

| 8 th Grade Science | | | | | | | |
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| The processes that change Earth's systems at different spatial scales today also caused changes in the past. | | | | | | | |
| Semester 1 | | | | Semester 2 | | | |
| Quarter 1 | | Quarter 2 | | Quarter 3 | | Quarter 4 | |
| Instructional Segment #1: Objects move and collide. | | Instructional Segment #2: Noncontact forces influence phenomena. | | Instructional Segment #3: Evolution explains life's unity and diversity. | | Instructional Segment #4: Sustaining local and global biodiversity. | |
| MS-LS4-1* ₁ MS-PS2-1 ₄ MS-PS2-2* ₇ MS-PS3-1 ₃ | MS-ETS1-1* MS-ETS1-2* MS-ETS1-3 MS-ETS1-4 | MS-ESS1-1* ₁ MS-ESS1-2 ₄ MS-ESS1-3 ₃ MS-PS2-3 ₂ | MS-PS2-4 ₄ MS-PS2-5 ₂ MS-PS3-2 ₄ | MS-LS3-1 ₆ MS-LS4-1* ₁ MS-LS4-2 ₁ MS-LS4-3 ₁ | MS-LS4-4* ₂ MS-LS4-5 ₂ MS-LS4-6* ₂ MS-ESS1-4 ₃ | MS-LS4-4* ₂ MS-LS4-6* ₂ MS-ESS1-1* ₁ MS-ESS3-4 ₂ MS-PS4-1 ₁ | MS-PS4-2 ₆ MS-PS4-3 ₆ MS-ETS1-1* MS-ETS1-2* |
| * = standard is taught more than once within this course | | | | | | | |
| EP&Cs Connections: Principles 2 & 5 | ELD Connections: ELD.PI.6.1,5,6 a-b, 9,10,11a | EP&Cs Connections: n/a | ELD Connections: ELD.PI.6.1,5,6 a-b, 9,10,11a | EP&Cs Connections: Principle 2 | ELD Connections: ELD.PI.6.1,5,6 a-b, 9,10,11a | EP&Cs Connections: Principles 1 & 2 | ELD Connections: ELD.PI.6.1,5,6 a-b, 9,10,11a |
| CCSS ELA Connections: RST.6-8.1,3,7,9 , WHST.6-8.7,8,9 , SL.8.5 | CCSS Math Connections: 6.EE.2,6 , 6.NS.5 , 6.RP.1,2 , 7.EE.3,4 , 7.RP.2 , 7.SP.7 , 8.EE.1,2 , MP.2 | CCSS ELA Connections: RST.6-8.1,3,7 , WHST.6-8.1,7 , SL.8.5 | CSS Math Connections: 6.RP.1 , 6.EE.2,6 , 7.RP.2 , 7.EE.3,4 , MP.2 , MP.4 | CCSS ELA Connections: RST.6-8.1,4,7,9 , WHST.6-8.2,8,9 , SL.8.1,4,5 | CSS Math Connections: 6.RP.1 , 6.SP.5 , 6.EE.6 , 7.RP.2 , MP.4 | CCSS ELA Connections: RST.6-8.1,9 , WHST.6-8.1,2,9 , SL.8.1,4,5 | CSS Math Connections: 6.RP.1,3 , 6.SP.5 , 6.EE.6 , 7.EE.3,4 , 7.RP.2 , 8.F.3 , MP.2 , MP.4 |

Science & Engineering Practices (SEPs)

[Asking questions and defining problems](#)
[Developing and using models](#)
[Planning and carrying out investigations](#)
[Analyzing and interpreting data](#)

[Using mathematics and computational thinking](#)
[Constructing explanations and designing solutions](#)
[Engaging in argument from evidence](#)
[Obtaining, evaluating and communicating information](#)

Crosscutting Concepts (CCCs)

