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Correlations between the AASL *Standards for the 21st-Century Learner* and the Next Generation Science Standards

American Association of School Librarians

2015

Kindergarten

Physical Sciences	
Motion and Stability: Forces and Interactions	
K-PS2-1. 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.	
K-PS2-2. 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.	
Energy	
K-PS3-1. Make observations to determine the effect of sunlight on Earth's surface.	
K-PS3-2. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.	

Life Sciences	
From Molecules to Organisms: Structures and Processes	
K-LS1-1. Use observations to describe patterns of what plants and animals (including humans) need to survive.	

Earth and Space Sciences	
Earth's Systems	
K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.	
K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.	
Earth and Human Activity	
K-ESS3-1. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.	

K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.	
K-ESS3-3. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.	

1st Grade

Physical Sciences	
Waves and their Applications in Technologies for Information Transfer	
1-PS4-1. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	
1-PS4-2. Make observations to construct an evidence-based account that objects can be seen only when illuminated.	
1-PS4-3. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.	
1-PS4-4. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.	

Life Sciences	
From Molecules to Organisms: Structures and Processes	
1-LS1-1. 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.	
1-LS1-2. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.	
Heredity: Inheritance and Variation of Traits	
1-LS3-1. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.	

Earth and Space Sciences	
Earth's Place in the Universe	
1-ESS1-1. Use observations of the sun, moon, and stars to describe patterns that can be predicted.	

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

2nd Grade

Physical Sciences	
Matter and its Interactions	
2-PS1-1. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.	
2-PS1-2. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.	
2-PS1-3. 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.	
2-PS1-4. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.	

Life Sciences	
Ecosystems: Interactions, Energy, and Dynamics	
2-LS2-1. Plan and conduct an investigation to determine if plants need sunlight and water to grow.	
2-LS2-2. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	
Biological Evolution: Unity and Diversity	
2-LS4-1. Make observations of plants and animals to compare the diversity of life in different habitats.	

Earth and Space Sciences	
Earth's Place in the Universe	
2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	
Earth's Systems	

2-ESS2-1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	
2-ESS2-2. Develop a model to represent the shapes and kinds of land and bodies of water in an area.	
2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.	

Kindergarten - 2nd Grade

Engineering, Technology, and Applications of Science	
Engineering Design	
K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	
K-2-ETS1-2. Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	
K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	

3rd Grade

Physical Sciences	
Motion and Stability: Forces and Interactions	
3-PS2-1. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.3.1 Connect understanding to the real world. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions.
3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success.

	1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify).
3-PS2-3. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.

	2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation.
3-PS2-4. Define a simple design problem that can be solved by applying scientific ideas about magnets.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world.

	2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.3.4 Create products that apply to authentic, real-world contexts.

Life Sciences	
From Molecules to Organisms: Structures and Processes	
3-LS1-1. Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning.

	1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.2 Use interaction with and feedback from teachers and peers to guide own inquiry process. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations.

	2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings

	effectively. 3.1.5 Connect learning to community issues. 3.3.4 Create products that apply to authentic, real-world contexts.
Ecosystems: Interactions, Energy, and Dynamics	
3-LS2-1. Construct an argument that some animals form groups that help members survive.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information.

	1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 1.3.4 Contribute to the exchange of ideas within the learning community. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.2 Use interaction with and feedback from teachers and peers to guide own inquiry process. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings.

	2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively.

	3.1.5 Connect learning to community issues. 3.3.4 Create products that apply to authentic, real-world contexts.
Heredity: Inheritance and Variation of Traits	
3-LS3-1. 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.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions,

	resources, or strategies when necessary to achieve success. 1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.2 Use interaction with and feedback from teachers and peers to guide own inquiry process. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.

	2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding.
3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context.

	1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.2 Use interaction with and feedback from teachers and peers to guide own inquiry process. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.

	2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation.

	2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.5 Connect learning to community issues. 3.3.4 Create products that apply to authentic, real-world contexts.
Biological Evolution: Unity and Diversity	
3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias.

	1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.3.1 Connect understanding to the real world. 2.4.2 Reflect on systematic process, and assess for completeness of investigation.
3-LS4-2. 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.	1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to

	information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.3.1 Solicit and respect diverse perspectives while searching for information, collaborating with others, and participating as a member of the community.

