

8th Grade Science Year-At-A-Glance

The purpose of the Year-at-a-Glance document is to provide a quick overview of content and skills and the order in which a teacher presents them.

Embedded WIDA Standards		
Explain	ELD-SC.6-8.Explain.Interpretive	<p>Multilingual learners will interpret scientific explanations by...</p> <ul style="list-style-type: none"> • Defining investigable questions or design problems based on observations, information, and/or data about a phenomenon • Determining central ideas in complex evidence and information to help explain how or why a phenomenon occurs • Evaluating scientific reasoning that shows why data or evidence adequately supports conclusions
	ELD-SC.6-8.Explain.Expressive	<p>Multilingual learners will construct scientific explanations that...</p> <ul style="list-style-type: none"> • Describe valid and reliable evidence from sources about a phenomenon • Establish neutral or objective stance in how results are communicated • Develop reasoning to show relationships among independent and dependent variables in models and simple systems • Summarize patterns in evidence, making trade-offs, revising, and retesting
Argue	ELD-SC.6-8.Argue.Interpretive	<p>Multilingual learners will interpret scientific explanations by...</p> <ul style="list-style-type: none"> • Identifying convincing evidence from data, models, and/or information from investigations of phenomena or design solutions • Comparing reasoning and claims based on evidence from two arguments on the same topic • Evaluating whether they emphasize similar or different evidence and/or interpretations of facts
	ELD-SC.6-8.Argue.Expressive	<p>Multilingual learners will construct scientific explanations that...</p> <ul style="list-style-type: none"> • Introduce and contextualize topic/ phenomenon in issues related to the natural and designed world(s) • Support or refute a claim based on data and evidence • Establish and maintain a neutral or objective stance • Signal logical relationships among reasoning, evidence, data, and/or a model when making or defending a claim or counterclaim

8TH GRADE SCIENCE YEAR-AT-A-GLANCE

Quarter 1 Standards

Physical Science

Unit 1: Force and Motion	PACING using 70 minute periods	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)
<p>8.PS2.2 Conduct an investigation to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.</p> <p><i>**Emphasis on the gravitational force aspect of this standard.**</i></p>	Approx. 16 days	<p>Planning and carrying out controlled investigations Students begin to investigate independently, select appropriate independent variables to explore a dependent variable and recognize the value of failure and revision in the experimental process.</p>	<p>Cause and Effect Students begin to connect their explanations for cause and effect relationships to specific scientific theory.</p>
<p>8.PS2.3 Create a demonstration of an object in motion and describe the position, force, and direction of the object.</p>		<p>Developing and using models Students create models which are responsive and incorporate features that are not visible in the natural world but have implications on the behavior of the modeled systems and can identify limitations of their models.</p>	<p>Systems and System Models Students develop models for systems which include both visible and invisible inputs and outputs for that system.</p>
<p>8.PS2.4 Plan and conduct an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.</p>		<p>Planning and carrying out controlled investigations Students begin to investigate independently, select appropriate independent variables to explore a dependent variable and recognize the value of failure and revision in the experimental process.</p>	<p>Cause and Effect Students begin to connect their explanations for cause and effect relationships to specific scientific theory.</p>
<p>8.PS2.5 Evaluate and interpret that for every force exerted on an object there is an equal force exerted in the opposite direction.</p>		<p>Developing and using models Students create models which are responsive and incorporate features that are not visible in the natural world, but have implications on the behavior of the modeled systems and can identify limitations of their models.</p>	<p>Cause and Effect Students begin to connect their explanations for cause and effect relationships to specific scientific theory.</p>
Unit 2: Magnetism and Electricity	PACING using 70 minute periods	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)
<p>8.PS2.1 Design and conduct investigations depicting the relationship between magnetism and electricity in electromagnets, generators, and electrical motors, emphasizing the</p>	Approx. 8 days	<p>Asking questions (for science) and defining problems (for engineering) Questions originate based on experience as well as need to clarify and test other explanations or determine explicit relationships between variables.</p>	<p>Cause and Effect Students begin to connect their explanations for cause and effect relationships to specific scientific theory.</p>

