



Wisconsin Standards for Science Correlation to *PhD Science*™

Green indicates that <i>PhD Science</i> ™ fully addresses the standard within the grade level.
Blue indicates that <i>PhD Science</i> covers the standard but in a different grade level.
Yellow indicates that <i>PhD Science</i> partially covers the standard within the grade level.
Red indicates that <i>PhD Science</i> 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 Stude	ents use science and engineering practices, disciplinary core ideas, and <i>pa</i> r	tter	<i>ns</i> to make sense of
phenomena a	nd solve problems.		
SCI.CC1.3-5	Students identify similarities and differences in order to sort and		Level 3 M1 L11-L15
	classify natural objects and designed products. They identify patterns		Level 3 M1 L19-L20
	related to time, including simple rates of change and cycles, and use		Level 3 M1 L27–L29
	these patterns to make predictions.		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 Eff	ect		
SCI.CC2 Stude	ents use science and engineering practices, disciplinary core ideas, and <i>cau</i>	use (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		Level 3 M1 L1-L3
	relationships to explain change. They understand events that occur		Level 3 M1 L16-L18
	together with regularity may or may not signify a cause and effect		Level 3 M1 L21–L29
	relationship.		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, Propo	rtion, and Quantity		
•	ents use science and engineering practices, disciplinary core ideas, and an	unc	derstanding of <i>scale</i> ,
	nd quantity to make sense of phenomena and solve problems.		,
SCI.CC3.3-5	Students recognize natural objects and observable phenomena exist		Level 3 M1 L4-L10
	from the very small to the immensely large. They use standard units		Level 3 M2 L1–L2
	to measure and describe physical quantities such as mass, time,		Level 3 M3 L1–L3
	temperature, and volume.		Level 3 M3 L14–L15
Systems and	System Models		
SCI.CC4 Stude	ents use science and engineering practices, disciplinary core ideas, and an	unc	derstanding of
	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		Level 3 M1 L1–L3
	up a whole and can carry out functions its individual parts cannot.		Level 3 M1 L16–L20
	They also describe a system in terms of its components and their		Level 3 M2 L6–L15
	interactions.		Level 3 M2 L20–L28
			Level 3 M3 L9–L11
			Level 3 M4 L1–L30
Energy and N	latter		
	ents use science and engineering practices, disciplinary core ideas, and an	unc	derstanding of <i>energy</i>
	o make sense of phenomena and solve problems.		,
SCI.CC5.3-5	Students understand matter is made of particles and energy can be		Level 4 M2 L1–L3
	transferred in various ways and between objects. Students observe		Level 4 M2 L8–L26
	the conservation of matter by tracking matter flows and cycles before		Level 4 M3 L10–L19
	and after processes, recognizing the total mass of substances does not		Level 5 M1 L5–L8
	change.		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		
	ents use science and engineering practices, disciplinary core ideas, and an	unc	derstanding of
	function to make sense of phenomena and solve problems.		
SCI.CC6.3-5	Students understand different materials have different substructures,		Level 4 M3 L4–L6
	which can sometimes be observed; and substructures have shapes		Level 4 M3 L20
	and parts that serve functions.		Level 4 M3 L24–L25
			Level 4 M3 L29–L31
			Level 4 M4 L7–L9
			Level 4 M4 L25–L27
Stability and	 Change		200011111123
	ents use science and engineering practices, disciplinary core ideas, and an	unc	Herstanding of
	change to make sense of phenomena and solve problems.	JII.	acrotanianis or
SCI.CC7.3-5	Students measure change in terms of differences over time, and		Level 3 M1 L4–L15
301.007.3	observe that change may occur at different rates. They understand		Level 3 M1 L27–L29
	some systems appear stable, but over long periods of time they will		Level 3 M2 L16–L19
	eventually change.		Level 3 M3 L7–L8
	eventually change.		Level 3 M3 L12–L13
			Level 3 M3 L19–L20
			Level 3 M3 L26–L28
			LEVELO IVIO LZU-LZO





