

***PhD Science*[®] K–5 Curriculum Correlation to Nebraska’s College and Career Ready Standards for Science (CCR-Science)**

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PhD Science® Correlation to Nebraska’s College and Career Ready Standards for Science (CCR-Science): Level K

The *PhD Science* Level K curriculum aligns fully with the Kindergarten Nebraska CCR-Science Standards. A detailed analysis of alignment appears below.

Key: Module (M), Lesson (L)

Kindergarten Standards and Indicators

SC.K.1 Forces and Interactions: Pushes and Pulls	Aligned PhD Science Lessons
SC.K.1.1. Gather, analyze, and communicate evidence of forces and their interactions	Level K M2 L1–23
SC.K.1.1.A Plan and conduct an investigation to compare <u>the effects of</u> different strengths or different directions of pushes and pulls on the motion of an object.	Level K M2 L1–23
SC.K.1.1.B Analyze data to determine if a design solution works as intended <u>to change</u> the speed or direction of an object with a push or a pull.	Level K M2 L17–23

SC.K.7 Interdependent Relationships in Ecosystems: Animals, Plants, and Their Environment	Aligned PhD Science Lessons
SC.K.7.2 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.	Level K M3 L1–29 Level K M4 L1–28
SC.K.7.2.A Use observations to describe <u>patterns</u> of what plants and animals (including humans) need to survive.	Level K M3 L4–16, 19–22, 27–29
SC.K.7.2.B Construct an argument supported by evidence for how <u>plants and animals (including humans) can change the environment</u> to meet their needs.	Level K M4 L1–10, 14–16, 26–28
SC.K.7.2.C Use a model to represent <u>the relationship between the needs</u> of different plants or animals (including humans) <u>and the places</u> they live.	Level K M3 L1–3, 9–29 Level K M4 L1–2, 8–9, 11–13
SC.K.7.2.D Communicate solutions that will increase the positive <u>impact of</u> humans on the land, water, air, and/or other living things in the local environment.	Level K M4 L14–24, 26–28

SC.K.12 Weather and Climate	Aligned <i>PhD Science</i> Lessons
SC.K.12.3 Gather, analyze, and communicate evidence of weather and climate.	Level K M1 L1–30 Level K M4 L25
SC.K.12.3.A Use and share observations of local weather conditions <u>to describe patterns</u> over time.	Level K M1 L1–11, 17–24, 28–30 Level K M4 L25
SC.K.12.3.B Ask questions to obtain information about the purpose of <u>weather forecasting</u> to prepare for, and respond to, severe weather.	Level K M1 L22–30
SC.K.12.3.C Make observations to determine <u>the effect of</u> sunlight on Earth’s surface.	Level K M1 L8–11, 28–30
SC.K.12.3.D Use tools and materials to design and build a structure that will reduce the warming <u>effect</u> of sunlight on an area.	Level K M1 L12–16, 28–30
SC.K.12.3.E 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

PhD Science® Correlation to Nebraska’s College and Career Ready Standards for Science (CCR-Science): Level 1

The *PhD Science* Level 1 curriculum aligns fully with the Grade 1 Nebraska CCR-Science Standards. A detailed analysis of alignment appears below.

Key: Module (M), Lesson (L)

Grade 1 Standards and Indicators

SC.1.2 Waves: Light and Sound	Aligned PhD Science Lessons
SC.1.2.1 Gather, analyze, and communicate evidence of light and sound waves.	Level 1 M3 L1–29
SC.1.2.1.A Plan and conduct investigations to <u>provide evidence</u> that vibrating materials <u>can make</u> sound and that sound <u>can make</u> materials vibrate.	Level 1 M3 L1–17, 26–29
SC.1.2.1.B Make observations to construct an <u>evidence-based account</u> that objects can be seen <u>only when illuminated</u> .	Level 1 M2 L1–9, 21–23
SC.1.2.1.C Plan and conduct an investigation to <u>determine the effect of</u> placing objects made with different materials in the path of a beam of light.	Level 1 M2 L1–3, 10–23
SC.1.2.1.D Use tools and materials to design and build a <u>device that uses light or sound to solve the problem of communicating over a distance</u> .	Level 1 M3 L18–29