<p>factors that increase or diminish the electric current and the magnetic field strength.</p>			
<p>8. PS2.2 Conduct an investigation to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.</p> <p><i>**Emphasis on the magnetic and electric force aspect of this standard.**</i></p>		<p>Planning and carrying out controlled investigations Students begin to investigate independently, select appropriate independent variables to explore a dependent variable and recognize the value of failure and revision in the experimental process.</p>	<p>Cause and Effect Students begin to connect their explanations for cause and effect relationships to specific scientific theory.</p>
<p>8.ETS1.1 Develop a model to generate data for ongoing testing and modification of an electromagnet, a generator, and a motor such that optimal design can be achieved.</p>		<p>Obtaining, evaluating, and communicating information (O/E) Students can evaluate text, media, and visual displays of information with the intent of clarifying claims and reconciling explanations. (C) Students can communicate scientific information in writing utilizing embedded tables, charts, figures, graphs</p>	<p>Scale, Proportion, and Quantity Students make and evaluate derived/proportional measurements.</p>
<p>ACT Standards addressed in Q1</p>		<p>SIN 403 Identify a control in an experiment. SIN 404 Identify similarities and differences between experiments.</p> <p>EMI 301 Identify implications in a model. EMI 401 Determine which simple hypothesis, prediction, or conclusion is, or is not, consistent with a data presentation, model, or piece of information in text. EMI 404 Identify similarities and differences between models.</p> <ul style="list-style-type: none"> • Rich and authentic content may include: <ul style="list-style-type: none"> ○ Electrical circuits ○ Force and motions 	
<p>Quarter 1 Benchmark</p>			

Quarter 2 Standards

Physical Science

Unit 3: Waves	PACING using 70 minute periods	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)
8.PS4.1 Develop and use models to represent the basic properties of waves including frequency, amplitude, wavelength and speed.	Approx. 4 days	Using mathematics and computational thinking Students can use computing to process large amounts of data in order to develop mathematical representations (ratios, percentages, rates) that will help evaluate a scientific explanation.	Pattern Students recognize, classify, and record patterns in data, graphs, and charts.
8.PS4.2 Compare and contrast mechanical waves and electromagnetic waves based on refraction, reflection, transmission and absorption and their behavior through a vacuum and/or various media. <i>**Revisit in Q2**</i>	Approx. 9 days	Developing and using models Students create models which are responsive and incorporate features that are not visible in the natural world, but have implications on the behavior of the modeled systems and can identify limitations of their models.	Structure and Function Students begin to attribute atomic structure and interactions between particles to the properties of a material.
8.PS4.3 Evaluate the role that waves play in different communication systems.	Approx. 2 days	Constructing explanations and designing solutions Students form explanations using source (including student developed investigations) which show comprehension of parsimony, utilize quantitative and qualitative models to make predictions, and can support or cause revisions of a particular conclusion.	Structure and Function Students design systems, selecting materials for their relevant properties.

Earth's Place in the Universe

Unit 4: The Universe	PACING using 70 minute periods	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)
8.ETS1.2 Research and communicate information to describe how data from technologies (telescopes, spectrosopes, satellites, and space probes) provide information about objects in the solar system and universe.	Approx. 2 days	Obtaining, evaluating, and communicating information (O/E) Students can evaluate text, media, and visual displays of information with the intent of clarify in claims and reconciling explanations.	Scale, Proportion, and Quantity Students develop models to investigate scales that are beyond normal experiences.

