



## North Carolina Standard Course of Study (NCSCOS), Science Correlation to *PhD Science*<sup>™</sup>

Gree	en indicates that <i>PhD Science</i> ™ fully addresses the standard within the grade level.
Blue	e indicates that <i>PhD Science</i> covers the standard but in a different grade level.
Yello	ow 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 North Carolina Academic Standards and Performance Indicators for Science are partially covered by the Level 3 *PhD Science* curriculum. A detailed analysis of alignment appears in the table below.

Grade 3 St	andards		Aligned PhD
			Science Lessons
Forces and	d Motion		
3.P.1	Understand motion and factors that affect motion.		
3.P.1.1	Infer changes in speed or direction resulting from forces acting on an object.		Level 3 M4 L10–L18 Level 3 M4 L28–L30
3.P.1.2	Compare the relative speeds (faster or slower) of objects that travel the same distance in different amounts of time.		Level 3 M4 L5
3.P.1.3	Explain the effects of earth's gravity on the motion of any object on or near the earth.		Level 5 M4 L13–L14
Matter: Pr	operties and Change		
3.P.2	Understand the structure and properties of matter before and after th	ney	undergo a change.
3.P.2.1	Recognize that air is a substance that surrounds us, takes up space, and has mass.		Level 5 M1 L5–L6
3.P.2.2	Compare solids, liquids, and gases based on their basic properties.		Level 5 M1 L3–L5
3.P.2.3	Summarize changes that occur to the observable properties of materials when different degrees of heat are applied to them, such as melting ice or ice cream, boiling water or an egg, or freezing water.		Level 5 M1 L9–L12
Energy: Co	onservation and Transfer		
3.P.3	Recognize how energy can be transferred from one object to another.		
3.P.3.1	Recognize that energy can be transferred from one object to another by rubbing them against each other.		Level 3 M4 L16
3.P.3.2	Recognize that energy can be transferred from a warmer object to a cooler one by contact or at a distance and the cooler object gets warmer.		Level 5 M1 L9–L12 Level 5 M1 L23–L26
Earth in th	e Universe		
3.E.1	Recognize the major components and patterns observed in the earth/	mo	on/sun system.





3.E.1.1	Recognize that the earth is part of a system called the solar system		Level 4 M1 L1–L5
	that includes the sun (a star), planets, and many moons and the earth		Level 4 M1 L19-L20
	is the third planet from the sun in our solar system.		Level 4 M1 L25-L27
3.E.1.2	Recognize that changes in the length and direction of an object's		Level 5 M4 L1-L2
	shadow indicate the apparent changing position of the Sun during the		Level 5 M4 L5-L17
	day although the patterns of the stars in the sky, to include the Sun,		Level 5 M4 L20-L26
	stay the same.		
Earth Systems	, Structures, and Processes		
3.E.2	Compare the structures of the Earth's surface using models or three-d	ime	ensional diagrams.
3.E.2.1	Compare Earth's saltwater and freshwater features (including oceans,		Level 5 M3 L4–L5
	seas, rivers, lakes, ponds, streams, and glaciers).		Level 5 M3 L19–L27
3.E.2.2	Compare Earth's land features (including volcanoes, mountains,		Level 4 M1 L18-L20
	valleys, canyons, caverns, and islands) by using models, pictures,		Level 4 M1 L25–L27
	diagrams, and maps.		
Structures an	d Functions of Living Organisms		
3.L.1	Understand human body systems and how they are essential for life:	pro	tection, movement,
	and support.		
3.L.1.1	Compare the different functions of the skeletal and muscular system.		
3.L.1.2	Explain why skin is necessary for protection and for the body to		
	remain healthy.		
Ecosystems			
3.L.2	Understand how plants survive in their environments.		
3.L.2.1	Remember the function of the following structures as it relates to the		Level 3 M2 L10
	survival of plants in their environments:		
	Roots—absorb nutrients		
	Stems—provide support		
	Leaves—synthesize food		
	Flowers—attract pollinators and produce seeds for		
	reproduction		
3.L.2.2	Explain how environmental conditions determine how well plants		Level 3 M2 L1–L2
	survive and grow.		Level 3 M2 L9-L12
			Level 3 M2 L16–L19
			Level 3 M2 L22–L28
3.L.2.3	Summarize the distinct stages of the life cycle of seed plants.		Level 3 M3 L7–L8
3.L.Z.3	, , , , , , , , , , , , , , , , , , , ,		Level 3 M3 L23-L28
3.L.2.3			LCVCI 3 IVIS LZ3 LZ0
3.L.2.4	Explain how the basic properties (texture and capacity to hold water)		Level 5 M2 L12–L14
	Explain how the basic properties (texture and capacity to hold water) and components (sand, clay, and humus) of soil determine the ability		