SC.1.6 Structure, Function, and Information Processing	Aligned PhD Science Lessons
SC.1.6.2 Gather, analyze, and communicate evidence to show the relationship between structure and function in living things.	Level 1 M1 L1–29
SC.1.6.2.A Use materials to design a solution to a human problem by <u>mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.</u>	Level 1 M1 L1–21, 27–29
SC.1.6.2.B Develop a simple sketch, drawing, or physical model to illustrate how the <u>shape of an object helps it function</u> as needed to solve a given problem.	Level 1 M3 L21–25
SC.1.6.2.C Read texts and use media to determine patterns in a behavior of parents and offspring that help offspring survive.	Level 1 M1 L24–29
SC.1.6.2.D Make observations to construct an evidence-based account that young plants and animals <u>are like, but not exactly like,</u> their parents.	Level 1 M1 L22–23, 26–29

SC.1.11 Space Systems: Patterns and Cycles	Aligned PhD Science Lessons
SC.1.11.3 Gather, analyze, and communicate evidence of patterns and cycles of space systems.	Level 1 M4 L1–25
SC.1.11.3.A Use observations of the sun, moon, and stars <u>to describe patterns</u> that can be predicted.	Level 1 M4 L1–8, 14–25
SC.1.11.3.B Make observations at different times of the year <u>to relate the amount of daylight to the time of year.</u>	Level 1 M4 L9–13, 23–25

PhD Science® Correlation to Nebraska’s College and Career Ready Standards for Science (CCR-Science): Level 2

The *PhD Science* Level 2 curriculum aligns fully with the Grade 2 Nebraska CCR-Science Standards. A detailed analysis of alignment appears below.

Key: Module (M), Lesson (L)

Grade 2 Standards and Indicators

SC.2.3 Structure and Properties of Matter	Aligned PhD Science Lessons
SC.2.3.1 Gather, analyze, and communicate evidence of the structure, properties, and interactions of matter.	Level 2 M1 L1–31 Level 2 M2 L3–4, L14–17
SC.2.3.1.A Plan and conduct an investigation <u>to describe and classify</u> different kinds of materials <u>by their observable properties</u> .	Level 2 M1 L1–9, 12–16, 19, 23, 29–31 Level 2 M2 L3–4, 14–17
SC.2.3.1.B Analyze data obtained from testing different materials <u>to determine</u> which materials <u>have the properties that are best suited</u> for an intended purpose.	Level 2 M1 L20–31
SC.2.3.1.C 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
SC.2.3.1.D Make observations to construct an evidence-based account of how an object made of a small set of pieces <u>can be disassembled and made into a new object</u> .	Level 2 M1 L10–11, 29–31
SC.2.3.1.E Construct an argument with evidence that <u>some changes caused by</u> heating or cooling can be reversed and some cannot.	Level 2 M1 L14–19, 29–31

SC.2.7 Interdependent Relationships in Ecosystems	Aligned PhD Science Lessons
SC.2.7.2 Gather, analyze, and communicate evidence of interdependent relationships in ecosystems.	Level 2 M3 L1–29 Level 2 M4 L1–25
SC.2.7.2.A Plan and conduct an investigation to <u>determine if</u> plants need sunlight and water to grow.	Level 2 M3 L1–7, 25–29
SC.2.7.2.B Develop a simple model that <u>mimics the function</u> of an animal in dispersing seeds or pollinating plants.	Level 2 M3 L8–29
SC.2.7.2.C Make observations of plants and animals to compare <u>the diversity of life in different habitats</u> .	Level 2 M4 L1–3, 7–25

