PhD Science® K–5 Curriculum Correlation to *Alabama Course of Study: Science*

Contents

K–2 Grade Band

Level K 1

Level 1 7

Level 2 13

3–5 Grade Band

Level 3 19

Level 4 26

Level 5 32

PhD Science® Correlation to *Alabama Course of Study: Science* for Level K

Green indicates that *PhD Science*® fully addresses the standard within the K–2 grade band.

Blue indicates that *PhD Science* covers the standard but in a different grade band.

Yellow indicates that *PhD Science* partially covers the standard within the K–2 grade band.

Red indicates that *PhD Science* does not cover the standard.

Key: Module (M), Lesson (L)

The *PhD Science* K–2 curriculum aligns with the Grade K *Alabama Course of Study: Science*. A detailed analysis of alignment appears in the table below.

Grade K Science Content Standards

Physical Sciences

Motion and Stability: Forces and Interactions			**Aligned *PhD Science* Lessons**
1	Investigate the resulting motion of objects when forces of different strengths and directions act upon them.		Level K M2 L1–23
2	Use observations and data from investigations to determine if a design solution solves the problem of using force to change the speed or direction of an object.		Level K M2 L17–23

Life Sciences

Ecosystems: Interactions, Energy, and Dynamics			Aligned *PhD Science* Lessons
3	Distinguish between living and nonliving things and verify what living things need to survive.		Level K M3 L4–16, 19–22, 27–29
4	Gather evidence to support how plants and animals provide for their needs by altering their environment.		Level K M4 L1–10, 14–16, 26–28
5	Construct a model of a natural habitat conducive to meeting the needs of plants and animals native to Alabama.		Level K M3 L1–3, 9–29 Level K M4 L1–2, 8–9, 11–13
6	Identify and plan possible solutions to lessen the human impact on the local environment.		Level K M4 L14–24, 26–28

Earth and Space Sciences

Earth's Systems			Aligned *PhD Science* Lessons
7	Observe and describe the effects of sunlight on Earth's surface.		Level K M1 L8–11, 28–30
8	Design and construct a device to reduce the effects of sunlight.		Level K M1 L12–16, 28–30
9	Observe, record, and share findings of local weather patterns over a period of time.		Level K M1 L1–11, 17–24, 28–30 Level K M4 L25

Earth and Human Activity			Aligned *PhD Science* Lessons
10	Ask questions to obtain information about the purpose of weather forecasts in planning for, preparing for, and responding to severe weather.		Level K M1 L22–30

Science and Engineering Practices

Asking Questions and Defining Problems	**Aligned *PhD Science* Lessons**
	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
Developing and Using Models	**Aligned *PhD Science* Lessons**
	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
Planning and Carrying Out Investigations	**Aligned *PhD Science* Lessons**
	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
Analyzing and Interpreting Data	**Aligned *PhD Science* Lessons**
	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
Using Mathematics and Computational Thinking	**Aligned *PhD Science* Lessons**
	Level K M1 L17–21, 25–30 Level K M2 L17–20
Constructing Explanations and Designing Solutions	**Aligned *PhD Science* Lessons**
	Level K M2 L17–20 Level K M3 L4–16, 23–29

Engaging in Argument from Evidence		Aligned *PhD Science* Lessons
		Level K M3 L17–21, 27–29 Level K M4 L3–5, 11–13, 25
Obtaining, Evaluating, and Communicating Information		**Aligned *PhD Science* Lessons**
		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

Physical Sciences		Aligned *PhD Science* Lessons
Motion and Stability: Forces and Interactions		Level K M2 L1–23
Energy		Level K M1 L8–16, 28–30

Life Sciences		Aligned *PhD Science* Lessons
From Molecules to Organisms: Structures and Processes		Level K M3 L4–16, 19–22, 27–29

Earth and Space Sciences		Aligned *PhD Science* Lessons
Earth's Systems		Level K M1 L1–11, 17–24, 28–30 Level K M4 L1–10, 14–16, 25–28
Earth and Human Activity		Level K M1 L22–30 Level K M3 L1–3, 9–29 Level K M4 L1–2, 8–9, 11–24, 26–28

Engineering, Technology, and the Applications of Science		Aligned *PhD Science* Lessons
Engineering Design		Level K M1 L4–7, 12–16 Level K M2 L17–20 Level K M4 L20–24
Links Among Engineering, Technology, Science, and Society		Level K M3 L1–3 Level K M4 L11–13, 18–19, 25

Crosscutting Concepts

1	**Patterns**		**Aligned *PhD Science* Lessons**
			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**
			Level K M2 L4–23 Level K M4 L3–5, 10, 14–19, 26–28
3	**Scale, Proportion, and Quantity**		**Aligned *PhD Science* Lessons**
			Level K M1 L1–7, 10–24, 28–30 Level K M2 L7–9, 13–15, 21–23 Level K M3 L1–3 Level K M4 L25
4	**Systems and System Models**		**Aligned *PhD Science* Lessons**
			Level K M3 L1–3, 9–13, 19–21, 23–25, 27–29 Level K M4 L1–9, 11–16
5	**Energy and Matter**		**Aligned *PhD Science* Lessons**
			Level 2 M1 L10–11, 29–31 Level 2 M2 L3–4, 8–13, 22–24

6	**Structure and Function**		**Aligned *PhD Science* Lessons**
			Level K M1 L10–16 Level K M4 L20–24
7	**Stability and Change**		**Aligned *PhD Science* Lessons**
			Level K M1 L8–9, 17–21 Level K M4 L14–16

PhD Science® Correlation to *Alabama Course of Study: Science* for Level 1

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Key: Module (M), Lesson (L)

The *PhD Science* K–2 curriculum aligns with the Grade 1 *Alabama Course of Study: Science*. A detailed analysis of alignment appears in the table below.

