



Science: Systems and Structures

Competency: Create models to analyze how the structures and functions of a system work together and demonstrate how a change in one part affects the whole.

Grade Level Competency: Kindergarten

Students will create and use models to demonstrate how the structure and functions of a system are related, work together, and depend on each other. Students will predict how if one thing changes it affects the system.

Criteria	Extending	Proficient	In Progress	Beginning
Create Models	A complex performance or application of learning that is transferred to new or novel situations beyond the content area, makes extended or abstract connections to authentic, real-world, multifaceted situations, and/or constructs entirely new ideas that are transformational.	I can create models to demonstrate and explain a new or familiar scientific function or system. Note: Models may be graphical, mathematical, diagrams, etc.	I can create models to demonstrate a familiar scientific function or system.	I am acquiring skills to create models to demonstrate a scientific function or system.
Predict and Justify		I can use evidence to predict how if one thing changes, it will affect a function or scientific system.	I can use evidence given a specific change to predict how it will affect a function or scientific system.	I am acquiring skills to predict how a given change will affect a function or scientific system.

MDE grade level benchmarks embedded explicitly in the rubric

Kindergarten

0L.3.1.1.1 Develop a simple model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.



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Grade Level Competency: Grades 1-2				
Students will create and use models to demonstrate how the structure and functions of a system are related, work together, and depend on each other. Students will predict how if one thing changes it affects the system.				
Criteria	Extending	Proficient	In Progress	Beginning
Create Models	A complex performance or application of learning that is transferred to new or novel situations beyond the content area, makes extended or abstract connections to authentic, real-world, multifaceted situations, and/or constructs entirely new ideas that are transformational.	I can create models to demonstrate and explain a new or familiar scientific function or system. Note: Models may be graphical, mathematical, diagrams, etc. <input type="checkbox"/> Grade 1 <input type="checkbox"/> Grade 2	I can create models to demonstrate a familiar scientific function or system. <input type="checkbox"/> Grade 1 <input type="checkbox"/> Grade 2	I am acquiring skills to create models to demonstrate a scientific function or system. <input type="checkbox"/> Grade 1 <input type="checkbox"/> Grade 2
		I can use evidence to predict how if one thing changes, it will affect a function or scientific system. <input type="checkbox"/> Grade 1 <input type="checkbox"/> Grade 2	I can use evidence given a specific change to predict how it will affect a function or scientific system. <input type="checkbox"/> Grade 1 <input type="checkbox"/> Grade 2	I am acquiring skills to predict how a given change will affect a function or scientific system. <input type="checkbox"/> Grade 1 <input type="checkbox"/> Grade 2
MDE grade level benchmarks embedded explicitly in the rubric				
Grade 1 1L.3.1.1.1 Develop a simple model based on evidence to represent how plants or animals use their external parts to help them survive, grow, and meet their needs. 1L.3.2.2.2 Plan and design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. 1P.3.2.2.1 Design and build a device that uses light or sound to solve the problem of communicating over a distance.		Grade 2 2L.3.2.2.1 Engineer a device that mimics the structures and functions of plants or animals in seed dispersal.		



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Grade Level Competency: Grades 3-4

Students will create and use models to demonstrate how the structure and functions of a system are related, work together, and depend on each other. Students will predict how if one thing changes it affects the system.

Criteria	Extending	Proficient	In Progress	Beginning
Design Models	A complex performance or application of learning that is transferred to new or novel situations beyond the content area, makes extended or abstract connections to authentic, real-world, multifaceted situations, and/or constructs entirely new ideas that are transformational.	I can create/design models to demonstrate, explain and justify my thinking of a scientific system. Note: Models may be graphical, mathematical, diagrams, etc. <input type="checkbox"/> Grade 3 <input type="checkbox"/> Grade 4	I can create/design models to demonstrate and explain a scientific system. <input type="checkbox"/> Grade 3 <input type="checkbox"/> Grade 4	I am acquiring skills to create models to demonstrate and explain a scientific system. <input type="checkbox"/> Grade 3 <input type="checkbox"/> Grade 4
Predict and Justify		I can use evidence to predict and justify how if one thing changes it will affect a scientific system. <input type="checkbox"/> Grade 3 <input type="checkbox"/> Grade 4	I can use evidence to predict how if one thing changes it will affect a scientific system. <input type="checkbox"/> Grade 3 <input type="checkbox"/> Grade 4	I am acquiring the skills to predict how if one thing changes it will affect a scientific system. <input type="checkbox"/> Grade 3 <input type="checkbox"/> Grade 4

MDE grade level benchmarks embedded explicitly in the rubric

Grade 3

3L.3.1.1.2 Develop multiple models to describe how organisms have unique and diverse life cycles but all have birth, growth, reproduction, and death in common.

