# *PhD Science®* K–5 Curriculum Correlation to North Carolina 2023 K–12 Science Standards

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### K–2 Grade Band

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# *PhD Science*® Curriculum Correlation to North Carolina 2023 K–12 Science Standards: Level K

The *PhD Science* Level K curriculum partially aligns with the Kindergarten North Carolina 2023 K–12 Science Standards. A detailed analysis of alignment appears in the table below.

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

## Kindergarten Standards and Objectives

### Strand: Matter and Its Interactions

| PS.K.1 | Understand how objects are described based on their physical properties and how they are used. | Aligned *PhD Science* Lessons |
|---|---|---|
| PS.K.1.1 | Analyze and interpret data to classify objects by physical properties (size, color, shape, texture, weight, and flexibility). | Level 2 M1 L1–9, 12–16, 19–31<br>Level 2 M2 L3–4, 10–12, 14–17 |
| PS.K.1.2 | Engage in argument from evidence to summarize how different materials (clay, wood, cloth, paper, etc.) are used based on their physical properties. | Level K M1 L8, 11, 12–16<br>Level 1 M2 L15–18<br>Level 2 M1 L1–9, 12–13, 20–23<br>Level 2 M2 L14–17 |

### Strand: Motion and Stability—Forces and Interactions

| PS.K.2 | Understand the positions and motions of objects and organisms observed in the environment. | Aligned PhD Science Lessons |
|---|---|---|
| PS.K.2.1 | Use models to compare the relative position of various objects observed in the classroom and outside using position words such as in front of, behind, between, on top of, under, above, below, beside. | Level K M2 L10–12 |
| PS.K.2.2 | Carry out investigations to illustrate different ways objects and organisms move (to include falling to the ground when dropped): straight, zigzag, round and round, back and forth, fast and slow. | Level K M2 L1–23 |

**Strand: From Molecules to Organisms—Structures and Processes**

| LS.K.1 | Compare characteristics of animals that make them alike and different from other animals and nonliving things. | Aligned *PhD Science* Lessons |
|---|---|---|
| LS.K.1.1 | Engage in argument from evidence to summarize the characteristics of living organisms and nonliving things in terms of their structure, growth, changes, movement, basic needs. | Level K M3 L1–3, 9–29<br>Level K M4 L1–5, 8–9, 11–16 |
| LS.K.1.2 | Use models to exemplify how animals use their body parts to obtain food and other resources, protect themselves, and move from place to place. | Level K M4 6–7, 9<br>Level 1 M1 L1–15, 27–29 |

**Strand: Heredity—Inheritance and Variation of Traits**

| LS.K.2 | Understand characteristics of organisms that make them alike and different. | Aligned PhD Science Lessons |
|---|---|---|
| LS.K.2.1 | Analyze and interpret data to compare the characteristics of different types of the same animal to determine individual similarities and differences. | Level 3 M3 L1–11, 14–18, 21–28 |
| LS.K.2.2 | Analyze and interpret data to compare the characteristics of different types of the same plant to determine individual similarities and differences. | Level 3 M3 L12–13, 19–20 |

**Strand: Earth's Systems**

| ESS.K.1 | Understand change and observable patterns of weather that occur from day to day and throughout the year. | Aligned *PhD Science* Lessons |
|---|---|---|
| ESS.K.1.1 | Analyze and interpret data to compare changes in the environment due to weather. | Level K M4 L1–10, 14–16, 26–28 |
| ESS.K.1.2 | Use mathematics and computational thinking to summarize daily weather conditions noting changes that occur from day to day and throughout the year. | Level K M1 L1–11, 17–24, 28–30<br>Level K M4 L25 |
| ESS.K.1.3 | Obtain, evaluate, and communicate information to compare weather patterns that occur from season to season. | Level K M1 L1–11, 17–24, 28–30<br>Level K M4 L25 |

**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 |

# *PhD Science*® Curriculum Correlation to North Carolina 2023 K–12 Science Standards: Level 1

The *PhD Science* Level 1 curriculum partially aligns with the Grade 1 North Carolina 2023 K–12 Science Standards. A detailed analysis of alignment appears in the table below.