- 1.) [Patterns](#)
- 2.) [Cause and Effect](#)
- 3.) [Scale, Proportion, Quantity](#)
- 4.) [Systems and System Models](#)
- 5.) [Energy and Matter](#)
- 6.) [Structure and Function](#)
- 7.) [Stability and Change](#)

| Guiding Questions: | | | |
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| <i>Instructional Segment #1:</i> Objects move and collide. | <i>Instructional Segment #2:</i> Noncontact forces influence phenomena. | <i>Instructional Segment #3:</i> Evolution explains life's unity and diversity. | <i>Instructional Segment #4:</i> Sustaining local and global biodiversity. |
| <ul style="list-style-type: none"> • What are forces and how do they affect the motions of objects? • Do objects always need a force in order to keep moving? • What happens when a moving object collides with something? • How do fossils provide evidence of an ancient collision that wiped out the dinosaurs? | <ul style="list-style-type: none"> • What causes the cyclical changes in the appearance of the Moon? • How can an object influence the motion of another object without touching it? • Does Earth's force of gravity attract other objects equally? | <ul style="list-style-type: none"> • What can we infer about the history of Earth and life on earth from the clues we can uncover in rock layers and the fossil record? • What evidence supports Darwin's theory of biological evolution? • How do evolution and natural selection explain life's unity and diversity? | <ul style="list-style-type: none"> • What are the characteristic properties and behaviors of waves? • What human activities harm Earth's biodiversity and what human activities help sustain local and global biodiversity? • How does communication technology encode information and how can digital technologies be used to help sustain biodiversity? |

| 8 th Grade Science- Quarter 1 Overview | | | |
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| Quarter Topic Focus: Objects move and collide. | | | |
| Science & Engineering Practice (SEP) | Disciplinary Core Idea (DCI) | Crosscutting Concept (CCC) | Performance Expectation (PE) |
| How students will demonstrate their understanding... | What students will understand... | How students will connect their understanding across units and courses... (Why they should know it) | A complete standard (SEP + DCI + CCC = PE) <small>*colors are associated with SEP (see page 1 for key)</small> |
| 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. | (Patterns) | MS-LS4-1 |
| (Constructing Explanations and Designing Solutions) | Apply Newton’s Third Law to design a solution to a problem involving the motion of | two colliding objects. (Systems and System Models) | MS-PS2-1 |
| Plan and 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. | (Stability and Change) | MS-PS2-2 |
| 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. | (Scale, Proportion, Quantity) | MS-PS3-1 |
| 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. | (Influence of Science, Engineering and Technology on Society and the Natural World) | MS-ETS1-1 |

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| <p><u>Evaluate competing design solutions</u></p> | <p>using a systematic process to determine how well they <u>meet the criteria and constraints</u> of a problem.</p> | <p>n/a</p> | <p>MS-ETS1-2</p> |
| <p><u>Analyze data</u> from tests to determine similarities and differences among</p> | <p>several <u>design solutions to identify the best characteristics of each</u> that can be combined into a new solution to better meet the criteria for success.</p> | <p>n/a</p> | <p>MS-ETS1-3</p> |
| <p><u>Develop a model</u> to generate data</p> | <p><u>for iterative testing and modification</u> of a proposed object, tool, or process such that an optimal design can be achieved.</p> | <p>n/a</p> | <p>MS-ETS1-4</p> |

| 8 th Grade Science- Quarter 2 Overview | | | |
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| Quarter Topic Focus: Noncontact forces influence phenomena. | | | |
| Science & Engineering Practice (SEP) | Disciplinary Core Idea (DCI) | Crosscutting Concept (CCC) | Performance Expectation (PE) |
| How students will demonstrate their understanding... | What students will understand... | How students will connect their understanding across units and courses... (Why they should know it) | A complete standard (SEP + DCI + CCC = PE) <small>*colors are associated with SEP (see page 1 for key)</small> |
| 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. | (Patterns) | MS-ESS1-1 |
| Develop and use a model to describe the | role of gravity in the motions within galaxies and | the solar system . | MS-ESS1-2 |
| Analyze and interpret data to determine | scale properties of objects in the solar system . | (Scale, Proportion, Quantity) | MS-ESS1-3 |
| Ask questions about data to determine | the factors that affect the strength of electric and magnetic forces . | (Cause and Effect) | MS-PS2-3 |
| Construct and present arguments using evidence to support the claim that | gravitational interactions are attractive and depend on the masses of interacting objects. | (Systems and System Models) | MS-PS2-4 |
| 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. | (Cause and Effect) | MS-PS2-5 |
| 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. | (Systems and System Models) | MS-PS3-2 |