Science and Engi	neering Practices		Aligned PhD Science Lessons
Asking Questions	and Defining Problems		30,0,700 20000110
	ask questions and define problems, in conjunction with using crossc	utti	ng concents and
	deas, to make sense of phenomena and solve problems.	acci	ing concepts and
SCI.SEP1.A: Asking			
SCI.SEP1.A.3-5	Students ask questions that specify qualitative relationships. This		Level 3 M1 L1–L3
3C1.3E1 1.71.3 3	includes the following:		Level 3 M1 L21–L26
	Ask questions about what would happen if a variable is		Level 3 M2 L1–L2
	changed.		Level 3 M3 L1–L3
	 Identify scientific (testable) and non-scientific (non-testable) 		Level 3 M3 L12–L13
	questions.		Level 3 M4 L1–L3
	Ask questions that can be investigated and predict		Level 3 M4 L7–L9
	reasonable outcomes based on patterns such as cause and		Level 3 M4 L15–L16
	effect relationships.		Level 3 M4 L19–L30
SCI.SEP1.B: Defini			<u> </u>
SCI.SEP1.B.3-5	Students use prior knowledge to describe and define simple		Level 5 M2 L21–L23
	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.		
Developing and U			
	develop and use models, in conjunction with using crosscutting cond	cept	s and disciplinary
	se sense of phenomena and solve problems.		
SCI.SEP2.A: Devel			
SCI.SEP2.A.3-5	Students build and revise simple models and use models to		Level 3 M1 L1–L3
	represent events and design solutions. This includes the		Level 3 M1 L19–L20
	following:		Level 3 M2 L1-L3
	Identify limitations of models.		Level 3 M2 L6–L12
	Collaboratively develop and/or revise a model based on		Level 3 M2 L22–L25
	evidence that shows the relationships among variables for		Level 3 M3 L7–L11
	frequent and regular occurring events.		Level 3 M3 L21–L25
	Develop a model using an analogy, example, or abstract		Level 3 M4 L1–L3
	representation to describe a scientific principle or design		Level 3 M4 L17–L18
	solution.		Level 3 M4 L23–L27
	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.		
	ying Out Investigations		
	plan and carry out investigations, in conjunction with using crosscut	ttin	g concepts and
	deas, to make sense of phenomena and solve problems.		
	ing and Conducting Investigations		
SCI.SEP3.A.3-5	Students plan and carry out investigations that control variables		Level 3 M2 L4–L5
	and provide evidence to support explanations or design solutions.		Level 3 M3 L12–L13
	This includes the following:		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 Expla	anations and Designing Solutions		
	construct explanations and design solutions, in conjunction with usi	nσ	crosscutting concents
	ore ideas, to make sense of phenomena and solve problems.	''B	crosscutting concepts
	ruct an Explanation		
SCI.SEP6.A.3–5	Students use evidence to construct explanations that specify		Level 3 M1 L13–L15
3CI.3LF 0.A.3-3	variables which describe and predict phenomena. This includes		Level 3 M1 L18
	the following:		Level 3 M1 L21–L29
	 Construct an explanation of observed relationships (e.g., the 		Level 3 M2 L6–L8
	distribution of plants in the back yard).		Level 3 M2 L22–L28
	 Use evidence (e.g., measurements, observations, patterns) to 		Level 3 M3 L9–L11
	construct or support an explanation.		Level 3 M3 L14–L15
	 Identify the evidence that supports particular points in an 		Level 3 M3 L21–L28
	explanation.		Level 3 M4 L10–L14
	explanation.		Level 3 M4 L19–L21
			Level 3 M4 L28–L30
SCI.SEP6.B: Design	 Solutions		LCVCI 3 IVIT LZ0-L30
SCI.SEP6.B. Design	Students use evidence to create multiple solutions to design		Level 3 M1 L21–L26
JCI.JLFU.D.J-J	problems. This includes the following:		Level 3 M2 L9–L15
	Apply scientific ideas to solve design problems.		Level 3 M2 L20–L21
			Level 3 M3 L16–L20
	Constitute manages solutions to a problem and compare men		Level 3 M4 L12–L14
Francisci Avenus	well they meet the criteria and constraints.		Level 3 Wi4 L12-L14
	nent from Evidence	4. 4	:
	engage in argument from evidence, in conjunction with using crosso	utt	ing concepts and
	deas, to make sense of phenomena and solve problems.		
SCI.SEP7.A: Argue			
SCI.SEP7.A.3–5	Students critique the scientific explanations or solutions		Level 3 M1 L21–L26
	proposed by peers by citing relevant evidence about the natural		Level 3 M2 L9–L15
	and designed world. This includes the following:		Level 3 M2 L20–L21
	• Compare and refine arguments based on an evaluation of the evidence presented.		Level 3 M3 L16–L20 Level 3 M4 L12–L14
	Distinguish among facts, reasoned judgment based on		2000101111212121
	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.		
Obtaining. Evalua	ting, and Communicating Information		1
	will obtain, evaluate, and communicate information , in conjunction	wit	th using crosscutting
	plinary core ideas, to make sense of phenomena and solve problems		
	n, Evaluate, and Communicate Information		
SCI.SEP8.A.3-5	Students evaluate the merit and accuracy of ideas and methods.		Level 3 M1 L11–L17
	This includes the following:		Level 3 M2 L13-L15
	Read and comprehend grade-appropriate complex texts and		Level 3 M2 L20–L21
	other reliable media to summarize and obtain scientific and		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	e Ideas		Aligned PhD
Life Calamas			Science Lessons
Life Science	use science and engineering practices, crosscutting concents, and an u	ındı	arstanding of
	use science and engineering practices, crosscutting concepts, and an uncesses (on a scale from molecules to organisms) to make sense of p		_
problems.	ocesses for a scale from molecules to organisms, to make sense of p	пеп	officia and solve
•	h and Development of Organisms		
SCI.LS1.B.3	Reproduction is essential to every kind of organism. Organisms		Level 3 M3 L7–L8
30231.5.3	have unique and diverse life cycles.		Level 3 M3 L23–L28
	nare anique and an erec me system		1010.00 120 120
SCI.LS2 Students	use science and engineering practices, crosscutting concepts, and an u	ınd	erstanding of the
interactions, ene	rgy, and dynamics within ecosystems to make sense of phenomena a	nd s	solve problems.
SCI.LS2.C: Ecosys	tem Dynamics, Functioning, and Resilience		
SCI.LS2.C.3	When the environment changes, some organisms survive and		Level 3 M2 L1–L2
	reproduce, some move to new locations, some move into		Level 3 M2 L9-L12
	transformed environments, and some die.		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		Level 3 M2 L13-L15
	themselves, and cope with changes.		Level 3 M2 L26-L28
	use science and engineering practices, crosscutting concepts, and an u	und	erstanding of <i>heredity</i>
	phenomena and solve problems.		
SCI.LS3.A: Inherit			
SCI.LS3.A.3	Many characteristics of organisms are inherited from their		Level 3 M3 L1–L6
	parents. Other characteristics result from individuals' interactions		Level 3 M3 L14–L18
	with the environment. Many characteristics involve both		Level 3 M3 L26–L28
	inheritance and environment.		
SCI.LS3.B: Variati			
SCI.LS3.B.3	Different organisms vary in how they look and function because		Level 3 M3 L1–L6
	they have different inherited information; the environment also		Level 3 M3 L14–L18
l	affects the traits that an organism develops.		Level 3 M3 L26–L28





SCI.IS4 Students	s use science and engineering practices, crosscutting concepts, and an	unc	derstanding of
	tion to make sense of phenomena and solve problems.	unc	acratananig or
	nce of Common Ancestry and Diversity		
SCI.LS4.A.3	Some living organisms resemble organisms that once lived on		Level 3 M2 L1–L8
	Earth. Fossils provide evidence about the types of organisms and		Level 3 M2 L26-L28
	environments that existed long ago.		
SCI.LS4.B: Natur	·		
SCI.LS4.B.3	Differences in characteristics between individuals of the same		Level 3 M3 L21–L28
	species provide advantages in surviving and reproducing.		
SCI.LS4.C: Adapt	ation		
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: Biodiv	versity and Humans		
SCI.LS4.D.3	Populations of organisms live in a variety of habitats. Change in		Level 3 M2 L16–L28
	those habitats affects the organisms living there.		
Physical Science			
	suse science and engineering practices, crosscutting concepts, and an	unc	lerstanding of <i>forces</i> ,
interactions, mo	tion, and stability to make sense of phenomena and solve problems.		
SCI.PS2.A: Force	_ _		
SCI.PS2.A.3	Qualities of motion and changes in motion require description of		Level 3 M4 L1–L18
	both size and direction.		Level 3 M4 L28-L30
	The effect of unbalanced forces on an object results in a change		Level 3 M4 L10-L18
	of motion.		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,		Level 3 M4 L19-L21
	electrostatic) act even when the objects are not in contact.		Level 3 M4 L28–L30
Earth and Space	e Science		
SCI.ESS2 Student	ts use science and engineering practices, crosscutting concepts, and an	un	derstanding of <i>Earth's</i>
systems to make	sense of phenomena and solve problems.		
	ther and Climate		
SCI.ESS2.D.3	Climate describes patterns of typical weather conditions over		Level 3 M1 L11–L15
	different scales and variations. Historical weather patterns can be		Level 3 M1 L27–L29
	analyzed.		
	ts use science and engineering practices, crosscutting concepts, and an	un	derstanding of the
	n activity to make sense of phenomena and solve problems.		
SCI.ESS3.B: Natu			1 12 14 14 15
SCI.ESS3.B.3,4	A variety of hazards result from natural processes; humans		Level 3 M1 L1–L3
	cannot eliminate hazards but can reduce their impacts.		Level 3 M1 L16–L29