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

**Grade 1 Standards and Objectives**

**Strand: Motion and Stability—Forces and Interactions**

| PS.1.1 | Understand how forces (pushes or pulls) affect the motion of an object. | Aligned *PhD Science* Lessons |
|---|---|---|
| PS.1.1.1 | Use models to explain the effect of a push or pull on the motion of an object, with or without contact. | Level K M2 L1–23 |
| PS.1.1.2 | Carry out investigations to compare the effects of a given force on the motion of an object. | Level 3 M4 L12–14, 19–22 |

**Strand: Ecosystems—Interactions, Energy, and Dynamics**

| LS.1.1 | Understand characteristics of various environments and behaviors of humans that enable plants and animals to survive. | Aligned *PhD Science* Lessons |
|---|---|---|
| LS.1.1.1 | Obtain, evaluate, and communicate information to summarize the needs of different plants and animals. | Level K M3 L1–3, 9–29<br>Level K M4 L1–5, 8–9, 11–16 |
| LS.1.1.2 | Analyze and interpret data to compare how the needs of plants and animals can be met in different environments. | Level K M3 L1–3, 9–29<br>Level K M4 L1–2, 8–9, 11–13<br>Level 2 M4 L1–3, 7–25 |

**Strand: Earth's Place in the Universe**

| ESS.1.1 | Recognize the features and patterns of the Earth/Moon/Sun system as observed from Earth. | Aligned *PhD Science* Lessons |
|---|---|---|
| ESS.1.1.1 | Use models to recognize differences in the features of the day and night sky and apparent movement of objects across the sky as observed from Earth. | Level 1 M4 L1–8, 14–25 |
| ESS.1.1.2 | Analyze and interpret data to recognize patterns of observable changes in the moon's appearance from day to day. | Level 1 M4 L4–6, 19–21 |

**Strand: Earth's Systems**

| ESS.1.2 | Understand the physical properties of Earth materials. | Aligned *PhD Science* Lessons |
|---|---|---|
| ESS.1.2.1 | Obtain, evaluate, and communicate information to summarize the physical properties of Earth materials, including rocks, minerals, soils, and water. | Level 2 M2 L1–17, 20, 22–24 |
| ESS.1.2.2 | Carry out investigations to compare the properties of different soil samples from local places relating their capacity to retain water, provide nutrients, and support the growth of plants. | Level 2 M3 L3–4, 7 |

**Strand: Earth and Human Activity**

| ESS.1.3 | Understand that natural resources are important to humans. | Aligned PhD Science Lessons |
|---|---|---|
| ESS.1.3.1 | Obtain, evaluate, and communicate information to summarize ways in which humans use natural resources. | Level K M3 L1–3, 9–29<br>Level K M4 L1–5, 8–9, 11–16<br>Level 4 M1 L21–24 |
| ESS.1.3.2 | Engage in argument from evidence to explain ways that humans can protect natural resources in the environment. | Level K M4 L11–24, 26–28<br>Level 5 M3 L14–27 |

**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 |

# *PhD Science*® Curriculum Correlation to North Carolina 2023 K–12 Science Standards: Level 2

The *PhD Science* Level 2 curriculum partially aligns with the Grade 2 North Carolina 2023 K–12 Science Standards. A detailed analysis of alignment appears in the table below.

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

## Grade 2 Standards and Objectives

**Strand: Matter and Its Interactions**

| PS.2.1 | **Understand properties of solids and liquids and the changes they undergo.** | **Aligned *PhD Science* Lessons** |
|---|---|---|
| PS.2.1.1 | Carry out investigations to illustrate examples of matter that can change from a solid to a liquid and from a liquid to a solid by heating and cooling. | Level 2 M1 L14–16 |
| PS.2.1.2 | Analyze and interpret data to compare the amount (volume and weight) of water in a container before and after freezing. | Level 2 M1 L14–16 |
| PS.2.1.3 | Analyze and interpret data to compare the amount (volume and weight) of water left in an open container over time to the water left in a closed container. | Level 2 M1 L14–16 |

**Strand: Waves and Their Applications in Technologies for Information Transfer**

| PS.2.2 | **Understand the relationship between sound and vibrating objects.** | **Aligned *PhD Science* Lessons** |
|---|---|---|
| PS.2.2.1 | Carry out investigations to illustrate how sound is produced by vibrating objects and columns of air. | Level 1 M3 L1–17, 26–29 |
| PS.2.2.2 | Use models to summarize the relationship between sound and how sounds are produced and detected by parts of the body that vibrate. | Level 1 M3 L14<br>Level 4 M3 L12–19 |

