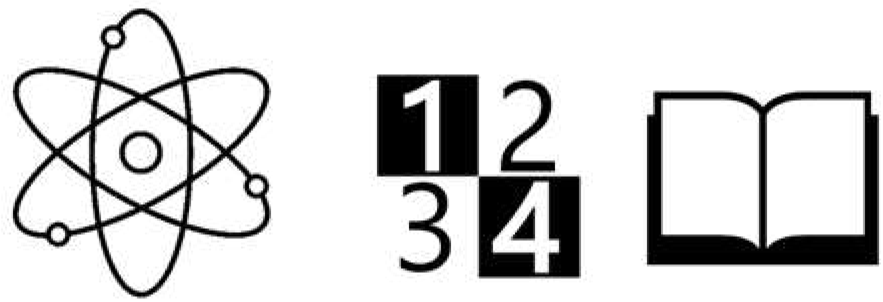
Washington Access to Instruction and Measurement



Science Access Point Frameworks 2019–2020

OVERVIEW OF SCIENCE ACCESS POINTS

Washington's new science alternate assessment, the WA-Access to Instruction & Measurement (WA-AIM), is aligned to the Next Generation Science Standards Performance Expectations to provide students with significant cognitive challenges greater access to the standards via a continuum of complexity, thus providing students with multiple entry points to accessing grade level content.

The Access Point Frameworks have three consistent levels of complexity: more complex (M), intermediate complexity (I), and less complex (L) across all content areas. The less complex Access Points are represented on the right side of the frameworks with the Access Points increasing the complexity of knowledge and skills the student is being asked to demonstrate moving towards the right, closer towards the CCSS.

The Access Point Frameworks are the underpinning for the WA-Access to Instruction & Measurement and serve as the foundation for the performance task component of the assessment. The Access Point Frameworks were developed with content experts in collaboration with educators from across the state of Washington and OSPI.

The layout of this document shows the association between the Next Generation Science Standard Performance Expectations and the Access Point Frameworks and provides educators the opportunity to see the spectrum of knowledge and skills articulated in each content standard. This document also allows educators to look at the shifts from upper elementary school (fifth grade), to middle school (eighth grade) to high school.

SCIENCE ACCESS POINTS

At fifth grade, eighth grade and high school, one Access Point Framework has been developed for five Next Generation Science Standard Performance Expectations.

HOW TO READ THE ACCESS POINT FRAMEWORKS

Science-3-LS1-1				Elementary
Discipline: Life Science		1		
Core Idea: From Molecules to Organisms: Structure and Processes				
2 Next Generation Science Standard Performance Expectation	Essential Concept	ACCESS POINTS Built on Three Levels of Complexity More Complex ◀····◀····Intermediate ···▶ ····▶ Less Complex		
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. *SEP: Developing and Using Models* • Dev[illegible] odels to desc[illegible] nenomena 3 *DCI: LS[illegible] rowth and Development of Organisms* • Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. *CCC: Patterns* Patterns of change can be used to make predictions.	EC.3-LS1-1: Student will develop a model to describe the life cycle patterns for organisms (includes birth, growth, reproduction and death). *SEP*: Develop and/or use a model to describe phenomena *DCI:* 4 and animals have [illegible] and diverse life cy[illegible] *CCC:* Patterns identified in life cycles can be used to make predictions.	Student will develop a model to predict how a life cycle event could impact the life cycle pattern for any organism. 5	Student will develop models to describe the patterns in the life cycles of different organisms. 6	Student will use a model to identify the life cycle pattern for an organisms. 7

1) The top three rows of the Access Point Framework will identify the content, standard and grade or grade band
2) The fourth row moving from left to right contains the headers for the K-12 Learning Standard, the standard's Essential Concept, followed by the three Access Point levels in the following order: More, Intermediate and Less.
3) This is the regular K-12 Learning Standard that the specific Access Point Framework is developed for.
4) This is the Essential Concept of the K-12 Learning Standard.
5) This is the More Complex Access Point. The content defines the knowledge and skills that will be assessed by the corresponding Performance Task at the More Complex level.
6) This is the Intermediate Complex Access Point. The content defines the knowledge and skills that will be assessed by the corresponding Performance Task at the Intermediate Complex level.
7) This is the Less Complex Access Point. The content defines the knowledge and skills that will be assessed by the corresponding Performance Task at the Less Complex level.