Grade 4

4E.3.1.1.1 Develop a model based in part on student observations or data to describe ways the geosphere, biosphere, hydrosphere, and atmosphere interact.



Science: Systems and Structures

Competency: Create models to analyze how the structures and functions of a system work together and demonstrate how a change in one part affects the whole.

Grade Level Competency: Grades 7-8				
Students will create and use models to represent the interdependence of the structure and function of a system, predict the impact of change on a system's structure and function, and design scientifically justified structures that meet specific functions.				
Criteria	Extending	Proficient	In Progress	Beginning
Design a Model	A complex performance or application of learning that is transferred to new or novel situations beyond the content area, makes extended or abstract connections to authentic, real-world, multifaceted situations, and/or constructs entirely new ideas that are transformational.	<p>I can design a complete and accurate conceptual model representing systems or structures based on scientific evidence.</p> <p>I can explain the major components or connections and revise the model to include new information.</p> <p>Note: Models may be physical, mathematical, computer, etc.</p> <p><input type="checkbox"/> Grade 7 <input type="checkbox"/> Grade 8</p>	<p>I can design an incomplete, but accurate model based on scientific evidence.</p> <p>I can explain the major components or connections in the model.</p> <p><input type="checkbox"/> Grade 7 <input type="checkbox"/> Grade 8</p>	<p>I am acquiring the knowledge and skills necessary to create an accurate model.</p> <p><input type="checkbox"/> Grade 7 <input type="checkbox"/> Grade 8</p>
		<p>I can design a unique solution for systems or structures that meets criteria and constraints.</p> <p><input type="checkbox"/> Grade 7 <input type="checkbox"/> Grade 8</p>	<p>I can design a solution that partially meets criteria and constraints to solve a problem.</p> <p><input type="checkbox"/> Grade 7 <input type="checkbox"/> Grade 8</p>	<p>I am acquiring the knowledge and skills necessary to design a solution.</p> <p><input type="checkbox"/> Grade 7 <input type="checkbox"/> Grade 8</p>
		<p>I can analyze systems or structures in a novel situation to make a claim supported by scientifically-reliable evidence and justify it using science concepts.</p> <p>Note: Evidence can be observations, readings, models, data, etc.</p> <p><input type="checkbox"/> Grade 7 <input type="checkbox"/> Grade 8</p>	<p>I can make a claim and attempt to give evidence to justify my reasoning.</p> <p><input type="checkbox"/> Grade 7 <input type="checkbox"/> Grade 8</p>	<p>I am acquiring the knowledge and skills necessary to make claims supported with evidence.</p> <p><input type="checkbox"/> Grade 7 <input type="checkbox"/> Grade 8</p>



Science: Systems and Structures

Competency: Create models to analyze how the structures and functions of a system work together and demonstrate how a change in one part affects the whole.

Grade Level Competency: Grades 9-12

Students will create and use comprehensive models to infer and evaluate the interdependence of the structure and function of a system, predict the impact of change on a system's structure and function, and design scientifically justified structures that meet specific functions.

Criteria	Extending	Proficient	In Progress	Beginning
Design/Model	A complex performance or application of learning that is transferred to new or novel situations beyond the content area, makes extended or abstract connections to authentic, real-world, multifaceted situations, and/or constructs entirely new ideas that are transformational.	I can design comprehensive models to simulate systems in the natural or designed world, and use them to predict the behavior of the system. Note: Models may be physical, mathematical, computer, etc.	I can design models to simulate systems in the natural or designed world, and use them to predict the behavior of the system. Note: Models may be physical, mathematical, computer, etc.	I can use models to simulate systems in the natural or designed world, and use them to predict the behavior of the system. Note: Models may be physical, mathematical, computer, etc.
Analyze and Justify		I can identify and analyze collected evidence (observations, readings, models, data) to support claims about the structure, properties, and function of a system.	I can identify and analyze collected evidence (observations, readings, models, data) and use it to support claims about the structure, properties, and function of a system.	I can identify and analyze collected evidence (observations, readings, models, data) about the structure, properties, and function of a system.