**Strand: From Molecules to Organisms—Structures and Processes**

| LS.2.1 | **Understand animal life cycles.** | **Aligned *PhD Science* Lessons** |
|---|---|---|
| LS.2.1.1 | Use models to summarize the life cycle of animals including birth, developing into an adult, reproducing, aging and death. | Level 3 M2 L16–19 |
| LS.2.1.2 | Obtain, evaluate, and communicate information to compare life cycles of different animals. | Level 3 M2 L17<br>Level 3 M3 L7–8, 23–28 |

**Strand: Heredity—Inheritance and Variation of Traits**

| LS.2.2 | Understand that organisms differ from or are similar to their parents based on characteristics of the organism. | Aligned *PhD Science* Lessons |
|---|---|---|
| LS.2.2.1 | Obtain, evaluate, and communicate information to summarize ways in which animals closely resemble their parents and ways they are different. | Level 1 M1 L22–23, 26–29<br>Level 3 M3 L14, 16–17 |
| LS.2.2.2 | Analyze and interpret data to illustrate variations among offspring of the same parents. | Level 3 M3 L14–18 |

**Strand: Earth's System**

| ESS.2.1 | Understand patterns of weather and factors that affect weather. | Aligned *PhD Science* Lessons |
|---|---|---|
| ESS.2.1.1 | Obtain, evaluate, and communicate information to summarize how energy from the sun serves as a source of light and warms the land, air, and water. | Level K M1 L8–11, 28–30 |
| ESS.2.1.2 | Use mathematics and computational thinking to summarize weather conditions (temperature, wind direction, wind speed, precipitation). | Level K M1 L3–9, 22–26 |
| ESS.2.1.3 | Carry out investigations to collect data and compare weather patterns that occur over time and relate observable patterns to time of day and time of year. | Level K M1 L17–21 |
| ESS.2.1.4 | Obtain, evaluate, and communicate information to recognize the tools scientists use for observing, recording, and predicting weather changes from day to day and during the season. | Level K M1 L4–9, 17–26 |

**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 |

# *PhD Science®* Curriculum Correlation to North Carolina 2023 K–12 Science Standards: Level 3

The *PhD Science* Level 3 curriculum partially aligns with the Grade 3 North Carolina 2023 K–12 Science Standards. A detailed analysis of alignment appears in the table below.

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

**Grade 3 Standards and Objectives**

**Strand: Matter and Its Interactions**

| PS.3.1 | Understand the structure and properties of matter before and after they undergo a change. | Aligned *PhD Science* Lessons |
|---|---|---|
| PS.3.1.1 | Engage in argument from evidence to infer that air is a substance that surrounds us, takes up space, and has mass. | Level 5 M1 L5–8 |
| PS.3.1.2 | Carry out investigations to classify solids, liquids, and gases based on their basic properties. | Level 5 M1 L3–6, 11–17, 23–26 |
| PS.3.1.3 | Engage in argument from evidence to explain observable changes to the properties of matter when heated or cooled. | Level 5 M1 L9–17, 23–26 |

**Strand: Motion and Stability—Forces and Interactions**

| PS.3.2 | Understand motion and factors that affect motion. | Aligned *PhD Science* Lessons |
|---|---|---|
| PS.3.2.1 | Carry out investigations to infer changes in speed or direction resulting from forces acting on an object. | Level 3 M4 L10–18, 28–30 |
| PS.3.2.2 | Carry out investigations to compare the relative speeds (faster or slower) of objects that travel the same distance in different amounts of time. | Level 3 M4 L5–6, 10–12 |
| PS.3.2.3 | Use models to explain the effect of Earth's gravity on the motion of any object on or near the Earth. | Level 3 M4 L2, 13–22, 28–30 |

**Strand: Energy**

| PS.3.3 | Understand how energy can be transferred from one object to another. | Aligned *PhD Science* Lessons |
|---|---|---|
| PS.3.3.1 | Ask questions to explain how heat is created by friction. | *PhD Science* does not cover this topic in the K–5 curriculum. |
| PS.3.3.2 | Carry out investigations to explain how energy can be transferred from a warmer object to a cooler one by contact or at a distance. | Level 4 M2 L11<br>Level 5 M1 L9–12, 23–26 |

