connects to students’ prior learning regarding patterns and is developmentally appropriate.
ESS2-5-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	Keep	Standard is developmentally appropriate and clarity is enhanced by the further explanation. The further explanation is <b>really important</b> to this standard implementation – is there a way to make sure this is available and noted?
ESS2-5-2. Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	<p><b>Rewrite: Describe and graph the relative amounts of fresh and salt water in various reservoirs, to interpret and analyze the distribution of water on Earth.</b></p> <p>ESS2-5-2. Describe and graph the amounts and percentages of <b>fresh and salt</b> water <del>and fresh water</del>, in various reservoirs, to <b>interpret and analyze</b></p>	<p>Standard revised for clarity and complexity for grade-level appropriateness.</p> <p>Align language to math standards. Proportions or ratios have been covered by 5<sup>th</sup> grade. Percentages are not addressed until 6<sup>th</sup> grade.</p> <p>Perhaps consider “Describe and graph the relative amounts of fresh and salt water”</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
	<del>evidence about</del> the distribution of water on Earth.	
ESS3-5-1. Support, obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.	<p><b>Rewrite: Obtain and combine information about ways communities protect Earth's resources and environment using scientific ideas.</b></p> <p>ESS3-5-1. <del>Support,</del> Obtain and combine information about ways <del>individual</del> communities <b>reduce human impact using science ideas</b> to protect the Earth’s resources and environment <b>using scientific ideas.</b></p>	<p>Consider “Obtain and combine information about ways communities protect Earth's resources and environment using scientific ideas.”</p> <p>ESS vertical alignment group concern that “impact’ carries a negative connotation. Have worked to mitigate that throughout the standards</p> <p>Standard is developmentally appropriate and clarity is enhanced by having further explanation. We used partial language from Massachusetts. Include a further explanation that addresses management as a means of protection, include examples used in Idaho.</p>

## MIDDLE SCHOOL (6-8) PHYSICAL SCIENCES

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PS1-MS-1. Develop models to describe the atomic composition	<b>Rewrite: Develop models to describe the atomic composition of simple molecules.</b>	Rationale is that the same standard is repeated in the HS standards word for word and vertical alignment is needed.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
of simple molecules and extended structures.	PS1-MS-1. Develop models to describe the atomic composition of simple molecules <del>and extended structures.</del>	(see Massachusetts’s 8.MS-PS1-1. Develop a model to describe that (a) atoms combine in a multitude of ways to produce pure substances which make up all of the living and nonliving things that we encounter, (b) atoms form molecules and compounds that range in size from two to thousands of atoms, and (c) mixtures are composed of different proportions of pure substances).
PS1-MS-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	KEEP	
PS1-MS-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	<p><b>Rewrite: Construct a scientific explanation, based on evidence, to describe that synthetic materials come from natural resources.</b></p> <p>PS1-MS-3. <del>Gather and make sense of information</del> <b>Construct a scientific explanation, based on evidence, to describe that synthetic materials come from natural resources and impact society.</b></p>	<p>Discussion about using the word “benefit” instead of impact; reasons for eliminating the word impact are sociological reasons.</p> <p>Also suggested to rewrite as follows: Gather INFORMATION ABOUT natural materials and analyze the synthetic materials that can be made from natural products through chemical processes.</p>



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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
		This should be added to the proposed revision. Most synthetic materials require something to happen.
PS1-MS-4. 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.	KEEP	Supporting documentation needed about spatial arrangement PS1-A
PS1-MS-5. 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.	KEEP	Supporting documentation and content limit needed.
PS1-MS-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	KEEP	The further explanation is definitely needed here.
PS2-MS-1. Apply Newton’s Third Law to design a solution to a problem involving the motion of two colliding objects.	KEEP	

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PS2-MS-2. 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.	<p>Rewrite: Plan and conduct 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.</p> <p>PS2-MS-2. Plan and conduct 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.</p>	In order to provide evidence the investigation must also be conducted.
PS2-MS-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	KEEP	Please include supporting data
PS2-MS-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	KEEP	
PS2-MS-5. Conduct an investigation and evaluate the experimental design to provide	KEEP	Please include content limit.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.		
PS3-MS-1. 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.	KEEP	Please include further explanation
PS3-MS-2. 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.	<p><b>Rewrite:</b> Develop a model to describe the relationship between the relative positions of objects interacting at a distance and the relative potential energy in the system.</p> <p>PS3-MS-2. Develop a model to describe the relationship between the relative positions <del>that when the arrangement</del> of objects interacting at a distance <del>changes, different amounts of and the</del> relative potential energy <del>are stored</del> in the system.</p>	<p>This still seems difficult to understand.</p> <p>From Massachusetts 7.MS-PS3-2</p> <p><b>Language more clear in the MA standard; this is why we decided to change it.</b></p> <p>Clarification Statements:</p> <p>Examples of objects within systems interacting at varying distances could include Earth and either a roller coaster cart at varying positions on a hill or objects at varying heights on shelves, changing the direction/orientation of a magnet, and a balloon with static electrical charge being brought closer to a stream of water. •Examples of models could include representations, diagrams, pictures, and written descriptions of systems. State</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
		<p>Assessment Boundaries: •State assessment will be limited to electric, magnetic, and gravitational interactions and to interactions of two objects at a time. •Calculations of potential energy are not expected in state assessment.</p> <p>Clarity of language from “their” to “the” and to emphasize that the energy belongs to the system.</p>
PS3-MS-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	KEEP	
PS3-MS-4. 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.	KEEP	
PS3-MS-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes,	KEEP	