| 8 th Grade Science- Quarter 3 Overview | | | |
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| Quarter Topic Focus: Evolution explains life's unity and diversity. | | | |
| <u>Science & Engineering Practice (SEP)</u> | <u>Disciplinary Core Idea (DCI)</u> | <u>Crosscutting Concept (CCC)</u> | Performance Expectation (PE) |
| How students will demonstrate their understanding... | What students will understand... | How students will connect their understanding across units and courses... (Why they should know it) | A complete standard (SEP + DCI + CCC = PE) <small>*colors are associated with SEP (see page 1 for key)</small> |
| <u>Develop and use a model</u> to describe why | structural changes <u>to genes (mutations) located on chromosomes may affect proteins</u> and may result in harmful, beneficial, or neutral effects to | the <u>structure and function</u> of the organism. | MS-LS3-1 |
| <u>Analyze and interpret data</u> for | patterns in the fossil record that document the <u>existence, diversity, extinction, and change of life forms</u> throughout the history of life on Earth under the assumption that natural laws operate today as in the past. | (<u>Patterns</u>) | MS-LS4-1 |
| Apply scientific ideas to <u>construct an explanation</u> for the | <u>anatomical similarities and differences</u> among modern organisms and between modern and fossil organisms to infer evolutionary relationships. | (<u>Patterns</u>) | MS-LS4-2 |
| <u>Analyze displays of pictorial data</u> | to compare patterns of similarities in the <u>embryological development</u> across multiple species to identify relationships not evident in the fully formed anatomy. | (<u>Patterns</u>) | MS-LS4-3 |
| <u>Construct an explanation based on evidence</u> that describes how | <u>genetic variation of traits in a population</u> increase some individuals' probability of surviving and reproducing in a specific environment. | (<u>Cause and Effect</u>) | MS-LS4-4 |

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| <p><u>Gather and synthesize information</u> about</p> | <p>technologies that have <u>changed the way humans influence the inheritance of desired traits</u> in organisms.</p> | <p>(Cause and Effect)</p> | <p>MS-LS4-5</p> |
| <p><u>Use mathematical representations to support explanations</u> of</p> | <p>how <u>natural selection may lead to increases and decreases of specific traits in populations over time</u>.</p> | <p>(Cause and Effect)</p> | <p>MS-LS4-6</p> |
| <p><u>Construct a scientific explanation</u> based on evidence from</p> | <p>rock strata for how the <u>geological time scale</u> is used to organize the Earth's 46 billion-year-old history.</p> | <p>(Scale, Proportion, Quantity)</p> | <p>MS-ESS1-4</p> |

| 8 th Grade Science- Quarter 4 Overview | | | |
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| Quarter Topic Focus: Sustaining local and global biodiversity. | | | |
| Science & Engineering Practice (SEP) | Disciplinary Core Idea (DCI) | Crosscutting Concept (CCC) | Performance Expectation (PE) |
| How students will demonstrate their understanding... | What students will understand... | How students will connect their understanding across units and courses... (Why they should know it) | A complete standard (SEP + DCI + CCC = PE) <small>*colors are associated with SEP (see page 1 for key)</small> |
| Construct an explanation based on evidence that describes how | genetic variation of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment. | (Cause and Effect) | MS-LS4-4 |
| Use mathematical representations to support explanations of | how natural selection may lead to increases and decreases of specific traits in populations over time . | (Cause and Effect) | MS-LS4-6 |
| 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. | (Patterns) | MS-ESS1-1 |
| Construct an argument supported by evidence for how | increases in human population and per-capita consumption of natural resources impact Earth's systems . | (Cause and Effect) | MS-ESS3-4 |
| 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. (Patterns) | MS-PS4-1 |
| Develop and use a model to describe | that waves are reflected, absorbed, or transmitted through various materials. | (Structure and Function) | MS-PS4-2 |

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| <p><u>Integrate qualitative scientific and technical information</u> to support the claim that</p> | <p><u>digitized signals</u> are a more reliable way to encode and transmit information than analog signals.</p> | <p>(<u>Structure and Function</u>)</p> | <p>MS-PS4-3</p> |
| <p>Define the <u>criteria and constraints of a design problem</u></p> | <p>with <u>sufficient precision to ensure a successful solution</u>, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> | <p>(<u>Influence of Science, Engineering and Technology on Society and the Natural World</u>)</p> | <p>MS-ETS1-1</p> |
| <p><u>Evaluate competing design solutions</u></p> | <p>using a systematic process to determine how well they <u>meet the criteria and constraints</u> of a problem.</p> | <p>n/a</p> | <p>MS-ETS1-2</p> |