

**SAU9 Science Competencies**

**Grades 9-12**

<p><b>Nature of Inquiry &amp; Research</b> Student will demonstrate the ability to work collaboratively and individually to generate testable questions or define problems, plan and conduct investigations using a variety of research methods in a various settings, analyze and interpret data, reason with evidence to construct explanations in light of existing theory and previous research, and effectively communicate the research processes and conclusions.</p>	<p><b>Patterns</b> Students will demonstrate the ability to observe and describe patterns in natural and human designed phenomena and use those patterns to support claims about the observed or predicted relationships among phenomena.</p>	<p><b>Cause and Effect</b> Students will demonstrate the ability to investigate, explain, and evaluate potential causal relationships by using evidence to support claims and predictions about the mechanisms that drive those relationships.</p>	<p><b>Scale, Quantity &amp; Proportion</b> Students will demonstrate the ability to describe and represent the significance of changes in observable and non-observable phenomena in terms of relative scale, proportion, and quantity.</p>	<p><b>System Models</b> Students will demonstrate the ability to investigate and analyze a natural or human designed system in terms of its boundaries, inputs, outputs, interactions, and behaviors and use this information to develop a system model that can be used to understand and empirically evaluate the accuracy of models in terms of representing the underlying system.</p>	<p><b>Energy &amp; Matter</b> Students will demonstrate the ability to analyze evidence from a variety of sources (investigations, models) to predict, connect and/or evaluate the cycling of matter and flow of energy within and between systems in order to understand, describe, or predict possibilities and limitations of systems.</p>	<p><b>Structure &amp; Function</b> Students will demonstrate the ability to use evidence to support claims about the relationship among structure and function of natural and human designed objects.</p>	<p><b>Stability &amp; Change</b> Students will demonstrate the ability to investigate and analyze static and dynamic conditions of natural and human designed systems in order to explain and predict changes over time.</p>
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**Grades 6-8**

<p><b>Nature of Inquiry &amp; Research</b> Students will work collaboratively and individually to generate testable questions or define problems in terms of given constraints and criteria; plan and conduct investigations or apply engineering design practices to analyze and interpret data, and construct and communicate evidence-based explanations or possible optimal solutions.</p>	<p><b>Patterns</b> Students will observe, predict, and analyze patterns in order to support evidence-based claims about relationships.</p>	<p><b>Cause and Effect</b> Students will investigate, explain, and evaluate potential causal relationships, using evidence to support claims and predictions about the mechanisms that drive those relationships.</p>	<p><b>Scale, Quantity &amp; Proportion</b> <i>Grades 7&amp;8</i> Students will apply reasoning and modeling to determine the proportional relationships in observable and non-observable phenomena in terms of relative scale and quantity.</p>	<p><b>System Models</b> Students will investigate and use models of natural or human-designed systems in order to describe a system, how its parts function together, and how internal and external factors affect the system or its parts.</p>	<p><b>Energy &amp; Matter</b> Students will analyze evidence (e.g., investigations, models, theories, scenarios) to predict and track changes in the cycling of matter and flow of energy within and between systems in order to identify their possibilities and limitations.</p>	<p><b>Structure &amp; Function</b> <i>Grades 7&amp;8</i> Students will analyze the relationship among structure and function of natural or human designed objects, using evidence to redesign or support claims about survival and/or improved performance.</p>	<p><b>Stability &amp; Change</b> <i>Grades 7&amp;8</i> Students will demonstrate the ability to investigate and analyze static and dynamic conditions of natural and human designed systems in order to explain and predict changes over time.</p>
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**Grades 4-5**

<p><b>Nature of Inquiry &amp; Research</b> Students will work collaboratively and individually to generate testable questions or to define problems in terms of a given situation and construct and communicate evidence-based explanations or best possible solutions.</p>	<p><b>Patterns</b> Students will sort and classify natural and designed phenomena, identify similarities and differences, in order to recognize and use patterns.</p>	<p><b>Cause and Effect</b> Students will investigate cause and effect relationships to make predictions and support evidenced-based explanations or claims about change.</p>	<p><b>Energy &amp; Matter</b> Students will investigate and use models to make predictions and support evidence based explanations about the cycling of matter and flow of energy within and between systems.</p>	<p><b>System Models</b> <i>Grade 5 only</i> Students will investigate and use models of natural or human-designed systems in order to describe a system, how its parts function together, and how internal and external factors affect the system or its parts.</p>
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**Grades K-3**

<p><b>Nature of Inquiry &amp; Research</b> Students will work collaboratively to answer testable questions to find possible solutions to simple problems.</p>	<p><b>Patterns</b> Students will observe patterns in the natural world (including human), develop questions to investigate, make connections, and support connections with evidence.</p>	<p><b>Cause and Effect</b> Students will investigate causal relationships that generate observable patterns and explain their thinking with evidence.</p>
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