

## South Dakota Science Standards Correlation to *PhD Science*®

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**Key:** Module (M), Lesson(L)

### *PhD Science* Level K

The Kindergarten South Dakota Science Standards are covered by the Level K *PhD Science* curriculum. A detailed analysis of alignment appears in the table below.

Kindergarten Physical Science Standards		Aligned <i>PhD Science</i> Lessons
K-PS2-1	Plan and carry out an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.	Level K M2 L1–23
K-PS2-2	Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.	Level K M2 L17–23
K-PS3-1	Make observations to determine the effect of sunlight on Earth’s surface.	Level K M1 L8–11, 28–30
K-PS3-2	Design and build a structure that will reduce the warming effect of sunlight on an area.	Level K M1 L12–16, 28–30
Kindergarten Life Science Standards		Aligned <i>PhD Science</i> Lessons
K-LS1-1	Describe patterns of what plants and animals (including humans) need to survive	Level K M3 L4–16, 19–22, 27–29

<b>Kindergarten Earth and Space Science Standards</b>		<b>Aligned <i>PhD Science</i> Lessons</b>
K-ESS2-1	Use and share observations of local weather conditions to describe patterns over time.	Level K M1 L1–11, 17–24, 28–30 Level K M4 L25
K-ESS2-2	Engage in argument from evidence for how plants and animals (including humans) can change the environment to meet their needs.	Level K M4 L1–10, 14–16, 26–28
K-ESS3-1	Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.	Level K M3 L1–3, 9–29 Level K M4 L1–2, 8–9, 11–13
K-ESS3-2	Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.	Level K M1 L22–30
K-ESS3-3	Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.	Level K M4 L14–24, 26–28
<b>K–2 Engineering Design Standards</b>		<b>Aligned <i>PhD Science</i> Lessons</b>
K–2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	Level K M1 L12–16
K–2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	Level K M2 L17–20
K–2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	Level K M4 L20–24


Science and Engineering Practices		Aligned <i>PhD Science</i> Lessons
1	Asking Questions and Defining Problems	Level K M1 L1–9, 12–16, 22–26 Level K M2 L1–3, 9 Level K M3 L1–8, 14–16, 22, 27–29
2	Developing and Using Models	Level K M1 L1–2, 12–16 Level K M2 L1–3, 10–12 Level K M3 L1–3, 9–12, 19–20 Level K M4 L1–9, 11–16
3	Planning and Carrying Out Investigations	Level K M1 L4–7, 10–24, 27–30 Level K M2 L7–8, 10–23 Level K M3 L4–8, 21 Level K M4 L3–5
4	Analyzing and Interpreting Data	Level K M1 L4–7, 22–24 Level K M2 L4–8, 21–23 Level K M3 L1–20, 22–26 Level K M4 L1–2, 6–7, 10, 14–17, 20–28
6	Constructing Explanations and Designing Solutions	Level K M2 L17–20 Level K M3 L4–16, 23–29
7	Engaging in Argument from Evidence	Level K M3 L17–21, 27–29 Level K M4 L3–5, 11–13, 25
8	Obtaining, Evaluating, and Communicating Information	Level K M1 L12–16, 28–30 Level K M2 L21–23 Level K M3 L23–29 Level K M4 L1–2, 6–10, 14–16, 18–24, 26–28


Disciplinary Core Ideas		
<b>Physical Science</b>		
PS2.A PS2.B PS3.B PS3.C	<b>Forces and Motion</b> <b>Types of Interactions</b> <b>Conservation of Energy and Energy Transfer</b> <b>Relationship Between Energy and Forces</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
	Pushes and pulls can have different strengths and directions, and can change the speed or direction of motion or start or stop. Bigger pushes and pulls cause bigger changes in an object's motion or shape. Sunlight warms Earth's surface.	Level K M1 L8–16, 28–30 Level K M2 L1–23
<b>Life Science</b>		
LS1.C	<b>Organization for Matter and Energy Flow in Organisms</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
	Plants and animals (including humans) need food and water in order to grow.	Level K M3 L4–8, 13–20, 22, 27–29
<b>Earth and Space Science</b>		
ESS2.D ESS2.E ESS3.A ESS3.B ESS3.C	<b>Weather and Climate</b> <b>Biogeology</b> <b>Natural Resources</b> <b>Natural Hazards</b> <b>Human Impacts on Earth Systems</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
	There are patterns and variations in local weather. Plants and animals can change their local environment. Plants and animals (including humans) need to survive, and there is a relationship between their needs and where they live. The purpose of weather forecasting is to prepare for and to respond to severe weather. Things people do can affect the environment, but they can make choices to reduce their impact.	Level K M1 L1–11, 17–30 Level K M3 L1–3, 9–22 Level K M4 L1–28

