

**SCIENCE (Grade 8) | Curriculum Map and Pacing Guide**

<p><b>COURSE DESCRIPTION:</b> Eighth grade science requires students to use scientific inquiry to discover patterns, trends, structures, and relationships that may be described by simple principles. These principles are related to the properties or interactions within and between systems. Students will study:</p> <ul style="list-style-type: none"> <li>▪ <u>Earth and Space Science</u>. Physical features of the Earth and how they formed, including the interior of Earth, the rock record, plate tectonics, and landforms.</li> <li>▪ <u>Physical Science</u>. Forces and motion within, on and around the Earth and within the universe.</li> <li>▪ <u>Life Science</u>. Continuation of the species.</li> </ul>	<p><b>Science Inquiry and Application (SIA):</b> <i>All grades 6-8 students will use the following scientific processes with appropriate laboratory safety techniques to construct their knowledge and understanding:</i></p> <ul style="list-style-type: none"> <li>▪ Identify questions that can be answered through scientific investigations. (SAI.1)</li> <li>▪ Design and conduct a scientific investigation. (SIA.2)</li> <li>▪ Use appropriate mathematics, tools and techniques to gather data and information. (SIA.3)</li> <li>▪ Analyze and interpret data. (SIA.4)</li> <li>▪ Develop descriptions, models, explanations and predictions. (SIA.5)</li> <li>▪ Think critically and logically to connect evidence and explanations. (SIA.6)</li> <li>▪ Recognize and analyze alternative explanations and predications. (SIA.7)</li> <li>▪ Communicate scientific procedures and explanations. (SAI.8)</li> </ul>
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QUARTER 1		
Ohio Science Standards (2018)	Student Learning Targets	Essential Investigations
<p style="text-align: center;"><b><u>Earth and Space Science (ESS)</u></b></p> <p><b>8.ESS.1:</b> The composition and properties of Earth’s interior are identified by the behavior of seismic waves.</p> <p><b>8.ESS.2:</b> Earth’s lithosphere consists of major and minor tectonic plates that move relative to each other.</p> <p><b>8.ESS.3:</b> A combination of constructive and destructive geologic processes formed Earth’s surface.</p> <p><b>8.ESS.4:</b> Evidence of the dynamic changes of Earth’s surface through time is found in the geologic record.</p>	<ul style="list-style-type: none"> <li>▪ Explain how seismic waves are used to describe Earth's layers. (ESS.1)</li> <li>▪ Explain the composition and properties of Earth’s layers. (ESS.2)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Working with Questions (SIA.1)</li> <li>▪ Cube Investigations (SIA.6)</li> <li>▪ Continents Puzzle (ESS.2, SIA.6)</li> <li>▪ Plotting the Evidence (ESS.2, SIA.4)</li> <li>▪ Plate Movement Simulation (ESS.2, SIA.5)</li> <li>▪ Gizmos Reflections (SIA.8)</li> <li>▪ AHA Connections (SIA.8)</li> </ul>

**QUARTER 2**

Ohio Science Standards (2018)	Student Learning Targets	Essential Investigations
<p><b>Earth and Space Science (ESS)</b></p> <p><b>8.ESS.1:</b> The composition and properties of Earth’s interior are identified by the behavior of seismic waves.</p> <p><b>8.ESS.2:</b> Earth’s lithosphere consists of major and minor tectonic plates that move relative to each other.</p> <p><b>8.ESS.3:</b> A combination of constructive and destructive geologic processes formed Earth’s surface.</p> <p><b>8.ESS.4:</b> Evidence of the dynamic changes of Earth’s surface through time is found in the geologic record.</p>	<ul style="list-style-type: none"> <li>▪ Explain how seismic waves are used to describe Earth's layers. (ESS.1)</li> <li>▪ Explain the composition and properties of Earth’s layers. (ESS.1)</li> <li>▪ Describe how geologic events and Earth formations result from plate motion. (ESS.3)</li> <li>▪ Use a variety of maps and models to analyze and describe the changing surface of the Earth. (ESS.3)</li> <li>▪ Identify and describe how erosion and deposition alter the surface of the Earth. (ESS.3)</li> <li>▪ Connect uniformitarianism to events shown within the geological record. (ESS.4)</li> <li>▪ Analyze a geologic record using relative dating principles. (ESS.4)</li> <li>▪ Infer what the environment was like at the time of deposition of a rock layer using the geologic and fossil records. (ESS.4)</li> <li>▪ Identify the use of absolute dating of rock techniques.(ESS.4)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Grand Canyon Rocks (ESS.4, SIA.2)</li> <li>▪ Liquid Layers (ESS.1, SIA.3)</li> <li>▪ Radioactive Decay Model (ESS.4, SIA.5)</li> <li>▪ Relative Dating (ESS.4, SIA.5)</li> <li>▪ Fracking Debate (ESS.3, SIA.6)</li> <li>▪ Stream Table (ESS.3, SIA.3)</li> <li>▪ Gizmos Reflections (SIA.8)</li> <li>▪ AHA Connections (SIA.8)</li> </ul>

**QUARTER 3**

Ohio Science Standards (2018)	Student Learning Targets	Essential Investigations
<p><b>Physical Science (PS)</b></p> <p><b>8.PS.1:</b> Objects can experience a force due to an external field such as magnetic, electrostatic, or gravitational fields.</p> <p><b>8.PS.2:</b> Forces can act to change the motion of objects.</p>	<ul style="list-style-type: none"> <li>▪ Recognize how forces at a distance can be explained by the fields that extend through space. (PS.1)</li> <li>▪ Provide evidence to show how an electrical field exists around objects with a charge. (PS.1)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Air Trolleys (PS.1, SIA.2)</li> <li>▪ Motion and Forces Controlled Experiment (PS.1, SIA.4)</li> <li>▪ Electromagnetic Controlled Experiment (PS.2, SIA.2)</li> <li>▪ Hubble Ultra Deep Field (PS.2, SIA.3)</li> <li>▪ Mysterious Events (PS.2, SIA.4)</li> </ul>

