

HAMPTON BOROUGH PUBLIC SCHOOL

SCIENCE CURRICULUM GUIDE

KINDERGARTEN THROUGH EIGHTH GRADE

Adopted: November 20, 2007

HAMPTON BOROUGH PUBLIC SCHOOL
SCIENCE CURRICULUM GUIDE
K-8

ACKNOWLEDGEMENTS

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AFFIRMATIVE ACTION STATEMENT

It is the policy of the Board of Education to provide equal employment and educational opportunities regardless of race, color, creed, religion, sex, ancestry, national origin, place of residence, social or economic condition, or non-applicable handicap.

Affirmative Action Office:

Andrew Dunn
c/o Hampton School
32-41 South Street
Hampton, NJ 08827
(908) 537-4101

ADAPTATIONS FOR SPECIAL EDUCATION STATEMENT

Although this curriculum guide has been developed for general education delivery, the knowledge, skills, attitudes, and behaviors identified are appropriate for the special education pupils in Hampton Public School. Modifications necessary to accommodate the education needs of individual pupil's handicaps will be described in the Individualized Educational Program (IEP). They are on file at:

Office of Special Services
c/o Hampton School
32-41 South Street
Hampton, NJ 08827
(908) 537-4101

PURPOSE/RATIONALE

The purpose of this Science curriculum is to enhance scientific reasoning and critical thinking skills, which can be learned by a diverse and multicultural student population. These skills will promote literacy in Science with comprehensive programs, utilizing a variety of educational resources, materials, and technology. The Science curriculum is also designed to provide rigorous and challenging instructional experiences which enhance the ability of students to identify and propose solutions to problems which require thought and reflection.

FORMAT FOR INSTRUCTION

The curriculum will challenge all students to actively investigate concepts and utilize a variety of resources. Students with special learning needs will have this curriculum adapted through the individualized educational program (I.E.P.). Through this course of study, the positive reinforcement of pre-learned skills may be necessary.

An integrated approach to the teaching of Science will help students understand how Science connects to literature and writing as well as other subjects. Cooperative learning strategies will be implemented to include multi-sensory experiences in a multi-cultural environment. Connections to everyday life through problem-solving will be emphasized. Hands-on inquiry-based Science instruction, as well as other ancillary materials, will be utilized to engage the students in activities promoting conceptual understandings and abstract reasoning.

This curriculum meets the New Jersey State Core Curriculum Content Standards for Science and the National Science Education Standards.

Science Curriculum Scope & Sequence—NJCCS

Standard	CPI	K	1	2	3	4	5	6	7	8
5.1 Scientific Processes	A. Habits of Mind	X	X	X	X	X	X	X	X	X
	B. Inquiry & Problem Solving		X	X	X	X	X	X	X	X
	C. Safety	X		X	X	X		X	X	X
5.2 Science & Society	A. Cultural Contributions					X	X	X	X	X
	B. Historical Perspectives			X	X	X	X	X	X	X
5.3 Mathematical Applications	A. Numerical Operations	X	X		X		X	X	X	X
	B. Geometry & Measurement				X			X	X	X
	C. Patterns & Algebra	X	X	X			X			X
	D. Data Analysis & Probability						X	X	X	X
5.4 Nature & Process of Technology	A. Science & Technology		X							X
	B. Nature of Technology			X	X	X	X	X	X	X
	C. Technological Design			X		X	X			X
5.5 Life Science	A. Matter, Energy & Organization in Living Systems	X			X	X	X	X	X	
	B. Diversity & Biological evolution	X		X	X	X		X	X	
	C. Reproduction & Heredity	X			X			X	X	
5.6 Physical Science- Chemistry	A. Structure & Properties of Matter	X	X			X	X	X		X
	B. Chemical Reactions					X		X		X
5.7 Physical Science— Physics	A. Motion & Forces	X				X	X			X
	B. Energy Transformations			X		X	X		X	X
5.8 Earth Science	A. Earth's Properties & Materials		X			X		X		
	B. Atmosphere & Weather	X	X		X		X			
	C. Processes that shape the Earth						X	X	X	
	D. How we study the Earth	X	X	X					X	
5.9 Astronomy & Space Science	A. Earth, Moon, Sun System	X		X		X		X		X
	B. Solar System			X		X		X		X
	C. Stars			X		X		X		X
	D. Galaxies & Universe									X
5.10 Environmental Studies	A. Natural Systems & Interactions		X		X		X			X
	B. Human Interactions & Impact		X		X		X	X	X	X

Science Topics for Each Grade

<u>Kindergarten</u>	<u>First Grade</u>	<u>Second Grade</u>
Day and Night (light & sound) Astronomy and Space	Weather and Seasons (climate)	Structure and Properties (Energy, Forces of Motion)
Needs of Plants and Animals	Matter	Dinosaurs and Fossils
Matter (How things Move?)	Rocks and Soil	Solar System (phases of Moon, Observe Stars)
5 Senses	Body Parts and Organs	Interaction of Living Things
Weather and Seasons (Introduce)	Movement and Sound	Introduction to Scientists and Inventors
<u>Third Grade</u>	<u>Fourth Grade</u>	<u>Fifth Grade</u>
Life cycles (plant & animal) (Birds and Monarchs)	Adaptations-animal, plant, human	Body systems
Weather (erosion, landforms)	Electricity and magnetism	Matter
Forces and Machines	Rocks and Minerals	Biomes-eco systems
Environmental Science	Digestive System	Motion and Forces
Bones and Muscles	Solar System	Weather
	Plants	
<u>Sixth Grade</u>	<u>Seventh Grade</u>	<u>Eighth Grade</u>
Scientific Processes/Lab Safety and Equipment	Earth Science/Forces that Shape Earth	Physical Science/Wave Energy
Life Science/ What is Life?	Life Science/What is Life?	Physical Science/Light
Life Science/Cells	Life Science/Cell Functions	Astronomy and Space (Earth patterns, Solar system, stars & Galaxies)
Chemistry/Structure of Matter	Life Science/Hereditry and Evolution	Chemistry
Earth Science/Water Planet	Scientific Processes/The Science Fair	Forces and Fluids
Scientific processes/The Science Fair	Energy	Scientific Process/Nature of Technology/Science Fair
Astronomy and Space Science/Earth and Moon		

Kindergarten**SCIENCE SCOPE AND SEQUENCE**

Since the Science curriculum aligns with the New Jersey Core Curriculum Content Standards, the Science committee has concluded that the learning outcomes at each grade level will help students to develop a thorough understanding of essential scientific ideas.

