



North Dakota Science Content Standards 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.

 Yellow indicates that *PhD Science* partially covers the standard within the grade level.

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Key: Module (M), Lesson (L)

PhD Science Level K

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

Kindergarten Performance Standards		
Physical Science (PS)		
Motion and Stability: Forces and Interactions		Aligned <i>PhD Science</i> Lessons
K-PS2-1	Conduct 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
Energy		Aligned <i>PhD Science</i> Lessons
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	Use tools and materials provided to design and build a structure that will reduce the warming effect of sunlight on Earth’s surface.	Level K M1 L12–16, 28–30

Life Science (LS)		
From Molecules to Organisms: Structures and Processes		
K-LS1-1	Describe patterns, through observation, of what plants and animals (including humans) need to survive.	Level K M3 L4–16, 19–22, 27–29
Earth and Space Science (ESS)		
Earth's Systems		Aligned <i>PhD Science</i> Lessons
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	Construct an argument supported by evidence for how plants and animals (including humans) can change their environment to meet their needs.	Level K M4 L1–10, 14–16, 26–28
Earth and Human Activity		Aligned <i>PhD Science</i> Lessons
K-ESS3-1	Represent the relationship between the needs of different plants and animals (including humans) and the places they live using a model.	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 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
Engineering & Technology (ET)		Aligned <i>PhD Science</i> Lessons
K–2-ET1-1	Ask questions, make observations, and gather information to define a simple problem (a situation people want to change) that can be solved through the development of a new or improved object or tool.	Level K M1 L12–16
K–2-ET1-2	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-ET1-3	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		
1	Asking Questions and Defining Problems	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Ask questions based on observations to find more information about the natural and/or designed world(s). 	Level K M1 L1–3, 22–26 Level K M2 L1–3, 9 Level K M3 L1–3, 14–16, 27–29
	<ul style="list-style-type: none"> Define a simple problem that can be solved through the development of a new or improved object or tool. 	Level K M1 L4–7, 12–16
2	Developing and Using Models	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Use a model to represent relationships in the natural world. 	Level K M3 L1–3, 9–12, 19–20 Level K M4 L1–9, 11–16
	<ul style="list-style-type: none"> Develop a simple model based on evidence to represent a proposed object or tool. 	Level K M1 L12–16
3	Planning and Carrying Out Investigations	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> With guidance, plan and investigate in collaboration with peers. 	Level K M2 L7–8, 10–15 Level K M3 L4–8
	<ul style="list-style-type: none"> Make observations (firsthand or from media) to collect data that can be used to make comparisons. 	Level K M1 L4–7, 10–11, 17–24, 27–30 Level K M2 L7–8, 16–23 Level K M3 L21
4	Analyzing and Interpreting Data	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. 	Level K M3 L4–8, 14–20, 22–26 Level K M4 L25
	<ul style="list-style-type: none"> Analyze data from tests of an object or tool to determine if it works as intended. 	Level K M4 L20–24
6	Constructing Explanations and Designing Solutions	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Use tools and materials provided to design and build a device that solves a specific problem or identifies a solution to a specific problem. 	Level K M2 L17–20


7	Engaging in Argument from Evidence	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Construct an argument with evidence to support a claim. 	Level K M3 L17–21, 27–29
8	Obtaining, Evaluating, and Communicating Information	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. 	Level K M4 L1–2, 6–10, 14–16, 18–19
	<ul style="list-style-type: none"> Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. 	Level K M1 L12–16, 28–30 Level K M2 L21–23 Level K M3 L27–29 Level K M4 L20–24, 26–28


