

# Kindergarten Science

Time Frame	Topic	Concepts/Skills/ideas	Activities	Resource
	<b>Scientific Inquiry</b>	<b>To be integrated into all content topics</b>		
		People can often learn about things around them by just observing those things carefully, but sometimes they can learn more by doing something to the things and noting what happens.		
		Tools such as thermometers, magnifiers, rulers, or balances often give more information about things that can be obtained by just observing things without their help.		
		Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.		
		When people give different descriptions of the same thing, it is usually a good idea to make some fresh observations instead of just arguing about who is right.		
	Nature of Science	When a science investigation is done the way it was done before, we expect to get a very similar result.		
		Science investigations generally work the same way in different places.		

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Time Frame	Topic	Concepts/Skills/ideas	Activities	Resource
	<b>Life Science</b>			
	Animal classifications (amphibians and reptiles)	Plants and animals have features that help them live in different environments.	identify and sort animals by characteristics.	
		Stories sometimes give plants and animals attributes they really do not have.	Sort animals by warm and cold blooded, classify birds, mammals, insects, arachnids,	funschool.kaboose.co
		Some animals and plants are alike in the way they look and in the things they do, and others are very different from one another.	Habitats	
			Chicks/life cycle	
		There is a variation among individuals of one kind within a population.	Life cycles of butterflies (from egg to butterfly)	
		Offspring are very much, but not exactly, like their parents and like one another.		
			Apples, Pumpkins (from seed to plant	
		Magnifiers help people see things they could not see without them.	Uses of apples, land, pumpkins	
		Most living things need water, food and air.		
		Pollination		

# Kindergarten Science

Time Frame	Topic	Concepts/Skills/ideas	Activities	Resource
	<b>Five Senses</b>			
		The human body has parts that help it seek, find, and take in food when it feels hunger.- eyes and noses for detecting food, legs to get to it, arms to carry it away, and a mouth to eat it.	Hearing, touch, sight, taste, and smell	
		senses can warn individuals about danger: muscles help them to fight, hide or get out of danger.	Name the five senses	
		The brain enables human beings to think and sends messages to other body parts to help them work properly.	importance of relationship to body parts	
		People can learn from each other by telling and listening, showing and watching, and imitating what others do.		
		Some of the things people do, like playing soccer, reading, writing , must be deliberately learned. Practicing helps people to improve, How well one learns sometimes depends on how one does it and how often and how hard one tries to learn.	Body awareness	

# Kindergarten Science

Time Frame	Topic	Concepts/Skills/ideas	Activities	Resource
	<b>Physical Science</b>			
	Liquid, Solid and Gas	Recognize differences in solids, liquids and gas		
		Water can be a liquid or a solid and can go back and forth from one form to the other. If water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing.	Observe and describe what happens when solids are mixed with water and when other liquids are mixed with water	
		Water left in an open container disappears, but water in a closed container does not disappear.	Describe things that can be done to solid materials. Mixing, melting, cutting, wetting, dissolving, bending, breaking, to change some of their properties	
		Objects can be described in terms of the materials they are made of (clay, cloth, paper, etc.) and their physical properties (color, size shape, weight, texture, flexibility, etc.) Describe things that can be done to liquids to change their properties.		
	Flow of Matter and Energy	Many materials can be recycled and used again, sometimes in different forms.	Reduce, reuse and recycle	

# Kindergarten Science

Time Frame	Topic	Concepts/Skills/ideas	Activities	Resource
	<b>Earth Science</b>			
		Things can be done to materials to change some of their properties, but not all materials respond the same way to what is done to them.		
	Weather	Observations		
		Some events in nature have a repeating pattern. The weather changes some from day to day, but things such as temperature and rain or snow tend to be high low or medium in the same months every year.	Chunks of rocks come in many sizes and shapes, from boulders to grains of sand and even smaller.	
			Change is something that happens to many things.	
*Some items were taken from Benchmarks for Science Literacy ( <a href="http://www.project2061.org/publications/bsl/online">www.project2061.org/publications/bsl/online</a> )				

# Grade 1 Science

Time Frame	Topic	Concepts/Skills/Ideas	Suggested Activities	Resource
	<b>Unifying Themes</b>	<b>To be integrated into content topics</b>		
		Most things are made of parts.		
		Something may not work if some of its parts are missing.		
		When parts are put together, they can do things that they couldn't do by themselves.		
		Many toys are like real things in some ways but not others. They may not be the same size, are missing many details, or are not able to do all of the same things.		
		A model of something is different from the real thing but can be used to learn something about the real thing.		
		One way to describe something is to say how it is and isn't like something else.		
		Objects change in some ways and stay the same in some ways.		
		People can keep track of some things, seeing where they come from and where they go.		
		An object can change in various ways, such as in size, weight, color, or temperature.		
		Small changes can sometimes be detected by comparing counts or measurements at different times.		
		Some things change so slowly or so quickly that the changes are hard to notice while they are taking place.		
		Things in nature and things people make have very different sizes, weights, ages, and speeds.		
		Students recognize that people have always engaged in science and technology and that there is a difference between the natural and designed worlds.		

# Grade 1 Science

Time Frame	Topic	Concepts/Skills/Ideas	Suggested Activities	Resource
	<b>Scientific Inquiry</b>	<b>To be integrated into all content topics</b>		
		People can often learn about things around them by just observing those things carefully, but sometimes they can learn more by doing something to the things and noting what happens.		
		Tools such as thermometers, magnifiers, rulers, or balances often give more information about things than can be obtained by just observing things without their help.		
		Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.		
		When people give different descriptions of the same thing, it is usually a good idea to make some fresh observations instead of just arguing about who is right.		