Grade 1 Science Content Standards

Physical Sciences

Waves and Their Applications in Technologies for Information Transfer			**Aligned *PhD Science* Lessons**
1	Conduct experiments to provide evidence that vibrations of matter can create sound and sound can make matter vibrate.		Level 1 M3 L1–17, 26–29
2	Construct explanations from observations that objects can be seen only when light is available to illuminate them.		Level 1 M2 L1–9, 21–23
3	Investigate materials to determine which types allow light to pass through, allow only partial light to pass through, block light, or reflect light.		Level 1 M2 L1–3, 10–23
4	Design and construct a device that uses light or sound to send a communication signal over a distance.		Level 1 M3 L18–29

Life Sciences

From Molecules to Organisms: Structures and Processes			Aligned *PhD Science* Lessons
5	Design a solution to a human problem by using materials to imitate 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
6	Obtain information to provide evidence that parents and their offspring engage in patterns of behavior that help the offspring survive.		Level 1 M1 L24–29

Heredity: Inheritance and Variation of Traits			Aligned *PhD Science* Lessons
7	Make observations to identify the similarities and differences of offspring to their parents and to other members of the same species.		Level 1 M1 L22–23, 26–29

Earth and Space Sciences

Earth's Place in the Universe			Aligned *PhD Science* Lessons
8	Observe, describe, and predict patterns of the sun, moon, and stars as they appear in the sky.		Level 1 M4 L1–8, 14–25
9	Observe seasonal patterns of sunrise and sunset to describe the relationship between the number of hours of daylight and the time of year.		Level 1 M4 L9–13, 23–25

Science and Engineering Practices

Asking Questions and Defining Problems	**Aligned *PhD Science* Lessons**
	Level 1 M1 L1–3, 11–15 Level 1 M2 L1–3 Level 1 M3 L1–3 Level 1 M4 L1–3, 14–16
Developing and Using Models	**Aligned *PhD Science* Lessons**
	Level 1 M1 L1–9, 11–15, 18 Level 1 M2 L1–7, 10–23 Level 1 M3 L7, 11–14 Level 1 M4 L1–3, 7–8
Planning and Carrying Out Investigations	**Aligned *PhD Science* Lessons**
	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
Analyzing and Interpreting Data	**Aligned *PhD Science* Lessons**
	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, 9–13
Using Mathematics and Computational Thinking	**Aligned *PhD Science* Lessons**
	Level 1 M2 L15–18 Level 1 M3 L21–25
Constructing Explanations and Designing Solutions	**Aligned *PhD Science* Lessons**
	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

Engaging in Argument from Evidence		Aligned *PhD Science* Lessons
		Level 1 M3 L4–6, 8–9, 18–20 Level 1 M4 L4–25
Obtaining, Evaluating, and Communicating Information		**Aligned *PhD Science* Lessons**
		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

Physical Sciences		Aligned *PhD Science* Lessons
Waves and Their Applications in Technologies for Information Transfer		Level 1 M2 L1–23 Level 1 M3 L1–29

Life Sciences		Aligned *PhD Science* Lessons
From Molecules to Organisms: Structures and Processes		Level 1 M1 L1–21, 27–29
Heredity: Inheritance and Variation of Traits		Level 1 M1 L22–23, 26–29

Earth and Space Sciences		Aligned *PhD Science* Lessons
Earth's Place in the Universe		Level 1 M4 L1–25

Engineering, Technology, and the Applications of Science		Aligned *PhD Science* Lessons
Engineering Design		Level 1 M1 L11–15 Level 1 M3 L21–25
Links Among Engineering, Technology, Science, and Society		Level 1 M1 L10–15 Level 1 M3 L20

Crosscutting Concepts

1	**Patterns**	**Aligned *PhD Science* Lessons**
		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**
		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
3	**Scale, Proportion, and Quantity**	**Aligned *PhD Science* Lessons**
		Level K M1 L1–7, 10–24, 28–30 Level K M2 L7–9, 13–15, 21–23 Level K M3 L1–3 Level K M4 L25 Level 2 M1 L8–9 Level 2 M2 L18–21 Level 2 M3 L3–6, 14–18, 25–29 Level 2 M4 L1–6, 17–19, 22–25
4	**Systems and System Models**	**Aligned *PhD Science* Lessons**
		Level 1 M1 L1–8, 16–17 Level 1 M2 L1–3, 10–23 Level 1 M3 L1–3, 8–10, 14, 21–29
5	**Energy and Matter**	**Aligned *PhD Science* Lessons**
		Level 2 M1 L10–11, 29–31 Level 2 M2 L3–4, 8–13, 22–24

6	**Structure and Function**		**Aligned *PhD Science* Lessons**
			Level 1 M1 L4–15, 27–29 Level 1 M3 L8–9
7	**Stability and Change**		**Aligned *PhD Science* Lessons**
			Level K M1 L8–9, 17–21 Level K M4 L14–16 Level 2 M2 L1–2, 18–24 Level 2 M3 L1–2, 25–29

PhD Science® Correlation to *Alabama Course of Study: Science* for Level 2

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Key: Module (M), Lesson (L)

The *PhD Science* K–2 curriculum aligns with the Grade 2 *Alabama Course of Study: Science*. A detailed analysis of alignment appears in the table below.