OBJECTIVES AND SKILLS	NJCCCS	I	D	M
LIFE SCIENCE				
A. NEEDS OF PLANTS AND ANIMALS				
<ul style="list-style-type: none"> Compare and contrast essential characteristics that distinguish living things from nonliving things 	5.5.A.2, 5.7.A.2, 5.10.B.1	X		
The student will apply knowledge about life processes to distinguish between living and nonliving things		X		
The student knows that environments have living and nonliving parts		X		
<ul style="list-style-type: none"> Investigate the basic needs of humans and other organisms 	5.5.A.1, 5.10.B.1	X		
The student knows some of the basic needs of living things (for example, food, water, space)		X		
<ul style="list-style-type: none"> Identify the sources and uses of water 	5.5.A.1, 5.5.B.1, 5.10.A.1, 5.10.B.1	X		
The student knows some of the basic needs of living things.		X		
The student knows that the activities of humans affect plants and animals in many ways.		X		
<ul style="list-style-type: none"> Associate organisms' basic needs with how they meet those needs with their surroundings 	5.5.A.1, 5.10.A.1, 5.10.B.1	X		
The student understands ways that animals obtain food from plants and other animals.		X		
<ul style="list-style-type: none"> Identify various needs of humans that are supplied by the natural of constructed environment. 	5.5.A.1, 5.10.A.1	X		
<ul style="list-style-type: none"> Raise questions about the world around them and be willing to seek answers through making careful observations and experimentation. 	5.1.A.1, 5.1.B.1, 5.1.C.2, 5.3.D.1, 5.4.B.1, 5.4.C.1	X		
B. PLANTS AND ANIMALS ALL AROUND				
<ul style="list-style-type: none"> Recognize that different types of plants and animals live in different parts of the world 	5.5.B.1, 5.10.A.1	X		
The student knows that life occurs on or near the surface of the earth in land, water, and air.		X		

*I=Introduce**D=Develop**M=Master*

The student knows that plants and animals may live in different habitats.		X			
• Associate organisms' basic needs with how they meet those needs within their surroundings	5.5.B.1, 5.7.A.1, 5.8.B.1, 5.10.A.1				
The student knows that plants and animals are found in different kinds of environments and are often hidden		X			
• Recognize that different types of plants and animals live in different parts of the world	5.5.B.1, 5.10.A.1	X			
The student knows that there are many different plants and animals living in many different kinds environments (hot, cold, wet, dry, sunny, dark).		X			
• Associate organisms' basic needs with how they meet those needs within their surroundings.	5.5.B.1, 5.10.A.1				
The student knows that plants and animals may live in different habitats.		X			
• Investigate the basic needs of humans and other organisms.	5.5.A.1, 5.5.B.1, 5.10.A.1	X			
The student knows that if living things do not get food, water, shelter, and space, they will die.		X			
• Develop strategies and skills for information-gathering and problem-solving, using appropriate tools and technologies.	5.1.A.1, 5.1.A.4, 5.1.B.1, 5.1.C.2, 5.3.A.3, 5.10.A.1	X			
OBJECTIVES AND SKILLS					
PHYSICAL SCIENCE		NJCCCS	I	D	M
A. MATTER AND PHYSICAL PROPERTIES					
Sort objects according to the materials from which they are made or their physical properties, and give a rationale for sorting	5.6.A.1	X			
The student knows that objects have many different observable properties.		X			
• Sort objects according to the materials from which they are made or their physical properties, and give a rationale for sorting.	5.6.A.1	X			
The student knows that some objects are made up of many different materials.		X			
• Sort objects according to the materials from which they are made or their physical properties, and give a rational for sorting.	5.6.A.1	X			
The student knows that matter exists in different states (solid, liquid, gas).		X			

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<ul style="list-style-type: none"> Observe that water can be a liquid or a solid and can change from one form to the other. 	5.6.A.3	X		
The student knows that matter exists in different states (solid, liquid, gas).		X		
The student knows that some objects are made up of many different materials.		X		
B. HOW THINGS MOVE				
<ul style="list-style-type: none"> Show that the position and motion of an object can be changed by pushing or pulling the object. 	5.5.A.2, 5.7.A.2	X		
The student knows that the motion of an object (for example, toy truck, toy car, ball, marble) can be changed by a push or a pull.				
<ul style="list-style-type: none"> Distinguish among the different ways objects can move such as: fast slow, in a straight line, in a circular path, back and forth. 	5.7.A.1, 5.8.D.1, 5.7.A.2	X		
The student knows the names of objects that roll, slide, or fly.		X		
The student knows that the motion of an object (for example, toy truck, toy car, ball, marble) can be changed by a push or a pull.		X		
The student understands that different things move at different speeds (bicycle/motorcycles, car/plane, tortoise/hare).		X		
<ul style="list-style-type: none"> Show that the position and motion of an object can be changed by pushing or pulling the object. 	5.7.A.2	X		
The student knows that vibrations caused by sound waves can be felt (for example, on a speaker when music is played, the head of a drum when it is hit, or a tuning fork).		X		
The student knows that the motion of an object (for example, toy truck, toy car, ball, marble) can be changed by a push or a pull.		X		
<ul style="list-style-type: none"> Raise questions about the world around them and be willing to seek answers through making careful observations and experimentation. 	5.1.A.1, 5.1.B.1, 5.1.C.2, 5.3.D.1, 5.4.B.1, 5.4.C.1	X		
OBJECTIVES AND SKILLS				
EARTH SCIENCE				
A. WEATHER AND SEASONS				
<ul style="list-style-type: none"> Identify patterns when observing the natural and constructed world. 	5.3.C.1, 5.8.B.3, 5.8.B.4	X		
<ul style="list-style-type: none"> Identify the sources and uses of water. 	5.8.B.1, 5.3.C.1, 5.5.A.1, 5.8.B.4	X		
<ul style="list-style-type: none"> Identify patterns when observing the natural and constructed world. 	5.3.C.1, 5.8.B.3, 5.8.B.4	X		

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<ul style="list-style-type: none"> Describe daily and seasonal changes and patterns in the weather. 	5.8.B.4, 5.3.C.1, 5.10.B.1	X			
The student understands that continuous patterns occur in nature (for example, seasons, phases of the Moon, blooming flowers).					
B. OUR LAND, WATER, AND AIR					
<ul style="list-style-type: none"> Observe and describe rocks and soil. 	5.8.A.1	X			
The student knows that the surface of the Earth is composed of different types of solid materials (for example, sand, pebbles, rocks, clumps of dirt).		X			
<ul style="list-style-type: none"> Record observations that describe the features of the natural world in local environments. 	5.5.D.1, 5.8.A.1	X			
The student recognizes that the solid materials making up the Earth come in all sizes, from boulders to grains of sand.		X			
<ul style="list-style-type: none"> Identify various needs of humans that are supplied by the natural or constructed environment. 	5.10.B.1	X			
The student knows that the activities of human beings affect plants and animals in many ways.		X			
The student knows that life occurs on or near the surface of the earth in land, water, and air.		X			
<ul style="list-style-type: none"> Identify the sources and uses of water 	5.8.B.1	X			
The student knows the basic needs of living things (for example, food, water, and air).		X			
<ul style="list-style-type: none"> Sort objects according to the materials from which they are made or their physical properties, and give a rationale for sorting. 	5.6.A.1	X			
The student knows ways to care for the Earth at home and in school (for example, limiting use of paper towels, turning off water while brushing teeth, turning off lights when no one will be in the room).		X			
<ul style="list-style-type: none"> Raise questions about the world around them and be willing to seek answers through making careful observations and experimentation. 	5.1.A.1, 5.1.A.2, 5.1.C.2, 5.3.D.1, 5.4.B.1	X			
OBJECTIVES AND SKILLS		NJCCCS	I	D	M
THE HUMAN BODY					
A. EXPLORING WITH THE FIVE SENSES					
<ul style="list-style-type: none"> Identify all five senses. 	5.5	X			
<ul style="list-style-type: none"> Learn the kinds of information that each sensory organ provides. 	5.5	X			