	3.3.2 Respect the differing interests and experiences of others, and seek a variety of viewpoints.
3-LS4-3. 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.	1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions.

	2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.5 Connect learning to community issues. 3.3.1 Solicit and respect diverse perspectives while searching for information, collaborating with others, and participating as a member of the community. 3.3.2 Respect the differing interests and experiences of others, and seek a variety of viewpoints. 3.3.4 Create products that apply to authentic, real-world contexts. 4.2.3 Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change, and seeking information about new ideas encountered through academic or personal experiences.
3-LS4-4. 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.	1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.3 Follow ethical and legal guidelines in gathering and using information.

	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding.

	2.4.4 Develop directions for future investigations. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly. 3.2.1 Demonstrate leadership and confidence by presenting ideas to others in both formal and informal situations. 3.3.1 Solicit and respect diverse perspectives while searching for information, collaborating with others, and participating as a member of the community. 3.3.2 Respect the differing interests and experiences of others, and seek a variety of viewpoints. 3.3.3 Use knowledge and information skills and dispositions to engage in public conversation and debate around issues of common concern. 3.3.4 Create products that apply to authentic, real-world contexts. 4.2.3 Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change,

	and seeking information about new ideas encountered through academic or personal experiences.

Earth and Space Sciences	
Earth's Systems	
3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.1 Conclude an inquiry-based research process by sharing new

	understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly. 3.2.1 Demonstrate leadership and confidence by presenting ideas to others in both formal and informal situations. 3.3.4 Create products that apply to authentic, real-world contexts.
3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.1 Respect copyright/intellectual property rights of creators and producers.

	1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.

	2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues.

	3.1.6 Use information and technology ethically and responsibly. 3.2.1 Demonstrate leadership and confidence by presenting ideas to others in both formal and informal situations. 3.3.1 Solicit and respect diverse perspectives while searching for information, collaborating with others, and participating as a member of the community. 3.3.4 Create products that apply to authentic, real-world contexts. 4.2.3 Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change, and seeking information about new ideas encountered through academic or personal experiences.
Earth and Human Activity	
3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.	

4th Grade

Physical Sciences	
Energy	
4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.	1.1.2 Use prior and background knowledge as context for new learning. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.3.1 Connect understanding to the real world. 2.4.1 Determine how to act on information (accept, reject, modify).
4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias.

	1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.3.1 Connect understanding to the real world.
4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.	1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.3 Follow ethical and legal guidelines in gathering and using information.

	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 4.2.3 Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change, and seeking information about new ideas encountered through academic or personal experiences.
4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.	1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful.

	2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning.

	3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly. 3.2.1 Demonstrate leadership and confidence by presenting ideas to others in both formal and informal situations. 3.3.4 Create products that apply to authentic, real-world contexts. 4.2.3 Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change, and seeking information about new ideas encountered through academic or personal experiences.
Waves and their Applications in Technologies for Information Transfer	
4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations.

	2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display

	knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly. 3.3.4 Create products that apply to authentic, real-world contexts.
4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world.

	2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly. 3.3.4 Create products that apply to authentic, real-world contexts.
4-PS4-3. Generate and compare multiple solutions that use patterns to transfer information.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning.

	1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world.

	2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly. 3.3.4 Create products that apply to authentic, real-world contexts.

Life Sciences	
From Molecules to Organisms: Structures and Processes	
4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	1.1.2 Use prior and background knowledge as context for new learning. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further

	investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively.

	3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly. 3.3.4 Create products that apply to authentic, real-world contexts.
4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.3.1 Connect understanding to the real world. 3.1.6 Use information and technology ethically and responsibly.

Earth and Space Sciences	
Earth's Place in the Universe	
4-ESS1-1. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life.

	1.1.2 Use prior and background knowledge as context for new learning. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.3.1 Connect understanding to the real world. 3.1.5 Connect learning to community issues.
Earth's Systems	
4-ESS2-1. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.3.3 Follow ethical and legal guidelines in gathering and using information.

	2.3.1 Connect understanding to the real world. 3.1.5 Connect learning to community issues.
4-ESS2-2. Analyze and interpret data from maps to describe patterns of Earth's features.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify).