# Grade 1 Science

Time Frame	Topic	Concepts/Skills/Ideas	Suggested Activities	Resource
	<b>Life Science</b>	<b>Insects</b>		
		Some insects are alike in the way they look and in the things they do, and others are very different from one another.	Create clay models of insects.	
		Stories sometimes give insects attributes they really do not have.		
		There is variation among individuals of one kind within a population.	4 kinds of arthropods (insects, crustaceans, millipedes/ centipedes, arachnids ) Compare different types of ants, bees, etc.	
		Offspring are very much, but not exactly, like their parents and like one another.	Compare life cycles (metamorphosis)	
		Living things are found almost everywhere in the world. There are somewhat different kinds in different places.		
		Different animals have external features that help them thrive in different kinds of places.	Label body parts	

# Grade 1 Science

Time Frame	Topic	Concepts/Skills/Ideas	Suggested Activities	Resource
	<b>Life Science</b>	<b>Plants</b>		
		Some plants are alike in the way they look and in the things they do, and others are very different from one another.	Compare parts of plants. Compare fruits and vegetables and the parts we eat.	
		Plants have features that help them live in different environments.		
		Stories sometimes give plants attributes they really do not have.		
		There is variation among individuals of one kind within a population.	Food tasting - different varieties	
		Living things are found almost everywhere in the world. There are somewhat different kinds in different places.	Map where we get fruits and vegetables imported from.	
		Plants need to take in water. In addition, plants need light.	Compare plants that do get water and light with ones that don't.	
		Most living things need water, food, and air.	Grow plants from seed and eat the edible portions of the mature plants.	
		Different plants have external features that help them thrive in different kinds of places.		

# Grade 1 Science

Time Frame	Topic	Concepts/Skills/Ideas	Suggested Activities	Resource
	<b>Life Science</b>	<b>Cycles</b>		
		Many materials can be recycled and used again, sometimes in different forms.	Reduce, Reuse, Recycle - provide containers to recycle in the classroom.	
	<b>Physical Science</b>	<b>Forces and Motion</b>		
		Things move in many different ways, such as straight, zigzag, round and round, back and forth, and fast and slow.	View, describe, and discuss all moving things- themselves, insects, birds, trees, doors, rain, fans, swings, balls, etc. Keep notes, draw pictures, and raise questions. Experiment with getting things to move or not move and change the direction or speed of things already in motion: marbles, dominoes, etc.	Forces / Motion Kit Books: The Magic School Bus Plays Ball
		The way to change how something is moving is to give it a push or a pull.		
		Things that make sound vibrate.	Experiment by feeling vibrations of instruments (drums, bells, stringed instruments, and own voices).	
		Things near the earth fall to the ground unless something holds them up.	Make lists of different kinds of motion and what things move that way.	
		Magnets can be used to make some things moved without being touched.	Experiment with magnets to get things to move without touching them.	

# Grade 1 Science

Time Frame	Topic	Concepts/Skills/Ideas	Suggested Activities	Resource
	<b>Earth Science</b>	<b>Weather</b>		
		The sun warms the land, air, and water.		
		Some events in nature have a repeating pattern. The weather changes from day to day, but things such as temperature and rain (or snow) tend to be high, low, or medium in the same months every year.	Describe the way in which weather changes over months. Keep daily records of temperature and precipitation. Plot them by week and month. Look for patterns.	
		Water can be a liquid or a solid and can go back and forth from one form to the other. If water is turned into ice and then the ice is allowed to melt, the amount of water is the same as it was before freezing.	Become familiar with freezing of water and melting of ice, the disappearance of wetness, and the appearance of water on cold surfaces.	
		Water left in an open container disappears, but water in a closed container does not disappear.	Describe what happens to water left in an open container as compared to water left in a closed container.	

# Grade 2 Science

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	<b>Unifying Themes</b>	<b>To be integrated into all content topics</b>		
		Most things are made of parts.		
		Something may not work if some of its parts are missing.		
		When parts are put together, they can do things that they couldn't do by themselves		
		Many toys are like real things in some ways but not others. They may not be the same size, are missing many details, or are not able to do all of the same things.		
		A model of something is different from the real thing but can be used to learn something about the real thing		
		One way to describe something is to say how it is and isn't like something else		
		Objects change in some ways and stay the same in some ways.		
		People can keep track of some things, seeing where they come from and where they go.		
		An object can change in various ways, such as in size, weight, color, or temperature.		
		Small changes can sometimes be detected by comparing counts or measurements at different times.		
		Things in nature and things people make have very different sizes, weights, ages, and speeds		
		Students recognize that people have always engaged in science and technology and that there is a difference between the natural and designed worlds		

# Grade 2 Science

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		Tools such as thermometers, magnifiers, rulers, or balances often give more information about things than can be obtained by just observing things without their help.		
		Describing things as accurately as possible is important in science because it enables people to compare their observations with those of others.		
		When people give different descriptions of the same thing, it is usually a good idea to make some fresh observations instead of just arguing about who is right.		
	<b>Life Science</b>	<b>Cycles</b>		
		Many materials can be recycled and used again, sometimes in different forms	Reduce Reuse Recycle	Scholastic News

# Grade 2 Science

Time Frame	Topic	Concepts/Skills/Ideas	Suggested Activities	Resource
	<b>Life Science</b>	<b>Maine Wildlife</b>		
		Identify, classify, record characteristics and facts (Some animals and plants are alike in the way they look and the things they do and others are very different from another).	List of Animals: Project (Maine book)	Chewonki Foundation
		Their role in the ecosystem/ habitats	Bat	
		Discuss Maine Wildlife in relationship to the Endangered species list (Some kinds of organisms that once lived on Earth have completely disappeared, although they were something like others that are alive)	Black Bear	<a href="http://www.chewonki.org">www.chewonki.org</a>
		Relationship to the state in which we live as well as around the world.(Living things are found almost everywhere in the world there are somewhat different kinds in different places)	Moose	
		Relationships ( food chain/ prey vs. predator/life cycle) (Animals eat plants or other animals for food and may also use plants (or even other animals) for shelter and nesting.	Chickadee	
		Plants and animals have features that help them live in different environments.	Honey bee	<a href="http://www.mbgnet.net">www.mbgnet.net</a>
		Different plants and animals have external features that help them thrive in different kinds of places.	Salmon	
		A human baby (all mammals) grows inside its mother until its birth. Even after birth, a human baby is unable to care for itself, and its survival depends on the care it receives from adults	Sea Mammals/Lobster	Chewonki Foundation New England Aquarium field trip Lobster boat field trip

