

Virginia Science Standards of Learning Correlation to PhD Science®

- Green indicates that *PhD Science*® fully addresses the standard within the grade level.
- Blue indicates that *PhD Science* covers the standard but in a different grade level.
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Key: Module (M), Lesson (L)

PhD Science Level K

The Kindergarten Virginia *Science Standards of Learning* are partially covered by the *PhD Science* curriculum. A detailed analysis of alignment appears in the table below.

Kindergarten Standards		
Scientific and Engineering Practices		
K.1	The student will demonstrate an understanding of scientific and engineering practices by	
a	asking questions and defining problems	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> • ask questions based on observations 	Level K M1–3, 22–26 Level K M2 L1–3, 9 Level K M3 L1–3, 14–16, 27–29
	<ul style="list-style-type: none"> • identify a problem based on need 	Level K M1 L4–7, 12–16
	<ul style="list-style-type: none"> • make predictions based on observations 	Level K M2 L13–15 Level K M3 L4–8

b	planning and carrying out investigations	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> make observations to collect data 	Level K M1 L4–7, 10–11, 17–24, 27–30 Level K M2 L7–8, 16–23 Level K M3 L21
	<ul style="list-style-type: none"> identify characteristics and properties of objects through observations 	Level 2 M1 L1–9, 12–16, 19–31 Level 2 M2 L3–4, 14–17
	<ul style="list-style-type: none"> measure the relative length and weight of common objects 	Level K M1 L4–7, 10–11, 17–24, 27–30 Level K M2 L7–8, 16–23 Level K M3 L21
	<ul style="list-style-type: none"> record information from investigations 	Level K M1 L4–7, 22–24 Level K M2 L4–6, 21–23 Level K M3 L1–3, 9–16 Level K M4 L14–16
c	interpreting, analyzing, and evaluating data	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> describe patterns 	Level K M1 L17–30 Level K M2 L1–6, 17–20 Level K M3 L4–8, 14–20, 22, 26–29 Level K M4 L3–5
	<ul style="list-style-type: none"> classify and/or sequence objects based on a single physical characteristic or property 	Level 2 M1 L1–9, 12–16, 19–31 Level 2 M2 L3–4, 14–17
	<ul style="list-style-type: none"> organize and represent data 	Level K M1 L4–7, 22–24 Level K M2 L4–8, 21–23 Level K M3 L1–3, 9–16 Level K M4 L1–2, 6–7, 10, 14–17, 20–24, 26–28
	<ul style="list-style-type: none"> read and interpret data in object graphs, picture graphs, and tables 	Level 2 M1 L20–22 Level 2 M3 L8–11, 23–29 Level 2 M4 L17–19
d	constructing and critiquing conclusions and explanations	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> make simple conclusions based on data or observations 	Level K M3 L4–16, 23–29

e	developing and using models	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> distinguish between a model and an actual object 	Level K M1 L1–2, 12–16 Level K M2 L1–3, 10–12
f	obtaining, evaluating, and communicating information	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> communicate comparative measures (e.g., heavier, lighter, longer, shorter, more, less, hotter, colder) 	Level K M3 L1–3, 9–12, 19–20 Level K M4 L1–9, 11–16
	<ul style="list-style-type: none"> communicate observations using pictures, drawings, and/or speech 	Level K M1 L12–16, 28–30 Level K M2 L21–23 Level K M3 L27–29 Level K M4 L20–24, 26–28
Force, Motion, and Energy		
K.2	The student will investigate and understand that pushes and pulls affect the motion of objects. Key ideas include	Aligned PhD Science Lessons
a	pushes and pulls can cause an object to move;	Level K M2 L7–23
b	pushes and pulls can change the direction of an object; and	Level K M2 L1–23
c	changes in motion are related to the strength of the push or pull.	Level K M2 L7–9, 21–23

Matter		
K.3	The student will investigate and understand that physical properties of an object can be described. Properties include	Aligned PhD Science Lessons
a	colors;	Level 2 M1 L4–7
b	shapes and forms;	Level 2 M1 L1–7
c	textures and feel; and	Level 2 M1 L1–7
d	relative sizes and weights of objects.	Level 2 M1 L1–7
K.4	The student will investigate and understand that water is important in our daily lives and has properties. Key ideas include	Aligned PhD Science Lessons
a	water has many uses;	Level K M3 L1–29
b	water can be found in many places;	Level 2 M4 L1–6, 16, 22–25
c	water occurs in different phases; and	Level 2 M4 L1–6, 16, 22–25
d	water flows downhill.	
Living Systems and Processes		
K.5	The students will investigate and understand that senses allow humans to seek, find, take in, and react or respond to different information. Key ideas include	Aligned PhD Science Lessons
a	the five basic senses correspond to specific human body structures; and	Level 2 M1 L1–7, 17–18
b	senses are used in our daily lives.	Level 2 M1 L1–7, 17–18
K.6	The student will investigate and understand that there are differences between living organisms and nonliving objects. Key ideas include	Aligned PhD Science Lessons
a	all things can be classified as living or nonliving; and	Level 2 M4 L1–6
b	living organisms have certain characteristics that distinguish them from nonliving objects.	Level 2 M4 L1–10
K.7	The student will investigate and understand that plants and animals have basic needs and life processes. Key ideas include	Aligned PhD Science Lessons
a	living things need adequate food, water, shelter, air, and space to survive;	Level K M3 L1–3, 9–29 Level K M4 L1–5, 8–9, 11–16
b	plants and animals have life cycles; and	Level 3 M2 L16–19
c	offspring of plants and animals are similar but not identical to their parents or to one another.	Level 1 M1 L22–23, 26–29