SC.2.13 Earth's Systems: Processes That Shape the Earth	Aligned PhD Science Lessons
SC.2.13.3 Gather, analyze, and communicate evidence of the processes that shape the earth.	Level 2 M2 L1–25 Level 2 M4 L1–6, 11–16, 20–21, 23–25
SC.2.13.3.A Use information from several sources to provide evidence that Earth <u>events can occur quickly or slowly</u> .	Level 2 M2 L18–24
SC.2.13.3.B Compare multiple solutions designed to <u>slow or prevent</u> wind or water from changing the shape of the land.	Level 2 M2 L1–17, 20, 22–24
SC.2.13.3.C Develop a model to represent the <u>shapes and kinds</u> of land and bodies of water <u>in an area</u> .	Level 2 M2 L1–2, 5–6 Level 2 M4 L1–6, 11–16, 20–21, 23–25
SC.2.13.3.D Obtain information to identify <u>where water is found on Earth</u> and that it can be solid or liquid.	Level 2 M4 L1–6, 16, 22–25

PhD Science® Correlation to Nebraska’s College and Career Ready Standards for Science (CCR-Science): K–2 Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts

The *PhD Science* K–2 curriculum fully aligns with the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts identified in *A Framework for K–12 Science Education* (NRC 2012)¹. An analysis of that alignment follows.

Key: Module (M), Lesson (L)

Science and Engineering Practices	Aligned <i>PhD Science</i> Lessons
Asking Questions and Defining Problems	Level K M1 L1–9, 12–16, 22–26 Level K M2 L1–3, 9 Level K M3 L1–8, 14–16, 22, 27–29 Level 1 M1 L1–3, 11–15 Level 1 M2 L1–3 Level 1 M3 L1–3 Level 1 M4 L1–3, 14–16 Level 2 M1 L1–3 Level 2 M2 L1–2 Level 2 M3 L1–6, 14–18 Level 2 M4 L1–3

¹ NRC (National Research Council). 2012. *A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Committee on a Conceptual Framework for New K–12 Science Education Standards. Board on Science Education, Division of Behavioral and Social Sciences and Education. Washington, DC: The National Academies Press

Science and Engineering Practices	Aligned <i>PhD Science</i> Lessons
<p>Developing and Using Models</p>	<p>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 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 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</p>
<p>Planning and Carrying Out Investigations</p>	<p>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 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 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</p>

Science and Engineering Practices	Aligned <i>PhD Science</i> Lessons
<p>Analyzing and Interpreting Data</p>	<p>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 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 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</p>
<p>Using Mathematics and Computational Thinking</p>	<p>Level K M1 L17–21, 25–30 Level K M2 L17–20 Level 1 M2 L15–18 Level 1 M3 L21–25 Level 2 M1 L20–22 Level 2 M2 L14–17 Level 2 M3 L8–11, 23–29 Level 2 M4 L7–8, 17–22</p>
<p>Constructing Explanations and Designing Solutions</p>	<p>Level K M2 L17–20 Level K M3 L4–16, 23–29 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 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</p>

Science and Engineering Practices	Aligned <i>PhD Science</i> Lessons
Engaging in Argument from Evidence	Level K M3 L17–21, 27–29 Level K M4 L3–5, 11–13, 25 Level 1 M3 L4–6, 8–9, 18–20 Level 1 M4 L4–25 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	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 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 Level 2 M1 L29–31 Level 2 M2 L1–2, 5–6, 14–19, 22–24 Level 2 M3 L8–12, 14–20, 25–29 Level 2 M4 L4–9, 11–16, 23–25