# Grade 2 Science

Time Frame	Topic	Concepts/Skills/Ideas	Suggested Activities	Resource
	<b>Earth Science</b>	<b>Rock Excavation</b>		
		Chunks of rocks come in many sizes and shapes, from boulders to grains of sand and even smaller.		Fort Foster
	<b>Earth Science</b>	<b>Ocean Relationships</b>		
		There are relationships that exist between living things and their surroundings.	Influence of the moon	
		Food webs show the interrelationships between animals and the food they eat in an estuary.		
		Tides change the water level in all parts of the estuary. <i>Change is something that happens to many things.</i>		Walk to Estuary
		Tide changes impact all aspects of the estuary including physical features and animals. <i>Animals and plants sometimes cause changes in their surroundings.</i>		Walk to Estuary
	<b>Earth Science</b>	<b>Moon</b>		
		High tide and low tide differ about six hours allowing people to predict tide patterns.		Walk to Estuary
		The ratio of salt in water varies from one part of the estuary to another.		
		A change in salinity of water would effect estuarine life forms.		Walk to Estuary
		Surveys and the analysis of their data can reveal useful understandings. <i>The moon looks a little different every day, but looks the same again about every four weeks.</i>	Watch moon phases	Dr. Hoop

## Grade 2 Science

Time Frame	Topic	Concepts/Skills/Ideas	Suggested Activities	Resource
	<b>Physical Science</b>	<b>Light and Shadows</b>		
		The sun can be seen only in the daytime, but the moon can be seen sometimes at night and sometimes during the day. The sun, moon, and stars all appear to move slowly across the sky.	Observe and record how light changes depending on it's source.	Light Journal
		There are more stars in the sky than anyone can easily count, but they are not scattered evenly, and they are not all the same in brightness or color.	Describe the changes in the appearance of the moon from day to day (i.e. Winter sky/ tidal changes)	

# Grade 3 Science

Time Frame	Topic	Concepts / Skills/ Ideas	GLE	Activity	Resource
	<b>Unifying Themes</b>				
		In something that consists of many parts, the parts usually influence one another.			
		Something may not work well (or at all) if a part of it is missing, broken, worn out, mismatched, or misconnected.			
		A model of something is similar to, but not exactly like, the thing being modeled. Some models are physically similar to what they are representing, but others are not.			
		Models are very useful for communicating ideas about objects, events, and processes. When using a model to communicate about something, it is important to keep in mind how it is different from the thing being modeled.			
		Some features of things may stay the same even when other features change			
		Things change in steady, repetitive, or erratic ways—or sometimes in more than one way at the same time.			
		Often the best way to tell which kinds of change are happening is to make a table or graph of measurements.			
		Some things, such as a person's age, change in only one direction			

# Grade 3 Science

Time Frame	Topic	Concepts / Skills/ Ideas	GLE	Activity	Resource
	<b>Scientific Inquiry</b>	<b>To be integrated into all content topics</b>			
		Students plan, conduct, analyze data from, and communicate results of investigations, including fair tests.			
		Pose investigable questions and seek answers from reliable sources of scientific information and from their own investigations.			
		Plan and safely conduct investigations including simple experiments that involve a fair test.			
		Use simple equipment, tools, and appropriate metric units of measurement to gather data and extend the senses.			
		Test hypothesis by experimenting with multiple variables			
		Use data to construct and support a reasonable explanation.			
		Scientific investigations may take may different forms.			
		Report results, with evidence			

# Grade 3 Science

Time Frame	Topic	Concepts / Skills/ Ideas	GLE	Activity	Resource	
	<b>Life Science</b>	<b>Human Body/Cells</b>				
	Human Body	Relationship and function of the 6 body systems: skeletal, respiratory, circulatory, muscular, digestive/excretory, nervous - General introduction to each system and how they work together. By breathing, people take in the oxygen they need to live. Skin protects the body from harmful substances and other organisms from drying out. The brain gets signals from all part of the body....				
		Vocabulary: digestion, stomach, small and large intestine, proteins, carbo, fats, vitamins, minerals, excrete, kidneys, vein, artery, heart, blood, nutrients, oxygen, muscle, smooth, cardiac, skeletal, nerves, brain, spinal cord, nose, trachea, lungs, oxygen, carbon dioxide				
		Know that cells are the building block. Some living things consists of a single cell. The cell needs food, water, and air.				
		Vocabulary: skeleton, bones, ligaments, tendons, cell, cell wall, cell membrane, nucleus				

# Grade 3 Science

Time Frame	Topic	Concepts / Skills/ Ideas	GLE	Activity	Resource
	<b>Physical Science</b>	<b>Earth Moon and Sun</b>			
		Observe/report movement of sun across sky throughout the year			
		Effects of moon and sun on Earth (tides, heat, seasons, light)			
		Earth's rotation causing night and day. The earth is one of several planets that orbits the sun, and the moon orbits around the earth. How the cycle affect local temperature.			
		The earth is approximately spherical in shape. Like the earth, the sun and planets are spheres. 4B/E2a			
		Effect of gravity, on Earth only- Things on or near the earth are pulled toward it by the earth's gravity. # Things on or near the earth are pulled toward it by the earth's gravity. 4B/E1			
		Vocabulary: rotate, revolve, orbit, eclipse, gravity, planet, moon, star, lunar			

# Grade 3 Science

Time Frame	Topic	Concepts / Skills/ Ideas	GLE	Activity	Resource
	<b>Earth Science</b>	<b>Planets</b>			
		Revolution and rotation of planets- Planets change their positions against the background of stars.			
		Students describe the positions and apparent motions of different objects in and beyond our solar system and how these objects can be viewed from Earth.			Magic School Bus, Inside the Earth book
		Show the locations of the sun, Earth, moon, and planets and their orbits. Explain how wind, waves, water, and ice reshape the surface of Earth.			
		Model of earth to show layers			
		Layers of Earth			
		Vocabulary: crust, mantle, inner core, outer core, atmosphere			
	<b>Earth Science</b>	<b>Solar System</b>			
		Sun is a star. Smaller and larger they look like points.			
		Relationship of locations of sun, moon and planets and their orbits (paths of objects)			

