Wisconsin Standards for Science Correlation to *PhD Science*™

Green indicates that *PhD Science*™ fully addresses the standard within the grade level.

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

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

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

Key: Module (M), Lesson (L)

PhD SCIENCE LEVEL 3

The Grade 3 Wisconsin Standards for Science are almost entirely covered by the Level 3 *PhD Science* curriculum: Standard 3-ETS3-1 is partially covered but not in the detail specified. A detailed analysis of alignment appears in the table below.

Crosscutting Concepts			**Aligned *PhD Science* Lessons**
Patterns			
SCI.CC1 Students use science and engineering practices, disciplinary core ideas, and ***patterns*** to make sense of phenomena and solve problems.			
SCI.CC1.3–5	Students identify similarities and differences in order to sort and classify natural objects and designed products. They identify patterns related to time, including simple rates of change and cycles, and use these patterns to make predictions.		Level 3 M1 L11–L15 Level 3 M1 L19–L20 Level 3 M1 L27–L29 Level 3 M2 L3–L8 Level 3 M2 L13–L15 Level 3 M3 L1–L8 Level 3 M3 L14–L18 Level 3 M3 L26–L28 Level 3 M4 L1–L9 Level 3 M4 L28–L30
Cause and Effect			
SCI.CC2 Students use science and engineering practices, disciplinary core ideas, and ***cause and effect*** relationships to make sense of phenomena and solve problems.			
SCI.CC2.3–5	Students routinely identify and test causal relationships and use these relationships to explain change. They understand events that occur together with regularity may or may not signify a cause and effect relationship.		Level 3 M1 L1–L3 Level 3 M1 L16–L18 Level 3 M1 L21–L29 Level 3 M2 L9–L12 Level 3 M2 L16–L28 Level 3 M3 L9–L13 Level 3 M3 L19–L25 Level 3 M4 L1–L3 Level 3 M4 L10–L30

Scale, Proportion, and Quantity			
SCI.CC3 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***scale, proportion, and quantity*** to make sense of phenomena and solve problems.			
SCI.CC3.3–5	Students recognize natural objects and observable phenomena exist from the very small to the immensely large. They use standard units to measure and describe physical quantities such as mass, time, temperature, and volume.		Level 3 M1 L4–L10 Level 3 M2 L1–L2 Level 3 M3 L1–L3 Level 3 M3 L14–L15
Systems and System Models			
SCI.CC4 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***systems and models*** to make sense of phenomena and solve problems.			
SCI.CC4.3–5	Students understand a system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. They also describe a system in terms of its components and their interactions.		Level 3 M1 L1–L3 Level 3 M1 L16–L20 Level 3 M2 L6–L15 Level 3 M2 L20–L28 Level 3 M3 L9–L11 Level 3 M4 L1–L30
Energy and Matter			
SCI.CC5 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***energy and matter*** to make sense of phenomena and solve problems.			
SCI.CC5.3–5	Students understand matter is made of particles and energy can be transferred in various ways and between objects. Students observe the conservation of matter by tracking matter flows and cycles before and after processes, recognizing the total mass of substances does not change.		Level 4 M2 L1–L3 Level 4 M2 L8–L26 Level 4 M3 L10–L19 Level 5 M1 L5–L8 Level 5 M1 L13–L14 Level 5 M1 L23–L26 Level 5 M2 L6–L11 Level 5 M2 L14–L19 Level 5 M2 L24–L26 Level 5 M3 L10–L11 Level 5 M4 L3–L4
Structure and Function			
SCI.CC6 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***structure and function*** to make sense of phenomena and solve problems.			
SCI.CC6.3–5	Students understand different materials have different substructures, which can sometimes be observed; and substructures have shapes and parts that serve functions.		Level 4 M3 L4–L6 Level 4 M3 L20 Level 4 M3 L24–L25 Level 4 M3 L29–L31 Level 4 M4 L7–L9 Level 4 M4 L25–L27
Stability and Change			
SCI.CC7 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***stability and change*** to make sense of phenomena and solve problems.			
SCI.CC7.3–5	Students measure change in terms of differences over time, and observe that change may occur at different rates. They understand some systems appear stable, but over long periods of time they will eventually change.		Level 3 M1 L4–L15 Level 3 M1 L27–L29 Level 3 M2 L16–L19 Level 3 M3 L7–L8 Level 3 M3 L12–L13 Level 3 M3 L19–L20 Level 3 M3 L26–L28

Science and Engineering Practices			Aligned *PhD Science* Lessons
Asking Questions and Defining Problems			
SCI.SEP1 Students ***ask questions and define problems***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP1.A: Asking Questions			
SCI.SEP1.A.3–5	Students ask questions that specify qualitative relationships. This includes the following: • Ask questions about what would happen if a variable is changed. • Identify scientific (testable) and non-scientific (non-testable) questions. • Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.		Level 3 M1 L1–L3 Level 3 M1 L21–L26 Level 3 M2 L1–L2 Level 3 M3 L1–L3 Level 3 M3 L12–L13 Level 3 M4 L1–L3 Level 3 M4 L7–L9 Level 3 M4 L15–L16 Level 3 M4 L19–L30
SCI.SEP1.B: Defining Problems			
SCI.SEP1.B.3–5	Students use prior knowledge to describe and define simple design problems that can be solved through the development of an object, tool, process, or system. They include several criteria for success and constraints on materials, time, or cost.		Level 5 M2 L21–L23
Developing and Using Models			
SCI.SEP2 Students ***develop and use models***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP2.A: Developing Models			
SCI.SEP2.A.3–5	Students build and revise simple models and use models to represent events and design solutions. This includes the following: • Identify limitations of models. • Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events. • Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. • Develop and/or use models to describe or predict phenomena. • Develop a diagram or simple physical prototype to convey a proposed object, tool, or process. • Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.		Level 3 M1 L1–L3 Level 3 M1 L19–L20 Level 3 M2 L1–L3 Level 3 M2 L6–L12 Level 3 M2 L22–L25 Level 3 M3 L7–L11 Level 3 M3 L21–L25 Level 3 M4 L1–L3 Level 3 M4 L17–L18 Level 3 M4 L23–L27
Planning and Carrying Out Investigations			
SCI.SEP3 Students ***plan and carry out investigations*****,** in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP3.A: Planning and Conducting Investigations			
SCI.SEP3.A.3–5	Students plan and carry out investigations that control variables and provide evidence to support explanations or design solutions. This includes the following:		Level 3 M2 L4–L5 Level 3 M3 L12–L13 Level 3 M4 L7–L18 Level 3 M4 L23–L30

	• Collaboratively plan and conduct an investigation to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. • Evaluate appropriate methods and tools for collecting data. • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. • Make predictions about what would happen if a variable changes. • Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.		
Analyzing and Interpreting Data			
SCI.SEP4 Students ***analyze and interpret data***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP4.A: Analyze and Interpret Data			
SCI.SEP4.A.3–5	Students begin to use quantitative approaches to collect data and conduct multiple trials of qualitative observations. (When possible, digital tools should be used.) This includes the following: • Represent data in tables or various graphical displays (bar graphs, pictographs, and pie charts) to reveal patterns that indicate relationships. • Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, or computation. • Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings. • Analyze data to refine a problem statement or the design of a proposed object, tool, or process. • Use data to evaluate and refine design solutions.		Level 3 M1 L4–L15 Level 3 M1 L19–L20 Level 3 M1 L27–L29 Level 3 M2 L3–L8 Level 3 M2 L16–L19 Level 3 M3 L4–L8 Level 3 M3 L14–L20 Level 3 M4 L4–L9
Using Mathematics and Computational Thinking			
SCI.SEP5 Students use ***mathematics and computational thinking***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP5.A: Qualitative and Quantitative Data			
SCI.SEP5.A.3–5	Students extend quantitative measurements to a variety of physical properties, using computation and mathematics to analyze data and compare alternative design solutions. This includes the following: • Organize simple data sets to reveal patterns that suggest relationships. • Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems. • Create and use graphs or charts generated from simple algorithms to compare alternative solutions to an engineering problem.		Level 3 M1 L4–L15 Level 3 M1 L19–L20 Level 3 M1 L27–L29 Level 3 M2 L3–L8 Level 3 M2 L16–L19 Level 3 M3 L4–L8 Level 3 M3 L14–L20 Level 3 M4 L4–L9