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• Identify the sense of smell to group scents.	5.5	X		
• Identify the sounds that different objects make.	5.7	X		
• Appreciate human experiences through sight, hearing, touch smell, and taste.	5.1	X		
• Using cooperative skills, discuss what senses we use to identify things.	5.1	X		
• Utilize social participation problem solving to discuss color, sizes, shape, weight, and texture of objects.	5.1	X		
• Cooperate and collaborate with classmates in activities such as making popcorn for taste, smell, use blindfolds, and pick objects from a bag and identify. Use audiotapes for children to identify sounds, ex. Telephone ringing.	5.1	X		
OBJECTIVES AND SKILLS				
SPACE AND TECHNOLOGY				
	NJCCCS	I	D	M
LOOKING AT THE SKY “DAY AND NIGHT”				
• Observe and identify objects in the day and night sky.	5.9	X		
• Discuss how the sun and moon affect our time, seasons, years.	5.9	X		
• Appreciate how humans used the objects in the sky for heat, light, etc.	5.9	X		

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First Grade

SCIENCE SCOPE AND SEQUENCE

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OBJECTIVES AND SKILLS LIFE SCIENCE	NJCCCS	I	D	M
A. BODY PARTS				
• The student will be able to identify body parts.	5.5	X	X	
• Know what each body part does.	5.5	X		
• Describe why we need these body parts.	5.5	X		
• Develop an appreciation for their bodies.	5.5	X	X	
• Appreciate the differences between people and their bodies.	5.5	X	X	
• Utilize the information about their body and how to keep it healthy.	5.5	X	X	
OBJECTIVES AND SKILLS PHYSICAL SCIENCE	NJCCCS	I	D	M
A. OBSERVING MATTER				
• Sort objects according to the materials from which they are made or their physical properties, and give a rationale for sorting.	5.6.A.1	X	X	
The student knows that objects are composed of parts that are too small to be seen without magnification (for examples, rocks, cookies, string, paper).		X	X	
• Sort objects according to the materials from which they are made or their physical properties, and give a rationale for sorting.	5.6.A.1	X	X	
The student knows that objects can be grouped according to their physical characteristics (for example, shape, color, texture, form, size).		X	X	
• Sort objects according to the materials from which they are made or their physical properties, and give a rationale for sorting.	5.6.A.1	X	X	
The student knows the effects of heating and cooling on solids, liquids, and gases.		X	X	
• Observe that water can be a liquid or a solid and can change from one form to the other.	5.6.A.3	X	X	

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The student knows the effects of heating and cooling on solids, liquids, and gases.		X	X	
The student knows the physical properties of ice, water, and steam.		X	X	
<ul style="list-style-type: none"> Express quantities using appropriate number formats, such as integers and fractions. 	5.3.A.3	X		
The student recognizes systems of matter and energy.		X		
<ul style="list-style-type: none"> Raise questions about the world around them and be willing to seek answers through making careful observations and experimentation. 	5.1.A.1	X		
The student knows that objects can be grouped according to their physical characteristics (for example, shape, color, texture, form, size).		X		
B. MOVEMENT & SOUND				
<ul style="list-style-type: none"> Show that the position and motion of an object can be changed by pushing or pulling the object. 	5.7.A.2		X	
The student understands various ways gravity affects the motion of objects (for example, an object on a ramp, an object that is dropped).		X	X	
<ul style="list-style-type: none"> Distinguish among the different ways objects can move such as fast and slow, in a straight line, in a circular path, and back and forth. 	5.7.A.1	X	X	
The student knows that various things move at different speeds when different forces are applied.		X	X	
The student investigates by observing and then describing how things move in many different ways, such as straight, zigzag, around and around, and back and forth.		X	X	
The student observes the effects some objects have on others even when the two objects might not touch.		X		
The student knows that magnetism is a force that may attract or repel certain materials.		X		
<ul style="list-style-type: none"> Demonstrate that sound can be produced by vibrating objects. 		X		
The student knows that vibrations of objects (for example, strings, drumheads, rubber bands) cause sounds.		X		
The student describes sounds from common sources.		X	X	
<ul style="list-style-type: none"> Recognizes that conducting science activities requires an awareness of potential hazards and the need for safe practices. 		X		
The student knows that vibrations of objects (for example, strings, drumheads, rubber bands) cause sounds.		X		

<p align="center">OBJECTIVES AND SKILLS EARTH SCIENCE</p>	<p align="center">NJCCS</p>	<p align="center">I</p>	<p align="center">D</p>	<p align="center">M</p>
<p>A. WEATHER AND SEASONS</p>		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Recognize weather conditions can change from day to day based on a graph. 		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Recognize factors which affect weather, including temperature, wind, precipitation, evaporation, condensation, and clouds. 		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Demonstrate an understanding that materials absorb different amounts of the sun’s heat. 		<p align="center">X</p>		
<ul style="list-style-type: none"> Identify wind can move at different speeds and can cause objects to move. 		<p align="center">X</p>		
<ul style="list-style-type: none"> Identify how weather conditions can affect water in different forms. 		<p align="center">X</p>		
<ul style="list-style-type: none"> Describe the four seasons and the signs associated with these seasons. 		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Identify how people adjust to the different weather conditions when seasons change. 		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Identify ways in which animals change to fit the seasonal weather conditions. 		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Describe how temperature and seasons also affect plant growth. 		<p align="center">X</p>	<p align="center">X</p>	
<p>B. LAND, WATER, AND AIR</p>				
<ul style="list-style-type: none"> Compare and observe the different layers and soils that compose the earth’s surface. 		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Observe how water is absorbed by soil and how water puddles disappear over time. 		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Identify the characteristics of rocks. 		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Classify rocks based on a similar property. 		<p align="center">X</p>	<p align="center">X</p>	
<ul style="list-style-type: none"> Discover that water flows downhill. 		<p align="center">X</p>		
<ul style="list-style-type: none"> Identify accumulated amounts of water can form different bodies of water, such as: puddles, lakes, oceans, or rivers. 		<p align="center">X</p>		
<ul style="list-style-type: none"> Identify recycling and the steps in the composting process. 		<p align="center">X</p>		
<ul style="list-style-type: none"> Identify the problems our natural world faces today. 		<p align="center">X</p>		
<ul style="list-style-type: none"> Identify the sources and uses of water. 		<p align="center">X</p>		
<p>The student extends and refines knowledge that the surface of the Earth is composed of different types of solid materials.</p>				

I=Introduce

D=Develop

M=Master

OBJECTIVES AND SKILLS ENVIRONMENTAL STUDIES	NJCCS	I	D	M
A. NATURAL SYSTEMS AND INTERACTIONS:				
<ul style="list-style-type: none"> • Associate organisms' basic needs with how they meet those needs within their surroundings. 		X		
B. HUMAN INTERACTIONS AND IMPACT				
<ul style="list-style-type: none"> • Identify various needs of humans that are supplied by the natural or constructed environment. 		X		

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SECOND GRADE

SCIENCE SCOPE AND SEQUENCE

Since the Science curriculum aligns with the New Jersey Core Curriculum Content Standards, the Science committee has concluded that the learning outcomes at each grade level will help students to develop a thorough understanding of essential scientific ideas.