Disciplinary Core Ideas	Aligned <i>PhD Science</i> Lessons
PS1 Matter and Its Interactions	Level 2 M1 L1–31 Level 2 M2 L3–4, 14–17
PS2 Motion and Stability: Forces and Interactions	Level K M2 L1–23
PS3 Energy	Level K M1 L8–16, 28–30
PS4 Waves and Their Applications in Technologies for Information Transfer	Level 1 M2 L1–23 Level 1 M3 L1–29
LS1 From Molecules to Organisms: Structures and Processes	Level K M3 L4–16, 19–22, 27–29 Level 1 M1 L1–21, 27–29
LS2 Ecosystems: Interactions, Energy, and Dynamics	Level 2 M3 L1–29
LS3 Heredity: Inheritance and Variation of Traits	Level 1 M1 L22–23, 26–29
LS4 Biological Evolution: Unity and Diversity	Level 2 M4 L1–3, 7–25
ESS1 Earth’s Place in the Universe	Level 1 M4 L1–25 Level 2 M2 L18–24
ESS2 Earth’s Systems	Level K M1 L1–11, 17–24, 28–30 Level K M4 L1–10, 14–16, 25–28 Level 2 M2 L1–17, 20, 22–24 Level 2 M4 L1–6, 11–16, 20–25
ESS3 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
ETS1 Engineering Design	Level K M1 L4–7, 12–16 Level K M2 L17–20 Level K M4 L20–24 Level 1 M1 L11–15 Level 1 M3 L21–25 Level 2 M1 L24–28 Level 2 M2 L8–12, 14–17 Level 2 M3 L14–18

Crosscutting Concepts	Aligned <i>PhD Science</i> Lessons
Patterns	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 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 Level 2 M1 L4–9 Level 2 M2 L1–2, 5–6 Level 2 M4 L1–8, 11–15, 20–21, 23–25
Cause and Effect	Level K M2 L4–23 Level K M4 L3–5, 10, 14–19, 26–28 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 Level 2 M1 L14–19, 29–31 Level 2 M2 L8–12, 20–21 Level 2 M3 L3–11
Scale, Proportion, and Quantity	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

Crosscutting Concepts	Aligned <i>PhD Science</i> Lessons
Systems and System Models	Level K M3 L1–3, 9–13, 19–21, 23–25, 27–29 Level K M4 L1–9, 11–16 Level 1 M1 L1–8, 16–17 Level 1 M2 L1–3, 10–23 Level 1 M3 L1–3, 8–10, 14, 21–29 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
Energy and Matter	Level 2 M1 L10–11, 29–31 Level 2 M2 L3–4, 8–13, 22–24
Structure and Function	Level K M1 L10–16 Level K M4 L20–24 Level 1 M1 L4–15, 27–29 Level 1 M3 L8–9 Level 2 M1 L24–28 Level 2 M2 L14–17 Level 2 M3 L8–11, 14–22
Stability and Change	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

Connections to Engineering, Technology, and Applications of Science	Aligned PhD Science Lessons
Interdependence of Science, Engineering, and Technology	Level K M3 L1–3 Level K M4 L25 Level 2 M3 L3–6, 14–18
Influence of Engineering, Technology, and Science on Society and the Natural World	Level K M4 L11–13, 18–19 Level 1 M1 L10–15 Level 1 M3 L20 Level 2 M2 L8–9, 14–17 Level 2 M3 L14–18

PhD Science® Correlation to Nebraska’s College and Career Ready Standards for Science (CCR-Science): Level 3

The *PhD Science* Level 3 curriculum aligns fully with the Grade 3 Nebraska CCR-Science Standards. A detailed analysis of alignment appears below.

Grade 3 Standards and Indicators

SC.3.1 Forces and Interactions: Motion and Stability	Aligned PhD Science Lessons
SC.3.1.1 Gather, analyze, and communicate evidence of forces and their interactions.	Level 3 M4 L1-30
SC.3.1.1.A Plan and conduct an investigation to provide evidence of <u>the effects of</u> balanced and unbalanced forces on the motion of an object.	Level 3 M4 L10–18, 28–30
SC.3.1.1.B Make observations and/or measurements of an object’s motion to provide evidence that a <u>pattern</u> can be used to predict future motion.	Level 3 M4 L1–9, 28–30
SC.3.1.1.C Ask questions to determine <u>cause and effect</u> relationships of electrical or magnetic interactions between two objects not in contact with each other.	Level 3 M4 L19–21, 28–30
SC.3.1.1.D Define a simple design problem that can be <u>solved by applying scientific ideas</u> about magnets.	Level 3 M4 L22–30