Constructing Explanations and Designing Solutions			
SCI.SEP6 Students ***construct explanations and design solutions***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP6.A: Construct an Explanation			
SCI.SEP6.A.3–5	Students use evidence to construct explanations that specify variables which describe and predict phenomena. This includes the following: • Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard). • Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation. • Identify the evidence that supports particular points in an explanation.		Level 3 M1 L13–L15 Level 3 M1 L18 Level 3 M1 L21–L29 Level 3 M2 L6–L8 Level 3 M2 L22–L28 Level 3 M3 L9–L11 Level 3 M3 L14–L15 Level 3 M3 L21–L28 Level 3 M4 L10–L14 Level 3 M4 L19–L21 Level 3 M4 L28–L30
SCI.SEP6.B: Design Solutions			
SCI.SEP6.B.3–5	Students use evidence to create multiple solutions to design problems. This includes the following: • Apply scientific ideas to solve design problems. • Generate multiple solutions to a problem and compare how well they meet the criteria and constraints.		Level 3 M1 L21–L26 Level 3 M2 L9–L15 Level 3 M2 L20–L21 Level 3 M3 L16–L20 Level 3 M4 L12–L14
Engaging in Argument from Evidence			
SCI.SEP7 Students ***engage in argument from evidence***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP7.A: Argue from Evidence			
SCI.SEP7.A.3–5	Students critique the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world. This includes the following: • Compare and refine arguments based on an evaluation of the evidence presented. • Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation. • Respectfully provide and receive critiques from peers about a proposed procedure, explanation, or model by citing relevant evidence and posing specific questions. • Construct and/or support an argument with evidence, data, or a model. • Use data to evaluate claims about cause and effect. • Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.		Level 3 M1 L21–L26 Level 3 M2 L9–L15 Level 3 M2 L20–L21 Level 3 M3 L16–L20 Level 3 M4 L12–L14
Obtaining, Evaluating, and Communicating Information			
SCI.SEP8 Students will ***obtain, evaluate, and communicate information***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP8.A: Obtain, Evaluate, and Communicate Information			
SCI.SEP8.A.3–5	Students evaluate the merit and accuracy of ideas and methods. This includes the following: • Read and comprehend grade-appropriate complex texts and other reliable media to summarize and obtain scientific and		Level 3 M1 L11–L17 Level 3 M2 L13–L15 Level 3 M2 L20–L21 Level 3 M4 L22

	technical ideas, and describe how they are supported by evidence. • Compare and/or combine information across complex texts and other reliable media to support the engagement in scientific and engineering practices. • Combine information in written text with that contained in corresponding tables, diagrams, or charts to support the engagement in other scientific and engineering practices. • Obtain and combine information from books or other reliable media to explain phenomena or solutions to a design problem. • Communicate scientific and technical information orally or in written formats, including various forms of media, which may include tables, diagrams, and charts.		

Disciplinary Core Ideas			**Aligned *PhD Science* Lessons**
Life Science			
SCI.LS1 Students use science and engineering practices, crosscutting concepts, and an understanding of ***structures and processes (on a scale from molecules to organisms)*** to make sense of phenomena and solve problems.			
SCI.LS1.B: Growth and Development of Organisms			
SCI.LS1.B.3	Reproduction is essential to every kind of organism. Organisms have unique and diverse life cycles.		Level 3 M3 L7–L8 Level 3 M3 L23–L28
SCI.LS2 Students use science and engineering practices, crosscutting concepts, and an understanding of the ***interactions, energy, and dynamics within ecosystems*** to make sense of phenomena and solve problems.			
SCI.LS2.C: Ecosystem Dynamics, Functioning, and Resilience			
SCI.LS2.C.3	When the environment changes, some organisms survive and reproduce, some move to new locations, some move into transformed environments, and some die.		Level 3 M2 L1–L2 Level 3 M2 L9–L12 Level 3 M2 L16–L19 Level 3 M2 L22–L28
SCI.LS2.D: Social Interactions and Group Behavior			
SCI.LS2.D.3	Being part of a group helps animals obtain food, defend themselves, and cope with changes.		Level 3 M2 L13–L15 Level 3 M2 L26–L28
SCI.LS3 Students use science and engineering practices, crosscutting concepts, and an understanding of ***heredity*** to make sense of phenomena and solve problems.			
SCI.LS3.A: Inheritance of Traits			
SCI.LS3.A.3	Many characteristics of organisms are inherited from their parents. Other characteristics result from individuals' interactions with the environment. Many characteristics involve both inheritance and environment.		Level 3 M3 L1–L6 Level 3 M3 L14–L18 Level 3 M3 L26–L28
SCI.LS3.B: **Variation of Traits**			
SCI.LS3.B.3	Different organisms vary in how they look and function because they have different inherited information; the environment also affects the traits that an organism develops.		Level 3 M3 L1–L6 Level 3 M3 L14–L18 Level 3 M3 L26–L28

SCI.LS4 Students use science and engineering practices, crosscutting concepts, and an understanding of ***biological evolution*** to make sense of phenomena and solve problems.			
SCI.LS4.A: Evidence of Common Ancestry and Diversity			
SCI.LS4.A.3	Some living organisms resemble organisms that once lived on Earth. Fossils provide evidence about the types of organisms and environments that existed long ago.		Level 3 M2 L1–L8 Level 3 M2 L26–L28
SCI.LS4.B: Natural Selection			
SCI.LS4.B.3	Differences in characteristics between individuals of the same species provide advantages in surviving and reproducing.		Level 3 M3 L21–L28
SCI.LS4.C: Adaptation			
SCI.LS4.C.3	Particular organisms can only survive in particular environments.		Level 3 M2 L1–L2 Level 3 M2 L9–L12 Level 3 M2 L16–L19 Level 3 M2 L22–L28
SCI.LS4.D: Biodiversity and Humans			
SCI.LS4.D.3	Populations of organisms live in a variety of habitats. Change in those habitats affects the organisms living there.		Level 3 M2 L16–L28
Physical Science			
SCI.PS2 Students use science and engineering practices, crosscutting concepts, and an understanding of ***forces, interactions, motion, and stability*** to make sense of phenomena and solve problems.			
SCI.PS2.A: Forces and Motion			
SCI.PS2.A.3	Qualities of motion and changes in motion require description of both size and direction.		Level 3 M4 L1–L18 Level 3 M4 L28–L30
	The effect of unbalanced forces on an object results in a change of motion.		Level 3 M4 L10–L18 Level 3 M4 L28–L30
	Patterns of motion can be used to predict future motion.		Level 3 M4 L1–L9 Level 3 M4 L28–L30
SCI.PS2.B: Types of Interactions			
SCI.PS2.B.3	Some forces act through contact, some forces (e.g., magnetic, electrostatic) act even when the objects are not in contact.		Level 3 M4 L19–L21 Level 3 M4 L28–L30
Earth and Space Science			
SCI.ESS2 Students use science and engineering practices, crosscutting concepts, and an understanding of ***Earth's systems*** to make sense of phenomena and solve problems.			
SCI.ESS2.D: Weather and Climate			
SCI.ESS2.D.3	Climate describes patterns of typical weather conditions over different scales and variations. Historical weather patterns can be analyzed.		Level 3 M1 L11–L15 Level 3 M1 L27–L29
SCI.ESS3 Students use science and engineering practices, crosscutting concepts, and an understanding of the ***Earth and human activity*** to make sense of phenomena and solve problems.			
SCI.ESS3.B: Natural Hazards			
SCI.ESS3.B.3,4	A variety of hazards result from natural processes; humans cannot eliminate hazards but can reduce their impacts.		Level 3 M1 L1–L3 Level 3 M1 L16–L29