Grade 3 Ext	ended Content Standards		Aligned PhD
			Science Lessons
Forces and			
EX.3.P.1	Understand the factors that affect motion.		
EX.3.P.1.1	Identify different ways objects move (to include falling to the ground		Level 3 M4 L1–L15
	when dropped):		Level 3 M4 L18
	Straight		Level 3 M4 L21–L22
	Up and down		
	Fast and slow		
EX.3.P.1.2	Describe the effect of a push or a pull on the motion of an object		Level 3 M4 L1–L9
	(e.g., how far, direction, magnitude).		Level 3 M4 L28–L30
EX.3.P.1.3	Compare objects (e.g., ramps and barriers) that may change the		Level 3 M4 L10–L18
	direction or speed of things that are already in motion.		Level 3 M4 L28-L30
Matter, Pro	perty and Change		
EX.3.P.2	Understand the properties of matter before and after they undergo of	han	ge.
EX.3.P.2.1	Identify liquids and how they take the shape of their container.		Level 5 M1 L5
			Level 5 M1 L9-L10
			Level 5 M1 L17
EX.3.P.2.2	Compare properties of water to other objects (e.g., objects that can		Level 5 M1 L9
	sink, float, or stay suspended in water).		Level 5 M1 L13-L14
			Level 5 M3 L12
EX.3.P.2.3	Identify processes (e.g., heating, cooling, cutting, smashing) that		Level 5 M1 L9-L17
	result in a physical change.		Level 5 M1 L23-L26
EX.3.P.2.4	Compare the effect of temperature change on matter (e.g., melting		Level 5 M1 L9–L17
	ice or ice cream, boiling water, or freezing water).		Level 5 M1 L23–L26
	ns, Structures, and Processes		
EX.3.E.1	Understand how changes in the seasons [affect] the Earth.		
EX.3.E.1.1	Identify common characteristics of the 4 seasons (winter, spring,		Level 3 M1 L1–L15
	summer, and fall).		Level 3 M1 L19–L20
			Level 3 M1 L27–L29
EX.3.E.1.2	Compare the changes which occur during each season (e.g.,		Level 5 M4 L1–L2
	temperature changes, leaves falling, snow, wind blowing, flowers		Level 5 M4 L5–L17
	blooming).		Level 5 M4 L20–L26
	and Functions of Living Organisms		
EX.3.L.1	Understand basic functions of the human body.		
EX.3.L.1.1	Identify basic functions of the human body (e.g., eating, breathing,		
	moving, sleeping).		
EX.3.L.1.2	Identify basic needs of the human body (e.g., food, water, rest,		Level 5 M2 L8–L14
	protection).		Level 5 M2 L20
			Level 5 M2 L24–L26
EX.3.L.1.3	Understand how the functions and basic needs of the human body		Level 5 M2 L8–L14
	are essential for life.		Level 5 M2 L20
			Level 5 M2 L24–L26