SC.3.7 Interdependent Relationships in Ecosystems	Aligned PhD Science Lessons
SC.3.7.2 Gather and analyze data to communicate an understanding of the interdependent relations in ecosystems.	Level 3 M2 L1–2, 9–12, 16–19, 22–28
SC.3.7.2.A Construct an argument that some animals <u>form groups that help members survive</u> .	Level 3 M2 L13–15, 26–28
SC.3.7.2.B Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived <u>long ago</u> .	Level 3 M2 L1–8, 26–28
SC.3.7.2.C Construct an argument with evidence that in a particular habitat some organisms <u>can survive well, some survive less well, and some cannot survive at all</u> .	Level 3 M2 L1–2, 9–12, 16–19, 22–28
SC.3.7.2.D Make a claim about the merit of a solution to a problem caused when <u>the environment changes and the types of plants and animals that live there</u> may change.	Level 3 M2 L16–28
SC.3.7.2.E Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	Level 3 M2 L22–25

SC.3.9 Inheritance and Variation: Life Cycles and Traits	Aligned PhD Science Lessons
SC.3.9.3 Gather and analyze data to communicate an understanding of inheritance and variation of traits through life cycles and environmental influences.	Level 3 M3 L7–8, 23–28
SC.3.9.3.A Develop models to describe that organisms have unique and diverse life cycles but all <u>have in common</u> birth, growth, reproduction, and death.	Level 3 M3 L7–8, 23–28
SC.3.9.3.B Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that <u>variation of these traits exists</u> in a group of similar organisms.	Level 3 M3 L1–6, 14–18, 26–28
SC.3.9.3.C Use evidence to support the explanation that traits <u>can be influenced by</u> the environment.	Level 3 M3 L9–13, 19–20, 26–28
SC.3.9.3.D Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species <u>may provide advantages</u> in surviving, finding mates, and reproducing.	Level 3 M3 L21–28

SC.3.12 Weather and Climate	Aligned PhD Science Lessons
SC.3.12.4 Gather and analyze data to communicate an understanding of weather and climate.	Level 3 M1 L1–15, 19–20, 27–29
SC.3.12.4.A Represent data in table, pictograph, and bar graph displays to describe typical weather conditions <u>expected during a particular season</u> .	Level 3 M1 L1–15, 19–20, 27–29
SC.3.12.4.B Obtain and combine information to describe <u>climates in different regions</u> of the world.	Level 3 M1 L11–15, 27–29
SC.3.12.4.C Make a claim about the merit of a design solution that <u>reduces the impacts</u> of a weather-related hazard.	Level 3 M1 L1–3, 16–29

PhD Science® Correlation to Nebraska’s College and Career Ready Standards for Science (CCR-Science): Level 4

The *PhD Science* Level 4 curriculum aligns fully with the Grade 4 Nebraska CCR-Science Standards. A detailed analysis of alignment appears below.

Key: Module (M), Lesson (L)

Grade 4 Standards and Indicators

SC.4.2 Waves: Waves and Information	Aligned PhD Science Lessons
SC.4.2.1 Gather, analyze, and communicate evidence of waves and the information they transfer.	Level 4 M3 L7-14, 18-27, 29-31
SC.4.2.1.A Develop a model of waves to describe <u>patterns</u> in terms of amplitude and wavelength and that waves can cause objects to move.	Level 4 M3 L7–14, 29–31
SC.4.2.1.B Generate and compare multiple solutions that use <u>patterns</u> to transfer information.	Level 4 M4 L18–27