ELEMENTARY

PERFORMANCE EXPECTATIONS DEVELOPED INTO ACCESS POINT FRAMEWORKS

Discipline	Core Idea	Performance Expectation
Engineering and Technology (ETS)	Engineering Design	**3-5-ETS1-1** Define a simple design problem reflecting a need or want that includes specified criteria for success and constraints on materials, time, or cost.
Life Science (LS)	From Molecules to Organisms: Structure and Process	**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.
Physical Science (PS)	Matter and Its Interactions	**5-PS1-1** Develop a model to describe that matter is made of particles too small to be seen.
Physical Science (PS)	Motion and Stability: Forces and Interactions	**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.
Earth and Space Sciences (ESS)	Earth's Place in the Universe	**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.

Science 3-5-ETS1-1				Elementary
Discipline: Engineering and Technology				
Core Idea: 3-5 ETS 1-1 Engineering Design				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀· · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP: Asking Questions and Defining Problems*** • Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on	**EC.3-5-ETS1-1:** Define a simple problem that reflects a need or want and has specific criteria and/or constraints. ***SEP:*** Define a simple design problem with solutions that meet specific criteria even though limited by specific constraints. ***DCI*:** Possible solutions to a problem are limited by available materials and resources (specific constraints). The success of the solutions to the	Given a want or need, student will define a simple design problem, identify constraints on solutions, and use criteria to evaluate a successful solution.	Given a want or need, student will define a simple design problem and identify specific criteria for success OR specific constraints on solutions.	Given a want or need, student will identify a simple design problem.

materials, time, or cost. ***DCI: ETS1.A Defining and Delimiting Engineering Problems*** • Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. ***CCC: Influence of Science, Engineering, and Technology on Society and the Natural World***	problem are determined by the required features (specific criteria) of a successful solution. Successful design solutions can be evaluated based on criteria and constraints. ***CCC:*** Reflects a need or want. Influence of science, engineering, and technology on society and the natural world. People's wants and needs change over time, as do demands for new technologies (solutions to problems). People's needs and wants change over time.			

• People's needs and wants change over time, as do their demands for new and improved technologies.				

Science 3-LS1-1				Elementary
Discipline: Life Science				
Core Idea: From Molecules to Organisms: Structure and Processes				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀· · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP: Developing and Using Models*** • Develop models to describe phenomena ***DCI*: *LS1.B: Growth and Development of Organisms*** • Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. ***CCC*: *Patterns***	**EC.3-LS1-1:** Student will develop a model to describe the life cycle patterns for organisms (includes birth, growth, reproduction and death). **SEP:** Develop and/or use a model to describe phenomena **DCI:** Plants and animals have unique and diverse life cycles. **CCC:** Patterns identified in life cycles can be used to make predictions.	Student will develop a model to predict how a life cycle event could impact the life cycle pattern for any organism.	Student will develop models to describe the patterns in the life cycles of different organisms.	Student will use a model to identify the life cycle pattern for an organisms.

Patterns of change can be used to make predictions.				

Science 5-PS1-1				Elementary
Discipline: Physical Science				
Core Idea: Matter and Its Interactions				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · ·◀· · Intermediate · · ·▶· · ··· ▶ Less Complex		
5-PS1-1: Develop a model to describe that matter is made of particles too small to be seen. ***SEP: Developing and Using Models*** • Use models to describe phenomena. ***DCI:PS1.A Structure and Properties of Matter*** • Matter of any type can be subdivided into particles that are too small to see, but even then the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see	**EC.5-PS1-1:** Use a model to show that small particles make up larger objects. ***SEP:*** Develop and use a model to describe phenomena. ***DCI:*** Structures and properties of matter. All matter can be broken down into particles that are still matter but are too small to be seen. ***CCC:*** Scale, proportion and quantity. Natural objects come in all different sizes, from the very small to the very large.	Student will develop and use a model to describe that matter is made of particles too small to be seen.	Student will use a model to describe that all objects (matter) are made of particles that are too small to be seen.	Given different models, student will identify the model that shows that matter is made of particles too small to be seen.

and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. ***CCC: Scale, Proportion, and Quantity*** • Natural objects exist from the very small to the immensely large.				