Grade 2 Science Content Standards

Physical Sciences

Matter and Its Interactions			**Aligned *PhD Science* Lessons**
1	Conduct an investigation to describe and classify various substances according to physical properties.		Level 2 M1 L1–9, 12–16, 29–31 Level 2 M2 L2–4, 14–17
2	Collect and evaluate data to determine appropriate uses of materials based on their properties.		Level 2 M1 L20–31
3	Demonstrate and explain how structures made from small pieces can be disassembled and then rearranged to make new and different structures.		Level 2 M1 L10–11, 29–31
4	Provide evidence that some changes in matter caused by heating or cooling can be reversed and some changes are irreversible.		Level 2 M1 L14–19, 29–31

Life Sciences

Ecosystems: Interactions, Energy, and Dynamics			Aligned *PhD Science* Lessons
5	Plan and carry out an investigation, using one variable at a time, to determine the growth needs of plants.		Level 2 M3 L1–7, 25–29
6	Design and construct models to simulate how animals disperse seeds or pollinate plants.		Level 2 M3 L8–29
7	Obtain information from literature and other media to illustrate that there are many different kinds of living things and that they exist in different places on land and in water.		Level 2 M4 L1–3, 7–25

Earth and Space Sciences

Earth's Systems			Aligned *PhD Science* Lessons
8	Make observations from media to obtain information about Earth events that happen over a short period of time or over a time period longer than one can observe.		Level 2 M2 L18–24
9	Create models to identify physical features of Earth.		Level 2 M2 L1–2, 5–6 Level 2 M4 L1–6, 11–16, 20–21, 23–25
10	Collect and evaluate data to identify water found on Earth and determine whether it is a solid or a liquid.		Level 2 M4 L1–6, 16, 22–25

Earth and Human Activity			Aligned *PhD Science* Lessons
11	Examine and test solutions that address changes caused by Earth's events.		Level 2 M2 L1–17, 20, 22–24

Science and Engineering Practices

Asking Questions and Defining Problems	**Aligned *PhD Science* Lessons**
	Level 2 M1 L1–3 Level 2 M2 L1–2 Level 2 M3 L1–6, 14–18 Level 2 M4 L1–3
Developing and Using Models	**Aligned *PhD Science* Lessons**
	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
Planning and Carrying Out Investigations	**Aligned *PhD Science* Lessons**
	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
Analyzing and Interpreting Data	**Aligned *PhD Science* Lessons**
	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
Using Mathematics and Computational Thinking	**Aligned *PhD Science* Lessons**
	Level 2 M1 L20–22 Level 2 M2 L14–17 Level 2 M3 L8–11, 23–29 Level 2 M4 L7–8, 17–22
Constructing Explanations and Designing Solutions	**Aligned *PhD Science* Lessons**
	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

Engaging in Argument from Evidence		Aligned *PhD Science* Lessons
		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
Obtaining, Evaluating, and Communicating Information		**Aligned *PhD Science* Lessons**
		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 L L4–9, 11–16, 23–25

Disciplinary Core Ideas

Physical Sciences		Aligned *PhD Science* Lessons
Matter and Its Interactions		Level 2 M1 L1–31 Level 2 M2 L3–4, 14–17

Life Sciences		Aligned *PhD Science* Lessons
Ecosystems: Interactions, Energy, and Dynamics		Level 2 M3 L1–29
Biological Evolution: Unity and Diversity		Level 2 M4 L1–3, 7–25

Earth and Space Sciences		Aligned *PhD Science* Lessons
Earth's Systems		Level 2 M2 L1–17, 20, 22–24 Level 2 M4 L1–6, 11–16, 20–25

Engineering, Technology, and the Applications of Science		Aligned *PhD Science* Lessons
Engineering Design		Level 2 M1 L24–28 Level 2 M2 L8–12, 14–17 Level 2 M3 L14–18
Links Among Engineering, Technology, Science, and Society		Level 2 M2 L14–17 Level 2 M3 L3–6, 14–18

Crosscutting Concepts

			Aligned *PhD Science* Lessons
1	**Patterns**		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**		Level 2 M1 L14–19, 29–31 Level 2 M2 L8–12, 20–21 Level 2 M3 L3–11
3	**Scale, Proportion, and Quantity**		Level 2 M1 L8–9 Level 2 M2 L18–21 Level 2 M3 L3–6, 14–18, 25–29 Level 2 M4 L1–6, 17–19, 22–25
4	**Systems and System Models**		Level 2 M1 L1–7, 12–13, 20–23, 29–31 Level 2 M2 L3–4, 7–12, 14–17 Level 2 M3 L8–13, 19–24 Level 2 M4 L7–16, 23–25
5	**Energy and Matter**		Level 2 M1 L10–11, 29–31 Level 2 M2 L3–4, 8–13, 22–24

6	**Structure and Function**		**Aligned *PhD Science* Lessons**
			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**
			Level 2 M2 L1–2, 18–24 Level 2 M3 L1–2, 25–29

PhD Science® Correlation to *Alabama Course of Study: Science* for Level 3

Green indicates that *PhD Science*® fully addresses the standard within the grade level or the 3–5 grade band.