SC.4.4 Energy: Conservation and Transfer	Aligned PhD Science Lessons
SC.4.4.2 Gather, analyze and communicate evidence of energy conservation and transfer.	Level 4 M2 L1-11, 24-26
SC.4.4.2.A Use evidence to construct an explanation relating the speed of an object to the <u>energy of that object</u> .	Level 4 M2 L6–7, 24–26
SC.4.4.2.B Make observations to provide evidence that <u>energy can be transferred</u> from place to place by sound, light, heat, and electrical currents.	Level 4 M2 L1–5, 10–11, 24–26
SC.4.4.2.C Ask questions and predict outcomes about the <u>changes in energy</u> that occur when objects collide.	Level 4 M2 L8–9, 24–26
SC.4.4.2.D Apply scientific ideas to design, test, and refine a device that converts <u>energy from one form to another</u> .	Level 4 M2 L12–26
SC.4.4.2.E Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.	Level 4 M4 L14–17
SC.4.4.2.F Obtain and combine information to describe that energy and fuels are derived from natural resources and that their <u>uses affect the environment</u> .	Level 4 M1 L21–27

SC.4.6 Structure, Function, and Information Processing	Aligned PhD Science Lessons
SC.4.6.3 Gather and analyze data to communicate an understanding of structure, function and information processing of living things.	Level 4 M3 L1-6, 15-31 Level 4 M4 L1-17, 25-27
SC.4.6.3.A Develop a model to describe that light reflecting from objects and entering the eyes <u>allows</u> objects to be seen.	Level 4 M4 L1–17, 25–27
SC.4.6.3.B Construct an argument that <u>plants and animals have internal and external structures that function to support</u> survival, growth, behavior, and reproduction.	Level 4 M3 L1–6, 20, 26–31
SC.4.6.3.C Use a model to describe that animals <u>receive different types of information through their senses, process the information in their brain,</u> and respond to the information.	Level 4 M3 L1–6, 15–25, 29–31

SC.4.13 Earth's Systems: Processes That Shape the Earth	Aligned PhD Science Lessons
SC.4.13.4 Gather and analyze data to communicate an understanding of Earth's systems and processes that shape the Earth.	Level 4 M1 L1-20, 25-27
SC.4.13.4.A Identify evidence from <u>patterns</u> in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	Level 4 M1 L1–5, 19–20, 25–27
SC.4.13.4.B Make observations and/or measurements to provide evidence of the <u>effects of</u> weathering or the rate of erosion by water, ice, wind, or vegetation.	Level 4 M1 L6–11, 25–27
SC.4.13.4.C Analyze and interpret data from maps to describe <u>patterns</u> of Earth's features.	Level 4 M1 L18–20, 25–27
SC.4.13.4.D Generate and compare multiple solutions to <u>reduce the impacts</u> of natural Earth processes on humans.	Level 4 M1 L12–17, 25–27

PhD Science® Correlation to Nebraska’s College and Career Ready Standards for Science (CCR-Science): Level 5

The *PhD Science* Level 5 fully with the Grade 4 Nebraska CCR-Science Standards. A detailed analysis of alignment appears below.

Key: Module (M), Lesson (L)

Grade 5 Standards and Indicators

SC.5.3 Structure and Properties of Matter	Aligned PhD Science Lessons
SC.5.3.1 Gather, analyze, and communicate evidence of structure and properties of matter.	Level 5 M1 L1-26
SC.5.3.1.A Develop a model to describe that matter is made of particles <u>too small to be seen</u> .	Level 5 M1 L5–10, 23–26
SC.5.3.1.B Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the <u>total weight of matter is conserved</u> .	Level 5 M1 L9–17, 23–26
SC.5.3.1.C Make observations and measurements to identify materials <u>based on their properties</u> .	Level 5 M1 L1–4, 11–17, 23–26
SC.5.3.1.D Conduct an investigation to determine whether the mixing of two or more substances <u>results in</u> new substances.	Level 5 M1 L1–2, 13–26

SC.5.8 Matter and Energy in Organisms and Ecosystems	Aligned PhD Science Lessons
SC.5.8.2 Gather and analyze data to communicate understanding of matter and energy in organisms and ecosystems.	Level 5 M2 L1-26
SC.5.8.2.A Use models to describe that energy in animals’ food (used for body repair, growth, and motion and to maintain body warmth) was once <u>energy from the sun</u> .	Level 5 M2 L15–19, 24–26
SC.5.8.2.B Support an argument that plants get the <u>materials they need</u> for growth chiefly <u>from air and water</u> .	Level 5 M2 L3–5, 24–26
SC.5.8.2.C Develop a model to describe the <u>movement of matter among plants, animals, decomposers, and the environment</u> .	Level 5 M2 L1–2, 6–14, 20, 24–26