Engineering, Tec	hnology, and the Application of Science		
	suse science and engineering practices, crosscutting concepts, and an	un	derstanding of
	n to make sense of phenomena and solve problems.		-
SCI.ETS1.A: Defin	ing and Delimiting Engineering Problems		
SCI.ETS1.A.3-5	Possible solutions to a problem are limited by available materials		Level 3 M1 L21–L26
	and resources (constraints). The success of a designed solution is		Level 4 M2 L17–L23
	determined by considering the desired features of a solution		Level 5 M2 L21–L23
	(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.		
SCI.ETS1.B: Devel	oping Possible Solutions		
SCI.ETS1.B.3-5	Research on a problem should be carried out before beginning to		Level 3 M1 L21–L26
	design a solution. Testing a solution involves investigating how		Level 4 M1 L12–L17
	well it performs under a range of likely conditions.		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		Level 3 M2 L23–L27
	solutions is an important part of the design process, and shared		Level 4 M1 L12–L17
	ideas can lead to improved designs.		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,		Level 3 M4 L23–L27
	which suggest the elements of the design that need to be		Level 4 M1 L12–L17
	improved.		Level 4 M4 L20–L23
			Level 5 M1 L18–L22
			Level 5 M2 L21–L23
			Level 5 M3 L19–L23
	nizing the Design Solution		
SCI.ETS1.C.3–5	Different solutions need to be tested in order to determine which		Level 3 M4 L23–L27
	of them best solves the problem, given the criteria and the		Level 4 M4 L12–L17
	constraints.		Level 4 M4 L20–L23
001550000			Level 5 M1 L18–L22
	s use science and engineering practices, crosscutting concepts, and an		
	neering, Technology, Science, and Society to make sense of phenome	na	and solve problems.
	dependence of Science, Engineering, and Technology		T
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,		Level 3 M2 L22–L25
	while scientific discoveries lead to the development of new		Level 3 M4 L22–L27
	technologies.		Level 4 M1 L12–L17
			Level 4 M4 L22–L24
			Level 5 M4 L7–L8





SCI.ETS2.B: Influe	nce of Engineering, Technology, and Science on Society and the Nati	ıral	World
SCI.ETS2.B.3-5	People's needs and wants change over time, as do their demands		Level 3 M1 L21–L26
	for new and improved technologies.		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		Level 3 M1 L21-L26
	increase their benefits, decrease known risks, and meet societal		Level 3 M2 L22-L25
	demands.		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		Level 3 M1 L21–L26
	changes in the way people live and interact with one another.		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

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





3-LS4-2	Use evidence to construct an explanation for how the variations in	Level 3 M3 L21-L28
	characteristics among individuals of the same species may provide	
	advantages in surviving, finding mates, and reproducing.	
3-LS4-3	Construct an argument with evidence that in a particular habitat	Level 3 M2 L1–L2
	some organisms can survive well, some survive less well, and some	Level 3 M2 L9–L12
	cannot survive at all.	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	Level 3 M2 L16–L28
	when the environment changes and the types of plants and	1010.0
	animals that live there may change.	
SCI.PS	Physical Science	
3-PS2-1	Plan and conduct an investigation to provide evidence of the	Level 3 M4 L10–L18
3 1 32 1	effects of balanced and unbalanced forces on the motion of an	Level 3 M4 L28–L30
	object.	LCVC1 3 1V14 L20 L30
3-PS2-2	Make observations and measurements of an object's motion to	Level 3 M4 L1–L9
3 1 32 2	provide evidence that a pattern can be used to predict future	Level 3 M4 L28–L30
	motion.	200131414 220 230
3-PS2-3	Ask questions to determine cause and effect relationships of	Level 3 M4 L19–L21
3 1 3 2 3	electric or magnetic interactions between two objects not in	Level 3 M4 L28–L30
	contact with each other.	20001011112201200
3-PS2-4	Define a simple design problem that can be solved by applying	Level 3 M4 L22–L30
0.02.	scientific ideas about magnets.	1010.0
SCI.ESS	Earth and Space Science	
3-ESS2-1	Represent data in tables and graphical displays to describe typical	Level 3 M1 L1–L15
3 2332 1	weather conditions expected during a particular season.	Level 3 M1 L19–L20
	Wedner conditions expected during a particular seasons	Level 3 M1 L27–L29
	Obtain and combine information to describe climates in different	Level 3 M1 L11–L15
1 3-FSS2-2		
3-ESS2-2		
	regions of the world.	Level 3 M1 L27–L29
3-ESS2-2 3-ESS3-1	regions of the world. Make a claim about the merit of a design solution that reduces the	Level 3 M1 L27–L29 Level 3 M1 L1–L3
3-ESS3-1	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.	Level 3 M1 L27–L29
3-ESS3-1 SCI.ETS	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29
3-ESS3-1	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26
3-ESS3-1 SCI.ETS	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials,	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29
3-ESS3-1 SCI.ETS 3-5-ETS1-1	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science 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 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27
3-ESS3-1 SCI.ETS	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. Generate and compare multiple possible solutions to a problem	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27 Level 3 M2 L22–L25
3-ESS3-1 SCI.ETS 3-5-ETS1-1	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27 Level 3 M2 L22–L25 Level 4 M1 L12–L17
3-ESS3-1 SCI.ETS 3-5-ETS1-1 3-5-ETS1-2	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 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 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27 Level 3 M2 L22–L25 Level 4 M1 L12–L17 Level 5 M3 L19–L23
3-ESS3-1 SCI.ETS 3-5-ETS1-1	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 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. Plan and carry out fair tests in which variables are controlled and	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27 Level 3 M2 L22–L25 Level 4 M1 L12–L17 Level 5 M3 L19–L23 Level 3 M2 L23–L27
3-ESS3-1 SCI.ETS 3-5-ETS1-1 3-5-ETS1-2	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 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. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27 Level 3 M2 L22–L25 Level 4 M1 L12–L17 Level 5 M3 L19–L23
3-ESS3-1 SCI.ETS 3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-2	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 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. 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 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27 Level 3 M2 L22–L25 Level 4 M1 L12–L17 Level 5 M3 L19–L23 Level 3 M4 L23–L27 Level 3 M4 L23–L27
3-ESS3-1 SCI.ETS 3-5-ETS1-1 3-5-ETS1-2	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 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. 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. Obtain and evaluate information showing that different cultures	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27 Level 3 M2 L22–L25 Level 4 M1 L12–L17 Level 5 M3 L19–L23 Level 3 M2 L23–L27 Level 3 M4 L23–L27 Level 3 M4 L23–L27 Level 3 M2 L1–L2
3-ESS3-1 SCI.ETS 3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-2	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 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. 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. Obtain and evaluate information showing that different cultures have created different tools and technologies to survive in	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27 Level 3 M2 L22–L25 Level 4 M1 L12–L17 Level 5 M3 L19–L23 Level 3 M2 L23–L27 Level 3 M4 L23–L27 Level 3 M4 L23–L27 Level 3 M2 L1–L2 Level 3 M2 L9–L12
3-ESS3-1 SCI.ETS 3-5-ETS1-1 3-5-ETS1-2 3-5-ETS1-2	regions of the world. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. Engineering, Technology, and the Application of Science Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. 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. 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. Obtain and evaluate information showing that different cultures	Level 3 M1 L27–L29 Level 3 M1 L1–L3 Level 3 M1 L16–L29 Level 3 M1 L21–L26 Level 3 M4 L23–L27 Level 3 M2 L22–L25 Level 4 M1 L12–L17 Level 5 M3 L19–L23 Level 3 M2 L23–L27 Level 3 M4 L23–L27 Level 3 M4 L23–L27 Level 3 M2 L1–L2