Engineering, Technology, and the Application of Science			
SCI.ETS1 Students use science and engineering practices, crosscutting concepts, and an understanding of ***engineering design*** to make sense of phenomena and solve problems.			
SCI.ETS1.A: Defining and Delimiting Engineering Problems			
SCI.ETS1.A.3–5	Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.		Level 3 M1 L21–L26 Level 4 M2 L17–L23 Level 5 M2 L21–L23
SCI.ETS1.B: Developing Possible Solutions			
SCI.ETS1.B.3–5	Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.		Level 3 M1 L21–L26 Level 4 M1 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.		Level 3 M2 L23–L27 Level 4 M1 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.		Level 3 M4 L23–L27 Level 4 M1 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23
SCI.ETS1.C: Optimizing the Design Solution			
SCI.ETS1.C.3–5	Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.		Level 3 M4 L23–L27 Level 4 M4 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22
SCI.ETS2 Students use science and engineering practices, crosscutting concepts, and an understanding of the links ***among Engineering, Technology, Science, and Society*** to make sense of phenomena and solve problems.			
SCI.ETS2.A: Interdependence of Science, Engineering, and Technology			
SCI.ETS2.A.3–5	Science and technology support each other.		Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M4 L22–L24 Level 5 M4 L7–L8
SCI.ETS2.A.3–5	Tools and instruments are used to answer scientific questions, while scientific discoveries lead to the development of new technologies.		Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M4 L22–L24 Level 5 M4 L7–L8

SCI.ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World			
SCI.ETS2.B.3–5	People's needs and wants change over time, as do their demands for new and improved technologies.		Level 3 M1 L21–L26 Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M1 L23–L24 Level 4 M2 L15–L23 Level 4 M4 L14–L17 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.		Level 3 M1 L21–L26 Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M1 L23–L24 Level 4 M2 L15–L23 Level 4 M4 L14–L17 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	When new technologies become available, they can bring about changes in the way people live and interact with one another.		Level 3 M1 L21–L26 Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M1 L23–L24 Level 4 M2 L15–L23 Level 4 M4 L14–L17 Level 5 M2 L21–L23 Level 5 M3 L19–L23

Performance Indicators			**Aligned *PhD Science* Lessons**
SCI.LS	**Life Science**		
3-LS1-1	Develop models to describe that organisms have unique and diverse life cycles, but all have in common birth, growth, reproduction, and death.		Level 3 M3 L7–L8 Level 3 M3 L23–L28
3-LS2-1	Construct an argument that some animals form groups that help members survive.		Level 3 M2 L13–L15 Level 3 M2 L26–L28
3-LS3-1	Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.		Level 3 M3 L1–L6 Level 3 M3 L14–L18 Level 3 M3 L26–L28
3-LS3-2	Use evidence to support the explanation that traits can be influenced by the environment.		Level 3 M3 L9–L13 Level 3 M3 L19–L20 Level 3 M3 L26–L28
3-LS4-1	Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.		Level 3 M2 L1–L8 Level 3 M2 L26–L28

3-LS4-2	Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.		Level 3 M3 L21–L28
3-LS4-3	Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.		Level 3 M2 L1–L2 Level 3 M2 L9–L12 Level 3 M2 L16–L19 Level 3 M2 L22–L28
3-LS4-4	Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.		Level 3 M2 L16–L28
SCI.PS	**Physical Science**		
3-PS2-1	Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.		Level 3 M4 L10–L18 Level 3 M4 L28–L30
3-PS2-2	Make observations and measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.		Level 3 M4 L1–L9 Level 3 M4 L28–L30
3-PS2-3	Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.		Level 3 M4 L19–L21 Level 3 M4 L28–L30
3-PS2-4	Define a simple design problem that can be solved by applying scientific ideas about magnets.		Level 3 M4 L22–L30
SCI.ESS	**Earth and Space Science**		
3-ESS2-1	Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.		Level 3 M1 L1–L15 Level 3 M1 L19–L20 Level 3 M1 L27–L29
3-ESS2-2	Obtain and combine information to describe climates in different regions of the world.		Level 3 M1 L11–L15 Level 3 M1 L27–L29
3-ESS3-1	Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.		Level 3 M1 L1–L3 Level 3 M1 L16–L29
SCI.ETS	**Engineering, Technology, and the Application of Science**		
3–5-ETS1-1	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 3 M1 L21–L26 Level 3 M4 L23–L27
3–5-ETS1-2	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–L25 Level 4 M1 L12–L17 Level 5 M3 L19–L23
3–5-ETS1-2	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 3 M2 L23–L27 Level 3 M4 L23–L27
3-ETS3-1	Obtain and evaluate information showing that different cultures have created different tools and technologies to survive in different types of environments.		Level 3 M2 L1–L2 Level 3 M2 L9–L12 Level 3 M2 L16–L19 Level 3 M2 L22–L28

Wisconsin Standards for Science Correlation to *PhD Science*™

Green indicates that *PhD Science*™ fully addresses the standard within the grade level.

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

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

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

Key: Module (M), Lesson (L)

PhD SCIENCE LEVEL 4

The Grade 4 Wisconsin Standards for Science are fully covered by the *PhD Science* curriculum but out of grade level/but some out of grade level. A detailed analysis of alignment appears in the table below.

Crosscutting Concepts			**Aligned *PhD Science* Lessons**
Patterns			
SCI.CC1 Students use science and engineering practices, disciplinary core ideas, and ***patterns*** to make sense of phenomena and solve problems.			
SCI.CC1.3–5	Students identify similarities and differences in order to sort and classify natural objects and designed products. They identify patterns related to time, including simple rates of change and cycles, and use these patterns to make predictions.		Level 4 M1 L1–L5 Level 4 M1 L18–L20 Level 4 M2 L4–L5 Level 4 M2 L8–L11 Level 4 M2 L24–L26 Level 4 M3 L1–L3 Level 4 M3 L7–L11 Level 4 M3 L20 Level 4 M3 L24–L31 Level 4 M4 L1–L4 Level 4 M4 L7–L8 Level 4 M4 L14–L17 Level 4 M4 L22–L27
Cause and Effect			
SCI.CC2 Students use science and engineering practices, disciplinary core ideas, and ***cause and effect*** relationships to make sense of phenomena and solve problems.			
SCI.CC2.3–5	Students routinely identify and test causal relationships and use these relationships to explain change. They understand events that occur together with regularity may or may not signify a cause and effect relationship.		Level 4 M1 L6–L17 Level 4 M1 L19–L27 Level 4 M2 L1–L7 Level 4 M2 L10–L14 Level 4 M2 L24–L26 Level 4 M3 L6–L23 Level 4 M4 L3–L16 Level 4 M4 L18–L21 Level 4 M4 L25–L27

Scale, Proportion, and Quantity			
SCI.CC3 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***scale, proportion, and quantity*** to make sense of phenomena and solve problems.			
SCI.CC3.3–5	Students recognize natural objects and observable phenomena exist from the very small to the immensely large. They use standard units to measure and describe physical quantities such as mass, time, temperature, and volume.		Level 4 M1 L3–L5 Level 5 M1 L3–L4 Level 5 M1 L13–L17 Level 5 M1 L23–L26 Level 5 M2 L10–L11 Level 5 M3 L1–L5 Level 5 M3 L10–L11 Level 5 M3 L24–L27 Level 5 M4 L18–L19 Level 5 M4 L24–L26
Systems and System Models			
SCI.CC4 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***systems and models*** to make sense of phenomena and solve problems.			
SCI.CC4.3–5	Students understand a system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. They also describe a system in terms of its components and their interactions.		Level 4 M1 L1–L2 Level 4 M1 L12–L17 Level 4 M1 L21–L24 Level 4 M2 L1–L11 Level 4 M2 L15–L26 Level 4 M3 L7–L9 Level 4 M3 L15–L19 Level 4 M3 L21–L23 Level 4 M3 L26–L28 Level 4 M4 L1–L6 Level 4 M4 L10–L27
Energy and Matter			
SCI.CC5 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***energy and matter*** to make sense of phenomena and solve problems.			
SCI.CC5.3–5	Students understand matter is made of particles and energy can be transferred in various ways and between objects. Students observe the conservation of matter by tracking matter flows and cycles before and after processes, recognizing the total mass of substances does not change.		Level 4 M2 L1–L3 Level 4 M2 L8–L26 Level 4 M3 L10–L19 Level 5 M1 L5–L8 Level 5 M1 L13–L14 Level 5 M1 L23–L26 Level 5 M2 L6–L11 Level 5 M2 L14–L19 Level 5 M2 L24–L26 Level 5 M3 L10–L11 Level 5 M4 L3–L4
Structure and Function			
SCI.CC6 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***structure and function*** to make sense of phenomena and solve problems.			
SCI.CC6.3–5	Students understand different materials have different substructures, which can sometimes be observed; and substructures have shapes and parts that serve functions.		Level 4 M3 L4–L6 Level 4 M3 L20 Level 4 M3 L24–L25 Level 4 M3 L29–L31 Level 4 M4 L7–L9 Level 4 M4 L25–L27