Ecosystems		
EX.3.L.2	Understand how plants survive in their environment.	
EX.3.L.2.1	Identify the structures (leaf, flower, roots, and stem) of a plant and	Level 3 M3 L7-L8
	their functions.	Level 3 M3 L23-L28
EX.3.L.2.2	Compare basic needs of plants (e.g., air, water, light, soil, food, space)	Level 5 M2 L3-L5
	to humans.	Level 5 M2 L24-L26
EX.3.L.2.3	Compare soil components (sand/clay) and their capacity to retain	Level 5 M3 L1-L13
	water.	Level 5 M3 L18
		Level 5 M3 L27





# North Carolina Academic Standards and Performance Indicators for Science Correlation to *PhD Science*™

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Key: Module (M), Lesson (L)

### PhD Science Level 4

The Grade 4 North Carolina Academic Standards and Performance Indicators for Science are partially covered by the Level 4 *PhD Science* curriculum. A detailed analysis of alignment is provided in the table below.

Grade 4 St	andards		Aligned PhD
			Science Lessons
Forces and	Motion		
4.P.1	Explain how various forces affect the motion of an object.		
4.P.1.1	Explain how magnets interact with all things made of iron and with		Level 3 M4 L19–L21
	other magnets to produce motion without touching them.		Level 3 M4 L28-L30
4.P.1.2	Explain how electrically charged objects push or pull on other		Level 3 M4 L20-L21
	electrically charged objects and produce motion.		
Matter: Pro	operties and Change		
4.P.2	Understand the composition and properties of matter before and after	r th	ney undergo a change
	or interaction.		
4.P.2.1	Compare the physical properties of samples of matter (strength,		Level 5 M1 L3–L4
	hardness, flexibility, ability to conduct heat, ability to conduct		
	electricity, ability to be attracted by magnets, reactions to water and		
	fire).		
4.P.2.2	Explain how minerals are identified using tests for the physical		
	properties of hardness, color, luster, cleavage, and streak.		
4.P.2.3	Classify rocks as metamorphic, sedimentary, or igneous based on		
	their composition, how they are formed, and the processes that		
	create them.		
Energy: Co	nservation and Transfer		
4.P.3	Recognize that energy takes various forms that may be grouped based	d or	their interaction
	with matter.		
4.P.3.1	Recognize the basic forms of energy (light, sound, heat, electrical, and		Level 4 M2 L4–L5
	magnetic) as the ability to cause motion or create change.		Level 4 M2 L8–L26
4.P.3.2	Recognize that light travels in a straight line until it strikes an object		Level 4 M4 L3–L4
	or travels from one medium to another, and that light can be		Level 4 M4 L7–L8
	reflected, refracted, and absorbed.		
Earth in th	e Universe		