Wisconsin Standards for Science Correlation to *PhD Science*™

Green indicates that $\textit{PhD Science}^{\text{\tiny{TM}}}$ fully addresses the standard within the grade level.
Blue indicates that <i>PhD Science</i> covers the standard but in a different grade level.
Yellow indicates that <i>PhD Science</i> partially covers the standard within the grade level.
Red indicates that <i>PhD Science</i> 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 Stude	ents use science and engineering practices, disciplinary core ideas, and pa te	tter	<i>ns</i> to make sense of
phenomena a	nd solve problems.		
SCI.CC1.3-5	Students identify similarities and differences in order to sort and		Level 4 M1 L1-L5
	classify natural objects and designed products. They identify patterns		Level 4 M1 L18-L20
	related to time, including simple rates of change and cycles, and use		Level 4 M2 L4-L5
	these patterns to make predictions.		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 Eff	ect		
SCI.CC2 Stude	ents use science and engineering practices, disciplinary core ideas, and cau	ıse	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		Level 4 M1 L6-L17
	relationships to explain change. They understand events that occur		Level 4 M1 L19-L27
	together with regularity may or may not signify a cause and effect		Level 4 M2 L1-L7
	relationship.		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, Proport	tion, and Quantity		
	nts use science and engineering practices, disciplinary core ideas, and an	und	lerstanding of scale .
	nd quantity to make sense of phenomena and solve problems.	unc	icistalianing of scare,
SCI.CC3.3-5	Students recognize natural objects and observable phenomena exist		Level 4 M1 L3–L5
303333	from the very small to the immensely large. They use standard units		Level 5 M1 L3–L4
	to measure and describe physical quantities such as mass, time,		Level 5 M1 L13–L17
	temperature, and volume.		Level 5 M1 L23–L26
	tompolataro, and rotanio		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 S	System Models		
	nts use science and engineering practices, disciplinary core ideas, and an	und	lerstanding of
	nodels to make sense of phenomena and solve problems.		
SCI.CC4.3-5	Students understand a system is a group of related parts that make		Level 4 M1 L1–L2
	up a whole and can carry out functions its individual parts cannot.		Level 4 M1 L12–L17
	They also describe a system in terms of its components and their		Level 4 M1 L21–L24
	interactions.		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 M	atter		
	nts use science and engineering practices, disciplinary core ideas, and an	und	lerstanding of <i>energy</i>
	make sense of phenomena and solve problems.		0 0,
SCI.CC5.3-5	Students understand matter is made of particles and energy can be		Level 4 M2 L1-L3
	transferred in various ways and between objects. Students observe		Level 4 M2 L8-L26
	the conservation of matter by tracking matter flows and cycles before		Level 4 M3 L10-L19
	and after processes, recognizing the total mass of substances does not		Level 5 M1 L5-L8
	change.		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 Stude	nts use science and engineering practices, disciplinary core ideas, and an	und	lerstanding of
	function to make sense of phenomena and solve problems.		-
SCI.CC6.3-5	Students understand different materials have different substructures,		Level 4 M3 L4–L6
	which can sometimes be observed; and substructures have shapes		Level 4 M3 L20
	and parts that serve functions.		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 Stude	SCI.CC7 Students use science and engineering practices, disciplinary core ideas, and an understanding of				
stability and o	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 Engir	neering Practices		Aligned PhD
			Science Lessons
Asking Questions	and Defining Problems		
	ask questions and define problems, in conjunction with using crosso	utti	ng concepts and
	leas, to make sense of phenomena and solve problems.		
SCI.SEP1.A: Asking			
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 		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
	reasonable outcomes based on patterns such as cause and effect relationships.		
SCI.SEP1.B: Defini			
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 U			
	develop and use models, in conjunction with using crosscutting cond	cept	s and disciplinary
	e sense of phenomena and solve problems.		
SCI.SEP2.A: Develo			
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





			T			
	Use a model to test cause and effect relationships or					
	interactions concerning the functioning of a natural or					
	designed system.					
	rying Out Investigations					
	plan and carry out investigations, in conjunction with using crosscut	tin	g concepts and			
disciplinary core id	leas, to make sense of phenomena and solve problems.					
SCI.SEP3.A: Planni	ng and Conducting Investigations					
SCI.SEP3.A.3-5	Students plan and carry out investigations that control variables		Level 4 M1 L6–L11			
	and provide evidence to support explanations or design solutions.		Level 4 M1 L21–L22			
	This includes the following:		Level 4 M2 L6–L7			
	Collaboratively plan and conduct an investigation to produce		Level 4 M2 L10–L14			
	data to serve as the basis for evidence, using fair tests in		Level 4 M3 L15–L19			
	which variables are controlled and the number of trials		Level 4 M4 L7–L9			
	considered.		Level 4 M4 L14–L21			
	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 Inte						
	analyze and interpret data, in conjunction with using crosscutting co	onc	epts and disciplinary			
	e sense of phenomena and solve problems.					
_	ze and Interpret Data		I			
SCI.SEP4.A.3–5	Students begin to use quantitative approaches to collect data and		Level 4 M1 L12–L20			
	conduct multiple trials of qualitative observations. (When		Level 4 M1 L23–L24			
	possible, digital tools should be used.) This includes the following:		Level 4 M4 L10–L17			
	Represent data in tables or various graphical displays (bar graphs, pictographs, and pic shorts) to reveal patterns that					
	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. 					
Using Mathematic	cs and Computational Thinking		1			
	use <i>mathematics and computational thinking</i> , in conjunction with u	sin	g 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		Level 4 M2 L8–L9			
2552. 5 115 5	physical properties, using computation and mathematics to		Level 4 M4 L14–L17			
	analyze data and compare alternative design solutions. This					
	includes the following:					
1						





	 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 Expla	anations and Designing Solutions				
	construct explanations and design solutions, in conjunction with usi	ng (crosscutting concepts		
	re ideas, to make sense of phenomena and solve problems.	Ū			
	ruct an Explanation				
SCI.SEP6.A.3-5	Students use evidence to construct explanations that specify		Level 4 M1 L3-L7		
	variables which describe and predict phenomena. This includes		Level 4 M1 L12-L18		
	the following:		Level 4 M1 L21-L22		
	Construct an explanation of observed relationships (e.g., the		Level 4 M1 L25-L27		
	distribution of plants in the back yard).		Level 4 M2 L4-L5		
	• Use evidence (e.g., measurements, observations, patterns) to		Level 4 M2 L15-L26		
	construct or support an explanation.		Level 4 M3 L4-L5		
	Identify the evidence that supports particular points in an		Level 4 M3 L24-L25		
	explanation.		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		Level 4 M1 L3-L7		
	problems. This includes the following:		Level 4 M1 L12-L18		
	Apply scientific ideas to solve design problems.		Level 4 M1 L21–L22		
	Generate multiple solutions to a problem and compare how		Level 4 M1 L25–L27		
	well they meet the criteria and constraints.		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		
	nent from Evidence				
SCI.SEP7 Students engage in <i>argument from evidence</i> , in conjunction with using crosscutting concepts and					
	leas, to make sense of phenomena and solve problems.				
SCI.SEP7.A: Argue			Lovel 4 M2 L21 L22		
3CI.3EY/.A.3-5	Students critique the scientific explanations or solutions		Level 4 M3 L21–L23 Level 4 M3 L26–L28		
	proposed by peers by citing relevant evidence about the natural and designed world. This includes the following:		Level 4 M3 L26–L28 Level 4 M4 L7–L8		
	_		Level 4 IVI4 L7—L8		
	• 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.				
	- 03e data to evaluate claims about cause and effect.				