Stability and Change			
SCI.CC7 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***stability and change*** to make sense of phenomena and solve problems.			
SCI.CC7.3–5	Students measure change in terms of differences over time, and observe that change may occur at different rates. They understand some systems appear stable, but over long periods of time they will eventually change.		Level 4 M1 L3–L11 Level 4 M1 L18–L20 Level 4 M1 L25–L27

Science and Engineering Practices			**Aligned *PhD Science* Lessons**
Asking Questions and Defining Problems			
SCI.SEP1 Students ***ask questions and define problems***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP1.A: Asking Questions			
SCI.SEP1.A.3–5	Students ask questions that specify qualitative relationships. This includes the following: • Ask questions about what would happen if a variable is changed. • Identify scientific (testable) and non-scientific (non-testable) questions. • Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.		Level 4 M1 L1–L2 Level 4 M2 L1–L3 Level 4 M2 L8–L9 Level 4 M3 L1–L3 Level 4 M3 L6 Level 4 M3 L15–L19 Level 4 M4 L1–L2
SCI.SEP1.B: Defining Problems			
SCI.SEP1.B.3–5	Students use prior knowledge to describe and define simple design problems that can be solved through the development of an object, tool, process, or system. They include several criteria for success and constraints on materials, time, or cost.		Level 5 M2 L21–L23
Developing and Using Models			
SCI.SEP2 Students ***develop and use models***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP2.A: Developing Models			
SCI.SEP2.A.3–5	Students build and revise simple models and use models to represent events and design solutions. This includes the following: • Identify limitations of models. • Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events. • Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. • Develop and/or use models to describe or predict phenomena. • Develop a diagram or simple physical prototype to convey a proposed object, tool, or process.		Level 4 M1 L1–L2 Level 4 M2 L1–L3 Level 4 M2 L8–L11 Level 4 M2 L15–L16 Level 4 M3 L1–L3 Level 4 M3 L7–L14 Level 4 M4 L1–L8 Level 4 M4 L10–L24

	• Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.		
Planning and Carrying Out Investigations			
SCI.SEP3 Students ***plan and carry out investigations***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP3.A: Planning and Conducting Investigations			
SCI.SEP3.A.3–5	Students plan and carry out investigations that control variables and provide evidence to support explanations or design solutions. This includes the following: • Collaboratively plan and conduct an investigation to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. • Evaluate appropriate methods and tools for collecting data. • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. • Make predictions about what would happen if a variable changes. • Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.		Level 4 M1 L6–L11 Level 4 M1 L21–L22 Level 4 M2 L6–L7 Level 4 M2 L10–L14 Level 4 M3 L15–L19 Level 4 M4 L7–L9 Level 4 M4 L14–L21
Analyzing and Interpreting Data			
SCI.SEP4 Students ***analyze and interpret data***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP4.A: Analyze and Interpret Data			
SCI.SEP4.A.3–5	Students begin to use quantitative approaches to collect data and conduct multiple trials of qualitative observations. (When possible, digital tools should be used.) This includes the following: • Represent data in tables or various graphical displays (bar graphs, pictographs, and pie charts) to reveal patterns that indicate relationships. • Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, or computation. • Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings. • Analyze data to refine a problem statement or the design of a proposed object, tool, or process. • Use data to evaluate and refine design solutions.		Level 4 M1 L12–L20 Level 4 M1 L23–L24 Level 4 M4 L10–L17
Using Mathematics and Computational Thinking			
SCI.SEP5 Students use ***mathematics and computational thinking***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP5.A: Qualitative and Quantitative Data			
SCI.SEP5.A.3–5	Students extend quantitative measurements to a variety of physical properties, using computation and mathematics to analyze data and compare alternative design solutions. This includes the following:		Level 4 M2 L8–L9 Level 4 M4 L14–L17

	• Organize simple data sets to reveal patterns that suggest relationships. • Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems. • Create and use graphs or charts generated from simple algorithms to compare alternative solutions to an engineering problem.		
Constructing Explanations and Designing Solutions			
SCI.SEP6 Students ***construct explanations and design solutions***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP6.A: Construct an Explanation			
SCI.SEP6.A.3–5	Students use evidence to construct explanations that specify variables which describe and predict phenomena. This includes the following: • Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard). • Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation. • Identify the evidence that supports particular points in an explanation.		Level 4 M1 L3–L7 Level 4 M1 L12–L18 Level 4 M1 L21–L22 Level 4 M1 L25–L27 Level 4 M2 L4–L5 Level 4 M2 L15–L26 Level 4 M3 L4–L5 Level 4 M3 L24–L25 Level 4 M3 L29–L31 Level 4 M4 L14–L27
SCI.SEP6.B: Design Solutions			
SCI.SEP6.B.3–5	Students use evidence to create multiple solutions to design problems. This includes the following: • Apply scientific ideas to solve design problems. • Generate multiple solutions to a problem and compare how well they meet the criteria and constraints.		Level 4 M1 L3–L7 Level 4 M1 L12–L18 Level 4 M1 L21–L22 Level 4 M1 L25–L27 Level 4 M2 L4–L5 Level 4 M2 L15–L26 Level 4 M3 L4–L5 Level 4 M3 L24–L25 Level 4 M3 L29–L31 Level 4 M4 L14–L27
Engaging in Argument from Evidence			
SCI.SEP7 Students engage in ***argument from evidence***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP7.A: Argue from Evidence			
SCI.SEP7.A.3–5	Students critique the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world. This includes the following: • Compare and refine arguments based on an evaluation of the evidence presented. • Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation. • Respectfully provide and receive critiques from peers about a proposed procedure, explanation, or model by citing relevant evidence and posing specific questions. • Construct and/or support an argument with evidence, data, or a model. • Use data to evaluate claims about cause and effect.		Level 4 M3 L21–L23 Level 4 M3 L26–L28 Level 4 M4 L7–L8

	• Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.		
Obtaining, Evaluating, and Communicating Information			
SCI.SEP8 Students will ***obtain, evaluate, and communicate information***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP8.A: Obtain, Evaluate, and Communicate Information			
SCI.SEP8.A.3–5	Students evaluate the merit and accuracy of ideas and methods. This includes the following: • Read and comprehend grade-appropriate complex texts and other reliable media to summarize and obtain scientific and technical ideas, and describe how they are supported by evidence. • Compare and/or combine information across complex texts and other reliable media to support the engagement in scientific and engineering practices. • Combine information in written text with that contained in corresponding tables, diagrams, or charts to support the engagement in other scientific and engineering practices. • Obtain and combine information from books or other reliable media to explain phenomena or solutions to a design problem. • Communicate scientific and technical information orally or in written formats, including various forms of media, which may include tables, diagrams, and charts.		Level 4 M1 L3–L5 Level 4 M1 L23–L24 Level 4 M3 L4–L6 Level 4 M3 L10–L11 Level 4 M3 L20–L23 Level 4 M3 L26–L28 Level 4 M4 L22–L24