OBJECTIVES AND SKILLS	NJCCCS	I	D	M
LIFE SCIENCE				
A. INTERACTIONS OF LIVING THINGS				
• Classify objects into groups: living, once-living, and non-living.	5.5	X	X	
• Describe the needs of living things.	5.5	X	X	
• Identify and explain the functions of the main parts of a plant (roots, stem, leaves).	5.5	X	X	
• Identify swamp, woodland, desert, and seashore environments and the organisms, which live in each.	5.5	X	X	
• Describe how people, animals, and natural forces can change the environment.	5.5, 5.10	X	X	
• What makes an object a living, non-living, or once-living thing?		X	X	
• How do living things adapt to their environment?		X	X	
• What are the needs of living things?		X	X	
• Raise questions about the world around them and be willing to seek answers through making observations.	5.1	X	X	
• Keep records that describe observations	5.1	X	X	
OBJECTIVES AND SKILLS				
PHYSICAL SCIENCE				
A. PROPERTIES OF MATTER				
• Describe a toy or other familiar object as a system with parts that work together.	5.4.C.2, 5.1.A.1, 5.6.A.1, 5.6.A.2	X	X	
The student knows that common objects are composed of parts that are too small to be seen without magnification (for example, hair, cloth, paper).		X	X	
The student knows ways objects can be grouped according to similarities or differences of their physical characteristics.		X	X	
The student knows examples of solids, liquids, and gases.		X	X	

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The student knows the observable properties of solids, liquids, and gases.		X	X	
• Show that the position and motion of an object can be changed by pushing or pulling the object.	5.7.A.2, 5.1.A.1	X	X	
The student verifies that things can be done to materials to change some of their physical properties (e.g., cutting, heating freezing), but not all materials respond the same way (e.g., heating causes water to boil and sugar to melt).		X	X	
• Observe that water can be a liquid or a solid and can change from one form to the other.	5.6.A.3, 5.8.B.1, 5.8.B.2	X	X	
The student knows that not all objects or materials respond to change in the same way (for example, a plastic object in the freezer compared with water in a freezer).		X	X	
• The student understands ways energy and matter interact (for example, sunlight to affect plant growth, heat to boil water).		X	X	
• Know that when solving a problem it is important to plan and get ideas and help from other people.	5.1.A.4	X	X	
B. ENERGY				
• Recognize that the sun supplies light and heat to the Earth.	5.9.A.1, 5.9.B.1	X	X	
The student knows that the Sun supplies heat and light energy to Earth.		X	X	
• Identify various needs of humans that are supplied by the natural or constructed environment	5.10.B.1, 5.9.A.1	X	X	
The student understands the relationship of food to the need for energy for daily activities.		X	X	
• Recognize that the sun supplies light and heat to the Earth.	5.9.A.1, 5.9.B.1	X	X	
The student knows different heat sources (for example, friction, solar, nuclear, electric).		X	X	
The student understands ways energy and matter interact (for example, sunlight to affect plant growth, heat to boil water).		X	X	
• Observe the patterns of day and night and the movements of the shadows of objects on the Earth during the course of a day.	5.9.A.1, 5.6.A.1	X	X	
The student understands that some materials will allow light to pass through and others will not.		X	X	
• Raise questions about the world around them and be willing to seek answers through making careful observations and experimentation.	5.1.A.1, 5.1.C.1, 5.1.C.2	X	X	
The student understands ways energy and matter interact (for example, sunlight to affect plant growth, heat to boil water).		X	X	

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<ul style="list-style-type: none"> • Make a plan in order to design a solution to a problem. 	5.4.C.1, 5.1.A.1, 5.1.A.2, 5.1.B.1, 5.1.B.2, 5.3.C.1	X	X	
C. FORCES AND MOTION				
<ul style="list-style-type: none"> • Distinguish among the different ways objects can move such as fast and slow, in a straight line, in circular path, and back and forth. 	5.7.A.1, 5.7.A.2	X	X	
The student knows that objects exhibit different kinds of motion (for example, straight, circular, back and forth).		X	X	
The student knows that the amount and direction of the force exerted on an object (for example, push, pull, friction, and gravity) determines how much the object move.		X	X	
<ul style="list-style-type: none"> • Distinguish among the different ways objects can move such as fast and slow, in a straight line, in circular path, and back and forth. 	5.7.A.1, 5.7.A.2	X	X	
The student knows that there is a relationship between force and motion.		X	X	
<ul style="list-style-type: none"> • Distinguish among the different ways objects can move such as fast and slow, in a straight line, in circular path, and back and forth. 	5.7.A.1, 5.7.A.2	X	X	
The student knows that the amount and direction of the force exerted on an object (for example, push, pull, friction, and gravity) determines how much the object move.		X	X	
The student knows different heat sources (for example, friction, solar, nuclear, and electric).		X	X	
<ul style="list-style-type: none"> • Select and use simple tools and materials to complete a task. 	5.4.B.1, 5.7.A.1, 5.10.A.1	X	X	
The student knows examples of simple machines and understands how they change effort.		X	X	
The student is able to explain ways that simple machines make-work easier.		X		
<ul style="list-style-type: none"> • Sort objects according to the materials from which they are made or their physical properties, and give a rationale for sorting. 	5.6.A.1, 5.7.A.2	X	X	
The student knows that objects may be moved by being pushed and pulled with magnets.		X	X	
<ul style="list-style-type: none"> • Select and use simple tools and materials to complete a task. 	5.4.B.1, 5.7.A.1, 5.10.A.1	X	X	
The student knows that objects may be moved by being pushed and pulled with magnets.		X	X	

OBJECTIVES AND SKILLS EARTH SCIENCE	NJCCCS	I	D	M
A. EARTH THROUGH TIME--DINOSAURS AND FOSSILS		X	X	
• Compare the characteristics of different types of dinosaurs.	5.8	X	X	
• Conclude that dinosaurs were animals that lived on land a long time ago.	5.8	X	X	
• Estimate the relative sizes of dinosaurs.	5.8	X	X	
• Compare fossil imprints with fossil remains.	5.8	X	X	
• Conclude that dinosaur teeth give us clues to what they are.	5.1	X	X	
• What was the earth like long ago?		X	X	
• What lived on earth long ago?		X	X	
• What were the characteristics of various types of dinosaurs?		X	X	
• What do fossils tell us?		X	X	
B. ASTRONOMY AND SPACE--EARTH AND SPACE	5.9.A.1, 5.5.A.1, 5.9.B.1, 5.9.C.1, 5.10.B.1			
• Recognize that the sun supplies light and heat to the Earth.		X	X	
The student knows that the Sun supplies heat and light energy to Earth.		X	X	
• Distinguish among the different ways objects can move such as fast and slow, in a straight line, in a circular path, and back and forth.	5.7.A.1	X	X	
The student knows that each time the Earth completes one rotation, one day has passed and that this takes 24 hours.		X	X	
The student knows that the appearance of sunrise and sunset is due to the rotation of Earth every 24 hours.		X	X	
• Identify patterns when observing the natural and constructed world.	5.3.C.1	X	X	
The student knows that the Moon moves around the Earth, the Earth moves around the Sun, and the Moon is visible when it reflects the light from the Sun.		X	X	
• Observe that the position of the stars, with respect to each other (constellations) is unchanging.	5.9.C.2	X	X	
The student knows that stars and planets are always in the sky.		X	X	
• Identify patterns when observing the natural and constructed world.	5.3.C.1	X	X	
The student knows that the Moon moves around the Earth, the Earth moves around the Sun, and the Moon is visible when it reflects the light from the Sun.		X	X	