Make a claim about the merit of a solution to a problem by		
-		
constraints of the problem.		
ing, and Communicating Information		
will <i>obtain, evaluate, and communicate information</i> , in conjunction	wit	th using crosscutting
plinary core ideas, to make sense of phenomena and solve problems		
, Evaluate, and Communicate Information		
Students evaluate the merit and accuracy of ideas and methods.		Level 4 M1 L3-L5
This includes the following:		Level 4 M1 L23-L24
Read and comprehend grade-appropriate complex texts and		Level 4 M3 L4-L6
other reliable media to summarize and obtain scientific and		Level 4 M3 L10-L11
technical ideas, and describe how they are supported by		Level 4 M3 L20-L23
evidence.		Level 4 M3 L26-L28
 Compare and/or combine information across complex texts 		Level 4 M4 L22-L24
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		
reliable media to explain phenomena or solutions to a		
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١	citing relevant evidence about how it meets the criteria and constraints of the problem. ing, and Communicating Information will obtain, evaluate, and communicate information, in conjunction olinary core ideas, to make sense of phenomena and solve problems. Evaluate, and Communicate Information 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.	citing relevant evidence about how it meets the criteria and constraints of the problem. Ing, and Communicating Information Will obtain, evaluate, and communicate information, in conjunction with obtain, evaluate, and communicate information. 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

Disciplinary Co	re Ideas		Aligned PhD
			Science Lessons
Life Science			
SCI.LS1 Students use science and engineering practices, crosscutting concepts, and an understanding of <i>structures and processes</i> (on a scale from molecules to organisms) to make sense of phenomena and solve problems.			
SCI.LS1.A: Struc			
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 ener to make sense of phenomena and solve problems. SCI.PS3.A: Definitions of Energy SCI.PS3.A: Moving objects contain energy. The faster the object moves, the more energy it has. Level 4 M2 L24– Level 4 M2 L24– SCI.PS3.B: Conservation of Energy and Energy Transfer SCI.PS3.B: 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. SCI.PS3.C: Relationships between Energy and Forces SCI.PS3.C: When objects collide, contact forces transfer energy so as to change objects' motions. 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. SCI.PS4 Students use science and engineering practices, crosscutting concepts, and an understanding of waw and their applications in technologies for information transfer to make sense of phenomena and solve problems. SCI.PS4.A: Wave Properties SCI.PS4.A: Wave Properties SCI.PS4.B: Electromagnetic Radiation SCI.PS4.B: Electromagnetic Radiation SCI.PS4.B: Electromagnetic Radiation SCI.PS4.C: Information Technologies and Instrumentation SCI.PS4.C: Information Technologies and Instrumentation SCI.PS4.C: Patterns can encode, send, receive, and decode information. Level 4 M4 L15–
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SCI.PS4.C.4 Patterns can encode, send, receive, and decode information. Level 4 M4 L18–1 Earth and Space Science
Earth and Space Science
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SCI.ESS1 Students use science and engineering practices, crosscutting concepts, and an understanding of Ear
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 Level 4 M1 L1–L5
occurred in a landscape.
Level 4 M1 L25-
SCI.ESS2 Students use science and engineering practices, crosscutting concepts, and an understanding of <i>Ear</i>
systems to make sense of phenomena and solve problems.
SCI.ESS2.A: Earth Materials and Systems
SCI.LSSZ.M. Lai ili iviateriais anu systems
SCI.ESS2.A.4,5 Four major Earth systems interact. Rainfall helps to shape the Level 4 M1 L6–L2
land and affects the types of living things found in a region. Level 4 M1 L25-
Water, ice, wind, organisms, and gravity break rocks, soils, and
sediments into smaller pieces and move them around.