	2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly.
Earth and Human Activity	
4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.1 Display initiative and engagement by posing questions and

	investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.3 Demonstrate creativity by using multiple resources and formats. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.2.7 Display persistence by continuing to pursue information to gain a broad perspective. 1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn.

	2.3.1 Connect understanding to the real world. 3.1.5 Connect learning to community issues. 3.3.1 Solicit and respect diverse perspectives while searching for information, collaborating with others, and participating as a member of the community. 3.3.2 Respect the differing interests and experiences of others, and seek a variety of viewpoints.
4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply

	knowledge to curricular areas, real-world situations, and further investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly.

	3.3.2 Respect the differing interests and experiences of others, and seek a variety of viewpoints.

5th Grade

Physical Sciences	
Matter and Its Interactions	
5-PS1-1. Develop a model to describe that matter is made of particles too small to be seen.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions.

	2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly. 3.2.1 Demonstrate leadership and confidence by presenting ideas to others in both formal and informal situations. 3.3.4 Create products that apply to authentic, real-world contexts.
5-PS1-2. 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.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.

	2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.3.1 Connect understanding to the real world. 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly.
5-PS1-3. Make observations and measurements to identify materials based on their properties.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning.

	1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.3.1 Connect understanding to the real world. 3.1.5 Connect learning to community issues.
5-PS1-4. Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather

	meaning. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 2.3.1 Connect understanding to the real world. 3.1.5 Connect learning to community issues.
Motion and Stability: Forces and Interactions	
5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information.

	1.2.3 Demonstrate creativity by using multiple resources and formats. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions.

	2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 3.1.5 Connect learning to community issues. 4.2.3 Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change, and seeking information about new ideas encountered through academic or personal experiences.
Energy	
5-PS3-1. 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.	2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.

	2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues.

Life Sciences	
From Molecules to Organisms: Structures and Processes	
5-LS1-1. Support an argument that plants get the materials they need for growth chiefly from air and water.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning.

	1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.3 Demonstrate creativity by using multiple resources and formats. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating

	that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 3.1.5 Connect learning to community issues. 4.2.3 Maintain openness to new ideas by considering divergent opinions, changing opinions or conclusions when evidence supports the change, and seeking information about new ideas encountered through academic or personal experiences.
Ecosystems: Interactions, Energy, and Dynamics	
5-LS2-1. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information.

	2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning.

	3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.3.4 Create products that apply to authentic, real-world contexts.

Earth and Space Sciences	
Earth's Place in the Universe	
5-ESS1-1. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.	1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.3 Demonstrate creativity by using multiple resources and formats. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful.

	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.5 Connect learning to community issues.
5-ESS1-2. 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. [	1.3.1 Respect copyright/intellectual property rights of creators and producers. 2.1.2 Organize knowledge so that it is useful.

	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.3.1 Connect understanding to the real world. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly.
Earth's Systems	
5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.2 Use both divergent and convergent thinking to formulate

	alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.2.4 Demonstrate personal productivity by completing products to express learning. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.5 Connect learning to community issues. 3.3.4 Create products that apply to authentic, real-world contexts.
5-ESS2-2. 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.	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize

	information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.3.1 Connect understanding to the real world. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.1.6 Use information and technology ethically and responsibly.
Earth and Human Activity	
5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning.

	1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.3 Demonstrate creativity by using multiple resources and formats. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.3.1 Connect understanding to the real world.

	3.1.5 Connect learning to community issues.

3rd – 5th Grades

Engineering, Technology, and Applications of Science	
Engineering Design	
3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.3 Demonstrate creativity by using multiple resources and formats.

	1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.2.6 Display emotional resilience by persisting in information searching despite challenges. 1.2.7 Display persistence by continuing to pursue information to gain a broad perspective. 1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful.

	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding.

	3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.3.4 Create products that apply to authentic, real-world contexts. 4.2.1 Display curiosity by pursuing interests through multiple resources.
3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning.

	1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.3 Demonstrate creativity by using multiple resources and formats. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.2.6 Display emotional resilience by persisting in information searching despite challenges. 1.2.7 Display persistence by continuing to pursue information to gain a broad perspective. 1.3.1 Respect copyright/intellectual property rights of creators and producers. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.3.3 Follow ethical and legal guidelines in gathering and using information.