SC.5.11 Space Systems: Earth's Stars and Solar System	Aligned PhD Science Lessons
SC.5.11.3 Gather and analyze data to communicate understanding of space systems: Earth's stars and solar system.	Level 5 M4 L1-26
SC.5.11.3.A Support an argument that the gravitational force <u>exerted by Earth on objects</u> is directed down.	Level 5 M4 L3-4, 24-26
SC.5.11.3.B Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their <u>relative distances</u> from Earth.	Level 5 M4 L18-19, 24-26
SC.5.11.3.C Represent data in graphical displays to reveal <u>patterns</u> of daily changes in the 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

SC.5.13 Earth's Systems	Aligned PhD Science Lessons
SC.5.13.4 Gather and analyze data to communicate understanding of Earth's systems.	Level 5 M3 L1-27
SC.5.13.4.A Develop a model using an example to describe ways in which <u>the geosphere, biosphere, hydrosphere, and/or atmosphere interact</u> .	Level 5 M3 L1-3, 6-13, 19-27
SC.5.13.4.B Describe and graph <u>the amounts</u> of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	Level 5 M3 L4-5, 19-27
SC.5.13.4.C Obtain and combine information about ways individual communities use science ideas to protect the <u>Earth's resources and environment</u> .	Level 5 M3 L14-18, 24-27
SC.5.13.4.D Define a simple design problem that can be solved by applying scientific ideas about the conservation of fresh water <u>on Earth</u> .	Level 5 M3 L4-5, 19-27
SC.5.13.4.E Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.	Level 5 M2 L21-23

PhD Science® Correlation to Nebraska’s College and Career Ready Standards for Science (CCR-Science): 3–5 Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts

The *PhD Science* 3–5 curriculum fully aligns with the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts identified in *A Framework for K–12 Science Education* (NRC 2012). An analysis of that alignment follows.

Key: Module (M), Lesson (L)

Science and Engineering Practices	Aligned <i>PhD Science</i> Lessons
Asking Questions and Defining Problems	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 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 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

Science and Engineering Practices	Aligned <i>PhD Science</i> Lessons
<p>Developing and Using Models</p>	<p>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 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 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</p>
<p>Planning and Carrying Out Investigations</p>	<p>Level 3 M2 L4–5 Level 3 M3 L12–13 Level 3 M4 L7–18, 23–30 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 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</p>

Science and Engineering Practices	Aligned <i>PhD Science</i> Lessons
<p>Analyzing and Interpreting Data</p>	<p>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 Level 4 M1 L12–20, 23–24, 26–27 Level 4 M2 L25–26 Level 4 M4 L10–17 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</p>
<p>Using Mathematics and Computational Thinking</p>	<p>Level 3 M1 L4–12 Level 3 M2 L3, 16–19 Level 3 M3 L7–8 Level 3 M4 L23–27 Level 4 M2 L8–9 Level 4 M4 L14–17 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 Level 5 M1 L3–4, 15–17 Level 5 M3 L10–11, 24–27 Level 5 M4 L5–6, 25–26</p>