# Grade 4 Science

Time Frame	Topic	Concepts, Skills, and Specific Ideas	GLE	Activity / Assessment	Resource	
	<b>Scientific Inquiry</b>	<b>To be integrated into all content topics</b>				
		Pose investigable questions and seek answers from investigations including; making observations, collecting specimens for analysis, and conducting simple experiments.	B1			
		Use simple tools, equipment, and appropriate metric units to gather data.	B1			
		Make claims based on evidence collected from investigations.	B1			
		Understand that the results of similar investigations may have different results and causes of the differences.	B1			
		Communicate results to an appropriate audience.	B1			

# Grade 4 Science

Time Frame	Topic	Concepts, Skills, and Specific Ideas	GLE	Activity / Assessment	Resource
	<b>Life Science - Animal Studies Kit</b>				
	Adaptations	Explain how changes in an organism's habitat influence survival. Vocabulary: carnivore, herbivore, omnivore	E2	Habitat Diorama	
	Food Webs	Food Webs of animals and plants (producers, consumers, and decomposers) Vocabulary: producers, consumers, decomposers	E1, E2		
	Biomes and Habitats	Biomes to include: Fresh water, marine, deciduous forest, tundra, taiga, desert, rain forest, grasslands Vocabulary: tundra, deciduous forest, taiga	E2, E4		
		Description of the ways organisms depend on each other. (Food chains, food webs, carrying and dispersing seeds.) Vocabulary: dispersal	E1, E2	Food Chain Mobile	
	Diversity and Survival	Explain how organisms can effect the environment in different ways (Invasive and exotic species) Vocabulary: invasive, exotic	E1,E5	Museum of Science	
		Humans influences	E2		
		The nature of a habitat controls the kinds of organisms that may survive within it.	E2		
		An organism's structures and behaviors are related to its environment.	E1,E2, E4		
	Classification	Students compare and sort living things based on behaviors, environmental needs, and external features during its life cycle.	E2,E4	Animal Research	
		A combination of behaviors and structures, rather than any single characteristic, enables an animal to survive in a particular habitat.	E1,E4		
	Cells	Give examples of organisms that consists of a single cell, and organisms made from a collection of cells.	E3		
		Compare how needs of living things are met in single and multicelled organisms.	E1,E3		

# Grade 4 Science

Time Frame	Topic	Concepts, Skills, and Specific Ideas	GLE	Activity / Assessment	Resource
	<b>Life Science - Plant Growth and Development Kit</b>				
		Plants and other organisms are part of an organized system that regulates their life cycles and their interactions with the environment.			
		Explain how the food of most animals can be traced back to plants.	E1,E2		
		Organisms go through distinct stages as part of a process known as the life cycle.	E3,E4	Grow, sketch, and record development of plants.	
		Living things are interdependent; for example, plants depend on bees for pollination.	E1,E2, E4		
		Records, notes, and graphs help people understand how plants move through the life cycle and what factors affect their growth and development.	E1,E2, E4		
		Models can be used to identify the structures, functions, and behaviors of living organisms.	E1		

# Grade 4 Science

Time Frame	Topic	Concepts, Skills, and Specific Ideas	GLE	Activity / Assessment	Resource
	<b>Earth Science - Weather &amp; Water Kit</b>				
	Weather Patterns	Measure temperature, humidity, precipitation, and cloud cover.	D2		
		Understand that weather measurements can be used to make predictions about coming weather.	D2		
		Understand that meteorologists compare weather patterns in different places using data in graphs, maps, and charts.	D2		
	Air and Atmosphere	Understand that air is a substance that takes up space, can be felt, and can move things.	D2		
		Understand that the air in the atmosphere is a mixture of gases including invisible water vapor.	D2		
		Understand that weather happens in the lower part of the atmosphere where there is enough air and water.	D2		
	Phase Change	Understand that phase change- how water can change between being a solid, liquid, and gas- is vital to understanding weather.	D2		
	Water Cycle	Understands that the water cycle describes the movement of water in and between the atmosphere, the surface of Earth, and underground.	D2		
		Understand that the same water has been moving through the water cycle on Earth for millions of years.	D2		
	Technological Design		D2	Weather Fair	

## Grade 4 Science

Time Frame	Topic	Concepts, Skills, and Specific Ideas	GLE	Activity / Assessment	Resource
	<b>Physical Science - Energy Lights Maine Kit</b>				
		develop a basic understanding that light is a form of energy derived from the sun.	D4		
		devise a simple circuit that will light a bulb.	D4		
		recognize that materials have different conduction and insulation properties.	D4		
		identify electrical hazards and suggest ways to use electricity safely.	D4	CMP Presentation	
		explore the role of turbines in electricity production and design a simple model wind turbine.	D4		
	Technological Design	apply knowledge of electricity, circuits, conductors, and insulators to design and construct alarm circuits	D4	An Alarming Idea (MOS Engineering Unit)	

# Grade 5 Science

Time Frame	Topic	Content, Skills, & Specific Ideas	GLE	Activity	Resource	
	<b>Scientific Inquiry</b>	<b>To be integrated into all content topics</b>				
		Pose investigable questions and seek answers from investigations including; making observations, collecting specimens for analysis, and conducting simple experiments.	B1			
		Use simple tools, equipment, and appropriate metric units to gather data.	B1			
		Make claims based on evidence collected from investigations.	B1			
		Understand that the results of similar investigations may have different results and causes of the differences.	B1			
		Communicate results to an appropriate audience.	B1			
	<b>Technological Design</b>					
		The products of technological design must meet certain specifications, which are set forth in technical drawings.	B2	Motion & Design Kit		
		Technological designs and products may be evaluated in terms of their cost, as well as their scientific and technological efficiency.	B2	Motion & Design Kit		