**Strand: From Molecules to Organisms—Structures and Processes**

| LS.3.1 | Understand human body systems and how they are essential for life: protection, movement, and support. | Aligned *PhD Science* Lessons |
|---|---|---|
| LS.3.1.1 | Use models to infer the functions of the skeletal and muscular systems. | *PhD Science* does not cover this topic in the K–5 curriculum. |
| LS.3.1.2 | Obtain, evaluate, and communicate scientific information to explain why skin is necessary for protection and for the body to remain healthy. | *PhD Science* does not cover this topic in the K–5 curriculum. |

| LS.3.1 | Understand how plant structures aid in survival. | Aligned *PhD Science* Lessons |
|---|---|---|
| LS.3.2.1 | Carry out investigations to explain the structures and functions of plants and how they are essential for life. | Level 1 M1 L7–8, 19–21<br>Level 3 M2 L10 |
| LS.3.2.2 | Use models to exemplify the distinct stages of the life cycle of seed plants. | *PhD Science* does not cover this topic in the K–5 curriculum. |

**Strand: Ecosystems—Interactions, Energy, and Dynamics**

| LS.3.3 | Understand how environmental factors aid in the survival of plants. | Aligned *PhD Science* Lessons |
|---|---|---|
| LS.3.3.1 | Carry out investigations to explain how environmental conditions determine how well plants survive and grow. | Level 3 M2 L9–12, 19–21<br>Level 3 M3 9–13, 18–20 |
| LS.3.3.2 | Construct an explanation to infer how the basic properties and components of soil determine its ability to support the growth and survival of many plants. | Level 5 M2 L1, 11–14 |

**Strand: Earth's Place in the Universe**

| ESS.3.1 | Remember the major components and patterns observed in the earth/moon/sun system. | Aligned PhD Science Lessons |
|---|---|---|
| ESS.3.1.1 | Use models to recognize that the Earth is part of a system called the solar system that includes the sun (a star), planets, and many moons, and that the Earth is the third planet from the sun. | Level 5 M4 L1–2, 7–8, 13, 18–19 |
| ESS.3.1.2 | Carry out investigations to recognize that changes in the length and direction of an object's shadow indicate the apparent changing position of the sun during the day. | Level 5 M4 L5–6, 9–12 |
| ESS.3.1.3 | Obtain, evaluate, and communicate information to recognize the patterns of the stars (including the sun) stay the same as they appear to move across the sky. | Level 5 M4 L20–23 |

**Strand: Earth's Systems**

| ESS.3.2 | Understand the structures of the Earth's surface using models. | Aligned *PhD Science* Lessons |
|---|---|---|
| ESS.3.2.1 | Use models to compare Earth's saltwater and freshwater features (including oceans, seas, rivers, lakes, ponds, streams, and glaciers). | Level 2 M4 L16, 22<br>Level 5 M3 L4–8 |
| ESS.3.2.2 | Use models to compare Earth's land features (including volcanoes, mountains, valleys, canyons, caverns, and islands). | Level 4 M1 L1–2, 18–20 |

**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 |

## *PhD Science*® Curriculum Correlation to North Carolina 2023 K–12 Science Standards: Level 4

The *PhD Science* Level 4 curriculum partially aligns with the Grade 4 North Carolina 2023 K–12 Science Standards. A detailed analysis of alignment appears in the table below.

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

### Grade 4 Standards and Objectives

4

**Strand: Motion and Stability—Forces and Interactions**

| PS.4.1 | Explain how various forces affect the motion of an object. | Aligned PhD Science Lessons |
|---|---|---|
| PS.4.1.1 | Ask questions to summarize the relationship of magnetic interactions between two objects not in contact with each other. | Level 3 M4 L19–21 |
| PS.4.1.2 | Carry out investigations to explain how electrically charged objects push or pull on other objects to produce motion. | Level 3 M4 L20–21 |

**Strand: Energy**

| PS.4.2 | Understand that energy can be transferred from place to place by sound, light, heat, and electric currents. | Aligned PhD Science Lessons |
|---|---|---|
| PS.4.2.1 | Ask questions to identify basic forms of energy (light, sound, heat, and electrical) that cause motion or create change. | Level 4 M2 L1–26 |
| PS.4.2.2 | Use models to explain a simple electrical circuit and the necessary components. | Level 4 M2 L2, 4–5, 10–14 |
| PS.4.2.3 | Carry out investigations on common materials to classify them as insulators or conductors of electricity. | *PhD Science* does not cover this topic in the K–5 curriculum. |