Earth and Space Systems		
K.8	The student will investigate and understand that light influences temperature on Earth’s surfaces and can cause shadows. Key ideas include	Aligned PhD Science Lessons
a	the sun provides light and warms Earth’s surface;	Level K M1 L8–11, 28–30
b	shadows can be produced when sunlight or artificial light is blocked by an object; and	Level 1 M2 L1–12
c	objects in shadows and objects in sunlight have different temperatures.	Level K M1 L8–9, 12–16
K.9	The student will investigate and understand that there are patterns in nature. Key patterns include	Aligned PhD Science Lessons
a	daily weather;	Level K M1 L17–20
b	seasonal changes; and	Level K M1 L17–21
c	day and night.	Level 1 M4 L9–13, 23–25
K.10	The student will investigate and understand that change occurs over time. Key ideas include	Aligned PhD Science Lessons
a	natural and human-made things change over time;	Level K M1 L8–9, 17–21
b	living and nonliving things change over time;	Level K M1 L8–9, 17–21
c	changes can be observed and measured; and	Level K M1 L8–9, 17–21
d	changes may be fast or slow.	Level K M4 L14–16
Earth Resources		
K.11	The student will investigate and understand that humans use resources. Key ideas include	Aligned PhD Science Lessons
a	some materials and objects can be used over and over again;	Level K M4 L18–24 Level 1 M3 L1–6, 8–9
b	materials can be recycled; and	Level K M4 L18–24 Level 1 M3 L1–6, 8–9
c	choices we make impact the air, water, land and living things.	Level K M4 L11–24, 26–28

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Key: Module (M), Lesson (L)

PhD Science Level 1

The Grade 1 Virginia *Science Standards of Learning* are covered by the *PhD Science* curriculum. A detailed analysis of alignment appears in the table below.

Grade 1 Standards		
Scientific and Engineering Practices		
1.1	The student will demonstrate an understanding of scientific and engineering practices by	
a	asking questions and defining problems	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> • ask questions and make predictions based on observations 	Level 1 M1 L1–3 Level 1 M2 L1–3 Level 1 M3 L1–3, 11–13, 15–17, 26–29 Level 1 M4 L1–3, 14–16
	<ul style="list-style-type: none"> • identify a simple problem that can be solved through the development of a new tool or improved object 	Level 1 M1 L11–15

b	planning and carrying out investigations	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> with guidance, conduct investigations to produce data 	Level 1 M1 L19–20 Level 1 M2 L15–18
	<ul style="list-style-type: none"> identify characteristics and properties of objects by observations 	Level 2 M1 L1–16, 19, 23, 29–31 Level 2 M2 L3–4, 14–17
	<ul style="list-style-type: none"> use tools to measure relative length, weight, volume, and temperature of common objects 	Level 2 M1 L20–22 Level 2 M3 L8–11, 23–29 Level 2 M4 L17–19
c	interpreting, analyzing, and evaluating data	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> use and share pictures, drawings, and/or writings of observations 	Level K M2 L7–8 Level K M4 L1–2, 6–7, 10, 14–17, 20–24, 26–28
	<ul style="list-style-type: none"> describe patterns and relationships 	Level 1 M1 L16–21, 27–29 Level 1 M2 L1–9 Level 1 M3 L10 Level 1 M4 L4–6, 9–13
	<ul style="list-style-type: none"> classify and arrange objects based on a single physical characteristic or property 	Level 2 M1 L1–16, 19, 23, 29–31 Level 2 M2 L3–4, 14–17
	<ul style="list-style-type: none"> organize and represent various forms of data using tables, picture graphs, and object graphs 	Level 2 M1 L20–22 Level 2 M3 L8–11, 23–29 Level 2 M4 L17–19
	<ul style="list-style-type: none"> read and interpret data displayed in tables, picture graphs, and object graphs, using the vocabulary <i>more, less, fewer, greater than, less than, and equal to</i> 	Level 1 M1 L24–25 Level 1 M3 L18–19 Level 1 M4 L9–13
d	constructing and critiquing conclusions and explanations	Aligned PhD Science Lessons
	<ul style="list-style-type: none"> make simple conclusions based on data or observations 	Level 1 M4 L9–13, 19–21
	<ul style="list-style-type: none"> recognize unusual or unexpected results 	Level K M4 L14–16