Disciplinary Core Ideas			**Aligned *PhD Science* Lessons**
Life Science			
SCI.LS1 Students use science and engineering practices, crosscutting concepts, and an understanding of ***structures and processes (on a scale from molecules to organisms)*** to make sense of phenomena and solve problems.			
SCI.LS1.A: Structure and Function			
SCI.LS1.A.4	Plants and animals have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.		Level 4 M3 L1–L6 Level 4 M3 L20 Level 4 M3 L26–L31
SCI.LS1.D: Information Processing			
SCI.LS1.D.4	Different sense receptors are specialized for particular kinds of information; animals use their perceptions and memories to guide their actions.		Level 4 M3 L1–L6 Level 4 M3 L15–L25 Level 4 M3 L29–L31

Physical Science			
SCI.PS3 Students use science and engineering practices, crosscutting concepts, and an understanding of ***energy*** to make sense of phenomena and solve problems.			
SCI.PS3.A: Definitions of Energy			
SCI.PS3.A.4	Moving objects contain energy. The faster the object moves, the more energy it has.		Level 4 M2 L6–L9 Level 4 M2 L12–L16 Level 4 M2 L24–L26
SCI.PS3.B: Conservation of Energy and Energy Transfer			
SCI.PS3.B.4	Energy can be moved from place to place by moving objects, or through sound, light, or electrical currents. Energy can be converted from one form to another form.		Level 4 M2 L1–L3 Level 4 M2 L10–L11 Level 4 M2 L15–L16 Level 4 M2 L24–L26
SCI.PS3.C: Relationships between Energy and Forces			
SCI.PS3.C.4	When objects collide, contact forces transfer energy so as to change objects' motions.		Level 4 M2 L8–L9 Level 4 M2 L24–L26
SCI.PS3.D: Energy in Chemical Processes and Everyday Life			
SCI.PS3.D.4, 5	Plants capture energy from sunlight which can be used as fuel or food. Stored energy in food or fuel can be converted to useable energy.		Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26
SCI.PS4 Students use science and engineering practices, crosscutting concepts, and an understanding of ***waves and their applications in technologies for information transfer*** to make sense of phenomena and solve problems.			
SCI.PS4.A: Wave Properties			
SCI.PS4.A.4	Waves are regular patterns of motion, which can be made in water by disturbing the surface. Waves of the same type can differ in amplitude and wavelength. Waves can make objects move.		Level 4 M3 L7–L14 Level 4 M3 L29–L31
SCI.PS4.B: Electromagnetic Radiation			
SCI.PS4.B.4	Objects can be seen when light reflected from their surface enters our eyes.		Level 4 M4 L1–L17 Level 4 M4 L25–L27
SCI.PS4.C: Information Technologies and Instrumentation			
SCI.PS4.C.4	Patterns can encode, send, receive, and decode information.		Level 4 M4 L18–L27
Earth and Space Science			
SCI.ESS1 Students use science and engineering practices, crosscutting concepts, and an understanding of ***Earth's place in the universe*** to make sense of phenomena and solve problems.			
SCI.ESS1.C: The History of Planet Earth			
SCI.ESS1.C.4	Certain features on Earth can be used to order events that have occurred in a landscape.		Level 4 M1 L1–L5 Level 4 M1 L19–L20 Level 4 M1 L25–L27
SCI.ESS2 Students use science and engineering practices, crosscutting concepts, and an understanding of ***Earth's systems*** to make sense of phenomena and solve problems.			
SCI.ESS2.A: Earth Materials and Systems			
SCI.ESS2.A.4,5	Four major Earth systems interact. Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, organisms, and gravity break rocks, soils, and sediments into smaller pieces and move them around.		Level 4 M1 L6–L11 Level 4 M1 L25–L27

SCI.ESS2.B: Plate Tectonics and Large-Scale System Interactions			
SCI.ESS2.B.4	Earth's physical features occur in patterns, as do earthquakes and volcanoes. Maps can be used to locate features and determine patterns in those events.		Level 4 M1 L18–L20 Level 4 M1 L25–L27
SCI.ESS2.E: Biogeology			
SCI.ESS2.E.4	Living things can affect the physical characteristics of their environment.		Level 4 M1 L6–L11 Level 4 M1 L25–L27
SCI.ESS3 Students use science and engineering practices, crosscutting concepts, and an understanding of the **Earth and human activity** to make sense of phenomena and solve problems.			
SCI.ESS3.A: Natural Resources			
SCI.ESS3.A.4	Energy and fuels humans use are derived from natural sources, and their use affects the environment. Some resources are renewable over time, others are not.		Level 4 M1 L21–L27
SCI.ESS3.B: Natural Hazards			
SCI.ESS3.B.3,4	A variety of hazards result from natural processes; humans cannot eliminate hazards but can reduce their impacts.		Level 3 M1 L1–L3 Level 3 M1 L16–L29
Engineering, Technology, and the Application of Science			
SCI.ETS1 Students use science and engineering practices, crosscutting concepts, and an understanding of ***engineering design*** to make sense of phenomena and solve problems.			
SCI.ETS1.A: Defining and Delimiting Engineering Problems			
SCI.ETS1.A.3–5	Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.		Level 3 M1 L21–L26 Level 4 M2 L17–L23 Level 5 M2 L21–L23
SCI.ETS1.B: Developing Possible Solutions			
SCI.ETS1.B.3–5	Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.		Level 3 M1 L21–L26 Level 4 M1 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.		Level 3 M2 L23–L27 Level 4 M1 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.		Level 3 M4 L23–L27 Level 4 M1 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23

SCI.ETS1.C: Optimizing the Design Solution			
SCI.ETS1.C.3–5	Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.		Level 3 M4 L23–L27 Level 4 M4 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22
SCI.ETS2 Students use science and engineering practices, crosscutting concepts, and an understanding of the links ***among Engineering, Technology, Science, and Society*** to make sense of phenomena and solve problems.			
SCI.ETS2.A: Interdependence of Science, Engineering, and Technology			
SCI.ETS2.A.3–5	Science and technology support each other.		Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M4 L22–L24 Level 5 M4 L7–L8
SCI.ETS2.A.3–5	Tools and instruments are used to answer scientific questions, while scientific discoveries lead to the development of new technologies.		Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M4 L22–L24 Level 5 M4 L7–L8
SCI.ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World			
SCI.ETS2.B.3–5	People's needs and wants change over time, as do their demands for new and improved technologies.		Level 3 M1 L21–L26 Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M1 L23–L24 Level 4 M2 L15–L23 Level 4 M4 L14–L17 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.		Level 3 M1 L21–L26 Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M1 L23–L24 Level 4 M2 L15–L23 Level 4 M4 L14–L17 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	When new technologies become available, they can bring about changes in the way people live and interact with one another.		Level 3 M1 L21–L26 Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M1 L23–L24 Level 4 M2 L15–L23 Level 4 M4 L14–L17 Level 5 M2 L21–L23 Level 5 M3 L19–L23