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
energy is transferred to or from the object.		
PS4-MS-1. 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.	<p><b>Rewrite:</b> Use diagrams of a simple wave to explain that (a) a wave has a repeating pattern with a specific amplitude, frequency, and wavelength, and (b) the amplitude of a wave is related to the energy in the wave</p> <p>PS4-MS-1. Use <del>mathematical representations to describe</del> diagrams of a simple <del>model for waves that includes how</del> to explain that (a) a wave has a repeating pattern with a specific amplitude, frequency, and wavelength, and (b) the amplitude of a wave is related to the energy <del>of</del> in the wave.</p>	<p>From Massachusetts’s 6.MS-PS4-1 The a) and b) format may need adjustment.</p> <p>State Assessment Boundaries: Electromagnetic waves are not expected in state assessment.</p> <p>State assessment will be limited to standard repeating waves.</p> <p><b>Some concern expressed about the mathematical representations should be introduced here.</b></p>
PS4-MS-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.	KEEP	Can we include examples of materials in the supporting content?
PS4-MS-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more	<p><b>Rewrite:</b> Present qualitative scientific and technical information to support the claim that digitized signals (0s and</p>	From Massachusetts 6.MS-PS4-3.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
reliable way to encode and transmit information than analog signals.	<p>1s) can be used to encode and transmit information.</p> <p>PS4-MS-3. <del>Integrate</del> <b>Present</b> qualitative scientific and technical information to support the claim that digitized signals (sent as wave pulses representing 0s and 1s) <del>are a more reliable way can be used</del> to encode and transmit information <del>than analog signals</del>.</p>	<p><b>Need to include analog in the further explanation.</b></p> <p><b>Qualitative data</b> can be observed and recorded. This <b>data</b> type is non-numerical in nature.</p> <p>With this definition, can middle school students make a jump to binary code????</p>

## MIDDLE SCHOOL (6-8) LIFE SCIENCES

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
MS-LS1-1. Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.	Keep	This standard is age appropriate, covers essential content in life science, and is consistent with Massachusetts (MA) which is one of the states the legislature recommended we consider.
MS-LS1-2. Develop and use a model to describe the function	Keep	Consistent with MA.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
of a cell as a whole and ways parts of cells contribute to the function.		Add supporting content to clarify genes to proteins.
MS-LS1-3. Use argument supported by evidence for how a living organism is a system of interacting subsystems composed of groups of cells.	<p>Rewrite: Make a claim supported by evidence for how a living organism is a system of interacting subsystems composed of groups of cells.</p> <p>LS1- MS-3. <del>Use argument</del> Make a claim supported by evidence for how a living organism is a system of interacting subsystems composed of groups of cells.</p>	Adjustments were made to the practice to make it more age appropriate.
MS-LS1-4. Construct a scientific argument based on evidence to defend a claim of life for a specific object or organism.	KEEP	
MS-LS1-5. 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.	Keep	This standard spirals well from 5 <sup>th</sup> grade and flows nicely into high school.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>MS-LS1-6. 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.</p>	<p><b>Rewrite: Develop a conceptual model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as matter moves through an organism.</b></p> <p>LS1- MS-6. Develop a <b>conceptual</b> model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as <b>this</b> matter moves through an organism.</p>	<p>The term “conceptual” clarifies that the big ideas are modeled rather than the details of chemical reactions and their formulas.</p> <p>This guidance should be in supporting documentation for consistency with practices language.</p>
<p>LS2-MS-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.</p>	<p><b>Rewrite: Analyze and interpret data to provide evidence for the effects of periods of abundant and scarce resources on organisms and the size of populations of organisms in an ecosystem.</b></p> <p>LS2-MS-1. Analyze and interpret data to provide evidence for the effects of <b>periods of abundant and scarce resources availability</b> on organisms and <b>the size of populations of organisms</b> in an ecosystem.</p> <p>PHYSICAL SCIENCE</p>	<p>MA wording is more specific and clarifies the intent.</p> <p>PHYSICAL SCIENCE</p> <p>keep original language. The terms abundant and scarce are not needed and make it harder to read. The standard should emphasize the variability of resources not just the extremes.</p>



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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
	KEEP	
LS2-MS-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	Keep	Pairs nicely with previous standard.
LS2-MS-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	Keep	Important that students develop models of energy as an essential driver for ecosystems.
LS2-MS-4. Develop a model to describe the flow of energy through the trophic levels of an ecosystem.	Keep	Important that students develop models of energy as an essential driver for ecosystems.
LS2-MS-5. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	<p>Rewrite: Construct an argument supported by evidence that changes to physical or biological components of an ecosystem affect populations.</p> <p>LS2-MS-5. Construct an argument supported by <del>empirical</del> evidence that changes to physical or biological</p>	Removed empirical to avoid confusion in interpreting the language.