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		Level 4 M1 L18–L20	
	volcanoes. Maps can be used to locate features and determine		Level 4 M1 L25-L27	
	patterns in those events.			
SCI.ESS2.E: Biogeo	ology			
SCI.ESS2.E.4	Living things can affect the physical characteristics of their		Level 4 M1 L6-L11	
	environment.		Level 4 M1 L25–L27	
	use science and engineering practices, crosscutting concepts, and an	un	derstanding of the	
Earth and human	activity to make sense of phenomena and solve problems.			
SCI.ESS3.A: Natura	•			
SCI.ESS3.A.4	Energy and fuels humans use are derived from natural sources,		Level 4 M1 L21–L27	
	and their use affects the environment. Some resources are			
	renewable over time, others are not.			
SCI.ESS3.B: Natura	al Hazards			
SCI.ESS3.B.3,4	A variety of hazards result from natural processes; humans		Level 3 M1 L1–L3	
	cannot eliminate hazards but can reduce their impacts.		Level 3 M1 L16-L29	
Engineering, Tech	nnology, and the Application of Science			
SCI.ETS1 Students	use science and engineering practices, crosscutting concepts, and an	un	derstanding of	
engineering desig	n to make sense of phenomena and solve problems.			
SCI.ETS1.A: Defini	ng and Delimiting Engineering Problems			
SCI.ETS1.A.3-5	Possible solutions to a problem are limited by available materials		Level 3 M1 L21-L26	
	and resources (constraints). The success of a designed solution is		Level 4 M2 L17-L23	
	determined by considering the desired features of a solution		Level 5 M2 L21–L23	
	(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.			
SCI.ETS1.B: Develo	pping Possible Solutions			
SCI.ETS1.B.3-5	Research on a problem should be carried out before beginning to		Level 3 M1 L21–L26	
	design a solution. Testing a solution involves investigating how		Level 4 M1 L12-L17	
	well it performs under a range of likely conditions.		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		Level 3 M2 L23-L27	
	solutions is an important part of the design process, and shared		Level 4 M1 L12-L17	
	ideas can lead to improved designs.		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,		Level 3 M4 L23-L27	
	which suggest the elements of the design that need to be		Level 4 M1 L12–L17	
	improved.		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		Level 3 M4 L23–L27	
	of them best solves the problem, given the criteria and the		Level 4 M4 L12–L17	
	constraints.		Level 4 M4 L20–L23	
			Level 5 M1 L18–L22	
SCI.ETS2 Students	use science and engineering practices, crosscutting concepts, and an	un		
	neering, Technology, Science, and Society to make sense of phenome		_	
SCI.ETS2.A: Interd	lependence 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,		Level 3 M2 L22–L25	
	while scientific discoveries lead to the development of new		Level 3 M4 L22-L27	
	technologies.		Level 4 M1 L12-L17	
			Level 4 M4 L22–L24	
			Level 5 M4 L7-L8	
SCI.ETS2.B: Influe	nce of Engineering, Technology, and Science on Society and the Nat	ural	World	
SCI.ETS2.B.3-5	People's needs and wants change over time, as do their demands		Level 3 M1 L21-L26	
	for new and improved technologies.		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		Level 3 M1 L21-L26	
	increase their benefits, decrease known risks, and meet societal		Level 3 M2 L22-L25	
	demands.		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		Level 3 M1 L21–L26	
	changes in the way people live and interact with one another.		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		Level 4 M3 L1–L6
	external structures that function to support survival, growth,		Level 4 M3 L20
	behavior, and reproduction.		Level 4 M3 L26-L31
4-LS1-2	Use a model to describe that animals receive different types of		Level 4 M3 L1–L6
	information through their senses, process the information in their		Level 4 M3 L15–L25
	brain, and respond to the information in different ways.		Level 4 M3 L29–L31
SCI.PS	Physical Science		
4-PS3-1	Use evidence to construct an explanation relating the speed of an		Level 4 M2 L6–L7
	object to the energy of that object.		Level 4 M2 L24–L26
4-PS3-2	Make observations to provide evidence that energy can be		Level 4 M2 L1–L5
	transferred from place to place by sound, light, heat, and electric		Level 4 M2 L10–L11
	currents.		Level 4 M2 L24–L26
4-PS3-3	Ask questions and predict outcomes about the changes in energy		Level 4 M2 L8–L9
	that occur when objects collide.		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		Level 4 M3 L7-L14
	amplitude and wavelength and that waves can cause objects to move.		Level 4 M3 L29–L31
4-PS4-2	Develop a model to describe that light reflecting from objects and		Level 4 M4 L1–L17
	entering the eye allows objects to be seen.		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		Level 4 M1 L1–L5
	rock layers to support an explanation for changes in a landscape		Level 4 M1 L19-L20
	over time		Level 4 M1 L25–L27
4-ESS2-1	Make observations and measurements to provide evidence of the		Level 4 M1 L6–L11
	effects of weathering or the rate of erosion by water, ice, wind, or vegetation.		Level 4 M1 L25–L27
4-ESS2-2	Analyze and interpret data from maps to describe patterns of		Level 4 M1 L18–L20
	Earth's features		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		Level 4 M1 L12–L17
	natural Earth processes on humans.		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	Level 3 M2 L23–L27
	failure points are considered to identify aspects of a model or	Level 3 M4 L23-L27
	prototype that can be improved.	Level 4 M4 L14–L17
		Level 5 M1 L18–L22
4-ETS3-1	Construct an explanation for how energy is transferred in a	Level 4 M2 L1-L5
	system, and then revise that explanation based on new evidence.	Level 4 M2 L8–L9
		Level 4 M2 L24–L26





Wisconsin Standards for Science Correlation to *PhD Science*™

Green indicates that <i>PhD Science</i> ™ fully addresses the standard within the grade level.
Blue indicates that <i>PhD Science</i> covers the standard but in a different grade level.
Yellow indicates that <i>PhD Science</i> partially covers the standard within the grade level.
Red indicates that <i>PhD Science</i> 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					
	nts use science and engineering practices, disciplinary core ideas, and pa nd solve problems.	tter	'ns to make sense of		
SCI.CC1.3-5	Students identify similarities and differences in order to sort and		Level 5 M1 L7-L8		
	classify natural objects and designed products. They identify patterns		Level 5 M2 L1–L5		
	related to time, including simple rates of change and cycles, and use		Level 5 M2 L8-L9		
	these patterns to make predictions.		Level 5 M2 L15–L17		
			Level 5 M3 L6-L9		
			Level 5 M4 L1–L17		
			Level 5 M4 L20-L26		
Cause and Eff	ect				
	nts use science and engineering practices, disciplinary core ideas, and <i>ca</i> nd cand cand cand cand cand cand cand ca	use	and effect		
SCI.CC2.3-5	Students routinely identify and test causal relationships and use these		Level 5 M1 L1–L2		
	relationships to explain change. They understand events that occur		Level 5 M1 L5–L6		
	together with regularity may or may not signify a cause and effect		Level 5 M1 L9–L10		
	relationship.		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 <i>scale</i> , <i>proportion</i> , <i>and quantity</i> to make sense of phenomena and solve problems					
SCI.CC3.3-5	Students recognize natural objects and observable phenomena exist		Level 5 M1 L3-L4		
	from the very small to the immensely large. They use standard units		Level 5 M1 L13-L17		





	to measure and describe physical quantities such as mass, time,	Level 5 M1 L2	3–L26	
	temperature, and volume.	Level 5 M2 L1	0-L11	
		Level 5 M3 L1	-L5	
		Level 5 M3 L1	0-L11	
		Level 5 M3 L2	4–L27	
		Level 5 M4 L1	8-L19	
		Level 5 M4 L2	4–L26	
Systems and S	System Models			
	nts use science and engineering practices, disciplinary core ideas, and an	understanding of		
	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	Level 5 M1 L3		
	up a whole and can carry out functions its individual parts cannot.	Level 5 M1 L1	5–L17	
	They also describe a system in terms of its components and their	Level 5 M2 L1	–L2	
	interactions.	Level 5 M2 L6		
		Level 5 M2 L1	4	
		Level 5 M2 L1	8-L19	
		Level 5 M2 L2	4–L26	
		Level 5 M3 L1	–L9	
		Level 5 M3 L1	2-L13	
		Level 5 M3 L1	9–L27	
		Level 5 M4 L1	–L2	
		Level 5 M4 L7	–L26	
Energy and M	latter			
SCI.CC5 Stude	nts use science and engineering practices, disciplinary core ideas, and an	understanding of <i>e</i>	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	Level 5 M1 L5		
	transferred in various ways and between objects. Students observe	Level 5 M1 L1	3–L14	
	the conservation of matter by tracking matter flows and cycles before	Level 5 M1 L2		
	and after processes, recognizing the total mass of substances does not	Level 5 M2 L6	-L11	
	change.	Level 5 M2 L1	4–L19	
		Level 5 M2 L2	4–L26	
		Level 5 M3 L1	0-L11	
		Level 5 M4 L3	–L4	
Structure and	Function			
	nts use science and engineering practices, disciplinary core ideas, and an	understanding of		
structure and	<i>function</i> to make sense of phenomena and solve problems.			
SCI.CC6.3-5	Students understand different materials have different substructures,	Level 4 M3 L4	–L6	
	which can sometimes be observed; and substructures have shapes	Level 4 M3 L2	0	
	and parts that serve functions.	Level 4 M3 L2	4–L25	
		Level 4 M3 L2	9-L31	
		Level 4 M4 L7	–L9	
		Level 4 M4 L2	5-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	Level 5 M1 L1	-L2	
	observe that change may occur at different rates. They understand	Level 5 M1 L9		
	some systems appear stable, but over long periods of time they will	Level 5 M1 L1		
	eventually change.	Level 5 M2 L1		
	,	Level 5 M2 L2		
	<u> </u>			