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• Recognize that the sun supplies light and heat to the Earth.	5.9.A.1	X	X	
The student knows that stars and planets are always in the sky		X	X	
• Observe that stars are many, scattered, and different in brightness.	5.9.C.1	X	X	
The student knows that stars and planets are always in the sky.		X	X	
• Identify the phases of the moon				
OBJECTIVES AND SKILLS SCIENCE & INVENTORS				
	NJCCCS	I	D	M
• Introduce and talk about scientists and inventors in historical context.	5.2.B.1	X	X	
The student knows a significant thing about some scientists and inventors.		X	X	

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THIRD GRADE

SCIENCE SCOPE AND SEQUENCE

Since the Science curriculum aligns with the New Jersey Core Curriculum Content Standards, the Science committee has concluded that the learning outcomes at each grade level will help students to develop a thorough understanding of essential scientific ideas.

OBJECTIVES AND SKILLS LIFE SCIENCE	NJCCCS	I	D	M
A. LIFE CYCLES OF PLANTS AND ANIMALS	5.5.2, 5.45.4B, 5.1.4A, 5.1.4C, 5.5.6C			
<ul style="list-style-type: none"> Identify and sequence stages in life cycles of plants and animals (flowering and non-flowering plants; vertebrates and invertebrates) 		X		
<ul style="list-style-type: none"> Recognize that humans and other organisms resemble their parents 			X	
<ul style="list-style-type: none"> Compare and contrast the life cycles of humans with that of other mammals 		X		
<ul style="list-style-type: none"> Identify the stages and migration of Monarch Butterflies 		X		
B. CHARACTERISTICS OF PLANTS AND ANIMALS				
<ul style="list-style-type: none"> Recognize that plants and animals are composed of different parts performing different functions 			X	
<ul style="list-style-type: none"> Identify characteristics that distinguish the invertebrate group from the vertebrate group 		X		
<ul style="list-style-type: none"> Describe the characteristics of mammals, birds, amphibians, reptiles, and fish 		X		
<ul style="list-style-type: none"> Discover how birds' beaks are adapted to the food they eat and how their feet are adapted to behaviors 		X		
<ul style="list-style-type: none"> Identify the basic needs of animals and how they meet them 			X	
<ul style="list-style-type: none"> Describe and explain how learned and instinctive behaviors help animals survive 		X		
C. HUMAN PHYSIOLOGY	5.5.4A			
<ul style="list-style-type: none"> Identify the major parts of the skeletal system 			X	
<ul style="list-style-type: none"> Discover how muscles cause body movement 		X		
<ul style="list-style-type: none"> Identify ways to maintain good health. 			X	

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M=Master

OBJECTIVES AND SKILLS EARTH SCIENCE	NJCCCS	I	D	M
A. ENVIRONMENTAL STUDY	5.10.2A, 5.10.2B, 5.10.4A, 5.10.4B			
<ul style="list-style-type: none"> Identify various needs of humans that are supplied by the natural environment 			X	
<ul style="list-style-type: none"> Differentiate between natural resources that are renewable and those that are not 			X	
<ul style="list-style-type: none"> Explain how meeting human requirements affects the environment 			X	
<ul style="list-style-type: none"> Raise questions about the world 			X	
<ul style="list-style-type: none"> Discuss Earth Day 			X	
<ul style="list-style-type: none"> Discuss Arbor Day 				
<ul style="list-style-type: none"> Realize that people can have a positive or negative impact on the environment 			X	
<ul style="list-style-type: none"> Appreciate the need to conserve energy 			X	
<ul style="list-style-type: none"> Appreciate that natural resources such as water are limited 			X	
<ul style="list-style-type: none"> Acknowledge that availability of water is limited and must be conserved 			X	
B. WEATHER	5.1.4B, 5.1.4C, 5.2.4B, 5.3.4A, 5.4.2B, 5.6.4, 5.8.2B, 5.8.4B, 5.8.4C, 5.10.4B			
<ul style="list-style-type: none"> Understand the Water Cycle: evaporation, condensation, and precipitation 		X		
<ul style="list-style-type: none"> Understand weather conditions and how they affect our lives 			X	
<ul style="list-style-type: none"> Recognize that air takes up space and moves around us as wind 			X	
<ul style="list-style-type: none"> Identify sources of water on the earth's surface 			X	
<ul style="list-style-type: none"> Observe measurable quantities such as temperature, wind direction, wind speed and precipitation amounts 			X	
<ul style="list-style-type: none"> Explain that the uneven heating of the earth results in wind 		X		
<ul style="list-style-type: none"> Identify atmospheric conditions that combine to make up weather 		X	X	
<ul style="list-style-type: none"> Compare and contrast weather and climate 		X		
<ul style="list-style-type: none"> Explain where water is found 			X	
<ul style="list-style-type: none"> Discover that water can change form 			X	
<ul style="list-style-type: none"> Relate the sun's energy to the heating of the earth 			X	

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• Discover the relationship between heat and temperature			X	
• Identify types of clouds		X		
• Describe the weather associated with each type of cloud		X		
• Identify storms			X	
• Identify weather instruments and how they are used			X	
• Describe the job of a meteorologist		X		
• Analyze information about severe weather and safety precautions		X		
• Define erosion and explain how water causes it		X		
OBJECTIVES AND SKILLS PHYSICS	NJCCCS	I	D	M
FORCES AND MACHINES	5.1.4A, 5.1.4B, 5.3.4A, 5.3.4B, 5.4.2B, 5.4.4B, 5.7.4			
Define the forces of friction and gravity			X	
Demonstrate how simple machines help people use forces			X	
Identify the parts of various compound machines		X		
Describe an object as a system with parts that work together		X		
Raise questions about the world around them and seek answers through observations and experimentations			X	

I=Introduce

D=Develop

M=Master

FOURTH GRADE

SCIENCE SCOPE AND SEQUENCE

Since the Science curriculum aligns with the New Jersey Core Curriculum Content Standards, the Science committee has concluded that the learning outcomes at each grade level will help students to develop a thorough understanding of essential scientific ideas.