# Grade 5 Science

Time Frame	Topic	Content, Skills, & Specific Ideas	GLE	Activity	Resource
	<b>Life Science</b>				
	Life Cycles	Describe the changes in external features and behaviors of an organism during its life cycle.	E2		
		Explain how organisms can affect the environment in different ways.	E2		
		Adaptations - Changes in an organism's habitat influence its survival (Darwin)	E2		
		Explain how changes in an organism's habitat can influence its survival.	E2		
	Classification	Biodiversity - Sorting living things according to their features and behaviors.	E1		
	<b>Earth Science</b>				
	Changing Earth	The physical properties of rocks can change through erosion and weathering	D2		
		Wind, water, ice, and waves are processes that reshape the Earth's surface.	D2		
		The study of rocks and fossils shows past life, extinct species and environmental changes over time. (Compare fossils to present living organisms, Formation of Fossils)	D2		

# Grade 5 Science

Time Frame	Topic	Content, Skills, & Specific Ideas	GLE	Activity	Resource
	<b>Physical Science</b>				
	Matter	Matter is anything that has mass and occupies space	D3		
		Materials can be made up of parts too small to be seen without magnification.	D3		
		Substances can be combined in various ways and can be made from a number of basic ingredients. (chemical and physical change)	D3		
		There are various states of matter: solid, liquid, gas	D3		
		Matter has physical and chemical properties and can undergo physical and chemical changes	D3		
		Phase changes occur can occur when heated or cooled.	D3		
	Force and Motion	The position and motion of an object may be changed by a force, such as pushing or pulling.	D4	Motion & Design Kit	
		The forces acting on a vehicle include different forms of energy that act as driving and resisting forces.	D4	Motion & Design Kit	

# Grade 6 Science

Time Frame	Content	Concepts	GLE	Assessment	Resource
	<b>Unifying Themes</b>				
	<b>Students apply the principles of systems, models, constancy and change, and scale in science and technology.</b>				
	1. <u>Systems</u> Students describe and apply principles of systems in man-made things, natural things, and processes.	What makes our <u>solar system</u> a system?			
	2. <u>Models</u> Students use models to examine a variety of real-world phenomena from the physical setting, the living environment, and the technological world and compare advantages and disadvantages of various models.	When we make a model, such as a model of <u>planets</u> , what characteristics are accurate or inaccurate?			
	3. <u>Constancy and Change</u> Students describe how patterns of change vary in physical, biological, and technological systems.	What changes in organisms occur as the result of <u>evolution</u> ? How do <u>ecosystems</u> change when <u>climate changes</u> ?			
	4. <u>Scale</u> Students use scale to describe objects, phenomena, or processes related to Earth, space, matter, and mechanical and living systems.	How is the scale of <u>geologic time</u> different from the scale of historical and human scale time? What is the true scale of <u>planets'</u> sizes and distances from the sun?			

# Grade 6 Science

Time Frame	Content	Concepts	GLE	Assessment	Resource
	<b>The Skills and Traits of Scientific Inquiry and Technological Design</b>				
	<b>Students plan, conduct, analyze data from and communicate results of in-depth scientific investigations; and they use a systematic process, tools, equipment, and a variety of materials to create a technological design and produce a solution or product to meet a specified need.</b>				
	1. <u>Skills and traits of Scientific Inquiry</u> Students plan, conduct, analyze data from, and communicate results of investigations, including simple experiments.	How do we conduct a scientific investigation? <u>Science Showcase</u> work. Observation of <u>decomposition columns</u> and measurements of leachate/compost height, weight, and pH. <u>Gulf of Maine Research Institute</u> lab investigation.			
		How do we do data collection and analyses, form conclusions, and communicate results? <u>Seeds and starch</u> lab, <u>convection</u> lab, Spruce Creek estuary <u>salinity</u> graph			
		How do we use scientific instruments to measure mass, volume, length, temperature, salinity? <u>Triple beam balance</u> , <u>graduated cylinder</u> , <u>hydrometer</u> and <u>refractometer</u> .			
	2. <u>Skills and Traits of Tech Design</u> Students use a systematic process, tools, equipment, and a variety of materials to design and produce a solution or product to meet a specified need, using established criteria.	Construction of scientific tools - <u>Decomposition Columns</u> and <u>Berlese funnels</u> . Construction of <u>Marshmallow Catapults</u> given a common list of materials.			

# Grade 6 Science

Time Frame	Content	Concepts	GLE	Assessment	Resource
	<b>The Scientific and Technological Enterprise</b>				
	<b>Students understand the history and nature of scientific knowledge and technology, the processes of inquiry and technological design, and the impacts science and technology have on society and the environment.</b>				
	1. <u>The Scientific and Technological Enterprise</u> : Students understand the history and nature of scientific knowledge and technology, the processes of inquiry and technological design, and the impacts science and technology have on society and the environment.	Lab investigations using controlled variables and repeated trials, such as <u>Solar Energy vs.. Tilt lab</u> .			
	2. <u>Understandings about Science and Technology</u> Students understand and compare the similarities and differences between scientific inquiry and technological design.				
	3. <u>Science, Technology, and Society</u> Students identify and describe the role of science and technology in addressing personal and societal challenges.	Science <u>current events</u> .			
	4. <u>History and Nature of Science</u> Students describe historical examples that illustrate how science advances knowledge through the scientists involved and through the ways scientists think about their work and the work of others.	How were <u>coelacanths</u> discovered and classified? How did <u>Darwin</u> develop his theory of evolution? What is the history of the development of <u>plate tectonics</u> theory?			

# Grade 6 Science

Time Frame	Content	Concepts	GLE	Assessment	Resource
	<b>The Physical Setting</b>				
	<b>Students understand the universal nature of matter, energy, force, and motion and identify how these relationships are exhibited in Earth Systems, in the solar system, and throughout the universe.</b>				
	1. <u>Universe and Solar System</u> Students explain the movements and describe the location, composition, and characteristics of our solar system and universe, including planets, the sun, and galaxies.	How do the characteristics and locations of planets compare to each other?			
	2. <u>Earth</u> Students describe the various cycles, physical and biological forces and processes, position in space, energy transformations, and human actions that affect the short-term and long-term changes to the Earth.	How do the motions of Earth, moon, and sun cause days, years, seasons, tides, and moon phases?  How do the components and processes of Earth systems-biosphere, atmosphere, hydrosphere, lithosphere, plate tectonics, rocks, carbon cycle-interact?			