	1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.1.6 Use the writing process, media and visual literacy, and technology skills to create products that express new understandings. 2.2.1 Demonstrate flexibility in the use of resources by adapting information strategies to each specific resource and by seeking additional resources when clear conclusions cannot be drawn. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world.

	2.3.2 Consider diverse and global perspectives in drawing conclusions. 2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.3.4 Create products that apply to authentic, real-world contexts. 4.2.1 Display curiosity by pursuing interests through multiple resources.
3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.2 Use prior and background knowledge as context for new learning. 1.1.3 Develop and refine a range of questions to frame the search for

	new understanding. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.7 Make sense of information gathered from diverse sources by identifying misconceptions, main and supporting ideas, conflicting information, and point of view or bias. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.3 Demonstrate creativity by using multiple resources and formats. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.2.6 Display emotional resilience by persisting in information searching despite challenges. 1.2.7 Display persistence by continuing to pursue information to gain a

	broad perspective. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.3.3 Follow ethical and legal guidelines in gathering and using information. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 2.3.1 Connect understanding to the real world. 2.3.2 Consider diverse and global perspectives in drawing conclusions.

	2.3.3 Use valid information and reasoned conclusions to make ethical decisions. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.5 Connect learning to community issues. 3.3.4 Create products that apply to authentic, real-world contexts. 4.2.1 Display curiosity by pursuing interests through multiple resources.

Middle School (Grades 6th – 8th)

Physical Sciences	
Matter and Its Interactions	
MS-PS1-1. Develop models to describe the atomic composition of simple molecules and extended structures.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	1.1.2 Use prior and background knowledge as context for new learning. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-PS1-3. Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.6 Read, view, and listen for information presented in any format (e.g.,

	textual, visual, media, digital) in order to make inferences and gather meaning. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning.
MS-PS1-4. 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.	1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information.
MS-PS1-5. 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.	
MS-PS1-6. Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.2.3 Demonstrate creativity by using multiple resources and formats.

	1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.2.6 Display emotional resilience by persisting in information searching despite challenges. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.4.1 Assess the processes by which learning was achieved in order to revise strategies and learn more effectively in the future. 3.4.2 Assess the quality and effectiveness of the learning product.
Motion and Stability: Forces and Interactions	
MS-PS2-1. Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	1.1.2 Use prior and background knowledge as context for new learning. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
MS-PS2-2. 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.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.2.1 Display initiative and engagement by posing questions and

	investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.
MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.9 Collaborate with others to broaden and deepen understanding. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.3.4 Contribute to the exchange of ideas within the learning community. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses.

	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.3.4 Contribute to the exchange of ideas within the learning community. 2.1.2 Organize knowledge so that it is useful. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-PS2-5. Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.9 Collaborate with others to broaden and deepen understanding. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary.

	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
Energy	
MS-PS3-1. 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.	1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 1.2.3 Demonstrate creativity by using multiple resources and formats. 2.1.2 Organize knowledge so that it is useful. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.1.4 Use technology and other information tools to analyze and organize information. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-PS3-2. 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.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 1.2.3 Demonstrate creativity by using multiple resources and formats.
MS-PS3-3. Apply scientific principles to design, construct, and test a	1.1.2 Use prior and background knowledge as context for new learning.

device that either minimizes or maximizes thermal energy transfer.	1.2.6 Display emotional resilience by persisting in information searching despite challenges. 2.4.1 Determine how to act on information (accept, reject, modify). 2.4.2 Reflect on systematic process, and assess for completeness of investigation.
MS-PS3-4. 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.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
MS-PS3-5. Construct, use, and present arguments to support the claim	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular

that when the kinetic energy of an object changes, energy is transferred to or from the object.	subjects, and make the real-world connection for using this process in own life. 1.3.4 Contribute to the exchange of ideas within the learning community. 2.1.2 Organize knowledge so that it is useful.
Waves and Their Applications in Technologies for Information Transfer	
MS-PS4-1. 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.	1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 1.2.3 Demonstrate creativity by using multiple resources and formats. 2.1.2 Organize knowledge so that it is useful. 2.1.4 Use technology and other information tools to analyze and organize information.
MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
MS-PS4-3. Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	1.1.2 Use prior and background knowledge as context for new learning. 1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 2.1.2 Organize knowledge so that it is useful.