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2018 Standard	Proposed revision <b>Revisions are in red text.</b>	Rationale for revision
	components of an ecosystem affect populations.	
LS2-MS-6. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	<p><b>Rewrite: Design and evaluate competing solutions for maintaining biodiversity and ecosystem services.</b></p> <p>LS2-MS-6. <b>Design and</b> Evaluate competing <del>design</del> solutions for maintaining biodiversity and ecosystem services.</p>	Added “Design” because we feel it is important for students to come up with solutions. We would also like the further explanations to include a recommendation to use examples tied to Idaho.
LS3-MS-1. Develop and use a model to describe why mutations may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	<p><b>Rewrite: Develop and use a model to describe how structural changes to genes (mutations) may or may not result in changes to proteins which may lead to harmful, beneficial, or neutral effects on the organism.</b></p> <p>LS3-MS-1. Develop and use a model to describe <del>why</del> <b>how structural changes to genes (mutations) may or may not result in changes to proteins which may lead to</b> harmful, beneficial, or neutral effects to <del>the structure and function of the organism</del> <b>trait.</b></p> <p>PHYSICAL SCIENCE KEEP</p>	<p>It is important to introduce proteins at the middle school level to prepare them for the high school standard. We used MA wording for this reason.</p> <p><b>When is genes to proteins introduced? see note in MS-LS1-2. Add supporting content to clarify genes to proteins.</b></p> <p>PHYSICAL SCIENCE use original language.</p> <p>Not sure if “how” or “why” in this case mean the same when referring to genes?</p>

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
LS3-MS-2. 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.	Keep	Incorporates the SEP of developing and using models (of various kinds) and is age appropriate.
LS4-MS-1. 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.	Keep	The SEP of analyzing and interpreting data is represented well in this standard.  What kind of data are the students analyzing and interpreting? When is the concept of a natural law covered (Appendix H)?
LS4-MS-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer relationships.	Keep	The SEP of constructing explanations is addressed here. It also addresses common ancestry and diversification.
LS4-MS-3. Analyze displays of pictorial data to compare	Keep	This standards is a good age-appropriate intro

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
patterns of similarities in the anatomical structures across multiple species of similar classification levels to identify relationships.		
LS4-MS-4. 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.	Keep	This standard is age appropriate, builds on 5 <sup>th</sup> grade standards and includes scientific practices.
LS4-MS-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	<p><b>Rewrite: Obtain, evaluate, and communicate information about how technologies allow humans to influence the inheritance of desired traits in organisms.</b></p> <p>LS4-MS-5. <del>Gather and synthesize</del> Obtain, evaluate, and communicate information about <b>how</b> technologies <del>that have changed the way</del> allow humans <b>to</b> influence the inheritance of desired traits in organisms.</p>	Obtain and evaluate is clearer than synthesize and is directly tied to our practices. Changed other wording to clarify.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>LS4-MS-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.</p>	<p><b>Rewrite: Use mathematical models to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.</b></p> <p>LS4-MS-6. Use mathematical <del>representations</del> <b>models</b> to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.</p>	<p>Mathematical representations is too unclear for some.</p>

## MIDDLE SCHOOL (6-8) EARTH AND SPACE SCIENCES

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>ESS1-MS-1. 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.</p>	<p>Keep</p>	<p>This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level. Important for students to understand this knowledge.</p>

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>ESS1-MS-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.</p>	<p><b>Rewrite: Develop and use a model to describe the role of gravity in the orbital motions within galaxies and the solar system.</b></p> <p>ESS1-MS-2 Develop and use a model to describe the role of gravity in the <b>orbital</b> motions within galaxies and the solar system.</p>	<p>Adding the word “orbital” gives clarity regarding motions and eliminates possible confusion about including more complex motions.</p>
<p>ESS1-MS-3. Analyze and interpret data to determine scale properties of objects in the solar system.</p>	<p><b>Rewrite: Analyze and interpret data to determine scale properties of objects (such as relative size, distance, motions, and features) in the solar system.</b></p> <p>ESS1-MS-3 Analyze and interpret data to determine scale properties of objects <b>(such as relative size, distance, motions, and features)</b> in the solar system.</p>	<p>The standard is broad enough to cover 6-8 and we added the parentheses to further define what scale properties could include.</p>
<p>ESS1-MS-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth’s history.</p>	<p><b>Rewrite: Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to analyze Earth’s history.</b></p> <p>ESS1-MS-4 Construct a scientific explanation based on evidence from rock strata for how the geologic time</p>	<p>The standard allows for students to engage in scientific processes while applying science content specific vocabulary. Changing from the word “organize” to the word “analyze” requires higher order of thinking about how to study Earth’s history.</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
	scale is used to <del>organize</del> analyze Earth’s history.	*Further explanation may be needed for clarity of evidence from rock strata to include index fossils, layers of meteorite dust, major events, etc.
ESS2-MS-1. Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process.	<p><b>Rewrite: Develop a model to describe the cycling of Earth’s materials and the internal and external flows of energy that drive the rock cycle processes.</b></p> <p>ESS2-MS-1 Develop a model to describe the cycling of Earth’s materials and the <b>internal and external flows</b> of energy that drives <del>this</del> the rock cycle processes.</p>	The internal and external energy are added to specify that not all energy driving these processes comes from one source. Adding the language of “rock cycle” gives clarity to the purpose of the standard and what materials are cycling.
ESS2-MS-2. Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales.	KEEP	<p>“Geologic” processes is the term that best encompasses the processes that have shaped the Earth over a variety of spatial and temporal scales.</p> <p>Guidance document could include clarification of what is a geoscience process</p> <p>Consider the word geoscience, biogeochemical, or geologic in vertical alignment.</p> <p>“Geomorphological” processes is another word option that may make the grammar better– plus it is a term exactly specific to what is being described here.</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
ESS2-MS-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	Keep	Vertical alignment supports a foundation of historical discoveries and evidence for past plate motions, while in high school students will explore current plate motions. The standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.
ESS2-MS-4. Develop a model to describe the cycling of water through Earth’s systems driven by energy from the sun and the force of gravity.	Keep	Strong vertical alignment of water cycle throughout grade levels. This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.
ESS2-MS-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	Keep	This standard allows students to gather local data on weather. This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.  *It may need clarification on the differences between weather and climate.
ESS2-MS-6. 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.	Keep	Understanding uneven heating is a critical piece to understanding all energy flow on Earth and how it drives water and air circulation.