Blue indicates that *PhD Science* covers the standard but in a different grade band.

Yellow indicates that *PhD Science* partially covers the standard within the grade level or the 3–5 grade band.

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Key: Module (M), Lesson (L)

The *PhD Science* 3–5 curriculum aligns with the Grade 3 *Alabama Course of Study: Science*. A detailed analysis of alignment appears in the table below.

Grade 3 Science Content Standards

Physical Sciences

Motion and Stability: Forces and Interactions			**Aligned *PhD Science* Lessons**
1	Plan and carry out an experiment to determine the effects of balanced and unbalanced forces on the motion of an object using one variable at a time, including number, size, direction, speed, position, friction, or air resistance, and communicate these findings graphically.		Level 3 M4 L10–18, 28–30
2	Investigate, measure, and communicate in a graphical format how an observed pattern of motion can be used to predict the future motion of an object.		Level 3 M4 L1–9, 28–30
3	Explore objects that can be manipulated in order to determine cause–and–effect relationships of electric interactions between two objects not in contact with one another or magnetic interactions between two objects not in contact with one another.		Level 3 M4 L19–21, 28–30
4	Apply scientific ideas about magnets to solve a problem through an engineering design project.		Level 3 M4 L22–30

Life Sciences

From Molecules to Organisms: Structures and Processes			Aligned *PhD Science* Lessons
5	Obtain and combine information to describe that organisms are classified as living things, rather than nonliving things, based on their ability to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.		Level 3 M2 L1–2, 9–12, 16–19 Level 3 M3 L7–8, 23–25, 26–28
6	Create representations to explain the unique and diverse life cycles of organisms other than humans, including commonalities such as birth, growth, reproduction, and death.		Level 3 M2 L17 Level 3 M3 L7–8, 23–28

Heredity: Inheritance and Variation of Traits			Aligned *PhD Science* Lessons
7	Examine data to provide evidence that plants and animals, excluding humans, have traits inherited from parents and that variations of these traits exist in groups of similar organisms.		Level 3 M3 L1–6, 14–18, 23–28
8	Engage in argument from evidence to justify that traits can be influenced by the environment.		Level 3 M3 L9–13, 19–20, 26–28

Unity and Diversity			Aligned *PhD Science* Lessons
9	Analyze and interpret data from fossils to provide evidence of organisms and the environments in which they lived long ago.		Level 3 M2 L1–8, 26–28
10	Investigate how variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.		Level 3 M3 L21–28
11	Construct an argument from evidence to explain the likelihood of an organism's ability to survive when compared to the resources in a certain habitat. Construct explanations that forming groups helps some organisms survive. Create models that illustrate how organisms and their habitats make up a system in which the parts depend on each other. Categorize resources in various habitats as basic materials, produced materials, or as nonmaterial.		Level 3 M2 L1–2, 9–12, 16–19, 22–28
12	Evaluate engineered solutions to a problem created by environmental changes and any resulting impacts on the types and density of plant and animal populations living in the environment.		Level 3 M2 L16–19, 20–25, 26–28

Earth and Space Sciences

Earth's Systems			Aligned *PhD Science* Lessons
13	Display data graphically and in tables to describe typical weather conditions expected during a particular season.		Level 3 M1 L1–15, 19–20, 27–29
14	Collect information from a variety of sources to describe climates in different regions of the world.		Level 3 M1 L11–15, 27–29

Earth and Human Activity			Aligned *PhD Science* Lessons
15	Evaluate a design solution that reduces the impact of a weather-related hazard.		Level 3 M1 L1–3, 16–29

Science and Engineering Practices

Asking Questions and Defining Problems		Aligned *PhD Science* Lessons
		Level 3 M1 L1–3, 21–26, 28–29 Level 3 M2 L1–2 Level 3 M3 L1–3, 12–13 Level 3 M4 L1–3, 7–9, 15–16, 19–30
Developing and Using Models		**Aligned *PhD Science* Lessons**
		Level 3 M1 L1–3, 19–20 Level 3 M2 L1–3, 6–12, 22–25, 27–28 Level 3 M3 L7–11, 21–25, 27–28 Level 3 M4 L1–3, 17–18, 23–30
Planning and Carrying Out Investigations		**Aligned *PhD Science* Lessons**
		Level 3 M2 L4–5 Level 3 M3 L12–13 Level 3 M4 L7–18, 23–30