Performance Indicators			Aligned *PhD Science* Lessons
SCI.LS1	**Life Science**		
4-LS1-1	Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.		Level 4 M3 L1–L6 Level 4 M3 L20 Level 4 M3 L26–L31
4-LS1-2	Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.		Level 4 M3 L1–L6 Level 4 M3 L15–L25 Level 4 M3 L29–L31
SCI.PS	**Physical Science**		
4-PS3-1	Use evidence to construct an explanation relating the speed of an object to the energy of that object.		Level 4 M2 L6–L7 Level 4 M2 L24–L26
4-PS3-2	Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.		Level 4 M2 L1–L5 Level 4 M2 L10–L11 Level 4 M2 L24–L26
4-PS3-3	Ask questions and predict outcomes about the changes in energy that occur when objects collide.		Level 4 M2 L8–L9 Level 4 M2 L24–L26
4-PS3-4	Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.		Level 4 M2 L12–L26
4-PS4-1	Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.		Level 4 M3 L7–L14 Level 4 M3 L29–L31
4-PS4-2	Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.		Level 4 M4 L1–L17 Level 4 M4 L25–L27
4-PS4-3	Generate and compare multiple solutions that use patterns to transfer information.		Level 4 M4 L18–L27
SCI.ESS	**Earth and Space Science**		
4-ESS1-1	Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time		Level 4 M1 L1–L5 Level 4 M1 L19–L20 Level 4 M1 L25–L27
4-ESS2-1	Make observations and measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.		Level 4 M1 L6–L11 Level 4 M1 L25–L27
4-ESS2-2	Analyze and interpret data from maps to describe patterns of Earth's features		Level 4 M1 L18–L20 Level 4 M1 L25–L27
4-ESS3-1	Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.		Level 4 M1 L21–L27
4-ESS3-2	Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.		Level 4 M1 L12–L17 Level 4 M1 L25–L27
SCI.ETS	**Engineering, Technology, and the Application of Science**		
3–5-ETS1-1	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 4 M2 L17–L23
3–5-ETS1-2	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 4 M1 L12–L17

3–5-ETS1-2	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 3 M2 L23–L27 Level 3 M4 L23–L27 Level 4 M4 L14–L17 Level 5 M1 L18–L22
4-ETS3-1	Construct an explanation for how energy is transferred in a system, and then revise that explanation based on new evidence.		Level 4 M2 L1–L5 Level 4 M2 L8–L9 Level 4 M2 L24–L26

Wisconsin Standards for Science Correlation to *PhD Science*™

Green indicates that *PhD Science*™ fully addresses the standard within the grade level.

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

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

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

Key: Module (M), Lesson (L)

PhD SCIENCE LEVEL 5

The Grade 5 Wisconsin Standards for Science are fully covered by the *PhD Science* curriculum but out of grade level/but some out of grade level. A detailed analysis of alignment appears in the table below.

Crosscutting Concepts			**Aligned *PhD Science* Lessons**
Patterns			
SCI.CC1 Students use science and engineering practices, disciplinary core ideas, and ***patterns*** to make sense of phenomena and solve problems.			
SCI.CC1.3–5	Students identify similarities and differences in order to sort and classify natural objects and designed products. They identify patterns related to time, including simple rates of change and cycles, and use these patterns to make predictions.		Level 5 M1 L7–L8 Level 5 M2 L1–L5 Level 5 M2 L8–L9 Level 5 M2 L15–L17 Level 5 M3 L6–L9 Level 5 M4 L1–L17 Level 5 M4 L20–L26
Cause and Effect			
SCI.CC2 Students use science and engineering practices, disciplinary core ideas, and ***cause and effect*** relationships to make sense of phenomena and solve problems.			
SCI.CC2.3–5	Students routinely identify and test causal relationships and use these relationships to explain change. They understand events that occur together with regularity may or may not signify a cause and effect relationship.		Level 5 M1 L1–L2 Level 5 M1 L5–L6 Level 5 M1 L9–L10 Level 5 M1 L18–L22 Level 5 M2 L3–L7 Level 5 M2 L12–L13 Level 5 M2 L18–L23 Level 5 M3 L6–L8 Level 5 M3 L12–L18 Level 5 M4 L5–L6 Level 5 M4 L24–L26
Scale, Proportion, and Quantity			
SCI.CC3 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***scale, proportion, and quantity*** to make sense of phenomena and solve problems			
SCI.CC3.3–5	Students recognize natural objects and observable phenomena exist from the very small to the immensely large. They use standard units		Level 5 M1 L3–L4 Level 5 M1 L13–L17

	to measure and describe physical quantities such as mass, time, temperature, and volume.		Level 5 M1 L23–L26 Level 5 M2 L10–L11 Level 5 M3 L1–L5 Level 5 M3 L10–L11 Level 5 M3 L24–L27 Level 5 M4 L18–L19 Level 5 M4 L24–L26
Systems and System Models			
SCI.CC4 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***systems and models*** to make sense of phenomena and solve problems.			
SCI.CC4.3–5	Students understand a system is a group of related parts that make up a whole and can carry out functions its individual parts cannot. They also describe a system in terms of its components and their interactions.		Level 5 M1 L3–L4 Level 5 M1 L15–L17 Level 5 M2 L1–L2 Level 5 M2 L6–L11 Level 5 M2 L14 Level 5 M2 L18–L19 Level 5 M2 L24–L26 Level 5 M3 L1–L9 Level 5 M3 L12–L13 Level 5 M3 L19–L27 Level 5 M4 L1–L2 Level 5 M4 L7–L26
Energy and Matter			
SCI.CC5 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***energy and matter*** to make sense of phenomena and solve problems.			
SCI.CC5.3–5	Students understand matter is made of particles and energy can be transferred in various ways and between objects. Students observe the conservation of matter by tracking matter flows and cycles before and after processes, recognizing the total mass of substances does not change.		Level 5 M1 L5–L8 Level 5 M1 L13–L14 Level 5 M1 L23–L26 Level 5 M2 L6–L11 Level 5 M2 L14–L19 Level 5 M2 L24–L26 Level 5 M3 L10–L11 Level 5 M4 L3–L4
Structure and Function			
SCI.CC6 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***structure and function*** to make sense of phenomena and solve problems.			
SCI.CC6.3–5	Students understand different materials have different substructures, which can sometimes be observed; and substructures have shapes and parts that serve functions.		Level 4 M3 L4–L6 Level 4 M3 L20 Level 4 M3 L24–L25 Level 4 M3 L29–L31 Level 4 M4 L7–L9 Level 4 M4 L25–L27
Stability and Change			
SCI.CC7 Students use science and engineering practices, disciplinary core ideas, and an understanding of ***stability and change*** to make sense of phenomena and solve problems.			
SCI.CC7.3–5	Students measure change in terms of differences over time, and observe that change may occur at different rates. They understand some systems appear stable, but over long periods of time they will eventually change.		Level 5 M1 L1–L2 Level 5 M1 L9–L12 Level 5 M1 L18–L26 Level 5 M2 L12–L13 Level 5 M2 L20

			Level 5 M2 L24–L26 Level 5 M3 L14–L18 Level 5 M4 L5–L6 Level 5 M4 L9–L12 Level 5 M4 L24–L26

Science and Engineering Practices			**Aligned *PhD Science* Lessons**
Asking Questions and Defining Problems			
SCI.SEP1 Students ***ask questions and define problems***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP1.A: Asking Questions			
SCI.SEP1.A.3–5	Students ask questions that specify qualitative relationships. This includes the following: • Ask questions about what would happen if a variable is changed. • Identify scientific (testable) and non-scientific (non-testable) questions. • Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.		Level 5 M1 L1–L2 Level 5 M2 L1–L2 Level 5 M2 L21–L23 Level 5 M3 L1–L3 Level 5 M3 L19–L23 Level 5 M4 L1–L2 Level 5 M4 L13
SCI.SEP1.B: Defining Problems			
SCI.SEP1.B.3–5	Students use prior knowledge to describe and define simple design problems that can be solved through the development of an object, tool, process, or system. They include several criteria for success and constraints on materials, time, or cost.		Level 5 M2 L21–L23
Developing and Using Models			
SCI.SEP2 Students ***develop and use models***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP2.A: Developing Models			
SCI.SEP2.A.3–5	Students build and revise simple models and use models to represent events and design solutions. This includes the following: • Identify limitations of models. • Collaboratively develop and/or revise a model based on evidence that shows the relationships among variables for frequent and regular occurring events. • Develop a model using an analogy, example, or abstract representation to describe a scientific principle or design solution. • Develop and/or use models to describe or predict phenomena. • Develop a diagram or simple physical prototype to convey a proposed object, tool, or process. • Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.		Level 5 M1 L1–L2 Level 5 M1 L5–L10 Level 5 M1 L13–L14 Level 5 M1 L23–L26 Level 5 M2 L1–L2 Level 5 M2 L6–L7 Level 5 M2 L14 Level 5 M2 L20 Level 5 M3 L1–L3 Level 5 M3 L6–L16 Level 5 M3 L19–L27 Level 5 M4 L1–L4 Level 5 M4 L7–L17 Level 5 M4 L20–L26