		(C) Students can communicate scientific information in writing utilizing embedded tables, charts, figures, graphs.	
8.ESS1.1 Research, analyze, and communicate that the universe began with a period of rapid expansion using evidence from the motion of galaxies and composition of stars.	Approx. 4 days	Constructing explanations and designing solutions Students form explanations using source (including student developed investigations) which show comprehension of parsimony, utilize quantitative and qualitative models to make predictions, and can support or cause revisions of a particular conclusion.	Energy and Matter Students track energy changes through transformations in a system.
8.ESS1.2 Explain the role of gravity in the formation of our sun and planets. Extend this explanation to address gravity's effect on the motion of celestial objects in our solar system and Earth's ocean tides.	Approx. 5 days	Developing and using models Students create models which are responsive and incorporate features that are not visible in the natural world but have implications on the behavior of the modeled systems and can identify limitations of their models.	Systems and System Models Students evaluate the sub-systems that may make up a larger system.

Earth's Systems

Unit 5: Rocks and the Rock Cycle	PACING using 70 minute periods	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)
8.ESS2.3 Describe the relationship between the processes and forces that create igneous, sedimentary, and metamorphic rocks.	Approx. 6 days	Developing and using models Students create models which are responsive and incorporate features that are not visible in the natural world, but have implications on the behavior of the modeled systems and can identify limitations of their models.	Stability and Change Students make explanations of stability and change discussing components of a system.
ACT Standards addressed in Q2		<ul style="list-style-type: none"> • Rich and authentic contexts may include <ul style="list-style-type: none"> ○ Solar system ○ Stars, galaxies, and the universe 	

Quarter 2 Benchmark

Quarter 3 Standards

Earth's Systems

Unit 6: Plate Tectonics (Includes Distribution of Earth's Resources, Earthquakes, and Volcanoes)	PACING using 70 minute periods	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)
8.ESS2.4 Gather and evaluate evidence that energy from the earth's interior drives convection cycles within the asthenosphere which create changes within the lithosphere including plate movements, plate boundaries, and sea-floor spreading.	Approx. 10 days	Developing and using models Students create models which are responsive and incorporate features that are not visible in the natural world but have implications on the behavior of the modeled systems and can identify limitations of their models.	Energy and Matter Students track energy changes through transformations in a system.
8.ESS2.5 Construct a scientific explanation using data that explains that the gradual processes of plate tectonics accounting for A) the distribution of fossils on different continents, B) the occurrence of earthquakes, and C) continental and ocean floor features (including mountains, volcanoes, faults, and trenches).	Addressed throughout the unit in different places	Constructing explanations and designing solutions Students form explanations using source (including student developed investigations) which show comprehension of parsimony, utilize quantitative and qualitative models to make predictions, and can support or cause revisions of a particular conclusion.	Scale, Proportion, and Quantity Students develop models to investigate scales that are beyond normal experiences.
8.ESS3.2 Collect data, map, and describe patterns in the locations of volcanoes and earthquakes related to tectonic plate boundaries, interactions, and hotspots.	Approx. 7 days	Using mathematics and computational thinking Students can use computing to process large amounts of data in order to develop mathematical representations (ratios, percentages, rates) that will help evaluate a scientific explanation.	Pattern Students infer and identify cause and effect relationships from patterns.
8.ESS2.2 Evaluate data collected from seismographs to create a model of Earth's structure.	Approx. 4 days	Developing and using models Students create models which are responsive and incorporate features that are not visible in the natural world but have implications on the behavior of the modeled systems and can identify limitations of their models.	Energy and Matter Students track energy changes through transformations in a system.
8.ESS3.1 Interpret data to explain that Earth's mineral, fossil fuel, and groundwater resources are unevenly distributed as a result of geologic processes.	Addressed throughout the unit in different places	Analyzing and interpreting data Students should create and analyze graphical presentations of data to identify linear and non-linear relationships, consider statistical features within data and/or evaluate multiple data sets for a single phenomenon.	Cause and Effect Students begin to connect their explanations for cause and effect relationships to specific scientific theory.