Life Sciences	
From Molecules to Organisms: Structures and Processes	
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.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life.

	1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
MS-LS1-2. Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
MS-LS1-3. Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 2.1.2 Organize knowledge so that it is useful. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
MS-LS1-4. Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.	2.1.2 Organize knowledge so that it is useful. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	2.1.2 Organize knowledge so that it is useful. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-LS1-6. 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.	2.1.2 Organize knowledge so that it is useful. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating

	that the pattern of evidence leads to a decision or conclusion.
MS-LS1-7. 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.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success.
MS-LS1-8. Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.9 Collaborate with others to broaden and deepen understanding. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
Ecosystems: Interactions, Energy, and Dynamics	
MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	1.1.2 Use prior and background knowledge as context for new learning. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning.

	1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	2.1.2 Organize knowledge so that it is useful.
MS-LS2-3. Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success.
MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	2.1.2 Organize knowledge so that it is useful.
MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	1.1.9 Collaborate with others to broaden and deepen understanding. 1.2.3 Demonstrate creativity by using multiple resources and formats. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 2.1.1 Continue an inquiry-based research process by applying critical-

	thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
Heredity: Inheritance and Variation of Traits	
MS-LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
MS-LS3-2. 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.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
Biological Evolution: Unity and Diversity	
MS-LS4-1. 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.	1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.	1.1.2 Use prior and background knowledge as context for new learning.
MS-LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.

	1.2.3 Demonstrate creativity by using multiple resources and formats. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-LS4-4. 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.	2.1.2 Organize knowledge so that it is useful. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.	1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.7 Display persistence by continuing to pursue information to gain a broad perspective. 1.3.2 Seek divergent perspectives during information gathering and assessment. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses.

	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.1.5 Collaborate with others to exchange ideas, develop new understandings, make decisions, and solve problems.
MS-LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 1.2.3 Demonstrate creativity by using multiple resources and formats. 2.1.4 Use technology and other information tools to analyze and organize information.

Earth and Space Sciences	
Earth's Place in the Universe	
MS-ESS1-1. 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.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning.

	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.	2.1.2 Organize knowledge so that it is useful.
Earth's Systems	
MS-ESS2-1. Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
MS-ESS2-2. Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.	2.1.2 Organize knowledge so that it is useful. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-ESS2-3. Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 2.1.3 Use strategies to draw conclusions from information and apply

	knowledge to curricular areas, real-world situations, and further investigations. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-ESS2-4. Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
MS-ESS2-5. Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 1.1.9 Collaborate with others to broaden and deepen understanding. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-ESS2-6. 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.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry.
Earth and Human Activity	

MS-ESS3-1. 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.	2.1.2 Organize knowledge so that it is useful.
MS-ESS3-2. Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	1.1.2 Use prior and background knowledge as context for new learning.
MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	2.1.2 Organize knowledge so that it is useful.
MS-ESS3-5. Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life. 1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather

	meaning. 1.1.9 Collaborate with others to broaden and deepen understanding. 1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.2 Demonstrate confidence and self-direction by making independent choices in the selection of resources and information. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 1.2.6 Display emotional resilience by persisting in information searching despite challenges. 1.2.7 Display persistence by continuing to pursue information to gain a broad perspective. 1.3.4 Contribute to the exchange of ideas within the learning community. 1.4.1 Monitor own information-seeking processes for effectiveness and progress, and adapt as necessary. 1.4.3 Monitor gathered information, and assess for gaps or weaknesses. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.

	2.1.5 Collaborate with others to exchange ideas, develop new understandings, make decisions, and solve problems. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.4.3 Recognize new knowledge and understanding. 2.4.4 Develop directions for future investigations. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.2 Participate and collaborate as members of a social and intellectual network of learners. 3.3.5 Contribute to the exchange of ideas within and beyond the learning community. 3.3.6 Use information and knowledge in the service of democratic values. 4.3.1 Participate in the social exchange of ideas, both electronically and in person.

Engineering, Technology, and Applications of Science	
Engineering Design	
MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	1.1.2 Use prior and background knowledge as context for new learning. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information. 2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further

	investigations.
MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.9 Collaborate with others to broaden and deepen understanding. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information.
MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 1.1.9 Collaborate with others to broaden and deepen understanding. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
MS-ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	1.1.8 Demonstrate mastery of technology tools for accessing information and pursuing inquiry. 1.2.6 Display emotional resilience by persisting in information searching despite challenges.