Engineering, Technology, and Applications of Science		
<b>ETS1.A</b>	<b>Defining and Delimiting Engineering Problems</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
<b>ETS1.B</b>	<b>Developing Possible Solutions</b>	
<b>ETS1.C</b>	<b>Optimizing the Design Solution</b>	
	Engineering design in the earliest grades introduces students to “problems” as situations that people want to change. They can use tools and materials to solve simple problems, use different representations to convey solutions, and compare different solutions to a problem and determine which is best. Students in all [K–2] grade levels are not expected to come up with original solutions, although original solutions are always welcome. Emphasis is on thinking through the needs or goals that need to be met and which solutions best meet those needs and goals.	Level 1 M1 L11–15 Level 1 M3 L21–25

Crosscutting Concepts		Aligned <i>PhD Science</i> Lessons
<b>Patterns</b>		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
<b>Cause and Effect</b>		Level K M2 L4–23 Level K M4 L3–5, 10, 14–19, 26–28
<b>Systems and System Models</b>		Level K M3 L1–3, 9–13, 19–21, 23–25, 27–29 Level K M4 L1–9, 11–16

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**Key:** Module (M), Lesson(L)

### *PhD Science* Level 1

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

First Grade Physical Science Standards		Aligned <i>PhD Science</i> Lessons
1-PS4-1	Plan and carry out an investigation to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.	Level 1 M3 L1–17, 26–29
1-PS4-2	Construct an evidence-based account for how objects can be seen only when illuminated.	Level 1 M2 L1–9, 21–23
1-PS4-3	Plan and carry out an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.	Level 1 M2 L1–3, 10–23
1-PS4-4	Design and build a device that uses light or sound to solve the problem of communicating over a distance.	Level 1 M3 L18–29

<b>First Grade Life Science Standards</b>		<b>Aligned <i>PhD Science</i> Lessons</b>
1-LS1-1	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.	Level 1 M1 L1–21, 27–29
1-LS1-2	Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.	Level 1 M1 L24–29
1-LS3-1	Construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.	Level 1 M1 L22–23, 26–29
<b>First Grade Earth and Space Science Standards</b>		<b>Aligned <i>PhD Science</i> Lessons</b>
1-ESS1-1	Use observations of the sun, moon, and stars to describe patterns that can be predicted.	Level 1 M4 L1–8, 14–25
1-ESS1-2	Make observations at different times of the year to relate the amount of daylight to the time of year.	Level 1 M4 L9–13, 23–25
<b>K–2 Engineering Design Standards</b>		<b>Aligned <i>PhD Science</i> Lessons</b>
K–2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	Level 1 M1 L11–15
K–2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	Level 1 M3 L21–25
K–2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	Level 1 M3 L21–25

Science and Engineering Practices		Aligned <i>PhD Science</i> Lessons
3	Planning and Carrying Out Investigations	Level 1 M1 L19–20 Level 1 M2 L4–12, 15–18, 20–23 Level 1 M3 L1–9, 11–13, 15–29 Level 1 M4 L1–6, 14–16, 19–21
4	Analyzing and Interpreting Data	Level 1 M1 L10, 16–21, 27–29 Level 1 M2 L1–9 Level 1 M3 L8–13, 15–16, 26–29 Level 1 M4 L4–6, L9–13
6	Constructing Explanations and Designing Solutions	Level 1 M1 L7–8, 11–17, 22–23, 26–29 Level 1 M2 L4–7, 21–23 Level 1 M3 L4–6, 14, 21–29
8	Obtaining, Evaluating, and Communicating Information	Level 1 M1 L24–25, 27–29 Level 1 M2 L21–23 Level 1 M3 L18–19, 26–29 Level 1 M4 L9–18, 23–25




Disciplinary Core Ideas		
<b>Physical Science</b>		
PS4.A PS4.B PS4.C	<b>Wave Properties</b> <b>Electromagnetic Radiation</b> <b>Information Technologies and Instrumentation</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
	Sound can make matter vibrate, and vibrating matter can make sound. Objects can be seen only when light is available to illuminate them. People use devices to send and receive information.	Level 1 M2 L1–23 Level 1 M3 L1–29
<b>Life Science</b>		
LS1.A LS1.B LS1.D LS3.A LS3.B	<b>Structure and Function</b> <b>Growth and Development of Organisms</b> <b>Information Processing</b> <b>Inheritance of Traits</b> <b>Variation of Traits</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
	Plants and animals use their external parts to help them survive, grow, and meet their needs. Behaviors of parents and offspring help the offspring survive. Animals sense and communicate information and respond to inputs with behaviors that help them grow and survive. Young plants and animals are similar to their parents.	Level 1 M1 L1–29