****Not taught as an individual standard.**
*Interwoven between the above standards in this unit.***

ACT Standards addressed in this unit	<p>IOD 304 Determine how the values of variables change as the value of another variable changes in a simple data presentation.</p> <p>IOD 402 Compare or combine data from a simple data presentation.</p> <p>IOD 504 Determine and/or use a simple (e.g., linear) mathematical relationship that exists between data.</p> <ul style="list-style-type: none"> • Rich and authentic contexts may include <ul style="list-style-type: none"> ○ Earthquakes and volcanoes ○ Lakes, rivers, oceans ○ Mass movements ○ Plate tectonics ○ Groundwater ○ Plate tectonics ○ Earthquakes and volcanoes
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Life Science – Biological Change: Unity and Diversity

Unit 7: Geologic Time	PACING using 70 minute periods	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)
8.ESS2.1 Analyze and interpret data to support the assertion that rapid or gradual geographic changes lead to drastic population changes and extinction events.		<p>Analyzing and interpreting data Students should create and analyze graphical presentations of data to identify linear and non-linear relationships, consider statistical features within data and/or evaluate multiple data sets for a single phenomenon.</p>	<p>Scale, Proportion, and Quantity Students develop models to investigate scales that are beyond normal experiences.</p>
8.LS4.1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change in life forms throughout Earth's history.	Approximately 15 days	<p>Analyzing and interpreting data Students should create and analyze graphical presentations of data to identify linear and non-linear relationships, consider statistical features within data and evaluate multiple data sets for a single phenomenon.</p>	<p>Pattern Students recognize, classify, and record patterns in data, graphs, and charts.</p>
ACT Standards address in this unit		<ul style="list-style-type: none"> • Rich and authentic context may include <ul style="list-style-type: none"> ○ Fossils and geological time 	

Quarter 3 Benchmark

Quarter 4 Standards

Life Science – Biological Change: Unity and Diversity

Unit 8: Change Over Time (Continues into Q4)	PACING using 70 minute periods	Science and Engineering Practices (SEP)	Crosscutting Concepts (CCC)
<p>8.LS4.3 Analyze evidence from geology, paleontology, and comparative anatomy to support that specific phenotypes within a population can increase the probability of survival of that species and lead to adaptation.</p>	<p>Approximately 6 days</p>	<p>Engaging in argument from evidence Students present an argument based on empirical evidence, models, and invoke scientific reasoning.</p>	<p>Cause and Effect Students use cause and effect relationships to make predictions.</p>
<p>8.LS4.4 Develop a scientific explanation of how natural selection plays a role in determining the survival of a species in a changing environment.</p>		<p>Constructing explanations and designing solutions Students form explanations using source (including student developed investigations) which show comprehension of parsimony, utilize quantitative and qualitative models to make predictions, and can support or cause revisions of a particular conclusion.</p>	<p>Stability and Change Students make explanations of stability and change discussing molecular components of a system.</p>
<p>8.LS4.2 Construct an explanation addressing the similarities and differences of the anatomical structures and genetic information between extinct and extant organisms using evidence of common ancestry and patterns between taxa.</p>	<p>Approximately 6 days</p>	<p>Constructing explanations and designing solutions Students form explanations using source (including student developed investigations) which show comprehension of parsimony, utilize quantitative and qualitative models to make predictions, and can support or cause revisions of a particular conclusion.</p>	<p>Pattern Students recognize, classify, and record patterns in data, graphs, and charts.</p>
<p>8.LS4.5 Obtain, evaluate, and communicate information about the technologies that have changed the way humans use artificial selection to influence the inheritance of desired traits in other organisms.</p>	<p>Approximately 2 days</p>	<p>Obtaining, evaluating, and communicating information (O/E) Students can evaluate text, media, and visual displays of information with the intent of clarifying claims and reconciling explanations. (C) Students can communicate scientific information in writing utilizing embedded tables, charts, figures, graphs.</p>	<p>Cause and Effect Students begin to connect their explanations for cause and effect relationships to specific scientific theory.</p>
<p>ACT Standards addressed in Unit 7 and Unit 8</p>		<ul style="list-style-type: none"> ● Rich and authentic context may include <ul style="list-style-type: none"> ○ Evolution ○ Populations 	