Science 3-PS2-3				Elementary
Discipline: Physical Science				
Core Idea: Motion and Stability: Forces and Interactions				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀· · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP: Asking Questions and Defining Problems*** • Ask questions that can be investigated based on patterns such as cause and effect relationships. ***DCI: PS2.B: Types of Interactions*** • Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on	**EC.3-PS2-3:** Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects that do not touch. ***SEP: Asking Questions and Defining Problems*** • Ask questions that can be investigated based on patterns such as cause and effect relationships. ***DCI: PS2.B: Types of Interactions*** • Electric and magnetic forces between a pair of objects do not require that the objects be in contact..	Student will ask a question to determine the cause AND effect relationships of electric or magnetic interactions between two objects that do not touch.	Student will ask a question to determine a cause OR an effect relationship of electric or magnetic interactions between two objects that do not touch.	Student will identify a question about the cause of a magnetic interaction between two objects that do not touch.

the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other. ***CCC: Cause and Effect*** • Cause and effect relationships are routinely identified, tested, and used to explain change.	***CCC: Cause and Effect*** Cause and effect relationships are identified, tested, and used to explain change.			

Science 5-ESS1-2				Elementary
Discipline: Earth and Space Science				
Core Idea: Earth's Place in the Universe				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀· · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP: Analyzing and Interpreting Data*** • Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. ***DCI: ESS1.B: Earth and the Solar System*** • The orbits of Earth around the sun and of the moon around	**EC.5-ESS1-2:** Using data, student will organize data to identify patterns caused by Earth's rotation on its axis and Earth's orbit around the sun. ***SEP:*** Use graphical displays to identify patterns in data that show relationships. ***DCI:*** Earth and the Solar System: The rotation of Earth on its axis and the orbit of Earth around the Sun cause observable patterns. ***CCC:*** Patterns: identify patterns related to time, including simple rates of change and cycles, and use these patterns to make predictions.	Student will organize given data to graphically represent given data on daily changes in shadows, day and night, or seasonal appearances of some stars; describe patterns in the data, and identify the cause of the patterns as Earth's rotation on its axis or Earth's orbit around the sun.	Student will organize given data on daily changes in shadows, day and night, or seasonal appearances of some stars and describe patterns in the data.	Student identifies a graph that represents given data on daily changes in shadows or day and night and identify patterns in the data.

the Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon and stars at different times of the day, month, and year. ***CCC: Patterns*** • Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena.	Patterns can be used to identify natural changes.			

MIDDLE SCHOOL

PERFORMANCE EXPECTATIONS DEVELOPED INTO ACCESS POINT FRAMEWORKS

Discipline	Core Idea	Performance Expectation
Engineering and Technology (ETS)	Engineering Design	**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.
Life Science (LS)	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.
Physical Science (PS)	Energy	**MS-PS3-3:** Apply scientific principle to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.
Earth and Space Sciences (ESS)	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.
Earth and Space Sciences (ESS)	Earth's Systems	**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. .

Science MS-ETS1-3				Middle School
Discipline: Engineering & Technology				
Core Idea: Engineering Design				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity** **More Complex◀ · · · ·◀ · · · · Intermediate · · ·▶ · · · · ▶ Less Complex**		
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. ***SEP: Analyzing and Interpreting Data*** • Analyze and interpret data to determine similarities and differences in findings. ***DCI: ETS1.B; Developing Possible Solutions:*** • There are systematic processes for evaluating solutions	**EC.MS-ETS1-3**: Organize and interpret data from tests of several design solutions in order to develop a solution that better meets the criteria for success. **SEP:** Compare data to determine similarities and differences. **DCI: ETS1.B and ETS1.C**: Evaluate different solutions to determine the best parts of each solution (best meet design criteria and constraints). ***CCC***: None	Student will organize and use data from tests to determine similarities and differences among several design solutions. • Select features of each solution that can be combined into a new solution that better meets the criteria for success. • Develop a design that better meets the criteria and evaluate its effectiveness.	Student will organize and interpret data from several design solutions, to select features of each solution that can be combined into a new solution that better meets the criteria for success.	Given organized data from tests of several design solutions, student will identify solutions that better meet the criteria for success.