4.E.1	Explain the causes of day and night and phases of the moon.		
4.E.1.1	Explain the cause of day and night based on the rotation of Earth on		Level 5 M4 L1–L2
	its axis.		Level 5 M4 L5-L17
			Level 5 M4 L20-L26
4.E.1.2	Explain the monthly changes in the appearance of the moon, based		Level 5 M4 L1–L2
	on the moon's orbit around the Earth.		Level 5 M4 L5-L17
			Level 5 M4 L20-L26
Earth Histor	у		
4.E.2	Understand the use of fossils and changes in the surface of the earth a	ıs ev	vidence of the
	history of Earth and its changing life forms.		
4.E.2.1	Compare fossils (including molds, casts, and preserved parts of plants		Level 3 M2 L1-L8
	and animals) to one another and to living organisms.		Level 3 M2 L26-L28
4.E.2.2	Infer ideas about Earth's early environments from fossils of plants and		Level 4 M1 L3-L5
	animals that lived long ago.		
4.E.2.3	Give examples of how the surface of the earth changes due to slow		Level 4 M1 L6-L11
	processes such as erosion and weathering, and rapid processes such		Level 4 M1 L25-L27
	as landslides, volcanic eruptions, and earthquakes.		
Ecosystems			
4.L.1	Understand the effects of environmental changes, adaptations, and be	ehav	viors that enable
	animals (including humans) to survive in changing habitats.		
4.L.1.1	Give examples of changes in an organism's environment that are		Level 3 M2 L16-L28
	beneficial to it and some that are harmful.		
4.L.1.2	Explain how animals meet their needs by using behaviors in response		Level 5 M2 L8-L14
	to information received from the environment.		Level 5 M2 L20
			Level 5 M2 L24-L26
4.L.1.3	Explain how humans can adapt their behavior to live in changing		Level 5 M4 L1-L2
	habitats (e.g., recycling wastes, establishing rain gardens, planting		Level 5 M4 L6
	trees and shrubs to prevent flooding and erosion).		Level 5 M4 L9-L12
			Level 5 M4 L21
4.L.1.4	Explain how differences among animals of the same population		Level 3 M2 L16-L28
	sometimes give individuals an advantage in surviving and reproducing		
	in changing habitats.		
Molecular B	iology		
4.L.2	Understand food and the benefits of vitamins, minerals, and exercise.		
4.L.2.1	Classify substances as food or non-food items based on their ability to		Level 5 M2 L16–L17
	provide energy and materials for survival, growth, and repair of the		
	body.		
4.L.2.2	Explain the role of vitamins, minerals, and exercise in maintaining a		
	healthy body.		
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Grade 4 Exte	ended Content Standards		Aligned PhD
			Science Lessons
Forces and M	T		
EX.4.P.1	Understand how force affects the motion of an object.		1 12 144 142
EX.4.P.1.1	Describe the motion of a moving object (away from or closer).		Level 3 M4 L12
			Level 3 M4 L15–L16
			Level 3 M4 L18
57.45.40			Level 3 M4 L21
EX.4.P.1.2	Define force as a push or a pull.		Level 3 M4 L10–L11
EX.4.P.1.3	Predict how forces can change the speed or direction of moving		Level 3 M4 L10–L18
	objects.		Level 3 M4 L28–L30
	perties and Change		
EX.4.P.2	Compare solid materials by their physical properties.		
EX.4.P.2.1	Identify different types of solid materials (wood, rock, plastic, rubber,		Level 5 M1 L3
	glass, metal).		Level 5 M1 L10
EX.4.P.2.2	Compare physical properties of solid materials (weight, texture,		Level 5 M1 L3–L4
	hardness, flexibility, and strength).		Level 5 M1 L10-L11
Earth Syster	ns, Structures and Processes		
EX.4.E.1	Use the tools for observing, recording and measuring changes in weat	her	conditions.
EX.4.E.1.1	Use a thermometer to record temperature changes during the day,		Level 3 M1 L4-L7
	from day to day, and season to season.		
EX.4.E.1.2	Measure precipitation and note amounts (none, some, much) from		Level 3 M1 L4-L7
	day to day.		Level 3 M1 L13-L15
EX.4.E.1.3	Understand that moving air is wind and it affects the weather and our		Level 3 M1 L1-L5
	environment.		Level 3 M1 L9-L10
			Level 3 M1 L15-L20
Structures a	nd Functions of Living Organisms		
EX.4.L.1	Understand the needs of living things.		
EX.4.L.1.1	Identify healthy and unhealthy food choices for humans.		
EX.4.L.1.2	Understand the effects of healthy and unhealthy food choices on the		
	body.		
Ecosystems			
EX.4.L.1	Understand the effects of environmental changes, adaptations, and b	ehav	viors that enable
	plants and animals to survive in changing habitats.		
EX.4.L.1.1	Describe how animals adapt to their environment (e.g., bears		Level 3 M2 L1–L2
	hibernate in the winter, birds fly south for the winter, lizards change		Level 3 M2 L9–L12
	color).		Level 3 M3 L16–L19
			Level 3 M2 L22–L28
EX.4.L.1.2	Describe how plants adapt to their environments (e.g., plants grow		Level 4 M3 L1–L6
	towards the sun, leaves fall in the winter).		Level 4 M3 L20
	,		Level 4 M3 L26-L31
EX.4.L.1.3	Identify ways that plants and animals protect themselves.		Level 4 M3 L1–L6
			Level 4 M3 L20
			Level 4 M3 L26–L31
EX.4.L.1.4	Understand why adaptations and changes in behavior are essential		Level 4 M3 L1–L6
	for survival.		Level 4 M3 L20
			Level 4 M3 L26-L31





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Key: Module (M), Lesson (L)

### PhD Science Level 5

The Grade 5 North Carolina Academic Standards and Performance Indicators for Science are partially covered by the Level 5 *PhD Science* curriculum. A detailed analysis of alignment is provided in the table below.