**Strand: Waves and Their Applications in Technologies for Information Transfer**

| PS.4.3 | Understand the nature of light and how light interacts with objects. | Aligned PhD Science Lessons |
|---|---|---|
| PS.4.3.1 | Carry out investigations to infer the path light travels from a light source to a mirror and how it is reflected (by the mirror) using different angles. | Level 1 M2 L13–14<br>Level 4 M4 L3–4, 20–21 |
| PS.4.3.2 | Carry out investigations to explain how light is refracted and absorbed. | *PhD Science* does not cover this topic in the national K–5 curriculum. |

**Strand: From Molecules to Organisms—Structures and Processes**

| LS.4.1 | Understand the effects of environmental changes, adaptations, and behaviors that enable organisms to survive in changing habitats. | Aligned PhD Science Lessons |
|---|---|---|
| LS.4.1.1 | Use models to explain that plants and animals have external structures that function to support survival. | Level 4 M3 L11, 22–24, 26–28 |
| LS.4.1.2 | Use models to explain that animals receive different types of information through their senses, process the information, and respond to the information in different ways. | Level 4 M3 L1–6, 15–25, 29–31 |
| LS.4.1.3 | Engage in argument from evidence to explain how differences among animals of the same population sometimes gives individuals an advantage in surviving and reproducing in changing habitats. | Level 3 M3 L21–28 |

**Strand: Biological Evolution—Unity and Diversity**

| LS.4.2 | Understand the use of fossils as evidence of the history of Earth and its changing life forms. | Aligned PhD Science Lessons |
|---|---|---|
| LS.4.2.1 | Analyze and interpret data to compare fossils to one another and living organisms. | Level 3 M2 L1–8<br>Level 4 M1 L1–5 |
| LS.4.2.2 | Analyze and interpret data to explain how fossils suggest ideas about Earth's early environment. | Level 4 M1 L3–5 |

**Strand: Earth's Place in the Universe**

| ESS.4.1 | Understand the causes of day and night and phases of the moon. | Aligned PhD Science Lessons |
|---|---|---|
| ESS.4.1.1 | Use models to explain the cause of day and night based on the rotation of the Earth on its axis. | Level 5 M4 L5–12 |
| ESS.4.1.2 | Use models to explain the repeating pattern of the phases of the moon (new, crescent, quarter, gibbous, and full). | Level 5 M4 L13–17 |

**Strand: Earth's Systems**

| ESS.4.2 | Understand patterns of change in the Earth's surface over time. | Aligned PhD Science Lessons |
|---|---|---|
| ESS.4.2.1 | Carry out investigations to classify minerals using tests for the physical properties of hardness, color, luster, cleavage, and streak. | *PhD Science* does not cover this topic in the national K–5 curriculum. |
| ESS.4.2.2 | Carry out investigations to classify rocks as metamorphic, sedimentary, or igneous based on their composition, how they are formed, and the processes that create them. | *PhD Science* does not cover this topic in the national K–5 curriculum. |
| ESS.4.2.3 | Use models to explain changes in Earth's surface over time (to include slow changes of erosion and weathering, and fast changes of earthquakes, landslides, and volcanic activity). | Level 4 M1 L6–11, 19–20, 25–27 |

**Strand: Earth and Human Activity**

| ESS.4.3 | Understand changes caused by human impact on the environment. | Aligned PhD Science Lessons |
|---|---|---|
| ESS.4.3.1 | Ask questions to infer whether changes in an organism's environment are beneficial or harmful. | Level 3 M2 L16–28<br>Level 4 M1 L22 |
| ESS.4.3.2 | Engage in argument from evidence to explain how humans can adapt their behavior to live in changing environments (e.g., recycling wastes, establishing rain gardens, planting native species to prevent flooding and erosion). | Level 4 M1 L12–17, 25–27<br>Level 5 M3 L14–27 |
| ESS.4.3.3 | Obtain, evaluate, and communicate information to compare solutions to environmental problems impacting plants and animals. | Level 3 M2 L21–25<br>Level 5 M3 L17–18, 19–23 |

**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 |

## *PhD Science*® Curriculum Correlation to North Carolina 2023 K–12 Science Standards: Level 5

The *PhD Science* Level 5 curriculum partially aligns with the Grade 5 North Carolina 2023 K–12 Science Standards. A detailed analysis of alignment appears in the table below.