Planning and Carrying Out Investigations			
SCI.SEP3 Students ***plan and carry out investigations***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP3.A: Planning and Conducting Investigations			
SCI.SEP3.A.3–5	Students plan and carry out investigations that control variables and provide evidence to support explanations or design solutions. This includes the following: • Collaboratively plan and conduct an investigation to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. • Evaluate appropriate methods and tools for collecting data. • Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. • Make predictions about what would happen if a variable changes. • Test two different models of the same proposed object, tool, or process to determine which better meets criteria for success.		Level 5 M1 L13–L14 Level 5 M1 L18–L22 Level 5 M2 L3–L5 Level 5 M3 L10–L11 Level 5 M4 L5–L6 Level 5 M4 L18–L19
Analyzing and Interpreting Data			
SCI.SEP4 Students ***analyze and interpret data***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP4.A: Analyze and Interpret Data			
SCI.SEP4.A.3–5	Students begin to use quantitative approaches to collect data and conduct multiple trials of qualitative observations. (When possible, digital tools should be used.) This includes the following: • Represent data in tables or various graphical displays (bar graphs, pictographs, and pie charts) to reveal patterns that indicate relationships. • Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, or computation. • Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings. • Analyze data to refine a problem statement or the design of a proposed object, tool, or process. • Use data to evaluate and refine design solutions.		Level 5 M1 L15–L17 Level 5 M2 L3–L5 Level 5 M2 L8–L13 Level 5 M2 L15–L17 Level 5 M3 L4–L5 Level 5 M3 L14–L16 Level 5 M4 L14–L15
Using Mathematics and Computational Thinking			
SCI.SEP5 Students use ***mathematics and computational thinking***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP5.A: Qualitative and Quantitative Data			
SCI.SEP5.A.3–5	Students extend quantitative measurements to a variety of physical properties, using computation and mathematics to analyze data and compare alternative design solutions. This includes the following: • Organize simple data sets to reveal patterns that suggest relationships.		Level 5 M1 L3–L4 Level 5 M1 L15–L17 Level 5 M3 L10–L11 Level 5 M3 L24–L27 Level 5 M4 L5–L6 Level 5 M4 L14–L15

	• Describe, measure, estimate, and/or graph quantities such as area, volume, weight, and time to address scientific and engineering questions and problems. • Create and use graphs or charts generated from simple algorithms to compare alternative solutions to an engineering problem.		
Constructing Explanations and Designing Solutions			
SCI.SEP6 Students ***construct explanations and design solutions***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP6.A: Construct an Explanation			
SCI.SEP6.A.3–5	Students use evidence to construct explanations that specify variables which describe and predict phenomena. This includes the following: • Construct an explanation of observed relationships (e.g., the distribution of plants in the back yard). • Use evidence (e.g., measurements, observations, patterns) to construct or support an explanation. • Identify the evidence that supports particular points in an explanation.		Level 5 M1 L5–L6 Level 5 M1 L11–L12 Level 5 M1 L18–L26 Level 5 M2 L12–L13 Level 5 M2 L15–L17 Level 5 M2 L21–L26 Level 5 M3 L17–L23 Level 5 M4 L3–L4 Level 5 M4 L9–L12 Level 5 M4 L20–L26
SCI.SEP6.B: Design Solutions			
SCI.SEP6.B.3–5	Students use evidence to create multiple solutions to design problems. This includes the following: • Apply scientific ideas to solve design problems. • Generate multiple solutions to a problem and compare how well they meet the criteria and constraints.		Level 5 M1 L5–L6 Level 5 M1 L11–L12 Level 5 M1 L18–L26 Level 5 M2 L12–L13 Level 5 M2 L15–L17 Level 5 M2 L21–L26 Level 5 M3 L17–L23 Level 5 M4 L3–L4 Level 5 M4 L9–L12 Level 5 M4 L20–L26
Engaging in Argument from Evidence			
SCI.SEP7 Students engage in ***argument from evidence***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP7.A: Argue from Evidence			
SCI.SEP7.A.3–5	Students critique the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world. This includes the following: • Compare and refine arguments based on an evaluation of the evidence presented. • Distinguish among facts, reasoned judgment based on research findings, and speculation in an explanation. • Respectfully provide and receive critiques from peers about a proposed procedure, explanation, or model by citing relevant evidence and posing specific questions. • Construct and/or support an argument with evidence, data, or a model. • Use data to evaluate claims about cause and effect.		Level 5 M1 L3–L4 Level 5 M2 L3–L5 Level 5 M2 L8–L11 Level 5 M2 L21–L23 Level 5 M3 L19–L23 Level 5 M4 L5–L6 Level 5 M4 L13–L17 Level 5 M4 L20–L21 Level 5 M4 L24–L26

	• Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.		
Obtaining, Evaluating, and Communicating Information			
SCI.SEP8 Students will ***obtain, evaluate, and communicate information***, in conjunction with using crosscutting concepts and disciplinary core ideas, to make sense of phenomena and solve problems.			
SCI.SEP8.A: Obtain, Evaluate, and Communicate Information			
SCI.SEP8.A.3–5	Students evaluate the merit and accuracy of ideas and methods. This includes the following: • Read and comprehend grade-appropriate complex texts and other reliable media to summarize and obtain scientific and technical ideas, and describe how they are supported by evidence. • Compare and/or combine information across complex texts and other reliable media to support the engagement in scientific and engineering practices. • Combine information in written text with that contained in corresponding tables, diagrams, or charts to support the engagement in other scientific and engineering practices. • Obtain and combine information from books or other reliable media to explain phenomena or solutions to a design problem. • Communicate scientific and technical information orally or in written formats, including various forms of media, which may include tables, diagrams, and charts.		Level 5 M2 L6–L7 Level 5 M2 L10–L11 Level 5 M2 L18–L20 Level 5 M3 L9 Level 5 M3 L14–L16 Level 5 M3 L19–L27 Level 5 M4 L18–L19

Disciplinary Core Ideas			**Aligned *PhD Science* Lessons**
Life Science			
SCI.LS1 Students use science and engineering practices, crosscutting concepts, and an understanding of ***structures and processes (on a scale from molecules to organisms)*** to make sense of phenomena and solve problems.			
SCI.LS1.C: Organization for Matter and Energy Flow in Organisms			
SCI.LS1.C.5	Food provides animals with the materials and energy they need for body repair, growth, warmth, and motion. Plants acquire material for growth chiefly from air, water, and process matter, and obtain energy from sunlight, which is used to maintain conditions necessary for survival.		Level 5 M2 L8–L9 Level 5 M2 L15–L19 Level 5 M2 L24–L26
SCI.LS2 Students use science and engineering practices, crosscutting concepts, and an understanding of the ***interactions, energy, and dynamics within ecosystems*** to make sense of phenomena and solve problems.			
SCI.LS2.A: Interdependent Relationships in Ecosystems			
SCI.LS2.A.5	The food of almost any animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants, while decomposers restore some materials back to the soil.		Level 5 M2 L8–L14 Level 5 M2 L20 Level 5 M2 L24–L26