with respect to how well they meet the criteria and constraints of a problem. • Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. ***ETS1.C: Optimizing the Design Solution*** • Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process- that is, some of those characterizes may be incorporated into the new design. ***CCC:*** None				

Science MS-LS2-1				**Middle School**
Discipline: Life Science				
Core Idea: Ecosystems: Interactions, Energy, and Dynamics				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀· · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP: Analyzing and Interpreting Data*** • Analyze and interpret data to provide evidence for phenomena. ***DCI:LS2.A: Interdependent Relationships in Ecosystems*** • Organisms, and populations of organisms, are dependent on their environmental interactions both with other living	**EC.MS-LS2-1**: Organize and interpret data to describe a cause and effect relationship of resource availability on organisms and/or populations in an ecosystem. ***SEP:*** Compare and interpret data to provide evidence for phenomena. ***DCI: LS2.A***: Organisms and population growth are limited by access to resources in an ecosystem. ***CCC:*** Cause and effect relationships can predict phenomena in systems.	Student will organize and interpret data to provide evidence for the effects of access to resources on organisms and/or populations, in an ecosystem.	Student will organize and interpret data to describe a cause and effect relationship of resource availability on organisms and/or populations in an ecosystem.	Given organized data on resource availability, student will identify the effects on organisms and/or populations in an ecosystem based on specific data (i.e., evidence).

things and with nonliving factors. • In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. • Growth of organisms and population increases are limited by access to resources. ***CCC: Cause and Effect*** • Cause and effect relationships may be used to predict phenomena in natural or designed systems.				

Science MS-PS3-3 — Middle School

Discipline: Physical Science

Core Idea: Energy

Next Generation Science Standard Performance Expectation	Essential Concept	ACCESS POINTS Built on Three Levels of Complexity: More Complex	Intermediate	Less Complex
MS-PS3-3: Apply scientific principle to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. ***SEP: Constructing Explanations and Designing Solution*** • Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system. ***DCI: PS3.A: Definitions of Energy*** • Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the	**EC.MS-PS3-3:** Given materials and directions, design, build and test a device that either increases or decreases the transfer of thermal energy. ***SEP:*** Apply scientific ideas or principles to construct, and test a device. ***DCI: PS3.A:*** Temperature is a measure of the energy of particles of matter. ***PS3.B:*** Energy moves from hotter areas or objects to colder areas or objects. ***ETS1.A:*** The more precisely a device's criteria and constraints can be met, the more	Student will design, build and test a device that either increases or decreases the transfer of thermal (heat) energy (movement of energy from hotter areas or objects to colder areas or objects).	Given materials and directions, student will build and test a device that either increases or decreases the transfer of thermal (heat) energy (movement of energy from hotter areas or objects to colder areas or objects).	Using a given device that was designed to either increase or decrease thermal (heat) energy transfer, student will identify which the device was intended to do (increase or decrease thermal (heat) energy transfer - movement of energy from hotter areas or objects to colder areas or objects) and test how well the device meets the criteria.

temperature and the total energy of a system depends on the types, states and amounts of energy present. ***PS3.B: Conservation of Energy and Energy Transfer*** • Energy is spontaneously transferred out of hotter regions or objects and into colder ones. ***ETS1.A: Defining and Delimiting an Engineering Problem*** • The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that likely to limit possible solutions (secondary)	likely it is that the solution will be successful. Constraints are descriptions that limit possible solutions. ***ETS1.B***: A solution needs to be tested, and then modified based on the test results in order to improve it. ***CCC:*** The transfer of energy can be tracked as energy flows through a system.			

ETS1.B: Developing Possible Solutions • A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluation solutions with respect to how well they meet criteria and constraints of a problem. (secondary) ***CCC: Energy and Matter*** The transfer of energy can be tracked as energy flows through a designed or natural system.				