# Grade 6 Science

Time Frame	Content	Concepts	GLE	Assessment	Resource
	<b>The Living Environment</b>				
	<p><b>Students understand that cells are the basic unit of life, that all life as we know it has evolved through genetic transfer and natural selection to create a great diversity of organisms, and that these organisms create interdependent webs through which matter and energy flow. Students understand similarities and differences between humans and other organisms and the interconnections of these interdependent webs.</b></p>				
	<p>1. <u>Biodiversity</u> Students differentiate among organisms based on biological characteristics and identify patterns of similarity.</p>	<p>How are plants, animals, fungi, protists, and bacteria similar and different in their anatomy and functions?</p>			
	<p>2. <u>Ecosystems</u> Students examine how the characteristics of the physical, non-living (abiotic) environment, the types and behaviors of living (biotic) organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are part.</p>	<p>How are organisms connected through the green and brown food webs? How are nutrients recycled?</p>			
	<p>5. <u>Evolution</u> Students describe the evidence that evolution occurs over many generations, allowing species to acquire many of their unique characteristics or adaptations.</p>	<p>What is the evidence that life on Earth has changed over the geologic timescale?</p>			
		<p>What are the mechanisms by which life has changed?</p>			

# Grade 7 Science

Time Frame	Topic	Concepts, Skills and Specific Ideas	GLE	Assessment	Resource
	<b>Skills and Traits of Scientific Inquiry and Technological Design</b>				
	Skills and Traits of Scientific Inquiry	Identify steps of scientific methods			
		Conduct labs using data collection, analyses, conclusion, communicate results			
		Measurement: Mass, length, volume, temperature			
	Skills and Traits of Technological Design			Bridge project	
	<b>Scientific and Technological Enterprise</b>				
	Understanding Inquiry	Lab investigations using controlled variables and repeated trials			
	Understandings about Science and Technology				
	Science, Technology, and Society				
	History and Science knowledge				

# Grade 7 Science

Time Frame	Topic	Concepts, Skills and Specific Ideas	GLE	Assessment	Resource
	<b>The Physical Setting</b>				
	<b>Students understand the universal nature of matter, energy, force, and motion and identify how these relationships are exhibited in Earth systems, in the solar system and throughout the universe.</b>				
	<b>Matter and Energy:</b> Students describe physical and chemical properties of matter, interactions and changes in matter, and transfer of energy through matter	<b>(Primary Focus)</b>			
	<b>Energy</b>	Types of energy: heat, chemical, mechanical, solar, electrical, sound			
		Transfer of energy: conduction, convection, radiation (waves)			
		Transformation of energy from one form to another		House project	
		Electric currents and circuits (included in types of energy)			
		Static electricity (included in types of energy)			
	<b>Matter</b>	Chemical and physical changes			
		Chemical reactions			
		States of matter (solid, liquid, gas)			
		Properties of matter: including characteristic properties i.e.:( density, solubility, boiling point)			
		Describe that all matter is made up of atoms			
		Conservations of matter			
		Discuss and understand the difference between elements, compounds and mixtures			
		Discuss metals and non-metals (period table)			
		Vocab- noble gases, metalloids, alkali metals			
		Periodic Table- why are elements in groups and periods? (classification based on patterns and trends)			

# Grade 7 Science

Time Frame	Topic	Concepts, Skills and Specific Ideas	GLE	Assessment	Resource
	<b>The Living Environment</b>				
	Students understand that cells are the basic unit of life, that all life as we know it has evolved through genetic transfer and natural selection to create a great diversity of organisms, create interdependent webs through which matter and energy flow. Students understand similarities and differences between humans and other organisms and the interconnections of these interdependent webs.				
	<b>Ecosystems</b>	<b>(Introductory Focus)</b>			
	Students examine how the characteristics of the physical, non-living (abiotic) environment, the types of behaviors of living (biotic) organisms, and the flow of matter and energy affect organisms and the ecosystem of which they are part.				
	<b>Ecology</b>	Flow of energy through pyramids, food webs, predator, prey			
		Primary and secondary consumers, producers, decomposers			
		Biomes: populations and communities			Maine Explorer Simulations
		Succession-			

# Grade 7 Science

Time Frame	Topic	Concepts, Skills and Specific Ideas	GLE	Assessment	Resource
	<b>The Physical Setting</b>				
	Students understand the universal nature of matter, energy force, and motion and identify how these relationships are exhibited in Earth Systems, in the solar system, and throughout the universe.				
	<b>Earth Cycles:</b> Students describe the various cycles, physical and biological forces and processes, position in space, energy transformations, and human actions that affect the short-term and long-term changes to the Earth	<b>(Introductory Focus)</b>			
		Environmental effects on humans (air, water pollution)			
		Layers of the atmosphere			
		Earthquakes- primary and secondary waves (Long term effects)			
		Climate and climate change (Green House Effect)			

# Grade 8 Science

Time Frame	Content	Skills	GLE	Assessment	Resource
	<b>Unifying Themes</b>				
	Systems	Natural (Universe, Human body), Machines			
	Models	Use and evaluation of models			
	Constancy and Change	Universe and Human Body			
	Scale	Universe and Cells			
	<b>Skills and Traits of Scientific Inquiry and Technological Design</b>				
	Skills and Traits of Scientific Inquiry	Identify steps of scientific method		Independent lab	
		Conduct scientific method		Independent lab	
		Conduct labs using data collection, analyses, conclusion and communicate results		Independent lab, crystal	
		Measurement: Mass, Length, Volume, Density, Force, Speed, Weight, Temperature (F/C), lightyear, astronomical unit		Test,. Lab, Buoyancy	
	Skills and Traits of Tech Design	Design and produce a product to meet a specific need		Rube Goldberg project	
	<b>Scientific and Technological Enterprise</b>				
	Understanding Inquiry	Lab investigations using controlled variables and repeated trials		Independent lab	
	Understandings about Science and Technology	Telescopes and electromagnetic spectrum, rocketry		Tests, labs, rockets	
	Science, Technology, and Society	Solar Power		Tests, solar cars	
	History and Science knowledge	Space program:		Oral presentation	
		Goddard, Hubble, Newton, Copernicus, Galileo contributions			