e	developing and using models		Aligned PhD Science Lessons
	<ul style="list-style-type: none"> use physical models to demonstrate simple phenomena and natural processes 		Level 1 M1 L1–8 Level 1 M2 L1–7, 10–23 Level 1 M3 L7, 11–13 Level 1 M4 L1–3, 7–8
f	obtaining, evaluating, and communicating information		Aligned PhD Science Lessons
	<ul style="list-style-type: none"> communicate observations and data using simple graphs, pictures, drawings, numbers, speech and/or writing 		Level 1 M1 L27–29 Level 1 M2 L21–23 Level 1 M3 L26–29 Level 1 M4 L23–25
Force, Motion, and Energy			
1.2	The student will investigate and understand that objects can move in different ways. Key ideas include		Aligned PhD Science Lessons
a	objects may have straight, circular, spinning, and back-and-forth motions; and		Level 3 M1 L1–9
b	objects may vibrate and produce sound.		Level 1 M3 L1–17, 26–29
Matter			
1.3	The student will investigate and understand that objects are made from materials that can be described by their physical properties. Key ideas include		Aligned PhD Science Lessons
a	objects are made of one or more materials with different physical properties and can be used for a variety of purposes;		Level 2 M1 L1–3, 10–13
b	when a material is changed in size most physical properties remain the same; and		Level 2 M1 L1–3, 10–13
c	the type and amount of material determine how much light can pass through an object.		Level 1 M2 L1–3, 10–23

Living Systems and Processes		
1.4	The student will investigate and understand that plants have basic life needs and functional parts that allow them to survive. Key ideas include	Aligned PhD Science Lessons
a	plants need nutrients, air, water, light, and a place to grow;	Level 2 M3 L1–7, 25–29
b	structures of plants perform specific functions; and	Level 1 M1 L7–8
c	plants can be classified based on a variety of characteristics.	Level 1 M1 L7–8, 22–23, 27–29
1.5	The student will investigate and understand that animals, including humans, have basic life needs that allow them to survive. Key ideas include	Aligned PhD Science Lessons
a	animals need air, food, water, shelter, and space (habitat);	Level 1 M1 L16–17
b	animals have different physical characteristics that perform specific functions; and	Level 1 M1 L4–6, 22–23, 27–29
c	animals can be classified based on a variety of characteristics.	Level 1 M1 L4–6, 22–23, 27–29
Earth and Space Systems		
1.6	The student will investigate and understand that there is a relationship between the sun and Earth. Key ideas include	Aligned PhD Science Lessons
a	the sun is the source of energy and light that warms the Earth’s land, air, and water; and	Level K M1 L8–9
b	the sun’s relative position changes in the Earth’s sky throughout the day.	Level 1 M4 L4–8
1.7	The student will investigate and understand that there are weather and seasonal changes. Key ideas include	Aligned PhD Science Lessons
a	changes in temperature, light, and precipitation occur over time;	Level K M1 L17–21, 25–26 Level 3 M1 L4–7, 11–12
b	there are relationships between daily weather and the season; and	Level 3 M1 L8–12
c	changes in temperature, light, and precipitation affect plants and animals, including humans.	Level 1 M4 L9–13 Level 2 M3 L3–7
Earth Resources		
1.8	The student will investigate and understand that natural resources can be used responsibly. Key ideas include	Aligned PhD Science Lessons
a	most natural resources are limited;	Level 4 M1 L21–24
b	human actions can affect the availability of natural resources; and	Level 4 M1 L21–24
c	reducing, reusing, and recycling are ways to conserve natural resources.	Level 4 M1 L21–24

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PhD Science Level 2

The Grade 2 Virginia *Science Standards of Learning* are almost entirely covered by the *PhD Science* curriculum. A detailed analysis of alignment appears in the table below.

