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Educational Programming for the School Year 2011-2012

Massachusetts Curriculum Frameworks

Pond Ecosystems			
K-2	Earth Science	4	The sun supplies heat and light to the earth and is necessary for life
		5	Events around us have repeating patterns, including the seasons of the year, day, and night.
K-2	Life Science	1	Animals and plants are living things that grow, reproduce, & need food, air, & water.
		3	Plants and animals have life cycles that vary.
		6	People and other animals interact with the environment through their senses.
		8	An organism's habitat provides for its basic needs.
3-5	Life Science	1	Physical characteristics of plants and animals
		3	Plants and animals go through predictable life cycles, including birth, growth, development, reproduction, and death.
		8	Organisms meet needs by using behaviors in response to information from the environment. Some behaviors are instinctive and others learned.
		9	Plants have characteristic behaviors. Plants and animals can survive harsh environments via seasonal behaviors
		10	Organisms can cause changes in their environment to ensure survival, which may affect the ecosystem.
		11	Energy derived from the sun is used by plants to produce sugars and is transferred with-in a food chain from producers to consumers to decomposers.
6-8	Life Science	1	Organisms are classified into kingdoms.
		13	Organisms interact and have different functions within an ecosystem that enable the ecosystem to survive.
		14	Roles & relationships among producers, consumers,

			and decomposers in the process of energy transfer in a food web.
		15	Dead plants and animals are broken down by other living organisms, which contributes to the system as a whole.
		16	Producers use energy from sunlight to make sugars through photosynthesis, which can be used immediately, stored for later use, or used by other organisms.
HS	Life Science	6.2	Changes in population size and biodiversity result from a variety of influences.
		6.3	A food web identifies producers, consumers, and decomposers, and explains the transfer of energy through trophic levels. Relationships among organisms add to the complexity of biological communities
Mysteries of Animal Tracking			
K-2	Earth Science	5	Events around us have repeating patterns, including the seasons of the year, day, and night.
K-2	Life Science	1	Animals and plants are living things that grow, reproduce, & need food, air, & water.
		2	Characteristics of living and nonliving things.
		3	Plants and animals have life cycles that vary.
		6	People and other animals interact with the environment through their senses.
		7	Animals and plants go through changes in appearance as the seasons change.
		8	An organism's habitat provides for its basic needs.
K-2	Physical Science	1	Observable properties of objects include size, shape, color, weight, and texture.
3-5	Life Science	8	Organisms meet needs by using behaviors in response to information from the environment. Some behaviors are instinctive and others learned.
		9	Plants have characteristic behaviors. Plants and animals can survive harsh environments via seasonal behaviors
		10	Organisms can cause changes in their environment to ensure survival, which may affect the ecosystem.
3-5	Physical Science	1	Properties of objects and materials.

Wide World of Insects

K-2	Earth Science	4	The sun supplies heat and light to the earth and is necessary for life
		5	Events around us have repeating patterns, including the seasons of the year, day, and night.
K-2	Life Science	1	Animals and plants are living things that grow, reproduce, & need food, air, & water.
		3	Plants and animals have life cycles that vary.
		6	People and other animals interact with the environment through their senses.
		7	Animals and plants go through changes in appearance as the seasons change.
		8	An organism's habitat provides for its basic needs.
3-5	Life Science	1	Physical characteristics of plants and animals
		3	Plants and animals go through predictable life cycles, including birth, growth, development, reproduction, and death.
		4	Major life cycle stages of the frog and butterfly.
		6	Inherited characteristics may change over time as adaptations to changes in the environment enable organisms to survive
		7	Changes in the environment have caused some plants and animals to die or move to new locations.
		8	Organisms meet needs by using behaviors in response to information from the environment. Some behaviors are instinctive and others learned.
		9	Plants have characteristic behaviors. Plants and animals can survive harsh environments via seasonal behaviors
		10	Organisms can cause changes in their environment to ensure survival, which may affect the ecosystem.
		11	Energy derived from the sun is used by plants to produce sugars and is transferred with-in a food chain from producers to consumers to decomposers.
6-8	Life Science	1	Organisms are classified into kingdoms.
		10	Genetic variation and environmental factors are causes of evolution and the diversity of organisms.
		13	Organisms interact and have different functions within an ecosystem that enable the ecosystem to survive.
		14	Roles & relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.