Grade 5 Stan	Grade 5 Standards		Aligned PhD	
			Science Lessons	
Forces and N	lotion			
5.P.1	Understand force, motion, and the relationship between them.			
5.P.1.1	Explain how factors such as gravity, friction, and change in mass		Level 3 M4 L1-L9	
	affect the motion of objects.		Level 3 M4 L28-L30	
5.P.1.2	Infer the motion of objects in terms of how far they travel in a certain		Level 3 M4 L4-L9	
	amount of time and the direction in which they travel.			
5.P.1.3	Illustrate the motion of an object using a graph to show a change in		Level 3 M4 L8-L9	
	position over a period of time.			
5.P.1.4	Predict the effect of a given force or a change in mass on the motion		Level 3 M4 L1-L9	
	of an object.			
Matter: Prope	erties and Change			
5.P.2	Understand the interactions of matter and energy and the changes the	at o	ccur.	
5.P.2.1	Explain how the sun's energy impacts the processes of the water		Level 5 M3 L8	
	cycle (including evaporation, transpiration, condensation,			
	precipitation, and runoff).			
5.P.2.2	Compare the weight of an object to the sum of the weight of its parts		Level 5 M1 L9-L17	
	before and after an interaction.		Level 5 M1 L23-L26	
5.P.2.3	Summarize properties of original materials, and the new material(s)		Level 5 M1 L13-L17	
	formed, to demonstrate that a change has occurred.		Level 5 M L23-L26	
Energy: Conse	ervation and Transfer			
S.P.3	Explain how the properties of some materials change as a result of he	atin	g and cooling.	
5.P.3.1	Explain the effects of the transfer of heat (either by direct contact or		Level 5 M1 L9-L17	
	at a distance) that occurs between objects at different temperatures		Level 5 M1 L23-L26	
	(conduction, convection, or radiation).			
5.P.3.2	Explain how heating and cooling affect some materials and how this		Level 5 M1 L11–L12	
	relates to their purpose and practical applications.		Level 5 M1 L23-L26	
Earth Systems	Earth Systems, Structures and Processes			





5.E.1	Understand weather patterns and phenomena, making connections to particular place and time.	th	e weather in a
5.E.1.1	Compare daily and seasonal changes in weather conditions (including		Level 5 M4 L1–L2
	wind speed and direction, precipitation, and temperature) and		Level 5 M4 L5-L17
	patterns.		Level 5 M4 L20-L26
5.E.1.2	Predict upcoming weather events from weather data collected		Level 3 M1 L1-L15
	through observation and measurements.		Level 3 M1 L19–L20
			Level 3 M1 L27–L29
5.E.1.3	Explain how global patterns such as the jet stream and water currents		
	influence local weather in measurable terms such as temperature,		
	wind direction and speed, and precipitation.		
Structures a	nd Functions of Living Organisms		
5.L.1	Understand how structures and systems of organisms (to include the l functions necessary for life.	hun	nan body) perform
5.L.1.1	Explain why some organisms are capable of surviving as a single cell		Level 5 M2 L8-L14
	while others require many cells that are specialized to survive.		Level 5 M2 L20
			Level 5 M2 L24–L26
5.L.1.2	Compare the major systems of the human body (digestive,		
	respiratory, circulatory, muscular, skeletal, and cardiovascular) in		
	terms of their functions necessary for life.		
Ecosystems			
5.L.2	Understand the interdependence of plants and animals with their eco	sys	tem.
5.L.2.1	Compare the characteristics of several common ecosystems, including		Level 5 M3 L4–L5
	estuaries and salt marshes, oceans, lakes and ponds, forests, and grasslands.		Level 5 M3 L19–L27
5.L.2.2	Classify the organisms within an ecosystem according to the function		Level 5 M2 L1–L14
	they serve: producers, consumers, or decomposers (biotic factors).		Level 5 M2 L24–L26
5.L.2.3	Infer the effects that may result from the interconnected relationship		Level 5 M2 L20-L26
	of plants and animals to their ecosystem.		
Evolution a	nd Genetics		
5.L.3	Understand why organisms differ from or are similar to their parents l characteristics of the organism.	oas	ed on the
5.L.3.1	Explain why organisms differ from or are similar to their parents		Level 3 M3 L1–L6
	based on the characteristics of the organism.		Level 3 M3 L14–L18
			Level 3 M3 L26–L28
5.L.3.2	Give examples of likenesses that are inherited and some that are not.		Level 3 M3 L1–L6
- :=:=:=			Level 3 M3 L14–L18
			Level 3 M3 L26–L28