	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 Engi	neering Practices	Aligned PhD				
		Science Lessons				
	and Defining Problems					
	ask questions and define problems, in conjunction with using crossc	utting concepts and				
	disciplinary core ideas, to make sense of phenomena and solve problems.					
SCI.SEP1.A: Asking						
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				
COL CED4 D D C: :	effect relationships.					
SCI.SEP1.B: Defini		1 15 140 104 100				
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 U						
	develop and use models, in conjunction with using crosscutting cond	cepts and disciplinary				
	se sense of phenomena and solve problems.					
SCI.SEP2.A: Devel	·					
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 L3–L14 Level 5 M1 L23–L26 Level 5 M2 L1–L2 Level 5 M2 L6–L7 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 Students evaluate the merit and accuracy of ideas and methods. SCI.SEP8.A.3-5 Level 5 M2 L6-L7 This includes the following: Level 5 M2 L10-L11 Read and comprehend grade-appropriate complex texts Level 5 M2 L18-L20 and other reliable media to summarize and obtain Level 5 M3 L9 scientific and technical ideas, and describe how they are Level 5 M3 L14-L16 Level 5 M3 L19-L27 supported by evidence. Level 5 M4 L18-L19 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 Cor	re Ideas		Aligned PhD			
			Science Lessons			
Life Science						
SCI.LS1 Students	SCI.LS1 Students use science and engineering practices, crosscutting concepts, and an understanding of					
structures and p	rocesses (on a scale from molecules to organisms) to make sense of pl	nen	omena and solve			
problems.						
SCI.LS1.C: Organ	ization for Matter and Energy Flow in Organisms					
SCI.LS1.C.5	Food provides animals with the materials and energy they need for		Level 5 M2 L8–L9			
	body repair, growth, warmth, and motion. Plants acquire material		Level 5 M2 L15–L19			
	for growth chiefly from air, water, and process matter, and obtain		Level 5 M2 L24–L26			
	energy from sunlight, which is used to maintain conditions					
	necessary for survival.					
	SCI.LS2 Students use science and engineering practices, crosscutting concepts, and an understanding of the					
	ergy, and dynamics within ecosystems to make sense of phenomena a	nd s	solve problems.			
SCI.LS2.A: Interd	lependent Relationships in Ecosystems					
SCI.LS2.A.5	The food of almost any animal can be traced back to plants.		Level 5 M2 L8-L14			
	Organisms are related in food webs in which some animals eat		Level 5 M2 L20			
	plants for food and other animals eat the animals that eat plants,		Level 5 M2 L24–L26			
	while decomposers restore some materials back to the soil.					





SCI.LS2.B: Cycle	s of Matter and Energy Transfer in Ecosystems		
SCI.LS2.B.5	Matter cycles between the air and soil and among organisms as		Level 5 M2 L6–L7
	they live and die.		Level 5 M2 L10-L14
	,		Level 5 M2 L24-L26
Physical Science	ce control of the con		
SCI.PS1 Student	s use science and engineering practices, crosscutting concepts, and an o	unde	erstanding of <i>matter</i>
	<i>ions</i> to make sense of phenomena and solve problems.		
SCI.PS1.A: Stru	tures and Properties of Matter		
SCI.PS1.A.5	Matter exists as particles that are too small to see. Matter is always		Level 5 M1 L5–L8
	conserved even if it seems to disappear. Measurements of a variety		Level 5 M1 L13-L14
	of observable properties can be used to identify particular		Level 5 M1 L23-L26
	materials.		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: Cher	nical Reactions		
SCI.PS1.B.5	Chemical reactions that occur when substances are mixed can be		Level 5 M1 L1–L2
	identified by the emergence of substances with different		Level 5 M1 L15-L26
	properties. In chemical reactions the total mass remains the same.		
SCI.PS2 Student	is use science and engineering practices, crosscutting concepts, and an u	unde	erstanding <i>of forces</i> ,
	otion, and stability to make sense of phenomena and solve problems.		
SCI.PS2.B: Type	es of Interactions		
SCI.PS2.B.5	The gravitational force of Earth acting on an object near Earth's		Level 5 M4 L3–L4
	surface pulls that object toward the planet's center.		Level 5 M4 L24-L26
SCI.PS3 Student	is use science and engineering practices, crosscutting concepts, and an u	unde	erstanding of <i>energy</i>
to make sense	of phenomena and solve problems.		
	gy in Chemical Processes and Everyday Life		
SCI.PS3.D.4, 5			
	Plants capture energy from sunlight which can be used as fuel or		Level 5 M2 L6–L7
, -	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 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26
	food.		Level 5 M2 L15-L19
			Level 5 M2 L15–L19 Level 5 M2 L24–L26
	food.		Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7 Level 5 M2 L15–L19
Earth and Space	food. Stored energy in food or fuel can be converted to useable energy.		Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7
Earth and Space	food. Stored energy in food or fuel can be converted to useable energy.	unc	Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26
Earth and Space	food. Stored energy in food or fuel can be converted to useable energy. ce Science	unc	Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26
Earth and Space SCI.ESS1 Studen place in the uni	food. Stored energy in food or fuel can be converted to useable energy. See Science Its use science and engineering practices, crosscutting concepts, and an	und	Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26
Earth and Space SCI.ESS1 Studen place in the uni	food. Stored energy in food or fuel can be converted to useable energy. See Science Its use science and engineering practices, crosscutting concepts, and an exerse to make sense of phenomena and solve problems.	unc	Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26
Earth and Space SCI.ESS1 Studen place in the unit SCI.ESS1.A: The	food. Stored energy in food or fuel can be converted to useable energy. Exercise Science Into use science and engineering practices, crosscutting concepts, and an exerse to make sense of phenomena and solve problems. Universe and Its Stars	unc	Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26 derstanding of <i>Earth's</i>
Earth and Space SCI.ESS1 Studen place in the unit SCI.ESS1.A: The SCI.ESS1.A.5	food. Stored energy in food or fuel can be converted to useable energy. Exercise Science Its use science and engineering practices, crosscutting concepts, and an exercise to make sense of phenomena and solve problems. Universe and Its Stars Stars range greatly in size and distance from Earth, and this can	unc	Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26 derstanding of <i>Earth's</i>
Earth and Space SCI.ESS1 Studen place in the unit SCI.ESS1.A: The SCI.ESS1.A.5	food. Stored energy in food or fuel can be converted to useable energy. See Science Into use science and engineering practices, crosscutting concepts, and an exerse to make sense of phenomena and solve problems. Universe and Its Stars Stars range greatly in size and distance from Earth, and this can explain their relative brightness.	unc	Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26 derstanding of <i>Earth's</i>
Earth and Space SCI.ESS1 Studen place in the unit SCI.ESS1.A: The SCI.ESS1.A.5	food. Stored energy in food or fuel can be converted to useable energy. See Science Into use science and engineering practices, crosscutting concepts, and an Interest of make sense of phenomena and solve problems. Universe and Its Stars Stars range greatly in size and distance from Earth, and this can explain their relative brightness. Stard and the Solar System	unc	Level 5 M2 L15–L19 Level 5 M2 L24–L26 Level 5 M2 L6–L7 Level 5 M2 L15–L19 Level 5 M2 L24–L26 derstanding of <i>Earth's</i> Level 5 M4 L18–L19 Level 5 M4 L24–L26