		15	Dead plants and animals are broken down by other living organisms, which contributes to the system as a whole.
		16	Producers use energy from sunlight to make sugars through photosynthesis, which can be used immediately, stored for later use, or used by other organisms.
		17	Ecosystems have changed through geologic time in response to various influences.
		18	Biological evolution accounts for species diversity developed over generations.
HS	Life Science	6.1	Birth, death, immigration, and emigration influence population size.
		6.2	Changes in population size and biodiversity result from a variety of influences.
		6.3	A food web identifies producers, consumers, and decomposers, and explains the transfer of energy through trophic levels. Relationships among organisms add to the complexity of biological communities

Designing for Wind

Mathematics

3-5	Number Sense & Operations	3.N.8	Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems, including those involving money. This standard is intentionally the same as standard 4.N.10.
		3.N.9	Know multiplication facts through 10 x 10 and related division facts, e.g., $9 \times 8 = 72$ and $72 \div 9 = 8$. Use these facts to solve related problems, e.g., 3 x 5 is related to 3 x 5
		4.N.10	Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems, including those involving money.
		4.N.11	Know multiplication facts through 12 x 12 and related division facts. Use these facts to solve related multiplication problems and compute related problems, e.g., 3 x 5 is related to 30 x 50, 300 x 5, and 30 x 500. ▲
6-8	Number Sense & Operations	6.N.9	Select and use appropriate operations to solve problems involving addition, subtraction, multiplication, division, and positive integer exponents with whole numbers, and with positive fractions, mixed numbers, decimals, and percents.

		7.N.9	Select and use appropriate operations—addition, subtraction, multiplication, division, and positive integer exponents—to solve problems with rational numbers (including negatives). This standard is intentionally the same as standard 8.N.12.
		8.N.12	Select and use appropriate operations—addition, subtraction, multiplication, division, and positive integer exponents—to solve problems with rational numbers (including negatives).
		4.N.12	Add and subtract (up to five-digit numbers) and multiply (up to three digits by two digits) accurately and efficiently. ▲
3-5	Patterns Relation, Algebra	4.P.4	4.P.4 Use pictures, models, tables, charts, graphs, words, number sentences, and mathematical notations to interpret mathematical relationships. ▲
		4.P.5	Solve problems involving proportional relationships, including unit pricing (e.g., four apples cost 80¢, so one apple costs 20¢) and map interpretation (e.g., one inch represents five miles, so two inches represent ten miles)
3-5	Data Analysis, Statistics, Probability	3.D.1	and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data. This standard is intentionally the same as standard 4.D.1.
		3.D.3	Construct and draw conclusions from representations of data sets in the forms of tables, line plots, pictographs, tallies, and bar graphs
		4.D.1	Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data.
		4.D.3	Construct, draw conclusions, and make predictions from various representations of data sets, including tables, bar graphs, pictographs, line graphs, line plots, and tallies.
		6.D.1	Use tree diagrams and other models (e.g., lists and tables) to represent possible or actual outcomes of trials. Analyze the outcomes.
		7.D.1	Select, create, interpret, and utilize the following tabular and graphical representations of data: circle graphs, Venn diagrams, stem-and-leaf plots, tables, and charts.
		8.D.2	Select, create, interpret, and utilize various tabular and graphical representations of data, e.g., circle

			graphs, Venn diagrams , scatterplots, stem-and-leaf plots, box-and-whisker plots , histograms, tables, and charts. Differentiate between continuous and discrete data
Science Technology and Engineering			
3-5	Physical Science	4	Identify the basic forms of energy (light, sound, heat, electrical, and magnetic). Recognize that energy is the ability to cause motion or create change.
		5	Give examples of how energy can be transferred from one form to another.
		6	Recognize that electricity in circuits requires a complete loop through which an electrical current can pass, and that electricity can produce light, heat, and sound.
6-8	Physical Science	11	Explain and give examples of how the motion of an object can be described by its position, direction of motion, and speed.
3-5	Tech/Engineering	2.1	Identify a problem that reflects the need for shelter, storage, or convenience.
6-8	Tech/Engineering	2.1	Identify and explain the steps of the engineering design process, i.e., identify the need or problem, research the problem, develop possible solutions, select the best possible solution(s), construct a prototype, test and evaluate, communicate the solution(s), and redesign
		2.5	Explain how such design features as size, shape, weight, function, and cost limitations would affect the construction of a given prototype.
HS	Earth and Space	2.1	Renewable energy resources and nonrenewable energy resources.
		2.2	Effects on the environment and on the carbon cycle of using renewable and nonrenewable resources.
HS	Physical Science (Physics)	5.6	Moving electric charges produce magnetic forces and moving magnets produce electric forces. The interplay of electric and magnetic forces is the basis for many technologies.
HS	Tech/Engineering	1.1	Steps of the engineering design process.
		1.2	The engineering design process is used to solve problems, advance society, and modify technologies, objects, and processes.
		4.4	Alternatives to nonrenewable energies.

