Arkansas K–12 Science Standards Correlation to *PhD Science*®

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Key: Module (M), Lesson (L)

PhD Science Level K

The Grade K Arkansas K–12 Science Standards are fully covered by the *PhD Science* K–2 curriculum. A detailed analysis of alignment appears in the table below. The lessons listed address the full and partial language of the specified NGSS component.

Grade K Performance Expectations		
Forces and Interactions: Pushes and Pulls		**Aligned *PhD Science* Lessons**
K-PS2-1	Plan and 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
Weather and Climate		**Aligned *PhD Science* 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 to design and build a structure that will reduce the warming effect of sunlight on an area.	Level K M1 L12–16, 28–30
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-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

Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment		Aligned *PhD Science* Lessons
K-LS1-1	Use observations to describe patterns of what plants and animals (including humans) need to survive.	Level K M3 L4–16, 19–22, 27–29
K-ESS2-2	Construct an argument supported by 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-ESS3-3	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, and Applications of Science		**Aligned *PhD Science* Lessons**
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			
1	**Asking Questions and Defining Problems**		**Aligned *PhD Science* Lessons**
	•	Ask questions based on observations to find more information about the designed world.	Level K M1 L1–3, 22–26 Level K M2 L1–3, 9 Level K M3 L1–3, 14–16, 27–29
	•	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 *PhD Science* Lessons**
	•	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
	•	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 *PhD Science* Lessons**
	• With guidance, plan and conduct an investigation in collaboration with peers.		Level K M2 L7–8, 10–15 Level K M3 L4–8
	• 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 *PhD Science* Lessons**
	• 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
	• 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 *PhD Science* Lessons**
	• Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.		Level K M2 L17–20
7	**Engaging in Argument from Evidence**		**Aligned *PhD Science* Lessons**
	• Construct an argument with evidence to support a claim.		Level K M3 L17–21, 27–29
8	**Obtaining, Evaluating, and Communicating Information**		**Aligned *PhD Science* Lessons**
	• 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
	• 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 *PhD Science* 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 *PhD Science* 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 *PhD Science* Lessons**
	Sunlight warms Earth's surface.		Level K M1 L8–16, 28–30
PS3.C	**Relationship Between Energy and Forces**		**Aligned *PhD Science* 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 *PhD Science* 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 *PhD Science* Lessons**
	Weather is the combination of sunlight, wind, snow or rain, 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 *PhD Science* Lessons**
	Plants and animals can change their environment.		Level K M4 L1–10, 14–16, 26–28
ESS3.A	**Natural Resources**		**Aligned *PhD Science* 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 *PhD Science* 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 *PhD Science* Lessons
	Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.		Level K M4 L11–24, 26–28
ETS1.A	**Defining and Delimiting an Engineering Problems**		**Aligned *PhD Science* 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
ETS1.B	**Developing Possible Solutions**		**Aligned *PhD Science* 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
ETS1.C	**Optimizing the Design Solution**		**Aligned *PhD Science* 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 *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	• Events have causes that generate observable patterns.	Level K M2 L4–16, 21–23 Level K M4 L3–5, 10, 14–19, 26–28
	• Simple tests can be designed to gather evidence to support or refute student ideas about causes.	Level K M2 L10–12, 17–20
4	**Systems and System Models**	**Aligned *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	• 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

Connections to Nature of Science	
Scientific Investigations Use a Variety of Methods	**Aligned *PhD Science* Lessons**
• Scientists use different ways to study the world.	Level K M2 L16
Scientific Knowledge Is Based on Empirical Evidence	**Aligned *PhD Science* Lessons**
• Scientists look for patterns and order when making observations about the world.	Level K M3 L4–8, 14–16

Connections to Engineering, Technology, and Applications of Science		
Interdependence of Science, Engineering, and Technology		**Aligned *PhD Science* Lessons**
• People encounter questions about the natural world every day.		Level K M3 L1–3
		Level K M4 L25
Influence of Engineering, Technology, and Science on Society and the Natural World		**Aligned *PhD Science* Lessons**
• People depend on various technologies in their lives; human life would be very different without technology.		Level K M4 L18–19

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Key: Module (M), Lesson (L)

PhD Science Level 1

The Grade 1 Arkansas K–12 Science Standards are fully covered by the *PhD Science* K–2 curriculum. A detailed analysis of alignment appears in the table below. The lessons listed address the full and partial language of the specified NGSS component.

Grade 1 Performance Expectations			
Waves: Light and Sound			**Aligned *PhD Science* Lessons**
1-PS4-1	Plan and conduct investigations 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	Make observations to construct an evidence-based account 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	Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.		Level 1 M3 L18–29