Science MS-ESS1-1 Middle School

Discipline: Earth and Space Sciences				
Core Idea: Earth's Place in the Universe				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀· · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP: Developing and Using Models*** • Develop and use a model to describe phenomena ***DCI: ESS1.A: The Universe and Its Stars*** • Patterns of the apparent motion of the sun, moon and stars in the sky can be observed, described, predicted, and explained with models. ***ESS1.B: Earth and the Solar System***	**EC.MS-ESS1-1** Use a model to show how the patterns of the motions of the Earth-moon-sun system cause the phases of the moon, eclipses of the sun or moon, and/or seasons. ***SEP:*** Develop and/or use a model to describe phenomena. ***DCI: ESS1.A:*** Patterns of the apparent motion of the Earth-moon-sun system can be described with models. ***ESS1.B:*** Models can be used to describe patterns of lunar phases, eclipses of the sun or the moon, and/or seasons. ***CCC:*** Patterns can be used to identify cause-	Student will develop and use a model to describe and predict patterns of the phases of the moon, eclipses of the sun or moon, and/or seasons.	Student will use a model to show how the motions of sun, moon, and Earth cause the phases of the moon, eclipses of the sun or moon, and/or seasons.	Student will identify parts and/or patterns of a model of the phases of the moon, eclipses of the sun or moon, and/or seasons.

• This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilts and are caused by the differential intensity of sunlight on different areas of Earth across the year. ***CCC: Patterns*** • Patterns can used to identify cause-and-effect relationships. ***Scientific Knowledge Assumes an Order and Consistency in Natural Systems*** • Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through	and-effect relationships.			

measurement and observation.				

Science MS-ESS2-6				**Middle School**
Discipline: Earth and Space Sciences				
Core Idea: Earth's Systems				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀ · · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP***: ***Developing and Using Models*** • Develop and use a model to describe phenomena. ***DCI***: ***ESS2.C: The Roles of Water in Earth's Surface Processes*** • Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.	**EC.MS-ESS2-6**: Use a model to describe how unequal heating of Earth by the sun causes different weather and/or climates in different areas on Earth. ***SEP:*** Develop and/or use a model to describe phenomena. ***DCI: ESS2.C:*** Uneven heating of water causes ocean currents. ***ESS2.D:*** Weather and climate are affected by interactions among sunlight, the ocean, location on Earth, and geography. Ocean currents distribute energy absorbed by the sun to different areas on Earth.	Student will develop and use a model to demonstrate and/or describe how unequal heating and the rotation of the Earth effect weather and climate systems.	Student will use a model to demonstrate and/or describe how unequal heating causes different weather and/or climates in different areas on Earth.	Student will identify the parts of a model (factors) that interact and cause different weather and/or climates in different areas on Earth.

ESS2.D: Weather and Climate • Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. • The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. ***CCC: System and System Models*** Models can be used to represent systems and their interactions-such	***CCC:*** Models can be used to represent systems and their interactions (inputs and outcomes), as well as energy and matter flow within the systems.			

as inputs, processes, and outputs- and energy, matter, and information flows within systems.				

HIGH SCHOOL

PERFORMANCE EXPECTATIONS DEVELOPED INTO ACCESS POINT FRAMEWORKS

Discipline	Core Idea	Performance Expectation
Engineering and Technology (ETS)	Engineering Design	**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.
Life Science (LS)	Ecosystems: Interactions, Energy, and Dynamics	**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.
Physical Science (PS)	Matter and Its Interactions	**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.
Earth and Space Sciences (ESS)	Earth's Systems	**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.
Earth and Space Sciences (ESS)	Earth and Human Activity	**HS-ESS3-4** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems.

Science HS-ETS1-2				**High School**
Discipline: Engineering & Technology				
Core Idea: Engineering Design				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀ · · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP: Constructing Explanations and Designing Solutions*** • Design a solution to a complex real-world problem based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. ***DCI: ETS.C: Optimizing the Design Solution*** • Criteria may need to be broken down into	**EC.HS-ETS1-2**: Design a solution to a real-world problem by breaking the problem down into smaller, more manageable problems. ***SEP:*** Design a solution to real-world problem based on scientific knowledge, evidence, criteria, and tradeoffs. ***DCI: ETS1.C:*** Optimizing a design solution requires breaking criteria down into simpler ones. ***CCC:*** None	Student will design a solution to a real-world problem by breaking the problem down into smaller, more manageable problems, designing potential solutions for each smaller problem, and describing how the combined solutions solve the overall problem and meet the criteria.	Student will break a real-world problem down into smaller, more manageable problems and design potential solutions that meet given criteria for each smaller problem.	Student will break a real-world problem down into smaller, more manageable problems and identify potential design solutions that meet given criteria for each smaller problem.