Disciplinary Core Ideas		
PS2.A	Forces and Motion	Aligned <i>PhD Science</i> Lessons
	Pushes and pulls can have different strengths and directions.	Level K M2 L7–23
	Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.	Level K M2 L1–23
PS2.B	Types of Interactions	Aligned <i>PhD Science</i> Lessons
	When objects touch or collide, they push on one another and can change motion.	Level K M2 L13–23
PS3.B	Conservation of Energy and Energy Transfer	Aligned <i>PhD Science</i> Lessons
	Sunlight warms Earth’s surface.	Level K M1 L8–16, 28–30
PS3.C	Relationship Between Energy and Forces	Aligned <i>PhD Science</i> Lessons
	A bigger push or pull makes things speed up or slow down more quickly.	Level K M2 L7–9, 21–23
LS1.C	Organization for Matter and Energy Flow in Organisms	Aligned <i>PhD Science</i> Lessons
	All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.	Level K M3 L4–16, 19–20, 22, 27–29
ESS2.D	Weather and Climate	Aligned <i>PhD Science</i> Lessons
	Weather is the combination of sunlight, wind, precipitation, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.	Level K M1 L1–11, 17–24, 28–30 Level K M4 L25

ESS2.E	Biogeology	Aligned <i>PhD Science</i> Lessons
	Plants and animals can change their environment.	Level K M4 L1–10, 14–16, 26–28
ESS3.A	Natural Resources	Aligned <i>PhD Science</i> Lessons
	Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.	Level K M3 L1–3, 9–29 Level K M4 L1–5, 8–9, 11–16
ESS3.B	Natural Hazards	Aligned <i>PhD Science</i> Lessons
	Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.	Level K M1 L17–20, 22–30
ESS3.C	Human Impacts on Earth Systems	Aligned <i>PhD Science</i> Lessons
	Things that people do to live comfortably can affect the world around them. They can make choices that reduce their impacts on the land, water, air, and other living things for sustainability.	Level K M4 L11–24, 26–28
ET1.A	Defining and Delimiting Engineering Problems	Aligned <i>PhD Science</i> Lessons
	A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions.	Level K M1 L4–7, 12–16 Level K M2 L17–20
	Asking questions, making observations, and gathering information are helpful in thinking about problems.	Level K M1 L12–16
	Before beginning to design a solution, it is important to clearly understand the problem.	Level K M1 L12–16
ET1.B	Developing Possible Solutions	Aligned <i>PhD Science</i> Lessons
	Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.	Level K M2 L17–20 Level K M4 L20–24
ET1.C	Optimizing the Design Solution	Aligned <i>PhD Science</i> Lessons
	Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	Level K M4 L20–24

Crosscutting Concepts		
1	Patterns	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. 	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
2	Cause and Effect	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Events have causes that generate observable patterns. 	Level K M2 L4–16, 21–23 Level K M4 L3–5, 10, 14–19, 26–28
	<ul style="list-style-type: none"> Simple tests can be designed/performed to gather evidence to support or refute student ideas about causes. 	Level K M2 L10–12, 17–20
4	Systems and System Models	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Systems in the natural and designed world have parts that work together. 	Level K M3 L1–3, 9–13, 19–21, 23–25, 27–29 Level K M4 L1–9, 11–16
6	Structure and Function	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). 	Level K M1 L10–16 Level K M4 L20–24

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Key: Module (M), Lesson (L)

PhD Science Level 1

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

First Grade Performance Standards		
Physical Science (PS)		
Waves and Their Applications in Technologies for Information Transfer		Aligned <i>PhD Science</i> Lessons
1-PS4-1	Plan and conduct investigations to provide evidence that sound can make materials vibrate and that vibrating materials can make sound.	Level 1 M3 L1–17, 26–29
1-PS4-2	Construct an evidence-based account, through observation, that objects can be seen only when illuminated.	Level 1 M2 L1–9, 21–23
1-PS4-3	Plan and conduct 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