Structure, Function, and Information Processing		Aligned *PhD Science* Lessons
1-LS1-1	Use materials to 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	Make observations to 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
Space Systems: Patterns and Cycles		**Aligned *PhD Science* Lessons**
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 year to relate the amount of daylight to the time of year.	Level 1 M4 L9–13, 23–25
Engineering, Technology, and Applications of Science		**Aligned *PhD Science* Lessons**
1-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
1-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
1-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		
1	**Asking Questions and Defining Problems**	**Aligned *PhD Science* Lessons**
	• Ask questions based on observations to find more information about the natural and/or designed world.	Level 1 M1 L1–3 Level 1 M2 L1–3 Level 1 M3 L1–3 Level 1 M4 L1–3, 14–16
	• 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 *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	• Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question.	Level 1 M1 L19–20 Level 1 M2 L15–18
	• 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 *PhD Science* Lessons**
	• 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, L9–13
	• Analyze data from tests of an object or tool to determine if it works as intended.	Level 1 M3 L8–9
6	**Constructing Explanations and Designing Solutions**	**Aligned *PhD Science* Lessons**
	• 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
	• Use tools and materials provided to design a device that solves a specific problem or a solution to a specific problem.	Level 1 M1 L11–15
8	**Obtaining, Evaluating, and Communicating Information**	**Aligned *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	Sound can make matter vibrate, and vibrating matter can make sound.	Level 1 M3 L1–17, 26–29
PS4.B	**Electromagnetic Radiation**	**Aligned *PhD Science* 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 *PhD Science* Lessons**
	People also 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 *PhD Science* 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 *PhD Science* 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 *PhD Science* 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 *PhD Science* 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 *PhD Science* 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 *PhD Science* 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 *PhD Science* Lessons
	Seasonal patterns of sunrise and sunset can be observed, described, and predicted.		Level 1 M4 L9–13, 23–25
ETS1.A	Defining and Delimiting Engineering Problems		Aligned *PhD Science* 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
ETS1.B	Developing Possible Solutions		Aligned *PhD Science* 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
ETS1.C	Optimizing the Design Solution		Aligned *PhD Science* 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 *PhD Science* Lessons**
	• Patterns in the natural 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 *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	• 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

Connections to Nature of Science		
Scientific Investigations Use a Variety of Methods		**Aligned *PhD Science* Lessons**
• Scientific investigations begin with a question.		Level 1 M2 L15–18
• Scientists use different ways to study the world.		Level 1 M4 L4–6
Scientific Knowledge Is Based on Empirical Evidence		**Aligned *PhD Science* Lessons**
• Scientists look for patterns and order when making observations about the world.		Level 1 M1 L24–25 Level 1 M2 L10–12
Scientific Knowledge Assumes an Order and Consistency in Natural Systems		**Aligned *PhD Science* Lessons**
• Science assumes natural events happen today as they happened in the past.		Level 1 M4 L9–13
• Many events are repeated.		Level 1 M4 L9–13

Connections to Engineering, Technology, and Applications of Science		
Influence of Engineering, Technology, and Science on Society and the Natural World		Aligned *PhD Science* Lessons
• Every human-made product is designed by applying some knowledge of the natural world and is built by using materials derived from the natural world.		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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Key: Module (M), Lesson (L)

PhD Science Level 2

The Grade 2 Arkansas K–12 Science Standards are fully covered by the *PhD Science* K–2 curriculum. A detailed analysis of alignment appears in the table below. The lessons listed address the full and partial language of the specified NGSS component.

Grade 2 Performance Expectations			
Structure and Properties of Matter			**Aligned *PhD Science* 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

Interdependent Relationships in Ecosystems		Aligned *PhD Science* Lessons
2-LS2-1	Plan and conduct 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
Earth's Systems: Processes That Shape the Earth		**Aligned *PhD Science* 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
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
Engineering, Technology, and Applications of Science		**Aligned *PhD Science* Lessons**
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
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
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		
1	**Asking Questions and Defining Problems**	**Aligned *PhD Science* Lessons**
	• Ask questions based on observations to find more information about the natural and/or designed world.	Level 2 M1 L1–3 Level 2 M2 L1–2 Level 2 M3 L1–2 Level 2 M4 L1–3
	• 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 *PhD Science* Lessons**
	• 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
	• 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 *PhD Science* Lessons**
	• 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
	• Make observations (firsthand or from media) to collect data that 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 *PhD Science* Lessons**
	• Analyze data from tests of an object or tool to determine if it works as intended.	Level 2 M1 L20–22, 24–28 Level 2 M3 L14–18

6	**Constructing Explanations and Designing Solutions**		**Aligned *PhD Science* Lessons**
	• 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
	• Compare multiple solutions to a problem.		Level 2 M2 L8–12, 14–17
7	**Engaging in Argument from Evidence**		**Aligned *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	Different kinds of matter exist and many of them can be either solid or liquid, 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 *PhD Science* 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 *PhD Science* 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 *PhD Science* Lessons**
	There are many different 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 *PhD Science* 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 *PhD Science* 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 *PhD Science* 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 *PhD Science* Lessons
	Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.		Level 2 M4 L1–6, 16, 22–25
ETS1.A	Defining and Delimiting Engineering Problems		Aligned *PhD Science* 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
ETS1.B	Developing Possible Solutions		Aligned *PhD Science* 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
ETS1.C	Optimizing the Design Solution		Aligned *PhD Science* 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 *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	• Events have causes that generate observable patterns.	Level 2 M1 L14–19, 29–31 Level 2 M2 L20–21 Level 2 M3 L8–11
	• 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 *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	• 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 *PhD Science* Lessons**
	• Things may change slowly or rapidly.	Level 2 M2 L18–24

Connections to Nature of Science	
Scientific Knowledge Is Based on Empirical Evidence	**Aligned *PhD Science* Lessons**
• Scientists look for patterns and order when making observations about the world.	Level 2 M4 L11–13, 17–21
Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena	**Aligned *PhD Science* Lessons**
• Scientists search for cause and effect relationships to explain natural events.	Level 2 M2 L10–12

Science Addresses Questions About the Natural and Material World	Aligned *PhD Science* Lessons
• Scientists study the natural and material world.	Level 2 M1 L20–22, 29–31 Level 2 M2 L1–4, 22–24 Level 2 M3 L25–29 Level 2 M4 L23–25

Connections to Engineering, Technology, and Applications of Science	
Influence of Engineering, Technology, and Science on Society and the Natural World	**Aligned *PhD Science* Lessons**
• Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.	Level 2 M2 L14–17 Level 2 M3 L14–18
• Developing and using technology has impacts on the natural world.	Level 2 M2 L8–9