simpler ones that can be approached systemically, and decisions about the priority of certain criteria over others (tradeoffs) may be needed. ***CCC:*** None				

<table>
<tr><th colspan="5">Science HS-LS2-5 — High School</th></tr>
<tr><td colspan="5">Discipline: Life Sciences</td></tr>
<tr><td colspan="5">Core Idea: Ecosystems: Interactions, Energy and Dynamics</td></tr>
<tr><td rowspan="2">Next Generation Science Standard Performance Expectation</td><td rowspan="2">Essential Concept</td><td colspan="3">ACCESS POINTS Built on Three Levels of Complexity</td></tr>
<tr><td colspan="3">More Complex◀ · · · ·◀ · · · · Intermediate · · · ▶ · · · · ▶ Less Complex</td></tr>
<tr><td>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.

SEP: Developing and Using Models
• Develop a model based on evidence to illustrate the relationships between systems or components of a system.

DCI: LS2.B: Cycles of Matter and Energy Transfer in Ecosystems
• Photosynthesis and cellular respiration are important components of the</td><td>EC.HS-LS2-5: Develop a model to illustrate the carbon cycle in a natural environment (life, air, water, and/or land).

SEP: Develop a model based on evidence to illustrate relationships in a system.

DCI: LS2.B: Photosynthesis and cellular respiration are important components of the carbon cycle.

PS3.D: Solar energy is captured and stored through photosynthesis.

CCC: Models can show systems and the interactions within and between systems.</td><td>Student will develop and use a model to illustrate the relationships between the components of a carbon cycle in terms of the inputs and outputs of photosynthesis and cellular respiration.</td><td>Given the components of a carbon cycle model, student will describe the relationships between the components in terms of the inputs and outputs of photosynthesis and cellular respiration.</td><td>Student will identify the components of a carbon cycle model in terms of the inputs and outputs of photosynthesis and cellular respiration.</td></tr>
</table>

carbon cycle, in which carbon is exchanged among the biosphere, atmosphere, oceans, and geosphere through chemical, physical, geological, and biological processes. ***PS3.D: Energy in Chemical Processes*** • The main way that solar energy is captured and stored on Earth is through the chemical process known as photosynthesis. (secondary) ***CCC: Systems and System Models*** Models (e.g., physical, mathematical, computer models) can be used to simulate systems and interactions-including energy, matter and information flows-within and between	Models can show systems and the flows of energy and matter within and between systems.			

systems at different scales.				

Science HS-PS1-5				**High School**
Discipline: Physical Sciences				
Core Idea: Matter and its Interactions				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀· · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP: Constructing Explanations and Designing Solutions*** • Apply scientific principles and evidence to provide an explanation of phenomena and solve design problems, taking into account possible unanticipated effects. ***DCI: PS1.B Chemical Reactions***	**EC.HS-PS1-5**: Use scientific principles and evidence to explain how changing temperature or concentration affects reaction rate. ***SEP:*** Apply scientific principles and evidence to explain phenomena. ***DCI: PS1.B:*** Chemical processes can be understood in terms of the collisions of molecules and the rearrangements of atoms by changes in energy. ***CCC:*** Patterns at different levels (atomic, microscopic, and visible) of systems can show cause and effect of phenomena.	For any given reaction, student will use evidence to explain how changing conditions (temperature and/or concentration of the reacting particles) affects the reaction rate.	Given a change in temperature or concentration of the reacting particles, student will use evidence to explain how the reaction rate of a given reaction is affected.	Student will use evidence to identify whether changing temperature or concentration of the reacting particles affects the reaction rate of a given reaction.

• Chemical processes, their rates, and whether or not energy is stored or released can be understood in terms of the collisions of molecules and the rearrangements of atoms into new molecules, with consequent changes in the sum of all bond energies in the set of molecules that are matched by changes in kinetic energy. ***CCC: Patterns*** • Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.				