Earth and Space Science		
ESS1.A	<b>The Universe and Its Stars</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
ESS1.B	<b>Earth and the Solar System</b>	
	Patterns of movements of the sun, moon, and stars, as seen from Earth, can be observed, described, and predicted.	Level 1 M4 L1–25
Engineering, Technology, and Applications of Science		
ETS1.A	<b>Defining and Delimiting Engineering Problems</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
ETS1.B	<b>Developing Possible Solutions</b>	
ETS1.C	<b>Optimizing the Design Solution</b>	
	Engineering design in the earliest grades introduces students to “problems” as situations that people want to change. They can use tools and materials to solve simple problems, use different representations to convey solutions, and compare different solutions to a problem and determine which is best. Students in all [K–2] grade levels are not expected to come up with original solutions, although original solutions are always welcome. Emphasis is on thinking through the needs or goals that need to be met and which solutions best meet those needs and goals.	Level 1 M1 L11–15 Level 1 M3 L21–25


<b>Crosscutting Concepts</b>		<b>Aligned <i>PhD Science</i> Lessons</b>
<b>Patterns</b>		Level 1 M1 L1–6, 16–29 Level 1 M2 L1–9, 21–23 Level 1 M3 L1–7, 11–13, 17–20, 26–29 Level 1 M4 L1–25
<b>Cause and Effect</b>		Level 1 M2 L1–7, 10–23 Level 1 M3 L4–7, 14–17, 26–29 Level 1 M4 L4–6, 9–13, 17–21, 23–25
<b>Structure and Function</b>		Level 1 M1 L4–15, 27–29 Level 1 M3 L8–9

<b>Connections to Engineering, Technology, and Applications of Science</b>		
<b>Influence of Engineering, Technology, and Science on Society and the Natural World</b>		<b>Aligned <i>PhD Science</i> Lessons</b>
Every human-made product is designed by applying some knowledge of the natural world and is built using natural materials.		Level 1 M1 L10–15
People depend on various technologies in their lives; human life would be very different without technology.		Level 1 M3 L20

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### *PhD Science* Level 2

The Grade 2 South Dakota Science Standards are covered by the Level 2 *PhD Science* curriculum. A detailed analysis of alignment appears in the table below.

Second Grade Physical Science Standards		Aligned <i>PhD Science</i> Lessons
2-PS1-1	Plan and carry out an investigation to describe and classify different kinds of materials by their observable properties.	 Level 2 M1 L1–9, 12–16, 19, 23, 29–31 Level 2 M2 L3–4, 14–17
2-PS1-2	Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.	 Level 2 M1 L20–31
2-PS1-3	Construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.	 Level 2 M1 L10–11, 29–31
2-PS1-4	Construct an argument using reasoning and evidence that some changes caused by heating or cooling can be reversed and some cannot.	 Level 2 M1 L14–19, 29–31

<b>Second Grade Life Science Standards</b>		<b>Aligned PhD Science Lessons</b>
2-LS2-1	Plan and carry out an investigation to determine if plants need sunlight and water to grow.	Level 2 M3 L1–7, 25–29
2-LS2-2	Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.	Level 2 M3 L8–29
2-LS4-1	Make observations of plants and animals to compare the diversity of life in different habitats.	Level 2 M4 L1–3, 7–25
<b>Second Grade Earth and Space Science Standards</b>		<b>Aligned PhD Science Lessons</b>
2-ESS1-1	Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	Level 2 M2 L18–24
2-ESS2-1	Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.	Level 2 M2 L1–17, 20, 22–24
2-ESS2-2	Develop a model to represent the shapes and kinds of land and bodies of water in an area.	Level 2 M2 L1–2, 5–6 Level 2 M4 L1–6, 11–16, 20–21, 23–25
2-ESS2-3	Obtain information to identify where water is found on Earth and that it can be solid or liquid.	Level 2 M4 L1–6, 16, 22–25
<b>K–2 Engineering Design Standards</b>		<b>Aligned PhD Science Lessons</b>
K–2-ETS1-1	Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.	Level 2 M1 L24–28 Level 2 M2 L8–12
K–2-ETS1-2	Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.	Level 2 M3 L14–18
K–2-ETS1-3	Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	Level 2 M2 L8–12, 14–17