Life Science (LS)		
From Molecules to Organisms: Structures and Processes		Aligned <i>PhD Science</i> Lessons
1-LS1-1	Construct an evidence-based argument with the use of a drawing or a model that illustrates how structures of plants or animals help them survive in their habitat.	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
Heredity: Inheritance and Variation of Traits		Aligned <i>PhD Science</i> Lessons
1-LS3-1	Construct an evidence-based account, through observation, that young plants and animals are alike, but not exactly like, their parents.	Level 1 M1 L22–23, 26–29
Earth and Space Science (ESS)		
Earth's Place in the Universe		Aligned <i>PhD Science</i> Lessons
1-ESS1-1	Describe patterns that can be predicted through observations of the Sun, Moon, and stars.	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
Engineering & Technology (ET)		Aligned <i>PhD Science</i> Lessons
K–2-ET1-1	Ask questions, make observations, and gather information to define a simple problem (a situation people want to change) that can be solved through the development of a new or improved object or tool.	Level 1 M1 L11–15
K–2-ET1-2	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-ET1-3	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		
1	Asking Questions and Defining Problems	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Ask questions based on observations to find more information about the natural and/or designed world(s). 	Level 1 M1 L1–3 Level 1 M2 L1–3 Level 1 M3 L1–3 Level 1 M4 L1–3, 14–16
	<ul style="list-style-type: none"> Define a simple problem that can be solved through the development of a new or improved object or tool. 	Level 1 M1 L11–15
2	Developing and Using Models	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Develop a simple model based on evidence to represent a proposed object or tool. 	Level 1 M1 L11–15
3	Planning and Carrying Out Investigations	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Plan and conduct investigations collaboratively to produce evidence to answer a question. 	Level 1 M1 L19–20 Level 1 M2 L15–18
	<ul style="list-style-type: none"> Make observations (firsthand or from media) to collect data that can be used to make comparisons. 	Level 1 M2 L4–12, 15–18, 20–23 Level 1 M3 L1–7, 11–13, 18–19 Level 1 M4 L4–6, 14–16, 19–21
4	Analyzing and Interpreting Data	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. 	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"> Analyze tests of an object or tool to determine if it works as needed. 	Level 1 M3 L8–9
6	Constructing Explanations and Designing Solutions	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. 	Level 1 M1 L7–8, 16–17, 22–23, 26–29 Level 1 M2 L4–7, 21–23 Level 1 M3 L4–6, 14, 26–29
	<ul style="list-style-type: none"> Use tools and materials provided to design a device that solves a specific problem. 	Level 1 M1 L11–15

7	Engaging in Argument from Evidence	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Construct an argument with evidence to support a claim. 	Level 1 M4 L9–13, 19–21
8	Obtaining, Evaluating, and Communicating Information	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. 	Level 1 M1 L24–25 Level 1 M3 L18–19 Level 1 M4 L9–13


Disciplinary Core Ideas		
PS4.A	Wave Properties	Aligned <i>PhD Science</i> Lessons
	Sound can make matter vibrate, and vibrating matter can make sound.	Level 1 M3 L1–17, 26–29
PS4.B	Electromagnetic Radiation	Aligned <i>PhD Science</i> Lessons
	Objects can be seen if light is available to illuminate them or if they give off their own light.	Level 1 M2 L1–9, 21–23
	Some materials allow light to pass through them, others allow only some light through, and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam.	Level 1 M2 L1–3, 10–23
PS4.C	Information Technologies and Instrumentation	Aligned <i>PhD Science</i> Lessons
	People use a variety of devices to communicate (send and receive information) over long distances.	Level 1 M3 L18–29


LS1.A	Structure and Function	Aligned <i>PhD Science</i> Lessons
	All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.	Level 1 M1 L1–15, 27–29
LS1.B	Growth and Development of Organisms	Aligned <i>PhD Science</i> Lessons
	Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.	Level 1 M1 L24–29
LS1.D	Information Processing	Aligned <i>PhD Science</i> Lessons
	Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.	Level 1 M1 L16–21, 27–29
LS3.A	Inheritance of Traits	Aligned <i>PhD Science</i> Lessons
	Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents.	Level 1 M1 L22–23, 26–29
LS3.B	Variation of Traits	Aligned <i>PhD Science</i> Lessons
	Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.	Level 1 M1 L22–23, 27–29
ESS1.A	The Universe and Its Stars	Aligned <i>PhD Science</i> Lessons
	Patterns of the motion of the Sun, Moon, and stars in the sky can be observed, described, and predicted.	Level 1 M4 L1–8, 14–25
ESS1.B	Earth and the Solar System	Aligned <i>PhD Science</i> Lessons
	Seasonal patterns of sunrise and sunset can be observed, described, and predicted.	Level 1 M4 L9–13, 23–25