Analyzing and Interpreting Data	Aligned *PhD Science* Lessons
	Level 3 M1 L4–15, 19–20, 27–29 Level 3 M2 L3–8, 16–19, 27–28 Level 3 M3 L4–9, 14–20, 27–28 Level 3 M4 L7–9
Using Mathematics and Computational Thinking	**Aligned *PhD Science* Lessons**
	Level 3 M1 L4–12 Level 3 M2 L3, 16–19 Level 3 M3 L7–8 Level 3 M4 L23–27
Constructing Explanations and Designing Solutions	**Aligned *PhD Science* Lessons**
	Level 3 M1 L13–15, 18, 21–29 Level 3 M2 L6–8, 22–28 Level 3 M3 L9–11, 14–15, 21–28 Level 3 M4 L10–14, 19–21, 28–30
Engaging in Argument from Evidence	**Aligned *PhD Science* Lessons**
	Level 3 M1 L21–26, 28–29 Level 3 M2 L9–15, 20–21, 27–28 Level 3 M3 L16–20 Level 3 M4 L12–14
Obtaining, Evaluating, and Communicating Information	**Aligned *PhD Science* Lessons**
	Level 3 M1 L11–17, 28–29 Level 3 M2 L13–15, 20–21 Level 3 M4 L22

Disciplinary Core Ideas

Physical Sciences		Aligned *PhD Science* Lessons
Motion and Stability: Forces and Interactions		Level 3 M4 L1–30

Life Sciences		Aligned *PhD Science* Lessons
From Molecules to Organisms: Structures and Processes		Level 3 M3 L7–8, 23–28
Heredity: Inheritance and Variation of Traits		Level 3 M3 L1–6, 9–20, 23–28
Unity and Diversity		Level 3 M2 L1–12, 16–28 Level 3 M3 L21–28

Earth and Space Sciences		Aligned *PhD Science* Lessons
Earth's Systems		Level 3 M1 L1–15, 19–20, 27–29
Earth and Human Activity		Level 3 M1 L1–3,16–29

Engineering, Technology, and Applications of Science		Aligned *PhD Science* Lessons
Engineering Design		Level 3 M1 L21–26 Level 3 M2 L22–25 Level 3 M4 L23–27
Links Among Engineering, Technology, Science, and Society		Level 3 M1 L21–26 Level 3 M2 L22–25 Level 3 M4 L22–27

Crosscutting Concepts

1	**Patterns**	**Aligned *PhD Science* Lessons**
		Level 3 M1 L11–15, 19–20, 27–29 Level 3 M2 L3–8, 13–15, 27–28 Level 3 M3 L1–8, 14–18, 26–28 Level 3 M4 L1–9, 28–30
2	**Cause and Effect**	**Aligned *PhD Science* Lessons**
		Level 3 M1 L1–3, 16–18, 21–29 Level 3 M2 L9–12, 16–28 Level 3 M3 L9–13, 19–25, 27–28 Level 3 M4 L1–3, 10–30
3	**Scale, Proportion, and Quantity**	**Aligned *PhD Science* Lessons**
		Level 3 M1 L4–10 Level 3 M2 L1–2, 27–28 Level 3 M3 L1–3, 14–15
4	**Systems and System Models**	**Aligned *PhD Science* Lessons**
		Level 3 M1 L1–3, 16–20 Level 3 M2 L6–15, 20–28 Level 3 M3 L9–11 Level 3 M4 L1–30
5	**Energy and Matter**	**Aligned *PhD Science* Lessons**
		Level 4 M2 L1–3, 8–26 Level 4 M3 L10–19, 30–31 Level 5 M1 L5–8, 13–14, 23–26 Level 5 M2 L6–11, 14–19, 24–26 Level 5 M3 L10–11 Level 5 M4 L3–4

6	**Structure and Function**		**Aligned *PhD Science* Lessons**
			Level 3 M2 L1–3, 9–12 Level 3 M3 L4–6, 21–28
7	**Stability and Change**		**Aligned *PhD Science* Lessons**
			Level 3 M1 L4–15, 27–29 Level 3 M2 L16–19 Level 3 M3 L7–8, 12–13, 19–20, 26–28

PhD Science® Correlation to *Alabama Course of Study: Science* for Level 4

Green indicates that *PhD Science*® fully addresses the standard within the grade level or the 3–5 grade band.

Blue indicates that *PhD Science* covers the standard but in a different grade band.

Yellow indicates that *PhD Science* partially covers the standard within the grade level or the 3–5 grade band.

Red indicates that *PhD Science* does not cover the standard.

Key: Module (M), Lesson (L)

The *PhD Science* 3–5 curriculum aligns with the Grade 4 *Alabama Course of Study: Science*. A detailed analysis of alignment appears in the table below.

Grade 4 Science Content Standards

Physical Sciences

Energy			**Aligned *PhD Science* Lessons**
1	Use evidence to explain the relationship of the speed of an object to the energy of that object.		Level 4 M2 L6–7, 24–26
2	Plan and carry out investigations that explain transference of energy from place to place by sound, light, heat, and electric currents. Provide evidence that heat can be produced in many ways and can move from one object to another by conduction. Demonstrate that different objects can absorb, reflect, and/or conduct energy. Demonstrate that electric circuits require a complete loop through which an electric current can pass.		Level 4 M2 L1–5, 10–11, 24–26
3	Investigate to determine changes in energy resulting from increases or decreases in speed that occur when objects collide.		Level 4 M2 L8–9, 24–26
4	Design, construct, and test a device that changes energy from one form to another.		Level 4 M2 L12–26
5	Compile information to describe how the use of energy derived from natural renewable and nonrenewable resources affects the environment.		Level 4 M1 L21–27 Level 4 M2 L12–17, 24–26