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

### Grade 5 Standards and Objectives

**Strand: Matter and Its Interactions**

| PS.5.1 | Understand the interactions of matter and energy and the changes that occur. | Aligned *PhD Science* Lessons |
|---|---|---|
| PS.5.1.1 | Carry out investigations to compare the weight of objects before and after an interaction. | Level 5 M1 L9–17, 23–26 |
| PS.5.1.2 | Carry out investigations to explain whether the mixing of two or more substances results in new substances. | Level 5 M1 L1–2, 13–26 |
| PS.5.1.3 | Carry out investigations to compare how heating and cooling affect some materials and how this relates to their purpose and practical applications. | Level 5 M1 L9–12 |

**Strand: Motion and Stability—Forces and Interactions**

| PS.5.2 | Understand force, motion, and the relationship between them. | Aligned *PhD Science* Lessons |
|---|---|---|
| PS.5.2.1 | Carry out investigations to explain how factors such as gravity, friction, and change in mass affect the motion of objects. | Level 3 M4 L1–21 |
| PS.5.2.2 | Use mathematics and computational thinking to infer the motion of an object (including position, direction, and speed). | Level 3 M4 L4–9 |

**Strand: From Molecules to Organisms—Structures and Processes**

| LS.5.1 | Understand how structures and systems of the human body perform functions necessary for life. | Aligned *PhD Science* Lessons |
|---|---|---|
| LS.5.1.1 | Use models to recognize the organizational structure of humans as a multicellular organism (cell, tissue, organ, system, organism). | *PhD Science* does not cover this topic in the K–5 curriculum. |
| LS.5.1.2 | Use models to compare the major systems of the human body (digestive, respiratory, circulatory, muscular, skeletal, nervous) as it relates to their functions necessary for life. | *PhD Science* does not cover this topic in the K–5 curriculum. |

**Strand: Ecosystems—Interactions, Energy, and Dynamics**

| LS.5.2 | Understand the interdependence of plants and animals with their ecosystem. | Aligned *PhD Science* Lessons |
|---|---|---|
| LS.5.2.1 | Engage in argument from evidence to compare the characteristics of several common ecosystems (including estuaries and salt marshes, oceans, lakes and ponds, rivers and streams, forests, and grasslands) in terms of their ability to support a variety of populations. | Level 5 M3 L4–5 |
| LS.5.2.2 | Use models to classify organisms within an ecosystem according to the function they serve: producers, consumers, or decomposers . | Level 5 M2 L1–2, 6–14, 20, 24–26 |
| LS.5.2.3 | Use models to infer the effects that may result from the interconnected relationships of plants and animals to their ecosystem. | Level 5 M2 L1–14, 20–26 |

**Strand: Heredity—Inheritance and Variation of Traits**

| LS.5.3 | Understand some characteristics of an organism are inherited and other characteristics are acquired. | Aligned *PhD Science* Lessons |
|---|---|---|
| LS.5.3.1 | Ask questions to compare instincts and learned behaviors. | Level 4 M3 L21 |
| LS.5.3.2 | Ask questions to compare inherited and acquired traits. | Level 3 M3 L14–18, 19–20, 26–28 |

**Strand: Earth's Systems**

| ESS.5.1 | Understand how Earth systems (hydrosphere and atmosphere) impact patterns of weather and climate. | Aligned *PhD Science* Lessons |
|---|---|---|
| ESS.5.1.1 | Analyze and interpret data to compare daily and seasonal changes in weather conditions (including wind speed and direction, precipitation, and temperature) and patterns. | Level 3 M1 L4–15, 19–20, 27–29 |
| ESS.5.1.2 | Analyze and interpret weather data to explain current and upcoming weather conditions (including severe weather such as hurricanes and tornadoes) in a given location. | Level 3 M1 L1–15, 19–20, 27–29 |
| ESS.5.1.3 | Construct an explanation to summarize the ocean's influences on weather and climate in North Carolina. | *PhD Science* does not cover this topic. |
| ESS.5.1.4 | Use models to explain how the sun's energy drives the processes of the water cycle (including evaporation, transpiration, condensation, precipitation). | Level 5 M3 L6–8 |

**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, 20–21, 22–26 |

| 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 |