Grade 5 Extended Content Standards			Aligned PhD Science Lessons	
Forces and Motion				
EX.5.P.1	Understand how force can change motion of objects.			
EX.5.P.1.1	Describe factors that would make it easier or harder to push or pull		Level 3 M4 L10-L18	
	an object (wheels, round, flat, heavy, light).		Level 3 M4 L28-L30	
EX.5.P.1.2	Compare changes in motion (speeding up, slowing down) under		Level 3 M4 L4-L6	
	certain conditions (e.g., steeper ramp, more weight, more or less		Level 3 M4 L10-L18	
	force).		Level 3 M4 L28-L30	





Matter: Prop	perties and Change				
EX.5.P.2	Understand the structure and properties of matter before and after they undergo a change.				
EX.5.P.2.1	Identify processes (e.g., burning or cooking) that result in a chemical change in matter.		Level 5 M1 L9–L17 Level 5 M1 L23–L26		
EX.5.P.2.2	Compare physical and chemical changes of matter.		Level 5 M1 L1–L2 Level 5 M1 L9–L26		
EX.5.P.2.3	Classify changes in matter as physical (reversible) or chemical (irreversible).		Level 5 M1 L1–L2 Level 5 M1 L9–L26		
Earth Systen	ns, Structures and Processes				
EX.5.E.1	Understand dangerous weather conditions.				
EX.5.E.1.1	Describe different types of weather (e.g., rain showers, thunderstorms, hail, tornadoes, hurricanes, blizzards).		Level 3 M1 L1–L20		
EX.5.E.1.2	Identify reasons for staying inside during severe weather (e.g.,		Level 3 M1 L1-L3		
	thunderstorms, hail, tornadoes, hurricanes).		Level 3 M1 L16–L29		
Structures a	nd Functions of Living Organisms				
EX.5.L.1	Understand how internal and external structures of the human body perform functions necessary for life.				
EX.5.L.1.1	Identify internal structures of the human body (e.g., heart, lungs, bones, stomach, muscles) and their functions.				
EX.5.L.1.2	Understand how the functions of internal and external structures (e.g., eyes, nose, ears, mouth) of the human body are essential for life.				
Ecosystems					
EX.5.L.2	Understand the interdependence of plants and animals with their eco	sys	tem.		
EX.5.L.2.1	Identify common ecosystems (e.g., oceans, lakes, deserts, forests, etc.).		Level 5 M3 L1–L13 Level 5 M3 L24–L27		
EX.5.L.2.2	Identify animals and plants found in common ecosystems (e.g., ocean, forest, lake, desert, arctic).		Level 5 M2 L8–L14 Level 5 M2 L20 Level 5 M2 L24–L26		
EX.5.L.2.3	Classify parts of different ecosystems as living and non-living.		Level 5 M2 L8–L14 Level 5 M2 L20 Level 5 M2 L24–L26		