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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>ESS3-MS-1. 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.</p>	<p><b>Rewrite: Construct a scientific explanation based on evidence of how Earth’s mineral, energy, and groundwater resources are unevenly distributed as a result of past and current geologic processes.</b></p> <p>ESS3-MS-1 Construct a scientific explanation based on evidence <del>for how the uneven distributions</del> of how Earth’s mineral, energy, and groundwater resources are <b>unevenly distributed as a</b> <del>the</del> result of past and current <del>geoscience</del> <b>geologic</b> processes.</p>	<p>“Geologic processes” is the term that best encompasses the processes that have shaped the Earth over a variety of spatial and temporal scales. The sentence structure was changed to improve readability.</p>
<p>ESS3-MS-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.</p>	<p><b>Rewrite: Analyze and interpret data on natural hazards to forecast future catastrophic events to mitigate their effects.</b></p> <p>ESS3-MS-2 Analyze and interpret data on natural hazards to forecast future catastrophic events <del>and inform the development of technologies</del> to mitigate their effects.</p>	<p>Removing the verbiage about technology allows for a broader exploration of practices and techniques used to mitigate natural hazards. This is also more age appropriate than asking students to develop technologies in middle school.</p> <p>*Needs supporting documentation to include practices and technologies to mitigate the effects of natural hazards.</p> <p>- ARCGIS offers free mapping technology to gain skills for employment.</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
		- Extensive free resources available (k-12 curriculum guides) that can be provided to teachers.
ESS3-MS-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	<p><b>Rewrite: Apply scientific principles to design a method for monitoring human activity and increasing beneficial human influences on the environment.</b></p> <p>ESS3-MS-3 Apply scientific principles to design a method for monitoring <del>and minimizing a human activity and increasing beneficial human influences impact</del> on the environment.</p>	<p>The standard was edited to be less conclusionary and more balanced.</p> <p>*see also ESS3-MS-4</p> <p>We don't need to sugar coat it. Human influences can be beneficial or not. We need to allow for both scenarios to be discussed. Possibly saying "positive and negative human activity of human influences. . . this is consistent with ESS3-MS-4</p>
ESS3-MS-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	<p><b>Rewrite: Construct an argument based on evidence for how changes in human population and per-capita consumption of natural resources positively and negatively impact Earth's systems.</b></p> <p>ESS3-MS-4 Construct an argument <del>supported by</del> based on evidence for how <del>increases</del> changes in human population and per-capita consumption of natural resources <b>positively and negatively</b> impact Earth's systems.</p>	<p>Change of language to increase neutrality and remove conclusionary language.</p> <p>*Discussion should include technologies to mitigate impacts. See also ESS3-MS-3</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
ESS3-MS-5. Ask questions to interpret evidence of the factors that cause climate variability over time.	<p>Rewrite: Ask questions to interpret evidence of the factors that cause climate variability throughout Earth’s history.</p> <p>ESS3-MS-5 Ask questions to interpret evidence of the factors that cause climate variability <del>over time</del> throughout Earth’s history.</p>	The change in language from “over time” to “Earth’s history” is to emphasize all time periods, not a focus on a limited recent time period. Also considered was “geologic time”, but that was not chosen because it may limit evidence to rock records only, rather than including seafloor sediment and ice cores.