Science and Engineering Practices		Aligned <i>PhD Science</i> Lessons
2	Developing and Using Models	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, 14–20, 23–29 Level 2 M4 L1–8, 20–21, 23–25
3	Planning and Carrying Out Investigations	Level 2 M1 L1–3, 17–18, 20–22, 24–31 Level 2 M2 L1–6, 8–12, 14–19, 22–24 Level 2 M3 L3–11, 13, 21–22, 25–29 Level 2 M4 L16–19
4	Analyzing and Interpreting Data	Level 2 M1 L4–11, 14–18, 20–22, 24–28 Level 2 M2 L5–6, 8–9 Level 2 M3 L14–20 Level 2 M4 L22–25
6	Constructing Explanations and Designing Solutions	Level 2 M1 L8–9, 12–13, 17–19, 23–31 Level 2 M2 L3–4, 7–17, 22–24 Level 2 M4 L23–25
7	Engaging in Argument from Evidence	Level 2 M2 L3–4, 10–13, 20–24 Level 2 M3 L14–18, 21–22 Level 2 M4 L4–6, 9–13, 16, 20–21, 23–25
8	Obtaining, Evaluating, and Communicating Information	Level 2 M1 L29–31 Level 2 M2 L1–2, 5–6, 14–19, 22–24 Level 2 M3 L8–12, 14–20, 25–29 Level 2 M4 L4–9, 11–16, 23–25

Disciplinary Core Ideas		
<b>Physical Science</b>		
<b>PS1.A</b> <b>PS1.B</b>	<b>Structure and Properties of Matter</b> <b>Chemical Reactions</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
	Matter exists as different substances that have observably different properties. Different properties are suited to different purposes. Objects can be built up from smaller parts. Heating and cooling substances cause changes that are sometimes reversible and sometimes not.	Level 2 M1 L1–31 Level 2 M2 L3–4, 14–17
<b>Life Science</b>		
<b>LS2.A</b> <b>LS4.D</b>	<b>Interdependent Relationships in Ecosystems</b> <b>Biodiversity and Humans</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
	Plants depend on water and light to grow and also depend on animals for pollination or to move their seeds around. A range of different organisms live in different places.	Level 2 M3 L1–29 Level 2 M4 L1–3, 7–25
<b>Earth and Space Science</b>		
<b>ESS1.C</b> <b>ESS2.A</b> <b>ESS2.B</b> <b>ESS2.C</b>	<b>The History of Planet Earth</b> <b>Earth Materials and Systems</b> <b>Plate Tectonics and Large-Scale System Interactions</b> <b>The Roles of Water in Earth’s Surface Processes</b>	<b>Aligned <i>PhD Science</i> Lessons</b>
	Some events on Earth occur very quickly; others can occur very slowly. Wind and water change the shape of the land. Maps show where things are located. The shapes and kinds of land and water in any area can be mapped. Water is found in many types of places and in different forms on Earth.	Level 2 M2 L1–24 Level 2 M4 L1–6, 11–16, 20–25

Engineering, Technology, and Applications of Science		
ETS1.A ETS1.B ETS1.C	Defining and Delimiting Engineering Problems Developing Possible Solutions Optimizing the Design Solution	Aligned <i>PhD Science</i> Lessons
	Engineering design in the earliest grades introduces students to “problems” as situations that people want to change. They can use tools and materials to solve simple problems, use different representations to convey solutions, and compare different solutions to a problem and determine which is best. Students in all [K–2] grade levels are not expected to come up with original solutions, although original solutions are always welcome. Emphasis is on thinking through the needs or goals that need to be met and which solutions best meet those needs and goals.	Level 1 M1 L11–15 Level 1 M3 L21–25

Crosscutting Concepts		Aligned <i>PhD Science</i> Lessons
Patterns		Level 2 M1 L4–9 Level 2 M2 L1–2, 5–6 Level 2 M4 L1–8, 11–15, 20–21, 23–25
Cause and Effect		Level 2 M1 L14–19, 29–31 Level 2 M2 L8–12, 20–21 Level 2 M3 L3–11
Energy and Matter		Level 2 M1 L10–11, 29–31 Level 2 M2 L3–4, 8–13, 22–24
Structure and Function		Level 2 M1 L24–28 Level 2 M2 L14–17 Level 2 M3 L8–11, 14–22
Stability and Change		Level 2 M2 L1–2, 18–24 Level 2 M3 L1–2, 25–29



Connections to Engineering, Technology, and Applications of Science	
Influence of Engineering, Technology, and Science on Society and the Natural World	Aligned <i>PhD Science</i> Lessons
Developing and using technology has impacts on the natural world.	Level 2 M2 L8–9