Waves and Their Applications in Technologies for Information Transfer			Aligned *PhD Science* Lessons
6	Develop a model of waves to describe patterns in terms of amplitude and wavelength, and including that waves can cause objects to move.		Level 4 M3 L7–14, 29–31
7	Develop and use models to show multiple solutions in which patterns are used to transfer information.		Level 4 M4 L18–27
8	Construct a model to explain that an object can be seen when light reflected from its surface enters the eyes.		Level 4 M4 L1–17, 25–27

Life Sciences

From Molecules to Organisms: Structure and Processes			Aligned *PhD Science* Lessons
9	Examine evidence to support an argument that the internal and external structures of plants and animals function to support survival, growth, behavior, and reproduction.		Level 4 M3 L1–6, 20, 26–31
10	Obtain and communicate information explaining that humans have systems that interact with one another for digestion, respiration, circulation, excretion, movement, control, coordination, and protection from disease.		*PhD Science* does not cover these topics in the K–5 curriculum.
11	Investigate different ways animals receive information through the senses, process that information, and respond to it in different ways.		Level 4 M3 L1–6, 15–25, 29–31

Earth and Space Sciences

Earth's Systems			Aligned *PhD Science* Lessons
12	Construct explanations by citing evidence found in patterns of rock formations and fossils in rock layers that Earth changes over time through both slow and rapid processes.		Level 4 M1 L1–5, 19–20, 25–27
13	Plan and carry out investigations to examine properties of soils and soil types.		Level 5 M2 L12–13 Level 5 M3 L10–11
14	Explore information to support the claim that landforms are the result of a combination of constructive forces, including crustal deformation, volcanic eruptions, and sediment deposition as well as a result of destructive forces, including erosion and weathering.		Level 4 M1 L6–11, 18–20, 25–27
15	Analyze and interpret data to determine effects of weathering and rate of erosion by water, ice, wind, and vegetation using one single form of weathering or erosion at a time.		Level 4 M1 L6–11, 25–27
16	Describe patterns of Earth's features on land and in the ocean using data from maps.		Level 4 M1 L18–20, 25–27
17	Formulate and evaluate solutions to limit the effects of natural Earth processes on humans.		Level 4 M1 L12–17

Science and Engineering Practices

Asking Questions and Defining Problems		Aligned *PhD Science* Lessons
		Level 4 M1 L1–2, 12–17, 23 Level 4 M2 L1–3, 8–9, 11, 17–23, 25–26 Level 4 M3 L1–3, 6, 15–19 Level 4 M4 L1–2, 14–17
Developing and Using Models		**Aligned *PhD Science* Lessons**
		Level 4 M1 L1–2, 26–27 Level 4 M2 L1–3, 8–11, 15–16, 25–26 Level 4 M3 L1–3, 7–14, 30–31 Level 4 M4 L1–8, 10–24, 26–27
Planning and Carrying Out Investigations		**Aligned *PhD Science* Lessons**
		Level 4 M1 L8–11, 21–22 Level 4 M2 L6–7, 10–14 Level 4 M3 L15–19 Level 4 M4 L7–9, 14–21, 26–27

Analyzing and Interpreting Data		Aligned *PhD Science* Lessons
		Level 4 M1 L12–20, 23–24, 26–27 Level 4 M2 L25–26 Level 4 M4 L10–17
Using Mathematics and Computational Thinking		**Aligned *PhD Science* Lessons**
		Level 4 M2 L8–9 Level 4 M4 L14–17
Constructing Explanations and Designing Solutions		**Aligned *PhD Science* Lessons**
		Level 4 M1 L3–7, 10, 12–18, 21–22, 25–27 Level 4 M2 L4–5, 15–26 Level 4 M3 L4–5, 24–25, 29–31 Level 4 M4 L14–27
Engaging in Argument from Evidence		**Aligned *PhD Science* Lessons**
		Level 4 M3 L21–23, 26–28, 30–31 Level 4 M4 L7–8
Obtaining, Evaluating, and Communicating Information		**Aligned *PhD Science* Lessons**
		Level 4 M1 L3–5, 23–24 Level 4 M3 L4–6, 10–11, 20–23, 26–28, 30–31 Level 4 M4 L22–24

Disciplinary Core Ideas

Physical Sciences		Aligned *PhD Science* Lessons
Energy		Level 4 M2 L1–26
Waves and Their Applications in Technologies for Information Transfer		Level 4 M3 L7–14, 29–31 Level 4 M4 L1–27

Life Sciences		Aligned *PhD Science* Lessons
From Molecules to Organisms: Structures and Processes		Level 4 M3 L1–6, 15–31

Earth and Space Sciences		Aligned *PhD Science* Lessons
Earth's Systems		Level 4 M1 L6–11, 18–20, 25–27

Engineering, Technology, and Applications of Science		Aligned *PhD Science* Lessons
Engineering Design		Level 4 M1 L12–17 Level 4 M2 L17–23 Level 4 M4 L14–17
Links Among Engineering, Technology, Science, and Society		Level 4 M1 L12–17, 23–24 Level 4 M2 L15–23 Level 4 M4 L14–17, 22–24