## HIGH SCHOOL (9-12) LIFE SCIENCES

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
LS1-HS-1. 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.	Keep	This standard addresses two important core ideas: system of specialized cells carry out the essential functions of life, and DNA contains the code for protein formation.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
LS1-HS-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	Keep	This standard is broad and appropriate. It gives curriculum designers plenty of flexibility in hitting the standard.
LS1-HS-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	Keep	It is important that students plan and conduct investigations. We want students doing science.
LS1-HS-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	Keep	Builds on middle school standards MS-LS-1 and MS-LS1-3, which addresses cell theory, and LS3-MS-2 which addresses the differences between asexual and sexual reproduction.
LS1-HS-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	Keep	Spirals well from the MS standard.
LS1-HS-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from	Rewrite: Construct an explanation based on evidence that organic molecules are primarily composed of six elements, where carbon, hydrogen, and	Used MA wording that specifies the elements.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.</p>	<p>oxygen atoms may combine with nitrogen, sulfur, and phosphorus to form monomers (including amino acids) that can further combine to form large carbon-based macromolecules.</p> <p>LS1-HS-6. Construct <del>and revise</del> an explanation based on evidence <del>that organic molecules are primarily composed of six elements, where for</del> <del>how</del> carbon, hydrogen, and oxygen <del>from sugar molecules</del> atoms may combine with <del>other elements</del> nitrogen, sulfur, and phosphorus to form <del>amino acids and/or other</del> monomers that can further combine to form large carbon-based <del>macromolecules</del>.</p>	
<p>LS1-HS-7. 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.</p>	<p>Keep</p>	<p>Energy and matter are an important cross-cutting concept as is the practice of using a model.</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
LS2-HS- 1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	Keep	This standard builds on the middle school standard to have students analyze and compare more types of data sets.
LS2-HS-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.	<p><b>Rewrite:</b> Use mathematical representations to support explanations that biotic and abiotic factors affect biodiversity at different scales, including genetic diversity within a populations and species diversity within an ecosystem.</p> <p>LS2-HS-2. Use mathematical representations to support <del>and revise</del> explanations <del>based on evidence about</del> that biotic and abiotic factors affecting biodiversity <del>and</del> at different scales, including genetic diversity within a populations <del>in</del> and species diversity within an ecosystems <del>of different scales.</del></p>	<p>Included MA wording for more specifics.</p> <p>Should we be consistent and use mathematical models (LS4-MS-1) in the language?</p>
LS2-HS-3. Construct and revise an explanation based on evidence for the cycling of	Remove	Combined with LS2-HS-4.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
matter and flow of energy in aerobic and anaerobic conditions.		
LS2-HS-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	<p><b>Rewrite: Construct an explanation using mathematical representations to support claims for the flow of energy through trophic levels and the cycling of matter in an ecosystem.</b></p> <p>LS2-HS-4. <b>Construct an explanation</b> <del>Use</del><b>ing</b> mathematical representations to support claims for <del>the cycling of matter and the</del> flow of energy <del>among organisms</del> through trophic levels and <del>the cycling of matter</del> in an ecosystem.</p>	<p>Reworded using part of the MA standards. Important to add “trophic levels” to the standard.</p> <p>Consistency as referred above (LS2-HS-2) is important.</p>
LS2-HS-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	Keep	Ties into earth science standards and builds nicely from middle school standards.
LS2-HS-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively	<b>Rewrite: Evaluate the claims, evidence, and reasoning that changing the</b>	Shortened the standard to make it more concise.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	<p><b>conditions of a stable ecosystem may result in a new ecosystem.</b></p> <p>LS2-HS-6. Evaluate the claims, evidence, and reasoning that <del>the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but</del> changing <b>the conditions of a static ecosystem</b> may result in a new ecosystem.</p>	
LS2-HS-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.	<p><b>Rewrite: Design, evaluate, and/or refine practices used to manage a natural resource based on direct and indirect effects of human activities on biodiversity and ecosystem health.</b></p> <p>LS2-HS-7. Design, evaluate, and/or refine <del>a solution for reducing the impacts</del> <b>practices used to manage a natural resource based on direct and indirect effects</b> of human activities on <del>the environment and</del> biodiversity and ecosystem health.</p>	While maintaining the practice, modifications are geared more toward natural resources and their management rather than implying the impacts of human activities. This was merged LS4-HS-6.
LS2-HS-8. Evaluate the evidence for the role of group behavior on individual and species'	<p><b>Rewrite: Evaluate the evidence for the role of group behavior on individual and</b></p>	The term "ability" is clearer.



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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
chances to survive and reproduce.	<p>species' ability to survive and reproduce.</p> <p>LS2-HS-8. Evaluate the evidence for the role of group behavior on individual and species' <del>chances ability</del> to survive and reproduce.</p>	
LS3-HS- 1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	Keep	Building upon students' content knowledge in middle school, they begin to engage in higher level thinking, in particular "Asking questions".
LS3-HS-2. 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.	Keep	Spirals nicely from middle grades and multiple phenomena can be explored to acquire evidence.
LS3-HS-3. Apply concepts of statistics and probability to explain the variation and	Rewrite: Apply concepts of probability and statistical analysis to explain the	Changed "statistics" to statistical analysis to better convey what students will be doing.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
distribution of expressed traits in a population.	<p>variation and distribution of expressed traits in a population.</p> <p>LS3-HS-3. Apply concepts of <del>statistics</del> <b>and</b> probability <b>and</b> statistical analysis to explain the variation and distribution of expressed traits in a population.</p>	
LS4-HS- 1. Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	Keep	It is important that students understand the current models of science and the evidence backing them.
LS4-HS-2. 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	<p><b>Rewrite: Construct an explanation based on evidence that the process of evolution through the mechanism of natural selection 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.</b></p>	This standard more specifically outlines the process of evolution for high school students (age appropriate). As is, the standard guides students to gain necessary knowledge rather than theoretical understanding. Added wording similar to MA: “through the mechanism of natural selection”.