Grade 2 Standards		
Scientific and Engineering Practices		
2.1	The student will demonstrate an understanding of scientific and engineering practices by	
a	asking questions and defining problems	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> • ask questions that can be investigated 	Level 2 M3 L3–6
	<ul style="list-style-type: none"> • make predictions based on observations and prior experiences 	Level 2 M1 L17–18
	<ul style="list-style-type: none"> • identify a simple problem that can be solved through the development of a new tool or improved object 	Level 2 M3 L14–18

b	planning and carrying out investigations	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> with guidance, plan and conduct simple investigations to produce data 	Level 2 M2 L8–12 Level 2 M3 L3–7 Level 2 M4 L17–19
	<ul style="list-style-type: none"> use appropriate tools to measure length, weight, and temperature of common objects using U.S. Customary units 	Level 2 M1 L3, 20–22 Level 2 M3 L8–11, 23–29 Level 2 M4 L17–19
	<ul style="list-style-type: none"> measure time intervals using proper tools 	Level 4 M2 L6–7
c	interpreting, analyzing, and evaluating data	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> organize and represent data in pictographs and bar graphs 	Level 2 M1 L20–22 Level 2 M3 L8–11, 23–29 Level 2 M4 L17–19
	<ul style="list-style-type: none"> read and interpret data represented in pictographs and bar graphs 	Level 2 M2 L1–2, 14–17
d	constructing and critiquing conclusions and explanations	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> make simple conclusions based on data or observations 	Level 2 M2 L3–4, 10–13, 21–24 Level 2 M4 L16
	<ul style="list-style-type: none"> distinguish between opinion and evidence 	Level K M3 L17–18 Level 1 M4 L9–13
	<ul style="list-style-type: none"> recognize unusual or unexpected results 	Level K M4 L14–16 Level 1 M3 L11–13, 15–16, 26–29
e	developing and using models	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> use models to demonstrate simple phenomena and natural processes 	Level 2 M1 L1–3, 14–16, 19, 29–31 Level 2 M2 L1–2, 14–17, 20–24 Level 2 M3 L1–6, 8–12, 19–20, 23–29 Level 2 M4 L1–3, 7–8
f	obtaining, evaluating, and communicating information	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> communicate observations and data using simple graphs, drawings, numbers, speech, and/or writing 	Level 2 M1 L29–31 Level 2 M2 L22–24 Level 2 M3 L8–12, 14–20, 25–29 Level 2 M4 L23–25

Force, Motion, and Energy		
2.2	The student will investigate and understand that different types of forces may cause an object’s motion to change. Key ideas include	Aligned PhD Science Lessons
a	forces from direct contact can cause an object to move;	Level 3 M4 L7–11
b	some forces, including gravity and magnetism, can cause objects to move from a distance; and	Level 3 M4 L12–14, 19–22
c	forces have applications in our lives.	Level 3 M4 L22–27
Matter		
2.3	The student will investigate and understand that matter can exist in different phases. Key ideas include	Aligned PhD Science Lessons
a	matter has mass and takes up space;	Level 2 M1 L8–9
b	solids, liquids, and gases have different characteristics; and	Level 2 M1 L4–7
c	heating and cooling can change the phases of matter.	Level 2 M1 L14–19
Living Systems and Processes		
2.4	The student will investigate and understand that plants and animals undergo a series of orderly changes as they grow and develop. Key ideas include	Aligned PhD Science Lessons
a	animals have life cycles; and	Level 3 M2 L16–19
b	plants have life cycles.	Level 2 M3 L1–7
2.5	The student will investigate and understand that living things are part of a system. Key ideas include	Aligned PhD Science Lessons
a	plants and animals are interdependent with their living and nonliving surroundings;	Level 2 M4 L1–6, 11–13
b	an animal’s habitat provides all of its basic needs; and	Level 2 M4 L1–10, 16, 23–25
c	habitats change over time due to many influences.	Level 2 M4 L1–3, 7–25
Earth and Space Systems		
2.6	The student will investigate and understand that there are different types of weather on Earth. Key ideas include	Aligned PhD Science Lessons
a	different types of weather have specific characteristics;	Level 3 M1 L1–7
b	measuring, recording, and interpreting weather data allows for identification of weather patterns; and	Level 3 M1 L8–17, 19–20
c	tracking weather allows us to prepare for the weather and storms.	Level 3 M1 L8–17, 19–20

2.7	The student will investigate and understand that weather patterns and seasonal changes affect plants, animals, and their surroundings. Key ideas include	Aligned <i>PhD Science</i> Lessons
a	weather and seasonal changes affect the growth and behavior of living things;	Level 1 M4 L9–13
b	wind and weather can change the land; and	Level 2 M2 L1–17, 20, 22–24
c	changes can happen quickly or slowly over time.	Level 2 M2 L18–24
Earth Resources		
2.8	The student will investigate and understand that plants are important natural resources. Key ideas include	Aligned <i>PhD Science</i> Lessons
a	the availability of plant products affects the development of a geographic area;	Level 2 M4 L1–3, 7–25
b	plants provide oxygen, homes, and food for many animals; and	Level 2 M4 L1–3, 7–25
c	plants can help reduce the impact of wind and water.	Level 2 M2 L14–17