OBJECTIVES AND SKILLS LIFE SCIENCE	NJCCCS	I	D	M
A. ADAPTATIONS AND ANIMALS	5.1.4A, 5.5.2A, 5.5.4			
Identify needs of animals and describe adaptations of structure and behavior that help them meet these needs			X	
Characterize adaptations that help animals find or build shelter			X	
Identify structural or behavioral adaptations that help animals survive			X	
Describe adaptations of structure and behavior in humans			X	
Compare and contrast learned and instinctive behaviors			X	
Describe food chains			X	
B. ADAPTATIONS AND PLANTS	5.5.2B, 5.5.4			
Identify needs of plants and describe adaptations of structure and growth that help them meet these needs			X	
Describe the parts of plants and their functions			X	
Classify stems and leaves and their features			X	
Describe root systems			X	
Discover how plants make food			X	
Explain how water, minerals, and food are transported to different parts of a plant			X	
Describe how plants reproduce			X	
Realize that plants change or adapt to different conditions (phototropism)			X	
Discover how seeds respond to gravity			X	
Discover adaptations that protect plants			X	
Discover how people use stems, roots, and leaves			X	
C. HUMAN PHYSIOLOGY	5.5.4A			
• Digestive System			X	

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Identify the role of major nutrients			X	
Identify parts of the digestive system and describe their roles			X	
Select foods from the food pyramid and create a balanced diet			X	
Discuss how food choices can affect your health			X	
Explain the role of teeth and saliva in digestion			X	
Relate the digestion of food to the organs it moves through in the digestive system			X	
OBJECTIVES AND SKILLS	NJCCCS	I	D	M
PHYSICS				
A. ELECTRICITY & MAGNETISM	5.1.4A, 5.1.4C, 5.2.4B, 5.4.2B, 5.4.2C, 5.4.4C, 5.7.4			
Recognize that some forces can act at a distance (magnetism, static electricity)			X	
Explain how objects become electrically charged			X	
Observe the behavior of charged materials			X	
Apply knowledge of static electricity in observations of everyday phenomena			X	
Compare and contrast the ability of different materials to carry moving charges			X	
Compare and contrast series and parallel circuits			X	
Identify and describe the functions of some devices found in a typical circuit			X	
Describe the generation and transmission of electricity			X	
Investigate the effects of connecting parts of a circuit in different ways			X	
Appreciate the importance of electricity in our everyday lives			X	
Discuss how electricity is transported			X	
Inform how many factories and power plants use devices to charge pollutant particles to collect and reduce pollution			X	
Compare and contrast natural magnets and electromagnets			X	
Describe ways magnets are used			X	
Investigate the magnetic properties of different materials			X	
Investigate how earth is a magnet and the effects of its magnetic field			X	

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OBJECTIVES AND SKILLS EARTH SCIENCE	NJCCCS	I	D	M
ROCKS & MINERALS	5.1.4A, 5.1.4B, 5.1.4C, 5.8.2, 5.8.4			
Observe and describe rocks and soil			X	
Observe that most rocks and soils are made of several substances or minerals			X	
Observe that the properties of soil vary from place to place and will affect the soil's ability to support life			X	
Recognize that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time			X	
Describe minerals and explain how they form and how they can be identified and used			X	
Observe the growth of crystals			X	
Compare and contrast minerals and ores			X	
Differentiate between igneous, sedimentary, and metamorphic rocks and list uses for these earth materials			X	
Classify rocks and explain the processes that form them			X	
Compare and contrast chemical, physical, and biological weathering			X	
Relate the processes involved in the rock cycle to the changes that occur in rocks			X	

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D=Develop

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FIFTH GRADE

SCIENCE SCOPE AND SEQUENCE

Since the Science curriculum aligns with the New Jersey Core Curriculum Content Standards, the Science committee has concluded that the learning outcomes at each grade level will help students to develop a thorough understanding of essential scientific ideas.

OBJECTIVES AND SKILLS ENVIRONMENTAL SCIENCE	NJCCCS	I	D	M
A. ECOSYSTEMS	5.1.4A, 5.10.2B, 5.10.4A, 5.10.4B, 5.10.6A, 5.10.6B, 5.5.4A			
Classify plants and animals as producers and consumers				X
Describe how consumers get their food				X
Explain relationships between living things			X	
Trace the path of energy and other substances in a food chain				X
Describe the elements and cycles that make up an ecosystem			X	X
Describe the effects of humans on different ecosystems and natural resources			X	X
Relate habitats, populations, and communities to ecosystems				X
Explain how ecosystems change over time			X	X
Appreciate how living things can share an environment				X
B. BIOMES	5.1.4A, 5.1.4B, 5.5.2B, 5.8.4, 5.5			
Identify the location, characteristics, and inhabitants of each of the world's land biomes	5.5.2B, 5.5.4			X
Describe the effects of factors such as temperature, moisture, light, and soil on biomes			X	X
Compare and contrast aquatic biomes			X	
Infer how changes in physical conditions affect the growth of plants		X	X	

I=Introduce

D=Develop

M=Master

OBJECTIVES AND SKILLS CHEMISTRY	NJCCCS	I	D	M
A. FORMS OF MATTER	5.2.8A, 5.3.4C, 5.3.4D, 5.6.4A, 5.6.4B, 5.6.6A, 5.6.6B, 5.6.8A, 5.10			
Describe the structure of atoms		X		
Compare and contrast the different properties of elements		X		
Discover how atoms differ from one another		X		
Observe the classification of elements on the periodic table		X		
Describe the formation of compounds		X		
Relate the makeup of a compound to its chemical formula		X		
Practice writing chemical formulas		X		
Compare and contrast the properties of different kinds of mixtures		X		
Collect data on ways to separate different mixtures		X		
Characterize the behavior of solutions		X		
Read and interpret a pH scale		X		
Discuss the implications of acid rain		X		
OBJECTIVES AND SKILLS PHYSICAL SCIENCE	NJCCCS	I	D	M
A. FORCES IN MOTION	5.1.4A, 5.2.8A, 5.2.8B, 5.3.4A, 5.4.2B, 5.4.2C, 5.7.4A, 5.7.6A			
Describe the motion of an object		X	X	
Understand that the motion of an object can be measured		X	X	
Recognize that motion can be retarded by forces such as friction and air resistance		X	X	
Discover the relationship between the strength of a force and its effect on an object		X	X	
Appreciate the effects of gravity as a force		X	X	
Describe how forces affect motion, work, and power		X	X	
Define the relationship between work and power		X	X	
Explain Newton's Laws of Motion		X		

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OBJECTIVES AND SKILLS LIFE SCIENCE	NJCCCS	I	D	M
A. BODY TRANSPORT SYSTEMS	5.5.4A	X		
Identify the parts and functions of the circulatory system		X		
Observe how pulse rate varies with exercise		X		
Describe the different parts of blood		X		
Identify the parts and functions of the respiratory system		X		
Define lung capacity		X		
Identify ways to improve the health of the body systems			X	
Evaluate the effects of smoking on the body			X	
Evaluate the effects of diet and exercise			X	

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SIXTH GRADE

SCIENCE SCOPE AND SEQUENCE

Since the Science curriculum aligns with the New Jersey Core Curriculum Content Standards, the Science committee has concluded that the learning outcomes at each grade level will help students to develop a thorough understanding of essential scientific ideas.