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

2018 Standard	Proposed revision <b>Revisions are in red text.</b>	Rationale for revision
and reproduce in the environment.	LS4-HS-2. Construct an explanation based on evidence that the process of evolution <b>through the mechanism of natural selection</b> 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.	
LS4-HS-3. 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.	<p><b>Rewrite: Apply concepts of probability and statistical analysis to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.</b></p> <p>LS4-HS-3. Apply concepts of <b>statistics and</b> probability <b>and statistical analysis</b> to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.</p>	Changed “statistics” to statistical analysis to better convey what students will be doing.

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>LS4-HS-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.</p>	<p>KEEP</p> <p><del>Rewrite: Research and communicate information about key features of viruses and bacteria to explain their ability to adapt and reproduce in a wide variety of environments.</del></p> <p>LS4-HS-4. <del>Construct an explanation based on evidence for how natural selection leads to adaptation of populations.</del></p>	<p><b>Addition of viruses and bacteria could be in the Further Explanation sections.</b></p> <p>This standard as written originally would follow the vertical alignment as students have learned about adaptations, natural selection, and population dynamics in previous grades. Leaving this standard more general allows for more local studies and topics, as well as allows districts a wider choice of curricula to teach this standard.</p> <p>It is essential that Idaho students be able to know about population dynamics for a range of organism (not just viruses and bacteria) and allows for place-based lesson development. For example, the more broadly written original standard would allow Idaho students to examine salmonid speciation and adaptation of Chinook vs. Sockeye salmon to a variety of environments or how different pine species (lodgepole vs. ponderosa pine) adapt to different elevations and temperatures within Idaho’s forests.</p>
<p>LS4-HS-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the</p>	<p><b>Rewrite: Evaluate models that demonstrate how changes in an environment may result in the evolution of a population of a given species, the</b></p>	<p>Used the wording of the MA standard. It was more specific and clear.</p>

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.</p>	<p>emergence of new species over generations, or the extinction of other species due to the processes of genetic drift, gene flow, mutation, and natural selection</p> <p>LS4-HS-5. Evaluate <del>the evidence supporting claims that</del> models that demonstrate how changes in an environmental <del>conditions</del> may result in <del>÷ (1) increases in the number of individuals of some species, (2) the evolution of a population of a given species, the emergence of new species over time generations, and (3) or the extinction of other species</del> due to the processes of genetic drift, gene flow, mutation, and natural selection.</p>	
<p>LS4-HS-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.</p>	<p>Remove</p>	<p>This standard was merged with LS2-HS-7</p>

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

## HIGH SCHOOL (9-12) PHYSICAL SCIENCES (CHEMISTRY)

2018 Standard	Proposed revision <b>Revisions are in red text.</b>	Rationale for revision
PSC1-HS-1. Develop models to describe the atomic composition of simple molecules and extended structures.	KEEP	See PS1-MS-1 revision to allow vertical alignment.
PSC1-HS-2. 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.	KEEP	Age appropriate and balanced.
PSC1-HS-3. 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.	<p><b>Rewrite: PSC1-HS-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of <del>electrical</del> electrostatic forces between particles.</b></p> <p>PSC1-HS-3. Plan and conduct an investigation to gather evidence to compare the structure of substances at the bulk scale to infer the strength of <del>electrical</del> electrostatic forces between particles.</p>	<p>Replace electrical with electrostatic.</p> <p>Rationale-electrostatic more relevant in Chemistry than electrical.</p> <p>We looked at MA and it was more complex than we wanted.</p>

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>PSC1-HS-4. 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 other types of radioactive decay.</p>	<p><b>Rewrite: 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 the various modes of radioactive decay.</b></p> <p>PSC1-HS-4. 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 the <del>other types</del> <b>various modes</b> of radioactive decay.</p>	<p>Radioactive decay needs to be distinguished from fission and fusion. Fission and fusion are not types of radioactive decay.</p> <p>Fission <i>*is*</i> a type of radioactive decay of unstable large nuclei</p>
<p>PSC1-HS-5. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.</p>	<p>KEEP</p>	<p>Age appropriate and balanced.</p>
<p>PSC2-HS-1 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</p>	<p>KEEP</p>	<p>Important to include the further explanation and content limit in this standard.</p>

**Note:** The table below shows proposed revisions to the 2018 Idaho Content Standards in Science.

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
knowledge of the patterns of chemical properties.		
PSC2-HS-2. 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.	<p><b>Rewrite: Develop a model to illustrate that the energy transferred during an exothermic or endothermic chemical reaction is based on the bond energy difference between bonds broken (absorption of energy) and bonds formed (release of energy).</b></p> <p>PSC2-HS-2. Develop a model to illustrate the <del>that the release or absorption of energy from a</del> transferred during an exothermic or endothermic chemical reaction <del>system depends upon the changes in total</del> based on the bond energy difference between bonds broken (absorption of energy) and bonds formed (release of energy).</p>	<p>From Massachusetts HS-PS1-4</p> <p>It helps to define the energy released or absorbed and also clarifies bond energy.</p> <p>Clearer wording</p>
PSC2-HS-3. 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.	KEEP	Age appropriate and balanced.