Science HS ESS2-2				**High School**
Discipline: Earth & Space Sciences				
Core Idea: Earth's Systems				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀ · · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
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. ***SEP: Analyzing and Interpreting Data*** • Analyze data using tools, technologies, and/or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. ***DCI: ESS2.A: Earth Materials and Systems*** • Earth's systems, being dynamic and	**EC.HS-ESS2-2**: Analyze data to make a claim about the impact of a change to Earth's surface (e.g., greenhouse gases, river dams, erosion) on another Earth system. ***SEP:*** Data can be used to make a scientific claim. ***DCI: ESS2.A:*** A change in one Earth system can cause a change in another Earth system. ***ESS2.D:*** Energy from the sun interacts with Earth's systems and impacts climate. ***CCC:*** Stability and Change - A change in one system can cause another system to	Student will organize and interpret data to make a claim about how a change to Earth's surface caused change that made another Earth system more stable or more unstable.	Student will organize and interpret data to make a claim about the impact of a change to Earth's surface on another Earth system.	Student will interpret given organized data and identify a claim about the impact of a change to Earth's surface on another Earth system.

interacting, cause feedback effects that can increase or decrease the original changes. ***ESS2.D: Weather and Climate*** • The foundation for Earth's global climate systems is the electromagnetic radiation from the sun, as well as its reflection, absorption, storage, and redistribution among the atmosphere, ocean, and land systems, and this energy's re-radiation into space. ***CCC: Stability and Change*** • Feedback (negative or positive) can stabilize or destabilize a system. ***Influence of Engineering, Technology, and Science on Society and the Natural World***	become more stable or more unstable. New technologies can have a positive or negative impact on our systems.			

New technologies can have deep impacts on society and the environment, including some that were not anticipated. Analysis of costs and benefits is a critical aspect of decisions about technology.				

Science HS-ESS3-4				High School
Discipline: Earth & Space Sciences				
Core Idea: Earth and Human Activity				
Next Generation Science Standard Performance Expectation	**Essential Concept**	**ACCESS POINTS Built on Three Levels of Complexity**		
		More Complex◀ · · · ·◀· · · · Intermediate · · ·▶ · · · · ▶ Less Complex		
HS-ESS3-4 Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. ***SEP: Constructing Explanations and Designing Solutions*** • Design or refine a solution to a complex real-world problem based on scientific knowledge, student-generated sources of evidence, prioritized criteria, and tradeoff considerations. ***DCI: ESS3.C: Human Impacts on Earth Systems*** • Scientists and engineers can make major contributions	**EC.HS-ESS3-4**: Refine a technological solution that reduces a human impact on natural systems. ***SEP:*** Design or refine a solution to a real-world problem based on scientific knowledge, evidence, criteria, and tradeoffs. ***DCI: ESS3.C:*** Scientists and engineers can reduce pollution and waste by developing technologies. ***ETS1.B:*** It is important to consider constraints and impacts when evaluating solutions. ***CCC:*** Stability and Change - Feedback can affect a system	Student will use data to refine a technological solution and describe how the refined solution reduces a human impact on natural systems and meets the given criteria and constraints.	Student will use data to refine a technological solution that reduces a human impact on natural systems and meets the given criteria and constraints.	Student will use data to identify whether a technological solution reduces a human impact on natural systems.

by developing technologies that produce less pollution and waster and that preclude ecosystem degradation. ***ETS1.B: Developing Possible Solutions*** • When evaluating solutions, it is important to take into account a range of constraints, including cost. Safety, reliability, and aesthetics, and to consider social, cultural, and environmental impacts. (secondary) ***CCCP: Stability and Change*** • Feedback (negative or positive) can stabilize or destabilize a system. ***Influence of Science, Engineering, and Technology on Society and the Natural World***	when a change in one system causes a change in another system. New technologies can have a positive or negative impact on our systems. Engineers change technologies to increase positive impacts and decrease negative impacts.			

Engineers continuously modify these technological systems by applying scientific knowledge and engineering design practices to increase benefits while decreasing costs and risks.				