SCI.LS2.B: Cycles of Matter and Energy Transfer in Ecosystems			
SCI.LS2.B.5	Matter cycles between the air and soil and among organisms as they live and die.		Level 5 M2 L6–L7 Level 5 M2 L10–L14 Level 5 M2 L24–L26
Physical Science			
SCI.PS1 Students use science and engineering practices, crosscutting concepts, and an understanding of ***matter and its interactions*** to make sense of phenomena and solve problems.			
SCI.PS1.A: Structures and Properties of Matter			
SCI.PS1.A.5	Matter exists as particles that are too small to see. Matter is always conserved even if it seems to disappear. Measurements of a variety of observable properties can be used to identify particular materials.		Level 5 M1 L5–L8 Level 5 M1 L13–L14 Level 5 M1 L23–L26 Level 5 M2 L6–L11 Level 5 M2 L14–L19 Level 5 M2 L24–L26 Level 5 M3 L10–L11 Level 5 M4 L3–L4
SCI.PS1.B: Chemical Reactions			
SCI.PS1.B.5	Chemical reactions that occur when substances are mixed can be identified by the emergence of substances with different properties. In chemical reactions the total mass remains the same.		Level 5 M1 L1–L2 Level 5 M1 L15–L26
SCI.PS2 Students use science and engineering practices, crosscutting concepts, and an understanding ***of forces, interactions, motion, and stability*** to make sense of phenomena and solve problems.			
SCI.PS2.B: Types of Interactions			
SCI.PS2.B.5	The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.		Level 5 M4 L3–L4 Level 5 M4 L24–L26
SCI.PS3 Students use science and engineering practices, crosscutting concepts, and an understanding of ***energy*** to make sense of phenomena and solve problems.			
SCI.PS3.D: Energy in Chemical Processes and Everyday Life			
SCI.PS3.D.4, 5	Plants capture energy from sunlight which can be used as fuel or food.		Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26
	Stored energy in food or fuel can be converted to useable energy.		Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26
Earth and Space Science			
SCI.ESS1 Students use science and engineering practices, crosscutting concepts, and an understanding of ***Earth's place in the universe*** to make sense of phenomena and solve problems.			
SCI.ESS1.A: The Universe and Its Stars			
SCI.ESS1.A.5	Stars range greatly in size and distance from Earth, and this can explain their relative brightness.		Level 5 M4 L18–L19 Level 5 M4 L24–L26
SCI.ESS1.B: Earth and the Solar System			
SCI.ESS1.B.5	The Earth's orbit and rotation, and the orbit of the moon around the Earth cause observable patterns.		Level 5 M4 L1–L2 Level 5 M4 L5–L17 Level 5 M4 L20–L26

SCI.ESS2 Students use science and engineering practices, crosscutting concepts, and an understanding of ***Earth's systems*** to make sense of phenomena and solve problems.			
SCI.ESS2.A: Earth Materials and Systems			
SCI.ESS2.A.4,5	Four major Earth systems interact. Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, organisms, and gravity break rocks, soils, and sediments into smaller pieces and move them around.		Level 4 M1 L6–L11 Level 4 M1 L25–L27
SCI.ESS2.C: The Roles of Water in Earth's Surface Processes			
SCI.ESS2.C.5	Most of Earth's water is in the ocean, and much of the Earth's freshwater is in glaciers or underground.		Level 5 M3 L4–L5 Level 5 M3 L24–L27
SCI.ESS3 Students use science and engineering practices, crosscutting concepts, and an understanding of the ***Earth and human activity*** to make sense of phenomena and solve problems.			
SCI.ESS3.C: Human Impacts on Earth Systems			
SCI.ESS3.C.5	Societal activities have had major effects on the land, ocean, atmosphere, and even outer space. Societal activities can also help protect Earth's resources and environments.		Level 5 M3 L14–L27
Engineering, Technology, and the Application of Science			
SCI.ETS1 Students use science and engineering practices, crosscutting concepts, and an understanding of ***engineering design*** to make sense of phenomena and solve problems.			
SCI.ETS1.A: Defining and Delimiting Engineering Problems			
SCI.ETS1.A.3–5	Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.		Level 3 M1 L21–L26 Level 4 M2 L17–L23 Level 5 M2 L21–L23
SCI.ETS1.B: Developing Possible Solutions			
SCI.ETS1.B.3–5	Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions.		Level 3 M1 L21–L26 Level 4 M1 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.		Level 3 M2 L23–L27 Level 4 M1 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved.		Level 3 M4 L23–L27 Level 4 M1 L12–L17 Level 4 M4 L20–L23 Level 5 M1 L18–L22 Level 5 M2 L21–L23 Level 5 M3 L19–L23
SCI.ETS1.C: Optimizing the Design Solution			
SCI.ETS1.C.3–5	Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints.		Level 3 M4 L23–L27 Level 4 M4 L14–L17 Level 5 M1 L18–L22

SCI.ETS2 Students use science and engineering practices, crosscutting concepts, and an understanding of the links among ***Engineering, Technology, Science, and Society*** to make sense of phenomena and solve problems.			
SCI.ETS2.A: Interdependence of Science, Engineering, and Technology			
SCI.ETS2.A.3–5	Science and technology support each other.		Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M4 L22–L24 Level 5 M4 L7–L8
SCI.ETS2.A.3–5	Tools and instruments are used to answer scientific questions, while scientific discoveries lead to the development of new technologies.		Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M4 L22–L24 Level 5 M4 L7–L8
SCI.ETS2.B: Influence of Engineering, Technology, and Science on Society and the Natural World			
SCI.ETS2.B.3–5	People's needs and wants change over time, as do their demands for new and improved technologies.		Level 3 M1 L21–L26 Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M1 L23–L24 Level 4 M2 L15–L23 Level 4 M4 L14–L17 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.		Level 3 M1 L21–L26 Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M1 L23–L24 Level 4 M2 L15–L23 Level 4 M4 L14–L17 Level 5 M2 L21–L23 Level 5 M3 L19–L23
	When new technologies become available, they can bring about changes in the way people live and interact with one another.		Level 3 M1 L21–L26 Level 3 M2 L22–L25 Level 3 M4 L22–L27 Level 4 M1 L12–L17 Level 4 M1 L23–L24 Level 4 M2 L15–L23 Level 4 M4 L14–L17 Level 5 M2 L21–L23 Level 5 M3 L19–L23

Performance Indicators			**Aligned *PhD Science* Lessons**
SCI.LS	**Life Science**		
5-LS1-1	Support an argument that plants get the materials they need for growth chiefly from air and water.		Level 5 M2 L3–L5 Level 5 M2 L24–L26

5-LS2-1	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.		Level 5 M2 L1–L2 Level 5 M2 L6–L14 Level 5 M2 L24–L26
SCI.PS	**Physical Science**		
5-PS1-1	Develop a model to describe that matter is made of particles too small to be seen.		Level 5 M1 L5–L10 Level 5 M1 L23–L26
5-PS1-2	Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.		Level 5 M1 L9–L17 Level 5 M1 L23–L26
5-PS1-3	Make observations and measurements to identify materials based on their properties.		Level 5 M1 L1–L4 Level 5 M1 L11–L17 Level 5 M1 L23–L26
5-PS1-4	Conduct an investigation to determine whether the mixing of two or more substances results in new substances.		Level 5 M1 L1–L2 Level 5 M1 L13–L26
5-PS2-1	Support an argument that the gravitational force exerted by Earth on objects is directed down.		Level 5 M4 L3–L4 Level 5 M4 L24–L26
5-PS3-1	Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.		Level 5 M2 L15–L19 Level 5 M2 L24–L26
SCI.ESS	**Earth and Space Science**		
5-ESS1-1	Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.		Level 5 M4 L18–L19 Level 5 M4 L24–L26
5-ESS1-2	Represent data in graphical displays 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–L2 Level 5 M4 L5–L17 Level 5 M4 L20–L26
5-ESS2-1	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and atmosphere interact.		Level 5 M3 L1–L3 Level 5 M3 L6–L13 Level 5 M3 L19–L27
5-ESS2-2	Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.		Level 5 M3 L4–L5 Level 5 M3 L19–L27
5-ESS3-1	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.		Level 5 M3 L14–L18 Level 5 M3 L24–L27
SCI.ETS	**Engineering, Technology, and the Application of Science**		
3–5-ETS1-1	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–L23
3–5-ETS1-2	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 5 M3 L19–L23
3–5-ETS1-2	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 5 M1 L18–L22
5-ETS3-1	Investigate properties of materials to provide evidence as to which would best work within an engineering design solution		Level 5 M1 L1–L4 Level 5 M1 L11–L17 Level 5 M1 L23–L26