High School (Grades 9th-12th)

Physical Sciences	
Matter and Its Interactions	
HS-PS1-1. 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.	1.1.2 Use prior and background knowledge as context for new learning.
HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	1.1.2 Use prior and background knowledge as context for new learning.
HS-PS1-3. 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.	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life.
HS-PS1-4. 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.	3.3.4 Create products that apply to authentic, real-world contexts.
HS-PS1-5. 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.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.
HS-PS1-6. Refine the design of a chemical system by specifying a change in conditions that would produce increased amounts of products at equilibrium.	
HS-PS1-7. Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction.	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations.
HS-PS1-8. Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay.	3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess.
Motion and Stability: Forces and Interactions	

HS-PS2-1. 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.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
HS-PS2-2. 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.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence.
HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.	2.2.4 Demonstrate personal productivity by completing products to express learning. 2.4.1 Determine how to act on information (accept, reject, modify).
HS-PS2-4. Use mathematical representations of Newton's Law of Gravitation and Coulomb's Law to describe and predict the gravitational and electrostatic forces between objects.	1.1.2 Use prior and background knowledge as context for new learning.
HS-PS2-5. 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.	1.2.1 Display initiative and engagement by posing questions and investigating the answers beyond the collection of superficial facts. 1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success.
HS-PS2-6. Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.	3.1.3 Use writing and speaking skills to communicate new understandings effectively.
Energy	
HS-PS3-1. 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.	2.2.4 Demonstrate personal productivity by completing products to express learning. 3.1.6 Use information and technology ethically and responsibly.

HS-PS3-2. 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 position of particles (objects).	3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.6 Use information and technology ethically and responsibly.
HS-PS3-3. Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.	3.3.4 Create products that apply to authentic, real-world contexts.
HS-PS3-4. 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).	1.1.1 Follow an inquiry-based process in seeking knowledge in curricular subjects, and make the real-world connection for using this process in own life.
HS-PS3-5. 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.	4.1.8 Use creative and artistic formats to express personal learning.
Waves and Their Applications in Technologies for Information Transfer	
HS-PS4-1. Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media.	
HS-PS4-2. Evaluate questions about the advantages of using a digital transmission and storage of information.	
HS-PS4-3. 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	1.1.4 Find, evaluate, and select appropriate sources to answer questions.
HS-PS4-4. Evaluate the validity and reliability of claims in published materials of the effects that different frequencies of electromagnetic radiation have when absorbed by matter.	1.1.4 Find, evaluate, and select appropriate sources to answer questions. 1.1.5 Evaluate information found in selected sources on the basis of accuracy, validity, appropriateness for needs, importance, and social and cultural context. 1.2.4 Maintain a critical stance by questioning the validity and accuracy of all information.
HS-PS4-5. Communicate technical information about how some	3.1.1 Conclude an inquiry-based research process by sharing new

technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.	understandings and reflecting on the learning.

Life Sciences	
From Molecules to Organisms: Structures and Processes	
HS-LS1-1. 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.	3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning. 3.1.3 Use writing and speaking skills to communicate new understandings effectively.
HS-LS1-2. Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	2.3.1 Connect understanding to the real world.
HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis.	2.2.2 Use both divergent and convergent thinking to formulate alternative conclusions and test them against the evidence. 2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.
HS-LS1-4. Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	2.4.3 Recognize new knowledge and understanding.
HS-LS1-5. Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	2.4.3 Recognize new knowledge and understanding.
HS-LS1-6. Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning.
HS-LS1-7. 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.	2.4.3 Recognize new knowledge and understanding.
Ecosystems: Interactions, Energy, and Dynamics	