ET1.A	Defining and Delimiting Engineering Problems	Aligned <i>PhD Science</i> Lessons
	A situation that people want to change or create can be approached as a problem to be solved through engineering.	Level 1 M1 L11–15
	Asking questions, making observations, and gathering information are helpful in thinking about problems.	Level 1 M1 L11–15
	Before beginning to design a solution, it is important to clearly understand the problem.	Level 1 M1 L11–15
ET1.B	Developing Possible Solutions	Aligned <i>PhD Science</i> Lessons
	Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.	Level 1 M3 L21–25
ET1.C	Optimizing the Design Solution	Aligned <i>PhD Science</i> Lessons
	Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	Level 1 M3 L21–25

Crosscutting Concepts		
1	Patterns	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. 	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
2	Cause and Effect	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Simple tests can be designed to gather evidence to support or refute student ideas about causes. 	Level 1 M2 L13–14 Level 1 M3 L7, 15–16
6	Structure and Function	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). 	Level 1 M1 L4–15, 27–29 Level 1 M3 L8–9

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Key: Module (M), Lesson (L)

PhD Science Level 2

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

Second Grade Performance Standards		
Matter and Its Interactions		Aligned <i>PhD Science</i> Lessons
2-PS1-1	Plan and conduct 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	Make observations to 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 with evidence that some changes caused by heating or cooling can be reversed and some cannot.	 Level 2 M1 L14–19, 29–31

Ecosystems: Interactions, Energy, and Dynamics		Aligned <i>PhD Science</i> Lessons
2-LS2-1	Plan 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
Biological Evolution: Unity and Diversity		Aligned <i>PhD Science</i> Lessons
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
Earth’s Place in the Universe		Aligned <i>PhD Science</i> Lessons
2-ESS1-1	Use information from several sources to provide evidence that Earth events can occur quickly or slowly.	Level 2 M2 L18–24
Earth’s Systems		Aligned <i>PhD Science</i> Lessons
2-ESS2-1	Compare and contrast 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
Engineering & Technology (ET)		Aligned <i>PhD Science</i> Lessons
K–2-ET1-1	Ask questions, make observations, and gather information to define a simple problem (a situation people want to change) 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-ET1-2	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-ET1-3	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		
1	Asking Questions and Defining Problems	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Ask questions based on observations to find more information about the natural and/or designed world(s). 	Level 2 M1 L1–3 Level 2 M2 L1–2 Level 2 M3 L1–2 Level 2 M4 L1–3
	<ul style="list-style-type: none"> Define a simple problem that can be solved through the development of a new or improved object or tool. 	Level 2 M3 L14–18
2	Developing and Using Models	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Develop a model to represent patterns in the natural world. 	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
	<ul style="list-style-type: none"> Develop a simple model based on evidence to represent a proposed object or tool. 	Level 2 M3 L14–18
3	Planning and Carrying Out Investigations	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. 	Level 2 M2 L8–12 Level 2 M3 L3–7 Level 2 M4 L17–19
	<ul style="list-style-type: none"> Make observations (firsthand or from media) to collect data which can be used to make comparisons. 	Level 2 M1 L1–3, 29–31 Level 2 M2 L1–6, 14–19 Level 2 M3 L3–6, 8–11, 13, 21–22, 25–29 Level 2 M4 L16–19
4	Analyzing and Interpreting Data	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Analyze data from tests of an object or tool to determine if it works as intended/needed. 	Level 2 M1 L20–22, 24–28 Level 2 M3 L14–18
6	Constructing Explanations and Designing Solutions	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. 	Level 2 M1 L8–9, 12–13, 17–19, 23, 29–31 Level 2 M2 L3–4, 7, 13, 22–24 Level 2 M4 L23–25
	<ul style="list-style-type: none"> Compare multiple solutions to a problem. 	Level 2 M2 L8–12, 14–17

7	Engaging in Argument from Evidence	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Construct an argument with evidence to support a claim. 	Level 2 M2 L3–4, 10–13, 21–24 Level 2 M4 L16
8	Obtaining, Evaluating, and Communicating Information	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. 	Level 2 M2 L5–6, 18–19 Level 2 M4 L4–9, 11–16, 23–25