# Grade 8 Science

Time Frame	Content	Skills	GLE	Assessment	Resource
	<b>The Physical Setting</b>				
	Universe	Characteristics, location, and formation of stars, constellations, galaxies, comets and asteroids		Tests, labs, Const.proj	
		Motion of stars comets, asteroids, red shift, gravity		Tests, labs	
		Conservation of matter			
	Forces and Motion	Types of friction force		Tests, labs	
		Newton's Laws of Motion		Cartoons, Rube G project	
		Simple and complex machines		Tests, labs	
		PE and KE energy		Tests, labs	
		Speed vs. Velocity formulas		Tests, labs	
		Conservation of energy			
	<b>The Living Environment</b>				
	Human Body	Cells to organ systems		Tests and labs	

# Grade 10 Biology

Time Frame	Content	Skills	GLE	Assessment	Resource
	<b>Skills and Traits of Scientific Inquiry and Technological Design</b>				
	Skills and Traits of Scientific Inquiry				
	Students demonstrate knowledge and application of scientific method in conducting investigation				
		Scientific Method			
		*Need district wide common language			
		Recognizing and Researching the Problem			
		Forming and Testing a Hypothesis			
		Experiment			
		Variable and Controls			
		Data			
		Draw Conclusion			
	Skills and Traits of Technological Design				
	Students demonstrate an ability to modify an investigation to improve process and finding				

# Grade 10 Biology

Time Frame	Content	Skills	GLE	Assessment	Resource
	<b>Scientific and Technological Enterprise</b>				
	Understanding of Inquiry				
	Students understand that inquiry is based on scientific principles and previous knowledge				
	Understandings about Science and Technology				
	Students understand that science and technology are dependent on each other for advancement of scientific knowledge.				
	Science, Technology and Society				
	Students understand that the advancement of science has ethical, societal, political, economic, religious and cultural implications.				
	History and Nature of Science				
	Students became aware of the human dimensions and traditions of science, the nature of scientific knowledge, and historical advancement of science.				

# Grade 10 Biology

Time Frame	Content	Skills	GLE	Assessment	Resource
	<b>The Living Environment</b>				
	<b>Biodiversity</b>				
	Students describe and analyze the relatedness among and within diverse populations of organisms and the importance of biodiversity				
		How adaptations are related to survival within an environment.			
		How DNA sequences determine degree of kinship.			
		How does body structure and chemistry show degree of kinship.			
		What are the consequences of changes in biodiversity?			
	<b>Ecosystems</b>				
	Students describe the interactions, cycles, and factors that affect ecosystem stability and change.				
		How carrying capacity and limiting factors affect past, present and future ecosystems.			
		How energy and materials cycle within and ecosystem.			
	<b>Cells</b>				
	Students describe structure and function of cells that form systems.				
		What are the structures of cells and their functions?			
		How does DNA work at the cellular level.			
		What is mitosis and meiosis?			
		What are important cell processes?			
		How does metabolism work in plants and animals.			
		How do cells form systems.			

# Grade 10 Biology

Time Frame	Content	Skills	GLE	Assessment	Resource
	Heredity and Reproduction Students examine the role of DNA in transferring traits from generation to generation,				
		What are advantages and disadvantages of sexual reproduction?			
		How does the DNA in genes contain instructions for cells.			
		What are causes and effects of gene mutations?			
	Evolution Students describe the interactions of species that lead to natural selection and evolution.				
		What evidence is there to support biological evolution?			
		How is the process of natural selection an advantage?			

# Grade 10 Biology

Time Frame	Content	Skills	GLE	Assessment	Resource
	<b>General Biology Terms</b>				
	<p>Abiotic, Acid, Adaptation, Appendages, Amphibian, Animals, Asexual reproduction, Bacteria, Balance, Base, Biology, Biome, Biotic, Budding, Caecum, Carnivore, Cell, Cellular respiration, Celsius, Chlorophyll, Chordate, Chromosome, Cilia, Classify, Colony, Conifer, Consumer, Control, Cyst, Data, Decomposers, Dehydrate, DNA, Dominant, Dorsal, Diffusion, Endoskeleton, Experiment, Exoskeleton, Fertilization, Fission, Flagellum, Fungi, Gene (genetics), Herbivore, Heterozygous, Hormones, Host, Hyphae, Hypothesis, Isopod, Interferon, Invertebrate, Parasite, Pore, Producer, Mammal, Metamorphosis, Meiosis, Metamorphosis, Microscope, Membrane, Mitosis, Molting, Monerans, Multicellular, Mutation, Neutral, Niche, Organ, Osmosis. Parasite, pH, Phototropism, Photosynthesis. Pores, Producer, Protist, Punnett square, RNA, Saprophytes, Scientific method, Scientific name, SI measurements, Spore, Symmetry, Technology, Theory, Tissue, Tropism, Trait, Transpiration, Vaccines, Vacuole, Variable, Vertebrate, Vestigial structure, Virus, Volume</p>				
	<p>MEA vocabulary: compare, conclude, describe, discuss, explain, from the perspective of..., identify, list, provide the one that best or most likely, sort, support, with respect to..., extinct organisms, fossils, common elements/mixtures/compounds/periodic table, food webs of common biomes, organ systems, common reactions including balanced equations and radioactive decay, common cell parts (mitochondrion, nucleus, ribosome, Golgi Apparatus, cytoplasm, chloroplasts), astronomical measurement, bacteria, conductor, conserved, convection, daughter cells, density, direct/indirect, diffraction, diffusion, dominant, drag, electromagnetic spectrum, elements, elliptical motion, energy, evaporation, eyepiece, exploitation, flagellum, frequencies, friction, geological, gene expression, glucose, impact, indirect/direct, inertia, isotope, interbreed, joules, kinetic, limiting factor, magma, magnitude, mantle, mass, matter, mesosphere, microorganism, model, Newtons, non-native, nucleus, oxidation, penicillin, property, primary, radiation, recessive, relative to, rotate, revolve, satellite, sedimentary, stable, static, structural adaptation</p>				