HS-LS2-1. Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.1.6 Use information and technology ethically and responsibly.
HS-LS2-2. Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.	3.1.3 Use writing and speaking skills to communicate new understandings effectively.
HS-LS2-3. Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning.
HS-LS2-4. Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations.
HS-LS2-5. Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere.	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations.
HS-LS2-6. Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem.	2.3.3 Use valid information and reasoned conclusions to make ethical decisions.
HS-LS2-7. Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.	3.3.4 Create products that apply to authentic, real-world contexts.
HS-LS2-8. Evaluate the evidence for the role of group behavior on individual and species' chances to survive and reproduce.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.
Heredity: Inheritance and Variation of Traits	
HS-LS3-1. Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	1.4.2 Use interaction with and feedback from teachers and peers to guide own inquiry process. 1.4.4 Seek appropriate help when it is needed.
HS-LS3-2. 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)	2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.

mutations caused by environmental factors.	
HS-LS3-3. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	1.1.2 Use prior and background knowledge as context for new learning.
Biological Evolution: Unity and Diversity	
HS-LS4-1. Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	3.1.3 Use writing and speaking skills to communicate new understandings effectively.
HS-LS4-2. 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 and reproduce in the environment.	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations.
HS-LS4-3. 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.	3.1.3 Use writing and speaking skills to communicate new understandings effectively.
HS-LS4-4. Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning.
HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations.
HS-LS4-6. Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	3.1.5 Connect learning to community issues. 3.3.4 Create products that apply to authentic, real-world contexts.

Earth and Space Sciences
Earth's Place in the Universe

HS-ESS1-1. 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.	2.1.3 Use strategies to draw conclusions from information and apply knowledge to curricular areas, real-world situations, and further investigations. 3.3.4 Create products that apply to authentic, real-world contexts.
HS-ESS1-2. Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe.	3.1.3 Use writing and speaking skills to communicate new understandings effectively.
HS-ESS1-3. Communicate scientific ideas about the way stars, over their life cycle, produce elements.	3.1.3 Use writing and speaking skills to communicate new understandings effectively.
HS-ESS1-4. Use mathematical or computational representations to predict the motion of orbiting objects in the solar system.	1.1.2 Use prior and background knowledge as context for new learning.
HS-ESS1-5. 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.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.
HS-ESS1-6. 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.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.
Earth's Systems	
HS-ESS2-1. 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.	3.3.4 Create products that apply to authentic, real-world contexts.
HS-ESS2-2. Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge.
HS-ESS2-3. Develop a model based on evidence of Earth's interior to describe the cycling of matter by thermal convection.	3.3.4 Create products that apply to authentic, real-world contexts.
HS-ESS2-4. Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate.	2.3.1 Connect understanding to the real world.
HS-ESS2-5. Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes.	2.3.1 Connect understanding to the real world.

HS-ESS2-6. Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	3.2.1 Demonstrate leadership and confidence by presenting ideas to others in both formal and informal situations.
HS-ESS2-7. Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.	3.3.5 Contribute to the exchange of ideas within and beyond the learning community.
Earth and Human Activity	
HS-ESS3-1. 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.	1.2.7 Display persistence by continuing to pursue information to gain a broad perspective.
HS-ESS3-2. Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on cost-benefit ratios.	
HS-ESS3-3. Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.	3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.3.4 Create products that apply to authentic, real-world contexts.
HS-ESS3-4. Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.	2.3.1 Connect understanding to the real world.
HS-ESS3-5. 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.	2.1.1 Continue an inquiry-based research process by applying critical-thinking skills (analysis, synthesis, evaluation, organization) to information and knowledge in order to construct new understandings, draw conclusions, and create new knowledge. 2.2.3 Employ a critical stance in drawing conclusions by demonstrating that the pattern of evidence leads to a decision or conclusion.
HS-ESS3-6. Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity.	1.1.6 Read, view, and listen for information presented in any format (e.g., textual, visual, media, digital) in order to make inferences and gather meaning. 2.3.1 Connect understanding to the real world.

Engineering, Technology, and Applications of Science

Engineering Design	
HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	2.3.2 Consider diverse and global perspectives in drawing conclusions.
HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.	1.2.5 Demonstrate adaptability by changing the inquiry focus, questions, resources, or strategies when necessary to achieve success. 2.1.2 Organize knowledge so that it is useful.
HS-ETS1-3. Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.	3.1.1 Conclude an inquiry-based research process by sharing new understandings and reflecting on the learning.
HS-ETS1-4. Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem.	2.3.1 Connect understanding to the real world. 3.1.4 Use technology and other information tools to organize and display knowledge and understanding in ways that others can view, use, and assess. 3.3.4 Create products that apply to authentic, real-world contexts.