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**QUARTER 3**

Ohio Science Standards (2018)	Student Learning Targets	Essential Investigations
<p align="center"><b><u>Life Science (LS)</u></b></p> <p><b>8.LS.1:</b> Diversity of species, a result of variation of traits, occurs through the process of evolution and extinction over many generations. The fossil records provide evidence that changes have occurred in number and types of species.</p> <p><b>8.LS.2:</b> Every organism alive today comes from a long line of ancestors who reproduced successfully every generation.</p> <p><b>8.LS.3:</b> The characteristics of an organism are a result of inherited traits received from parent(s).</p>	<ul style="list-style-type: none"> <li>▪ Predict how a magnetic field changes depending on the strength of the magnet and the distance between magnetic objects. (PS.1)</li> <li>▪ Explain how a gravitational field's attractive force changes with distance and mass. (PS.1)</li> <li>▪ Describe the relationship between magnetic fields and electrical currents. (PS.1)</li> <li>▪ Explain how motion of an object is measured with respect to a reference point. (PS.2)</li> <li>▪ Identify the types of contact and at-a-distance forces acting on an object.</li> <li>▪ Calculate and describe the net force on an object. (PS.2)</li> <li>▪ Predict how balanced forces acting on an object will cause the object to maintain its current motion. (PS.2)</li> <li>▪ Predict how unbalanced forces acting on an object will cause the object to change its motion. (PS.2)</li> <li>▪ Construct and analyze free-body diagrams in real world situations. (PS.2)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Gizmos Reflections (SIA.8)</li> <li>▪ AHA Connections (SIA.8)</li> </ul>

**QUARTER 4**

Ohio Science Standards (2018)	Student Learning Targets	Essential Investigations
<p align="center"><b><u>Life Science (LS)</u></b></p> <p><b>8.LS.1:</b> Diversity of species, a result of variation of traits, occurs through the process of evolution and extinction over many generations. The fossil records provide evidence that changes have occurred in number and types of species.</p>	<ul style="list-style-type: none"> <li>▪ Explain how diversity slowly occurs through population changes over numerous generations of a species. (LS.1)</li> <li>▪ Explain how sexual reproduction is responsible for the variation of genes that can result in diversity and advantageous traits. (LS.1)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Larkey Simulation (LS.3, SIA.4)</li> <li>▪ Natural Selection (LS.2, SIA.4)</li> <li>▪ Super Genetics (LS.3, SIA.7)</li> <li>▪ GMO Debate (LS.2, SIA.8)</li> <li>▪ Gizmos Reflections (SIA.8)</li> <li>▪ AHA Connections (SIA.8)</li> </ul>

QUARTER 4		
Ohio Science Standards (2018)	Student Learning Targets	Essential Investigations
<p><b>8.LS.2:</b> Every organism alive today comes from a long line of ancestors who reproduced successfully every generation.</p> <p><b>8.LS.3:</b> The characteristic of an organism are a result of inherited traits received from parent(s).</p>	<ul style="list-style-type: none"> <li>▪ Predict how changes in the environmental conditions could affect a population’s survival and reproductive success. (LS.1)</li> <li>▪ Analyze data and evidence from the fossil record to show how species have changed over time. (LS.1)</li> <li>▪ Assess the advantages and disadvantages of asexual and sexual reproduction. (LS.2)</li> <li>▪ Compare and contrast mitosis and meiosis. (LS.2)</li> <li>▪ Analyze how the combination of genes during sexual reproduction may increase or decrease an organism's chances for survival. (LS.2)</li> <li>▪ Explain how the expression of traits is influenced by genes and environmental factors. (LS.3)</li> <li>▪ Synthesize how genes inherited from parent(s) result in an individual’s genotype and phenotype. (LS.3)</li> <li>▪ Classify traits as dominant, recessive, or codominant. (LS.3)</li> <li>▪ Create and analyze a Punnett square to predict the possible outcomes of a trait. (LS.3)</li> <li>▪ Analyze a pedigree to map the inheritance of a certain trait. (LS.3)</li> </ul>	

**District Instructional Resources:**

*Science Fusion* (2017) / Houghton Mifflin Harcourt (6-year online subscription: 2019-2020 to 2024-2025)

Gizmos (online simulations – annual subscription) - <https://www.explorellearning.com/>

FOSS Next Generation Middle School Earth History Lite Kit - #1584912 / Delta Education

FOSS Next General Middle School Gravity and Kinetic Energy Complete Kit - #1465618 / Delta Education

FOSS Next Generation Middle School Electromagnetic Force Complete Kit - #1465615 / Delta Education

FOSS Next Generation Middle School Waves Complete Kit - #1465617 / Delta Education

FOSS Middle School Populations and Ecosystems (2<sup>nd</sup> Ed.) - #1533039 / Delta Education

FOSS Next Generation Middle School Heredity and Adaptation Complete Kit - #1465620 / Delta Education

**Ohio Science Standards:**

Ohio Learning Standards (2018) – retrieved Jan. 2, 2019

<http://education.ohio.gov/getattachment/Topics/Learning-in-Ohio/Science/Ohios-Learning-Standards-and-MC/SciFinalStandards121018.pdf.aspx?lang=en-US>