Crosscutting Concepts

1	**Patterns**	**Aligned *PhD Science* Lessons**
		Level 4 M1 L1–5, 18–20, 26–27 Level 4 M2 L4–5, 8–11, 24–26 Level 4 M3 L1–3, 7–11, 20, 24–31 Level 4 M4 L1–4, 7–8, 14–17, 22–27
2	**Cause and Effect**	**Aligned *PhD Science* Lessons**
		Level 4 M1 L6–17, 21–27 Level 4 M2 L1–7, 10–14, 24–26 Level 4 M3 L6–23, 30–31 Level 4 M4 L3–13, 18–21, 25–27
3	**Scale, Proportion, and Quantity**	**Aligned *PhD Science* Lessons**
		Level 4 M1 L3–5
4	**Systems and System Models**	**Aligned *PhD Science* Lessons**
		Level 4 M1 L1–2, 12–17, 21–24 Level 4 M2 L1–11, 15–26 Level 4 M3 L7–9, 15–19, 21–23, 26–28, 30–31 Level 4 M4 L1–6, 10–27
5	**Energy and Matter**	**Aligned *PhD Science* Lessons**
		Level 4 M2 L1–3, 8–26 Level 4 M3 L10–19, 30–31
6	**Structure and Function**	**Aligned *PhD Science* Lessons**
		Level 4 M3 L4–6, 20, 24–25, 29–31 Level 4 M4 L7–9, 25–27
7	**Stability and Change**	**Aligned *PhD Science* Lessons**
		Level 4 M1 L3–11, 18–20, 25–27

PhD Science® Correlation to *Alabama Course of Study: Science* for Level 5

Green indicates that *PhD Science*® fully addresses the standard within the grade level or the 3–5 grade band.

Blue indicates that *PhD Science* covers the standard but in a different grade band.

Yellow indicates that *PhD Science* partially covers the standard within the grade level or the 3–5 grade band.

Red indicates that *PhD Science* does not cover the standard.

Key: Module (M), Lesson (L)

The *PhD Science* 3–5 curriculum aligns with the Grade 5 *Alabama Course of Study: Science*. A detailed analysis of alignment appears in the table below.

Grade 5 Science Content Standards

Physical Sciences

Matter and Its Interactions			**Aligned *PhD Science* Lessons**
1	Plan and carry out investigations to provide evidence that matter is made of particles too small to be seen.		Level 5 M1 L5–10, 23–26
2	Investigate matter to provide mathematical evidence, including graphs, to show that regardless of the type of reaction or change that occurs when heating, cooling, or mixing substances, the total weight of the matter is conserved.		Level 5 M1 L9–17, 23–26
3	Examine matter through observations and measurements to identify materials based on their properties.		Level 5 M1 L1–4, 11–17, 23–26
4	Investigate whether the mixing of two or more substances results in new substances.		Level 5 M1 L1–2, 13–26
5	Construct explanations from observations to determine how the density of an object affects whether the object sinks or floats when placed in a liquid.		*PhD Science* does not cover this topic in the K–5 curriculum.

Motion and Stability: Forces and Interactions			Aligned *PhD Science* Lessons
6	Construct an explanation from evidence to illustrate that the gravitational force exerted by Earth on objects is directed downward towards the center of Earth.		Level 5 M4 L3–4, 24–26
7	Design and conduct a test to modify the speed of a falling object due to gravity.		Level 5 M4 L3–4

Life Sciences

Ecosystems: Interactions, Energy, and Dynamics			Aligned *PhD Science* Lessons
8	Defend the position that plants obtain materials needed for growth primarily from air and water.		Level 5 M2 L3–5, 24–26
9	Construct an illustration to explain how plants use light energy to convert carbon dioxide and water into a storable fuel, carbohydrates, and a waste product, oxygen, during the process of photosynthesis.		Level 5 M2 L6–7, 10–11, 18–19
10	Construct and interpret models to explain that energy in animals' food is used for body repair, growth, motion, and maintenance of body warmth and was once energy from the sun.		Level 5 M2 L15–19, 24–26
11	Create a model to illustrate the transfer of matter among producers; consumers, including scavengers and decomposers; and the environment.		Level 5 M2 L1–2, 6–9, 14, 20

Earth and Space Sciences

Earth's Place in the Universe			Aligned *PhD Science* Lessons
12	Defend the claim that one factor determining the apparent brightness of the sun compared to other stars is the relative distance from Earth.		Level 5 M4 L18–19, 24–26
13	Analyze data and represent with graphs to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.		Level 5 M4 L1–2, 5–17, 20–26

Earth's Systems			Aligned *PhD Science* Lessons
14	Use a model to represent how any two systems, specifically the atmosphere, biosphere, geosphere, and/or hydrosphere, interact and support life.		Level 5 M3 L1–3, 6–13, 19–27
15	Identify the distribution of freshwater and salt water on Earth and construct a graphical representation depicting the amounts and percentages found in different reservoirs.		Level 5 M3 L4–5, 19–27

Earth and Human Activity			Aligned *PhD Science* Lessons
16	Collect and organize scientific ideas that individuals and communities can use to protect Earth's natural resources and its environment.		Level 5 M3 L14–18, 24–27
17	Design solutions, test, and revise a process for cleaning a polluted environment.		Level 5 M3 L19–23