OBJECTIVES AND SKILLS SCIENTIFIC PROCESSES/LAB SAFETY & EQUIPMENT	NJCCCS	I	D	M
A. SCIENTIFIC PROCESSES/LAB SAFETY & EQUIPMENT	5.1.8.A, 5.1.8.B, 5.1.8.C, 5.3.8.D, 5.4.4.B			
Identify lab equipment and describe uses		X	X	X
Know when and how to use lab equipment		X	X	
Understand and practice safety procedures during laboratory investigations		X	X	
Define steps of the scientific method		X	X	
Define and use units of metric measurement for mass, length, volume and temperature		X	X	
Convert measurements within the metric system		X	X	
Identify questions and make predictions that can be addressed by conducting scientific investigations		X	X	
Design and conduct investigations incorporating the use of a control		X	X	
Collect, organize, analyze and interpret experimental data		X	X	
Communicate experimental findings to others		X	X	
B. THE SCIENCE FAIR	5.1.8.A, 5.1.8.B, 5.1.8.C, 5.3.8.A, 5.3.8.B, 5.3.8.D			
Identify questions and make predictions that can be tested through experimentation				
Design and conduct investigations incorporating the use of a control		X	X	
Measure and record experimental data		X	X	
Analyze experimental data and draw conclusions from it		X	X	
Present experimental data in several formats		X	X	X
Communicate experimental findings to others		X	X	
Show that experimental results can lead to new questions and further investigations		X	X	

I=Introduce

D=Develop

M=Master

OBJECTIVES AND SKILLS LIFE SCIENCE	NJCCCS	I	D	M
A. WHAT IS LIFE	5.2.8A, 5.3.4C, 5.3.4D, 5.6.4A, 5.6.4B, 5.6.6A 5.6.6B, 5.6.8A, 5.10			
Identify the basic needs of living things			X	
Distinguish between living and non-living things			X	X
Define the basic needs of organisms			X	X
Understand the scientific classification of living things		X	X	
Create and apply a classification system		X	X	
B. LIFE SCIENCE/CELLS	5.2.8.A, 5.2.8.B, 5.5.6.A			
Define and describe parts of plant and animal cells		X	X	
Describe the purpose of different cell parts		X	X	
Compare plant and animal cells		X	X	
Describe cell functions		X	X	
Relate cell form to function		X	X	
Describe system of organization in living things: cell, tissue, organ, organ system		X	X	
Use models to gain insight		X	X	
OBJECTIVES AND SKILLS CHEMISTRY	NJCCCS	I	D	M
A. STRUCTURE OF MATTER	5.1.8.A, 5.1.8.B, 5.1.8.C, 5.2.8.A 5.5.6.A, 5.5.6.B			
Define matter and what makes up matter		X	X	
Describe the parts of the atom and their charges		X	X	
Use models to gain insight		X	X	
Define and give examples of elements, mixtures, and compounds		X	X	
Identify names, symbols, and formulas for elements and compounds		X	X	
Determine the composition of an unknown sample of matter		X	X	

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Separate an heterogeneous mixture		X		
Describe physical and chemical properties of matter		X	X	
Measure and calculate density		X	X	
Identify and describe physical and chemical changes		X	X	
Observe and recognize evidence of a chemical change		X	X	
Describe how physical and chemical changes affect the world we live in		X	X	
OBJECTIVES AND SKILLS EARTH SCIENCE	NJCCCS	I	D	M
A. WATER PLANET	5.1.8.A, 5.1.8.B, 5.1.8.C, 5.3.8.D, 5.8.6.B, 5.10.6.A, 5.6.10.B			
Describe and illustrate the water cycle			X	
Describe the composition, circulation, and distribution of the world's oceans, estuaries, and marine environments		X	X	
Describe sources of freshwater on earth			X	
Define and describe properties of ocean water			X	
Explain causes of ocean tides and currents		X	X	
Identify and describe water organisms and their special adaptations			X	
Observe, collect and analyze data about a local stream		X	X	
Observe, collect and analyze data about the Atlantic Ocean		X	X	
Explain the need for water conservation			X	
OBJECTIVES AND SKILLS ASTRONOMY & SPACE	NJCCCS	I	D	M
A. EARTH & MOON	5.1.8.A, 5.1.8.B, 5.2.8.A, 5.2.8.B, 5.9.6.A, 5.9.6.B, 5.9.6.C			
Define and describe earth's orbit and rotation			X	
Describe how the motions of Earth define units of time such as days, months, and years			X	
Describe the earth's tilt on its axis and how this causes change in seasonal sunlight		X	X	
Explain how the force of gravity holds space objects in orbit		X	X	

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Describe how gravity affects matter		X	X	
Model the size and distance of the planets and sun in our solar system			X	
Identify constellations in the sky		X	X	
Define the individual stars that make up constellations		X	X	
Describe properties of stars		X	X	
Use random sampling and estimation to estimate the number of stars and galaxies in the night sky		X	X	

I=Introduce

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SEVENTH GRADE

SCIENCE SCOPE AND SEQUENCE

Since the Science curriculum aligns with the New Jersey Core Curriculum Content Standards, the Science committee has concluded that the learning outcomes at each grade level will help students to develop a thorough understanding of essential scientific ideas.

OBJECTIVES AND SKILLS EARTH SCIENCE	NJCCCS	I	D	M
A. FORCES THAT SHAPE THE EARTH	5.1.8.A, 5.2.8.A, 5.4.6.B, 5.8.4.C, 5.8.4.D, 5.8.6.C, 5.8.6.D			
Define and describe the earth’s composition			X	
Evaluate supporting evidence for the theories of Continental Drift and Plate Tectonics		X	X	
Define and describe types of plate boundaries		X	X	
Observe and explain convection currents		X	X	
Identify and describe types of volcanoes		X	X	
Relate the theories of Continental Drift and Plate Tectonics to the processes of mountain building, seafloor spreading, earthquakes and volcanoes		X	X	
Use models to support understanding		X	X	X
Describe the effects of earthquakes and volcanoes on people		X	X	
OBJECTIVES AND SKILLS LIFE SCIENCE	NJCCCS	I	D	M
A. WHAT IS LIFE	5.2.8A, 5.3.4C, 5.3.4D, 5.6.4A, 5.6.4B, 5.6.6A, 5.6.6B, 5.6.8A, 5.10			
Identify the basic needs of living things				X
Distinguish between living and non-living things				X
Define the basic needs of organisms				X
Understand the scientific classification of living things			X	
Create and apply a classification system			X	

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B. CELLS	5.2.8.A, 5.2.8.B, 5.5.6.A			
Define and describe parts of plant and animal cells			X	
Describe the purpose of different cell parts			X	
Compare plant and animal cells			X	
Describe cell functions			X	
Relate cell form to function			X	X
Describe system of organization in living things: cell, tissue, organ, organ system			X	X
Use models to gain insight			X	
C. HEREDITY & EVOLUTION	5.1.8.A, 5.1.8.B, 5.2.8.A, 5.2.8.B, 5.3.8.B, 5.3.8.D, 5.5.6.B, 5.5.6.C, 5.5.8.B, 5.5.8.C			
Observe individual variations within members of a species			X	
Distinguished between acquired and inherited traits		X	X	
Explain how traits are inherited		X	X	
Observe patterns of inheritance within families		X	X	
Describe Mendel's role in the history of genetics		X	X	
Identify dominant and recessive traits		X	X	
Predict inheritance using a Punnett Square		X	X	
Relate probability to patterns of inheritance		X	X	
Describe mutations and genetic disorders		X	X	
Evaluate advances in the area of genetics and genetic engineering		X	X	
Define reproductive and therapeutic cloning and evaluate their merits and shortcomings		X	X	
Explain and give evidence for the theory of evolution by natural selection		X	X	
Describe variations and adaptations within species		X	X	
Explain the relationship between inherited traits and environmental factors		X	X	
Identify the adaptations of primates		X	X	
Discuss the evolution of primates		X	X	