# Grade 10 Biology

Time Frame	Content	Skills	GLE	Assessment	Resource
	<b>Common, root word, prefix and suffix list</b>				
	amphi, aniti, arthro, atrium, bio, carb, cardio, centi, chloro, chromo, cyto, deci, deka, dermis, dia, endo, epi, ex, exo, fertile, flag, gen, genosstoma, hemo, hecto, herb, hydr, hypo, kilo, logy, micro, milli, mito, morph, multi, nephros, neuro, non, ov, para, pherein, photo, phyl, phyll, pneuma, post, pre, re, semi, scop, soma, spor, stoma, trop, zoo				
	Research and evaluate the social and environmental impacts of scientific and technological developments.				
	Describe the historical and cultural conditions at the time of an invention or discovery, and analyze the societal impacts of that invention.				
	Discuss the ethical issue surrounding a specific scientific or technological development.				
	Describe an individual's biological and other impacts on an environmental system.				
	Identify factors that have caused some countries to become leaders in science and technology.				
	Give examples of actions which may have expected or unexpected consequences that may be positive, negative, or both.				
	Explain the connections between industry, natural resources, population, and economic development.				
	Recognize scientific and technological contributions of diverse people including women, different ethnic groups, and races.				

# Grade 9 Physical Science

Time Frame	Content	Skills, Concepts, and Ideas	Assessment	Resource
	<b>Unifying Themes</b>			
	Students apply the principles of systems, models, constancy and change, and scale in science and technology			
	Systems			
	Models	Purpose, application, limitations, benefits		
	Constancy and Change	Students understand self-correcting and evolutionary nature of science		
	Scale	Student understand need to use scaling in the addressing and solving of scientific problems and design		
	<b>Skills and Traits of Scientific Inquiry and Technological Design</b>			
	Students plan, conduct, analyze data from and communicate results of in-depth scientific investigations. They use a systematic process, tools, equipment and a variety of materials to create a technological design and produce a solution or product to meet a specified need.			
	Skills and Traits of Scientific Inquiry	Students demonstrate knowledge and application of scientific method in conducting investigations		
	Skills and Traits of Technological Design	Students demonstrate an ability to modify an investigation to improve process and findings.		

# Grade 9 Physical Science

Time Frame	Content	Skills, Concepts, and Ideas	Assessment	Resource
	<b>The Scientific and Technological Enterprise</b>			
	Students understand the history and nature of scientific knowledge and technology, the processes of inquiry and technological design, and the impacts science and technology have on society and the environment.			
	Understandings of Inquiry	Students understand that inquiry is based on scientific principles and previous knowledge		
	Understandings about Science and Technology	Students understand that science and technology are dependent on each other for advancement of scientific knowledge		
	Science, Technology, and Society	Students understand that the advancement of science has ethical, societal, political, economic, religious and cultural implications		
	History and Nature of Science	Students appreciate the human dimensions and traditions of science, the nature of scientific knowledge, and historical evolution of science		

# Grade 9 Physical Science

Time Frame	Content	Skills, Concepts, and Ideas	Assessment	Resource
	<b>The Physical Setting</b>			
	Students understand the universal nature of matter, energy, force and motion and identify how these relationships are exhibited in Earth Systems, in the solar system, and throughout the universe.			
	Universe and Solar System	<b>Students explain the physical formation and changing nature of our universe and solar system, and how our past and present knowledge of the universe and solar system developed.</b>		
		Define and describe light years		
		Explain the role of gravity in forming and maintaining planets		
		Outline the age, origin, and process of formation of the universe as currently understood		
		Describe major events that have led to our current understanding of the universe and the current technologies used to further our understanding		
	Earth	<b>Students describe and analyze the biological, physical, energy, and human influences that shape and alter Earth Systems.</b>		
		Describe and analyze the effect of solar radiation, ocean currents and atmospheric conditions of the Earth's surface and habitability of Earth		
		Describe Earth's internal energy sources and their role in plate tectonics		
		Describe and analyze the effects of biological and geophysical influences, the origin and changing nature of Earth Systems		
		Describe and analyze the effects of human influence on Earth Systems		

# Grade 9 Physical Science

Time Frame	Content	Skills, Concepts, and Ideas	Assessment	Resource
	Matter and Energy	<b>Students describe the structure, behavior, and interactions of matter at the atomic level and the relationship between matter and energy.</b>		
		Students describe the structure of atoms in terms of neutrons, protons, electrons and quarks. How structure determines chemical properties		
		Describe how arrangement of atoms in a molecule determine a molecule's properties, including types of bonds it makes with other molecules and its mass, and make prediction about chemical reactions		
		Explain the essential roles of carbon and water in life processes		
		Describe how light is emitted and absorbed by atom's changing energy levels, and how the results can be used to identify a substance		
		Describe the factors that affect the rate of chemical reactions		
		Make predictions about the rate of chemical reactions		
		Describe fusion and fission nuclear reactions and the amounts of energy released		
		Describe radioactive decay and half-life		
		Understand the forms of Mechanical Energy (gravitational potential and kinetic) and the law of conservation of energy and solve problems. How energy changes form in energy transformations.		
		Understand the concepts of thermodynamics and calorimetry		

# Grade 9 Physical Science

Time Frame	Content	Skills, Concepts, and Ideas	Assessment	Resource
	Force and Motion	<b>Students understand that the laws of force and motion are the same across the universe.</b>		
		Students understand need to describe motion and kinematics		
		Students can perform simple calculations involving distance, time, velocity and acceleration		
		Students understand relative motion and need for a frame of reference		
		Students know Newton's three laws of motion		
		Students know Newton's Universal law of gravitation and implication of it being universal		
	National Standard	Students know four basic forces of nature		
		Students understand difference between transverse and compressional waves and that waves are movers of energy. Students are able to perform calculations involving velocity, wavelength and frequency		
		Students can describe properties of waves (amplitude, period, wavelength)		
		Wave interaction - reflection, refraction, interference, absorption, superposition		
		Describe the relationship between electric and magnetic fields and forces and give examples of modern use		