SCI.ESS2 Students	use science and engineering practices, crosscutting concepts, and an	un	derstanding of <i>Earth's</i>		
systems to make sense of phenomena and solve problems.					
	Materials and Systems				
SCI.ESS2.A.4,5	Four major Earth systems interact. Rainfall helps to shape the		Level 4 M1 L6–L11		
,-	land and affects the types of living things found in a region.		Level 4 M1 L25–L27		
	Water, ice, wind, organisms, and gravity break rocks, soils, and				
	sediments into smaller pieces and move them around.				
SCI.ESS2.C: The Ro	oles 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		Level 5 M3 L4–L5		
	freshwater is in glaciers or underground.		Level 5 M3 L24–L27		
SCI.ESS3 Students	use science and engineering practices, crosscutting concepts, and an	un			
	activity to make sense of phenomena and solve problems.		a e. o ta a a a a		
	n Impacts on Earth Systems				
SCI.ESS3.C.5	Societal activities have had major effects on the land, ocean,		Level 5 M3 L14–L27		
l	atmosphere, and even outer space. Societal activities can also				
	help protect Earth's resources and environments.				
Engineering, Tech	nnology, and the Application of Science				
	use science and engineering practices, crosscutting concepts, and an	un	derstanding of		
	n to make sense of phenomena and solve problems.		· ·		
	ng and Delimiting Engineering Problems				
SCI.ETS1.A.3-5	Possible solutions to a problem are limited by available materials		Level 3 M1 L21–L26		
	and resources (constraints). The success of a designed solution is		Level 4 M2 L17–L23		
	determined by considering the desired features of a solution		Level 5 M2 L21–L23		
	(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.				
SCI.ETS1.B: Develo	oping Possible Solutions				
SCI.ETS1.B.3-5	Research on a problem should be carried out before beginning to		Level 3 M1 L21–L26		
	design a solution. Testing a solution involves investigating how		Level 4 M1 L12–L17		
	well it performs under a range of likely conditions.		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		Level 3 M2 L23-L27		
	solutions is an important part of the design process, and shared		Level 4 M1 L12–L17		
	ideas can lead to improved designs.		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,		Level 3 M4 L23–L27		
	which suggest the elements of the design that need to be		Level 4 M1 L12–L17		
	improved.		Level 4 M4 L20–L23		
			Level 5 M1 L18–L22		
			Level 5 M2 L21–L23		
			Level 5 M3 L19–L23		
SCI.ETS1.C: Optim	izing the Design Solution				
SCI.ETS1.C.3-5	Different solutions need to be tested in order to determine which		Level 3 M4 L23–L27		
	of them best solves the problem, given the criteria and the		Level 4 M4 L14–L17		
	constraints.		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 I 22-I 27 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, Level 3 M2 L22-L25 while scientific discoveries lead to the development of new Level 3 M4 L22-L27 Level 4 M1 L12-L17 technologies. 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 Level 3 M1 L21-L26 for new and improved technologies. 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 Level 3 M1 L21-L26 increase their benefits, decrease known risks, and meet societal Level 3 M2 L22-L25 Level 3 M4 L22-L27 demands. Level 4 M1 L12-L17 Level 4 M1 L23-L24 Level 4 M2 L15-L23 Level 4 M4 L14-L17

Performance Indicators			Aligned PhD Science Lessons
SCI.LS	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

When new technologies become available, they can bring about

changes in the way people live and interact with one another.

Level 5 M2 L21–L23 Level 5 M3 L19–L23

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





5-LS2-1	Develop a model to describe the movement of matter among	Level 5 M2 L1–L2
	plants, animals, decomposers, and the environment.	Level 5 M2 L6–L14
	p , ,	Level 5 M2 L24–L26
SCI.PS	Physical Science	
5-PS1-1	Develop a model to describe that matter is made of particles too	Level 5 M1 L5-L10
	small to be seen.	Level 5 M1 L23–L26
5-PS1-2	Measure and graph quantities to provide evidence that regardless	Level 5 M1 L9-L17
	of the type of change that occurs when heating, cooling, or mixing	Level 5 M1 L23–L26
	substances, the total weight of matter is conserved.	
5-PS1-3	Make observations and measurements to identify materials based	Level 5 M1 L1–L4
	on their properties.	Level 5 M1 L11–L17
		Level 5 M1 L23–L26
5-PS1-4	Conduct an investigation to determine whether the mixing of two	Level 5 M1 L1–L2
	or more substances results in new substances.	Level 5 M1 L13-L26
5-PS2-1	Support an argument that the gravitational force exerted by Earth	Level 5 M4 L3-L4
	on objects is directed down.	Level 5 M4 L24–L26
5-PS3-1	Use models to describe that energy in animals' food (used for body	Level 5 M2 L15-L19
	repair, growth, motion, and to maintain body warmth) was once	Level 5 M2 L24–L26
	energy from the sun.	
SCI.ESS	Earth and Space Science	
5-ESS1-1	Support an argument that differences in the apparent brightness	Level 5 M4 L18-L19
	of the sun compared to other stars is due to their relative	Level 5 M4 L24–L26
	distances from Earth.	
5-ESS1-2	Represent data in graphical displays to reveal patterns of daily	Level 5 M4 L1–L2
	changes in length and direction of shadows, day and night, and the	Level 5 M4 L5-L17
	seasonal appearance of some stars in the night sky.	Level 5 M4 L20–L26
5-ESS2-1	Develop a model using an example to describe ways the	Level 5 M3 L1–L3
	geosphere, biosphere, hydrosphere, and atmosphere interact.	Level 5 M3 L6–L13
		Level 5 M3 L19–L27
5-ESS2-2	Describe and graph the amounts and percentages of water and	Level 5 M3 L4–L5
	fresh water in various reservoirs to provide evidence about the	Level 5 M3 L19–L27
	distribution of water on Earth.	
5-ESS3-1	Obtain and combine information about ways individual	Level 5 M3 L14–L18
	communities use science ideas to protect the Earth's resources	Level 5 M3 L24–L27
	and environment.	
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	Level 5 M2 L21–L23
	includes specified criteria for success and constraints on materials,	
	time, or cost.	
3-5-ETS1-2	Generate and compare multiple possible solutions to a problem	Level 5 M3 L19–L23
	based on how well each is likely to meet the criteria and	
	constraints of the problem.	
3-5-ETS1-2	Plan and carry out fair tests in which variables are controlled and	Level 5 M1 L18–L22
	failure points are considered to identify aspects of a model or	
	prototype that can be improved.	
5-ETS3-1	Investigate properties of materials to provide evidence as to which	Level 5 M1 L1–L4
	would best work within an engineering design solution	Level 5 M1 L11–L17
		Level 5 M1 L23–L26