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PSC2-HS-4. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	<p><b>Rewrite:</b> Use mathematical representations to support the claim that the number and type of atoms, and therefore mass, are conserved during a chemical reaction.</p> <p>PSC2-HS-4. Use mathematical representations to support the claim that the number and type of atoms, and therefore mass, are conserved during a chemical reaction.</p>	<p>Helps to clarify by adding number and type of atoms.</p> <p>Consistency language for mathematics is important.</p>
PSC2-HS-5. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.	<b>REMOVE</b>	Is covered in a higher level chemistry class, but beyond the scope of the age group in this standard.
PSC3-HS-1. 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.	<p><b>Rewrite:</b> Ask questions to clarify the idea that electromagnetic radiation can be described either by a wave model or a particle model.</p> <p>PSC3-HS-1 <del>Evaluate the claims, evidence, and reasoning behind</del> Ask questions to clarify the idea that electromagnetic radiation can be described either by a wave model or a</p>	<p>Evaluate is beyond the age group as well as looking at situations where one is more useful than the other.</p> <p>From Massachusetts HS-PS4-3. Evaluate the claims, evidence, and reasoning behind the idea that electromagnetic radiation can be described by either a wave model or a particle model, and that for some situations involving resonance, interference, diffraction, refraction, or the</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
	particle model, <del>and that for some situations one model is more useful than the other.</del>	photoelectric effect, one model is more useful than the other.  How you can teach this concept without this piece (Evaluate) being embedded in the instruction? Plus, it's in the MA standard that is quoted, why was it included if it was intended to be evidence that it's beyond the scope at this level?
PSC3-HS-2 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.	KEEP	Please keep the further explanation and content limit here.
PSC3-HS-3. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).	KEEP	Age appropriate and balanced.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PSC3-HS-4*. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. ---OPTIONAL	KEEP	Keep examples limited to Chemistry here in the further explanation. Rationale is to keep optional here because it is mandatory in Physics.
PSC3-HS-5. 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).	KEEP	However, Endo and exo thermic (in the further explanation) make this confusing. Remove please.

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## HIGH SCHOOL (9-12) PHYSICAL SCIENCES (PHYSICS) NO REVISIONS PROPOSED

2018 Standard	Proposed revision <b>Revisions are in red text.</b>	Rationale for revision
PSP1-HS-1. 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.	KEEP	Age appropriate and balanced.
PSP1-HS-2. 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.	KEEP	Age appropriate and balanced.
PSP1-HS-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.	KEEP	Age appropriate and balanced.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PSP1-HS-4. Use mathematical representations of Newton’s Law of Gravitation and Coulomb’s Law to describe and predict the gravitational and electrostatic forces between objects.	KEEP	Include inverse square law in further explanation.
PSP1-HS-5. 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.	KEEP	Age appropriate and balanced.
PSP1-HS-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.	KEEP	We feel it is important to have this standard in both Chemistry and Physics and it is independent of which is taught first.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PSP2-HS-1 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.	KEEP	Age appropriate and balanced.
PSP2-HS-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).	KEEP	The further explanation and content limit show this is more aligned to Physics so we keep, even though it is identical to Chemistry PSC3-HS-3
PSP2-HS-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.	KEEP	Age appropriate and balanced.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
PSP2-HS-4. 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).	KEEP	Identical to Chemistry, but students would get it here as well and no constraints on which is taught first.
PSP2-HS-5. 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.	KEEP	Age appropriate and balanced.
PSP3-HS-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	KEEP	Age appropriate and balanced.  Consistent language for mathematics is important.

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2018 Standard	Proposed revision <b>Revisions are in red text.</b>	Rationale for revision
PSP3-HS-2. Evaluate questions about the advantages of using digital transmission and storage of information.	KEEP	However, it would be a better fit for a computer science class.
PSP3-HS-3. 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.	KEEP	Identical to Chemistry PSC3-HS-1, but a better fit here.
PSP3-HS-4. Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.	KEEP	It would also be appropriate in Chemistry.
PSP3-HS-5. 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.	KEEP	Age appropriate and balanced.



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## HIGH SCHOOL (9-12) EARTH AND SPACE SCIENCES