Science and Engineering Practices	Aligned <i>PhD Science</i> Lessons
Constructing Explanations and Designing Solutions	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 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 L14–27Level 5 M1 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	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 Level 4 M3 L21–23, 26–28, 30–31 Level 4 M4 L7–8 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	Level 3 M1 L11–17, 28–29 Level 3 M2 L13–15, 20–21 Level 3 M4 L22 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 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	Aligned <i>PhD Science</i> Lessons
PS1 Matter and Its Interactions	Level 5 M1 L1–26
PS2 Motion and Stability: Forces and Interactions	Level 3 M4 L1–30 Level 5 M4 L3–4, 24–26
PS3 Energy	Level 4 M2 L1–26 Level 5 M2 L6–7, 15–19, 24–26
PS4 Waves and Their Applications in Technologies for Information Transfer	Level 4 M3 L7–14, 29–31 Level 4 M4 L1–27
LS1 From Molecules to Organisms: Structures and Processes	Level 3 M3 L7–8, 23–28 Level 4 M3 L1–6, 15–31 Level 5 M2 L3–5, 8–9, 15–19, 24–26
LS2 Ecosystems: Interactions, Energy, and Dynamics	Level 3 M2 L13–28 Level 5 M2 L1–2, 6–14, 20, 24–26
LS3 Heredity: Inheritance and Variation of Traits	Level 3 M3 L1–6, 9–20, 23–28
LS4 Biological Evolution: Unity and Diversity	Level 3 M2 L1–12, 16–28 Level 3 M3 L21–28
ESS1 Earth’s Place in the Universe	Level 4 M1 L1–5, 19–20, 25–27 Level 5 M4 L1–2, 5–26
ESS2 Earth’s Systems	Level 3 M1 L1–15, 19–20, 27–29 Level 4 M1 L6–11, 18–20, 25–27 Level 5 M3 L1–13, 24–27
ESS3 Earth and Human Activity	Level 3 M1 L1–3, 16–29 Level 4 M1 L12–17, 21–27 Level 5 M3 L14–27

Disciplinary Core Ideas	Aligned <i>PhD Science</i> Lessons
ETS1 Engineering Design	Level 3 M1 L21–26 Level 3 M2 L22–25 Level 3 M4 L23–27 Level 4 M1 L12–17 Level 4 M2 L17–23 Level 4 M4 L14–17 Level 5 M1 L18–22 Level 5 M2 L21–23 Level 5 M3 L19–23

Crosscutting Concepts	Aligned <i>PhD Science</i> Lessons
<p>Patterns</p>	<p>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 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 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</p>
<p>Cause and Effect</p>	<p>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 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 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</p>

Crosscutting Concepts	Aligned <i>PhD Science</i> Lessons
<p>Scale, Proportion, and Quantity</p>	<p>Level 3 M1 L4–10 Level 3 M2 L1–2, 27–28 Level 3 M3 L1–3, 14–15 Level 4 M1 L3–5 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</p>
<p>Systems and System Models</p>	<p>Level 3 M1 L1–3, 16–20 Level 3 M2 L6–15, 20–28 Level 3 M3 L9–11 Level 3 M4 L1–30 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 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</p>
<p>Energy and Matter</p>	<p>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</p>
<p>Structure and Function</p>	<p>Level 3 M2 L1–3, 9–12 Level 3 M3 L4–6, 21–28 Level 4 M3 L4–6, 20, 24–25, 29–31 Level 4 M4 L7–9, 25–27</p>

Crosscutting Concepts	Aligned <i>PhD Science</i> Lessons
<p>Stability and Change</p>	<p>Level 3 M1 L4–15, 27–29 Level 3 M2 L16–19 Level 3 M3 L7–8, 12–13, 19–20, 26–28 Level 4 M1 L3–11, 18–20, 25–27 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</p>

Connections to Engineering, Technology, and Applications of Science	Aligned <i>PhD Science</i> Lessons
<p>Interdependence of Science, Engineering, and Technology</p>	<p>Level 3 M2 L22–25 Level 3 M4 L22–27 Level 4 M1 L12–17 Level 4 M4 L22–24 Level 5 M4 L7–8</p>
<p>Influence of Engineering, Technology, and Science on Society and the Natural World</p>	<p>Level 3 M1 L21–26 Level 3 M2 L22–25 Level 3 M4 L22–27 Level 4 M1 L12–17, 23–24 Level 4 M2 L15–23 Level 4 M4 L14–17 Level 5 M2 L21–23 Level 5 M3 L19–23</p>