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OBJECTIVES AND SKILLS PHYSICAL SCIENCE	NJCCCS	I	D	M
A. ENERGY	5.1.8.A, 5.1.8.B, 5.4.8.A, 5.4.8.B, 5.4.8.C, 5.7.8.B, 5.10.8.B			
Explain what energy is		X	X	
Distinguish between potential energy and kinetic energy		X	X	
Explore factors that affect the amount of energy produced (mass, speed, distance)		X		
Identify various forms of energy		X	X	
Apply the law of the conservation of energy to energy transformations		X	X	
Identify how energy changes form		X	X	
Describe how electrical plants produce energy		X	X	
Explain what renewable, non-renewable, and alternative resources are		X	X	
Consider the advantages and disadvantages of using various energy sources		X	X	
OBJECTIVES AND SKILLS SCIENTIFIC PROCESSES	NJCCCS	I	D	M
A. THE SCIENCE FAIR	5.1.8.A, 5.1.8.B, 5.1.8.C, 5.3.8.A, 5.3.8.B, 5.3.8.D			
Identify questions and make predictions that can be tested through experimentation			X	
Design and conduct investigations incorporating the use of a control			X	
Measure and record experimental data			X	
Analyze experimental data and draw conclusions from it			X	
Present experimental data in several formats			X	X
Communicate experimental findings to others			X	
Show that experimental results can lead to new questions and further investigations			X	

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EIGHTH GRADE

SCIENCE SCOPE AND SEQUENCE

Since the Science curriculum aligns with the New Jersey Core Curriculum Content Standards, the Science committee has concluded that the learning outcomes at each grade level will help students to develop a thorough understanding of essential scientific ideas.

OBJECTIVES AND SKILLS PHYSICAL SCIENCE	NJCCCS	I	D	M
A. WAVES & LIGHT	5.1.8.A, 5.1.8.B, 5.2.8.A, 5.2.8.B, 5.2.8.A, 5.3.8.C, 5.3.8.D,5.7.8.B			
Explain the relationship between waves, energy and matter		X	X	
Describe the properties of transverse, mechanical and compressional waves		X	X	
Define and describe wavelength, frequency, and amplitude of transverse waves		X	X	
Describe wave reflection, refraction, diffraction, and interference		X	X	
Describe the properties of electromagnetic waves		X	X	
Identify the types of waves on the electromagnetic spectrum and their uses		X	X	
Explain how light interacts with materials		X	X	
Determine the colors in white light		X	X	
Describe why objects appear to have different colors		X	X	
Identify plane, convex and concave mirrors and describe their properties		X	X	
Explore the law of reflection		X	X	
Determine how plane, convex and concave mirrors produce images		X	X	
Identify convex and concave lenses and describe their properties		X	X	
Determine how plane, convex and concave lenses produce images		X	X	
Describe the uses of mirrors and lenses in optical devices		X	X	
Define and describe the parts of the human eye		X	X	

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OBJECTIVES AND SKILLS SCIENTIFIC PROCESSES	NJCCCS	I	D	M
A. NATURE OF TECHNOLOGY	5.4.4.A, 5.4.6.C, 5.4.8.A, 5.4.8.B, 5.4.8.C			
Distinguish between things that occur in nature and those that have been designed to solve human problems			X	
Identify the basic components in a technological systems: input, process, output and feedback		X	X	
Compare and contrast science and technology and consider the symbiotic relationship between advances in each field		X	X	
B. THE SCIENCE FAIR	5.1.8.A, 5.1.8.B, 5.1.8.C, 5.3.8.A, 5.3.8.B, 5.3.8.D			
Identify questions and make predictions that can be tested through experimentation			X	X
Design and conduct investigations incorporating the use of a control			X	X
Measure and record experimental data			X	X
Analyze experimental data and draw conclusions from it			X	X
Present experimental data in several formats			X	X
Communicate experimental findings to others			X	X
Show that experimental results can lead to new questions and further investigations			X	X
OBJECTIVES AND SKILLS ASTRONOMY	NJCCCS	I	D	M
A. EARTH PATTERN	5.1.8.A, 5.1.8.B, 5.2.8.A, 5.2.8.B, 5.4.8.B, 5.9.6.A, 5.9.8.A			
Examine Earth's physical characteristics			X	
Describe earth's rotation and orbit around the sun			X	
Explain how the motions of the Earth, sun and moon define units of time: days, months, and years			X	
Describe how the tilt, rotation, and orbital pattern on Earth relative to the sun produce seasons		X	X	
Describe the motions of the moon			X	

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Observe and define moon phases			X	
Explain why solar and lunar eclipses occur			X	
Infer what the moon's surface features may reveal about its history			X	
B. SOLAR SYSTEM, STARS & GALAXIES	5.1.8.A, 5.1.8.B, 5.2.8.A, 5.2.8.B, 5.4.8.B, 5.9.6.B, 5.9.6.C, 5.9.6.D, 5.9.8.B, 5.9.8.C, 5.9.8.D			
Discuss historical models of the solar system		X	X	
Describe the current models of the formation of the solar system			X	
Describe the physical features of the planets in the solar system			X	
Compare and contrast the planets of the solar system			X	
Define and describe other objects in the solar system: comets, meteoroids and asteroids			X	
Explore the concept of an expanding universe		X	X	
Describe the characteristics of stars		X	X	
Explore how stars are classified		X	X	
Describe how the temperature of a star is related to its color		X	X	
Describe the evolution of stars		X	X	
Explain why the position of the constellations change throughout the year		X	X	
Distinguish between absolute and apparent magnitude of stars		X	X	
Explore how parallax is used to determine the distance of stars		X	X	
Describe the structure of the Sun		X	X	
Describe sunspots, prominences and solar flares and discuss how they are related		X	X	
Use random sampling and estimation to estimate the number of galaxies		X	X	
Describe the role of technology in our understanding of space science		X	X	
OBJECTIVES AND SKILLS CHEMISTRY	NJCCCS	I	D	M
A. STRUCTURE OF MATTER & CHEMICAL REACTIONS	5.1.8.A, 5.1.8.B, 5.1.8.C, 5.3.8.A, 5.3.8.B, 5.3.8.C, 5.3.8.D, 5.6.6.A, 5.6.6.B, 5.6.8.A, 5.6.8.B			

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Describe and model the structure of the atom			X	
Identify how electrons are arranged in an atom			X	
Compare electron arrangement in an atom to its place on the period table			X	
Explore the characteristics of families and periods on the periodic table			X	
Define and model the difference between elements and compounds			X	
Describe and distinguish physical and chemical changes			X	
Observe and describe exothermic and endothermic reactions			X	
B. SUBSTANCES, MIXTURES, & SOLUBILITY	5.1.8.A, 5.1.8.B, 5.1.8.C, 5.3.8.A, 5.3.8.B, 5.3.8.C, 5.3.8.D, 5.6.6.A, 5.6.6.B, 5.6.8.A, 5.6.8.B			
Distinguish between substances and mixtures		X	X	
Use models to enhance understanding			X	
Compare and contrast heterogeneous and homogeneous mixtures		X	X	
Explain how solutions form and describe different types of solutions		X	X	
Separate heterogeneous mixtures based on physical properties			X	
Define solvents and explain why water is a good general solvent		X	X	
Identify factors that affect how substances dissolve in solvents		X	X	
Explain how temperature affects reaction rate		X	X	
Compare acids and bases			X	
Describe practical uses of acids and bases			X	
Explain how pH is used to determine the strength of an acid or base		X	X	

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