Disciplinary Core Ideas		
PS1.A	Structure and Properties of Matter	Aligned <i>PhD Science</i> Lessons
	Different kinds of matter exist and many of them can be either solid, liquid, or gas, depending on temperature. Matter can be described and classified by its observable properties.	Level 2 M1 L1–16, 19, 23, 29–31 Level 2 M2 L3–4, 14–17
	Different properties are suited to different purposes.	Level 2 M1 L20–31
	A great variety of objects can be built up from a small set of pieces.	Level 2 M1 L10–11, 24–31
PS1.B	Chemical Reactions	Aligned <i>PhD Science</i> Lessons
	Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.	Level 2 M1 L14–19, 29–31
LS2.A	Interdependent Relationships in Ecosystems	Aligned <i>PhD Science</i> Lessons
	Plants depend on water and light to grow.	Level 2 M3 L1–7, 25–29
	Plants depend on animals for pollination or to move their seeds around.	Level 2 M3 L8–29
LS4.D	Biodiversity and Humans	Aligned <i>PhD Science</i> Lessons
	There are many kinds of living things in any area, and they exist in different places on land and in water.	Level 2 M4 L1–3, 7–25

ESS1.C	The History of Planet Earth	Aligned <i>PhD Science</i> Lessons
	Some events happen very quickly; others occur very slowly over a time period much longer than one can observe.	Level 2 M2 L18–24
ESS2.A	Earth Materials and Systems	Aligned <i>PhD Science</i> Lessons
	Wind and water can change the shape of the land.	Level 2 M2 L1–17, 20, 22–24
ESS2.B	Plate Tectonics and Large-Scale System Interactions	Aligned <i>PhD Science</i> Lessons
	Maps show where things are located. One can map the shapes and kinds of land and water in any area.	Level 2 M2 L1–2, 5–6 Level 2 M4 L1–6, 11–16, 20–21, 23–25
ESS2.C	The Roles of Water in Earth’s Surface Processes	Aligned <i>PhD Science</i> Lessons
	Water is found in the oceans, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.	Level 2 M4 L1–6, 16, 22–25
ET1.A	Defining and Delimiting Engineering Problems	Aligned <i>PhD Science</i> Lessons
	A situation that people want to change or create can be approached as a problem to be solved through engineering.	Level 2 M1 L24–28 Level 2 M2 L8–12
	Asking questions, making observations, and gathering information are helpful in thinking about problems.	Level 2 M1 L24–28
	Before beginning to design a solution, it is important to clearly understand the problem.	Level 2 M1 L24–28
ET1.B	Developing Possible Solutions	Aligned <i>PhD Science</i> Lessons
	Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people.	Level 2 M3 L14–18
ET1.C	Optimizing the Design Solution	Aligned <i>PhD Science</i> Lessons
	Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	Level 2 M2 L8–12, 14–17

Crosscutting Concepts		
1	Patterns	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Patterns in the natural and human designed world can be observed. 	Level 2 M1 L4–9 Level 2 M2 L1–2, 5–6 Level 2 M4 L1–8, 11–15, 20–21, 23–25
2	Cause and Effect	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Events have causes that generate observable patterns. 	Level 2 M1 L14–19, 29–31 Level 2 M2 L20–21 Level 2 M3 L8–11
	<ul style="list-style-type: none"> Simple tests can be designed to gather evidence to support or refute student ideas about causes. 	Level 2 M1 L14–18 Level 2 M2 L8–12 Level 2 M3 L3–7
5	Energy and Matter	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Objects may break into smaller pieces and be put together into larger pieces or change shapes. 	Level 2 M1 L10–11, 29–31 Level 2 M2 L3–4, 8–13, 22–24
6	Structure and Function	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> The shape and stability of structures of natural and designed objects are related to their function(s). 	Level 2 M1 L24–28 Level 2 M2 L14–17 Level 2 M3 L8–11, 14–22
7	Stability and Change	Aligned <i>PhD Science</i> Lessons
	<ul style="list-style-type: none"> Things may change slowly or rapidly. 	Level 2 M2 L18–24