Science and Engineering Practices

Asking Questions and Defining Problems		Aligned *PhD Science* Lessons
		Level 5 M1 L1–2 Level 5 M2 L1–2, 21–23 Level 5 M3 L1–3, 19–23 Level 5 M4 L1–2, 13
Developing and Using Models		**Aligned *PhD Science* Lessons**
		Level 5 M1 L1–2, 5–10, 13–14, 23–26 Level 5 M2 L1–2, 6–7, 14, 20, 25–26 Level 5 M3 L1–3, 6–16, 24–27 Level 5 M4 L1–4, 7–17, 19–26
Planning and Carrying Out Investigations		**Aligned *PhD Science* Lessons**
		Level 5 M1 L13–14, 18–22, 24–26 Level 5 M2 L3–5 Level 5 M3 L10–11 Level 5 M4 L5–6, 18–19, 25–26

Analyzing and Interpreting Data		Aligned *PhD Science* Lessons
		Level 5 M1 L15–17, 24–26 Level 5 M2 L3–5, 8–13, 15–17, 25–26 Level 5 M3 L4–5, 14–16, 25–27 Level 5 M4 L14–15
Using Mathematics and Computational Thinking		**Aligned *PhD Science* Lessons**
		Level 5 M1 L3–4, 15–17 Level 5 M3 L10–11, 24–27 Level 5 M4 L5–6, 25–26
Constructing Explanations and Designing Solutions		**Aligned *PhD Science* Lessons**
		Level 5 M1 L L5–6, 11–12, 18–26 Level 5 M2 L12–13, 15–17, 21–26 Level 5 M3 L17–23, 25–27 Level 5 M4 L3–4, 9–12, 20–26
Engaging in Argument from Evidence		**Aligned *PhD Science* Lessons**
		Level 5 M1 L3–4, 24–26 Level 5 M2 L3–5, 8–11, 21–23, 25–26 Level 5 M3 L19–23, 25–27 Level 5 M4 L5–6, 13–17, 20–21, 24–26
Obtaining, Evaluating, and Communicating Information		**Aligned *PhD Science* Lessons**
		Level 5 M2 L6–7, 10–11, 18–20, 25–26 Level 5 M3 L9, 14–16, 19–27 Level 5 M4 L18–19

Disciplinary Core Ideas

Physical Sciences		Aligned *PhD Science* Lessons
Matter and Its Interactions		Level 5 M1 L1–26
Motion and Stability: Forces and Interactions		Level 5 M4 L3–4, 24–26

Life Sciences		Aligned *PhD Science* Lessons
Ecosystems: Interactions, Energy, and Dynamics		Level 5 M2 L1–2, 6–14, 20, 24–26

Earth and Space Sciences		Aligned *PhD Science* Lessons
Earth's Place in the Universe		Level 5 M4 L1–2, 5–26
Earth's Systems		Level 5 M3 L1–13, 24–27
Earth and Human Activity		Level 5 M3 L14–27

Engineering, Technology, and Applications of Science		Aligned *PhD Science* Lessons
Engineering Design		Level 5 M1 L18–22 Level 5 M2 L21–23 Level 5 M3 L19–23
Links Among Engineering, Technology, Science, and Society		Level 5 M2 L21–23 Level 5 M3 L19–23 Level 5 M4 L7–8

Crosscutting Concepts

1	**Patterns**	**Aligned *PhD Science* Lessons**
		Level 5 M1 L7–8 Level 5 M2 L1–5, 8–9, 15–17, 25–26 Level 5 M3 L6–9 Level 5 M4 L1–17, 20–26
2	**Cause and Effect**	**Aligned *PhD Science* Lessons**
		Level 5 M1 L1–2, 5–6, 9–10, 18–22, 24–26 Level 5 M2 L3–7, 12–13, 18–23, 25–26 Level 5 M3 L6–8, 12–18, 25–27 Level 5 M4 L5–6, 24–26
3	**Scale, Proportion, and Quantity**	**Aligned *PhD Science* Lessons**
		Level 5 M1 L3–4, 13–17, 23–26 Level 5 M2 L10–11 Level 5 M3 L1–5, 10–11, 24–27 Level 5 M4 L18–19, 24–26
4	**Systems and System Models**	**Aligned *PhD Science* Lessons**
		Level 5 M1 L3–4, 15–17 Level 5 M2 L1–2, 6–11, 14, 18–19, 24–26 Level 5 M3 L1–9, 12–13, 19–27 Level 5 M4 L1–2, 7–26
5	**Energy and Matter**	**Aligned *PhD Science* Lessons**
		Level 5 M1 L5–8, 13–14, 23–26 Level 5 M2 L6–11, 14–19, 24–26 Level 5 M3 L10–11 Level 5 M4 L3–4

6	**Structure and Function**		**Aligned *PhD Science* Lessons**
			Level 3 M2 L1–3, 9–12 Level 3 M3 L4–6, 21–28 Level 4 M4 L7–9, 25–27
7	**Stability and Change**		**Aligned *PhD Science* Lessons**
			Level 5 M1 L1–2, 9–12, 18–26 Level 5 M2 L12–13, 20, 24–26 Level 5 M3 L14–18 Level 5 M4 L5–6, 9–12, 24–26