2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
ESS1-HS-1. 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.	Keep	This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.
ESS1-HS-2. Construct an explanation of the current model of the origin of the universe based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.	Keep	This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.
ESS1-HS-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements.	<p><b>Rewrite: Communicate scientific ideas about the way stars, over their life cycle, transform elements.</b></p> <p>ESS1-HS-3 Communicate scientific ideas about the way stars, over their life cycle, transform elements.</p>	Replace the word “produce” with “transform” because “produce” implies creating the element rather than fusing elements.
ESS1-HS-4. Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.	Keep	This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
		Computational fits well in this one.
ESS1-HS-5. 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.	Keep	This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.
ESS1-HS-6. 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.	Keep	This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.
ESS2-HS-1. 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.	<p><b>Rewrite: Develop a model to illustrate how Earth’s internal and surface processes operate at different spatial and temporal scales, through both constructive and destructive forces, to form continental and ocean-floor features.</b></p> <p>ESS2-HS-1 Develop a model to illustrate how Earth’s internal and surface processes operate at different spatial and temporal scales, <b>through both constructive and</b></p>	Language added for clarity of topics including both plate tectonics and weathering and erosion processes that shape Earth’s features.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
	<b>destructive forces</b> , to form continental and ocean-floor features.	
ESS2-HS-2. Analyze geoscience data to make the claim that one change to Earth’s surface can create feedbacks that cause changes to other Earth systems.	Keep	This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.
ESS2-HS-3. Develop a model based on evidence of Earth’s interior to describe the cycling of matter by thermal convection.	Keep	This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.
ESS2-HS-4. Use a model to describe how variations in the flow of energy into and out of Earth’s systems result in changes in climate.	Keep	This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.
ESS2-HS-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.	<p><b>Rewrite: Plan and conduct an investigation of how the chemical and physical properties of water contribute to the mechanical and chemical mechanisms that affect Earth materials and surface processes.</b></p> <p>ESS2-HS-5 Plan and conduct an investigation of <b>how the chemical and physical</b> properties of water <del>and its effects</del></p>	Water needs to be emphasized in Idaho. The chemical and physical properties both need to be specified to increase rigor. This rewrite is a combination of Idaho and Massachusetts standards.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
	<p><del>can</del> contribute to the mechanical and chemical mechanisms that affect Earth materials and surface processes.</p>	
<p>ESS2-HS-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.</p>	<p><b>Rewrite: Develop a model to describe the cycling of carbon, and other nutrients, among the hydrosphere, atmosphere, geosphere, and biosphere.</b></p> <p>ESS2-HS-6 Develop a <b>quantitative</b> model to describe the cycling of carbon, <b>and other nutrients</b>, among the hydrosphere, atmosphere, geosphere, and biosphere.</p>	<p>Removal of the word “quantitative” to allow for age appropriate use of this standards in all high school grades regardless of math level. Addition of “and other nutrients” to include Idaho specific interests.</p>
<p>ESS2-HS-7. Construct an argument based on evidence about the simultaneous coevolution of Earth’s systems and life on Earth.</p>	<p>Keep</p>	<p>This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.</p>
<p>ESS3-HS-1. 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.</p>	<p>Keep</p>	<p>This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.</p> <p>*Noteworthy that natural hazards are not always negative and further explanation may be needed in supporting documents.</p>

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
ESS3-HS-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	Keep	This standard is (1) balanced, non-political content, and (2) appropriate for age and grade-level.  *some subsidies may cause difficulties for the cost-benefit analysis process.
ESS3-HS-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.	<p><b>Rewrite: Illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity.</b></p> <p>ESS3-HS-3. <del>Create a computational simulation to</del> illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.</p>	The removal of creating a computational simulation makes the standard more age appropriate and attainable for students, especially given limited technological resources for some. This now matches the language used by Massachusetts.
ESS3-HS-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.	<p><b>Rewrite: Evaluate or refine a scientific or technological solution that mitigates or enhances human influences on natural systems.</b></p> <p>ESS3-HS-4. Evaluate or refine a <b>scientific or technological</b> solution that <b>mitigates or enhances</b> human <b>influences</b> on natural systems.</p>	Add “scientific” to make sure that teachers are not limited to technological solutions.

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2018 Standard	Proposed revision Revisions are in red text.	Rationale for revision
<p>ESS3-HS-5. 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.</p>	<p><b>Rewrite: Analyze geoscience data and the results from global climate models to make an evidence-based explanation of how climate changes can impact Earth’s systems on a global and regional scale.</b></p> <p>ESS3-HS-5. Analyze geoscience data and the results from global climate models to make an evidence-based <del>forecast</del> <b>explanation</b> of how climate changes can impact to Earth’s systems on a global and regional scale.</p> <p>ESS3-HS-5. Analyze <del>geoscience data and the results from</del> global climate <del>models</del> <b>data</b> to make an evidence-based forecast of the current rate of global or regional climate change <del>and associated future impacts to Earth systems.</del></p>	<p>The wording is similar to Nebraska and Massachusetts. The changes to the wording of this standard are designed to get students directly interacting with the data.</p>
<p>ESS3-HS-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.</p>	<p><b>Rewrite: Communicate how relationships among Earth systems are being modified due to human activity.</b></p> <p>ESS3-HS-6. <del>Use a computational representation to illustrate the</del></p>	<p><del>Combined with ESS3-HS-4. Also removed in Massachusetts.</del></p> <p>Supporting content could include resources of where to find and how to</p>

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	<p><b>Communicate how</b> relationships among Earth systems <del>and how those relationships</del> are being modified due to human activity.</p> <p>Large group vote to split ESS3-HS-4 into ESS3-HS-6 as currently written.</p>	<p>utilize computational models in the evaluation aspect of ESS3-HS-6</p> <p>Felt that a computational representation is a college level task and might require technology that might not be available in all districts. Communicate seems to keep the rigor but avoid the technological difficulties.</p> <p>Not sure the use of computational representation works here. Possibly start at “Illustrate. . . .</p> <p>Communication can use computational models, speaking, listening, reading, writing, all ways we communicate. Guidance could be included in the supporting docs</p>