Geology of New England

Mathematics

K-2	Patterns, Relations and Algebra	K.P.1	Identify the attributes of objects as a foundation for sorting and classifying, e.g., a red truck, a red block, and a red ball share the attribute of being red; a square block, a square cracker, and a square book share the attribute of being square shaped.
		K.P.2	Sort and classify objects by color, shape, size, number, and other properties.
K-2	Geometry	K.G.1	Name, describe, sort, and draw simple two-dimensional shapes.
		K.G.2	Describe attributes of two-dimensional shapes, e.g., number of sides, number of corners.
		K.G.3	Name and compare three-dimensional shapes.
		2.G.1	Describe attributes and parts of two- and three-dimensional shapes, e.g., length of sides, and number of corners, edges, faces, and sides.
		2.G.2	Identify, describe, draw, and compare two-dimensional shapes, including both polygonal (up to six sides) and curved figures such as circles.
K-2	Data Analysis, Statistics and Probability	2.D.1	Use interviews, surveys, and observations to gather data about themselves and their surroundings.
3-5	Geometry	4.G.3	Recognize similar figures.
	Data Analysis, Statistics and Probability	3.D.1	Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data. <i>This standard is intentionally the same as standard 4.D.1.</i>
		4.D.1	Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data.

Science Technology and Engineering

PreK-2	Earth Science	1	Recognize that water, rocks, soil, and living organisms are found on the earth's surface.
PreK-2	Tech/Engineering	1.1	Identify and describe characteristics of natural materials (e.g., wood, cotton, fur, wool) and human-made materials (e.g., plastic, Styrofoam).
3-5	Earth Science	1	Give a simple explanation of what a mineral is and some examples, e.g., quartz, mica.
		2	Identify the physical properties of minerals (hardness, color, luster, cleavage, and streak), and explain how minerals can be tested for these different

			physical properties.
		3	Identify the three categories of rocks (metamorphic, igneous, and sedimentary) based on how they are formed, and explain the natural and physical processes that create these rocks.
Understanding Weather			
Mathematics			
K-2	Data Analysis, Statistics and Probability	2.D.1	Use interviews, surveys, and observations to gather data about themselves and their surroundings.
3-5	Data Analysis, Statistics and Probability	3.D.1	Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data. <i>This standard is intentionally the same as standard 4.D.1.</i>
		4.D.1	Collect and organize data using observations, measurements, surveys, or experiments, and identify appropriate ways to display the data.
Science Technology and Engineering			
PreK-2	Earth Science	2	Understand that air is a mixture of gases that is all around us and that wind is moving air.
		3	Describe the weather changes from day to day and over the seasons.
PreK-2	Physical Science (Chemistry)	1	Observable properties of objects include size, shape, color, weight, and texture.
		2	Identify objects and materials as solid, liquid, or gas. Recognize that solids have a definite shape and that liquids and gases take the shape of their container
PreK-2	Physical Science (Physics)	2	Objects and materials are solid, liquid, or gas. Solids have a definite shape; liquids and gases take the shape of their container.
		3	Objects can move in various ways.
		4	Change the motion of an object by applying a force. The greater the force, the greater the change in motion.
3-5	Earth Science	4	Explain the relationship among the energy provided by the sun, the global patterns of atmospheric movement, and the temperature differences among water, land, and atmosphere.

		6	Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.
		7	Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.
		8	Describe how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.
		9	Differentiate between weather and climate.
		11	Give examples of how the cycling of water, both in and out of the atmosphere, has an effect on climate.
3-5	Physical Science (Chemistry)	2	Solids, liquids, and gases have distinct properties.
		3	Water can be changed from one state to another by adding or taking away heat
		4	Basic forms of energy, which cause motion or create change.
3-5	Physical Science (Physics)	2	Solids, liquids, and gases have distinct properties.
		3	Water can be changed from one state to another by adding or taking away heat.
		4	Basic forms of energy, which cause motion or create change.
6-8	Physical Science (Chemistry)	14	Temperature change results from adding or taking away heat energy from a system.
		15	The effect of heat on particle motion during a change in phase
		16	Heat moves in predictable ways, from warmer to cooler objects until reaching equilibrium.
6-8	Physical Science (Physics)	11	11:An object's motion can be described by its position, direction of motion, and speed.
		14	Temperature change results from adding or taking away heat energy from a system.
		15	The effect of heat on particle motion during a change in phase.
		16	Heat moves in predictable ways, moving from warmer to cooler objects until reaching equilibrium.

Forces of Nature

3-5	Earth Science	6	Air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.
		12	Earth's surface changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes.
3-5	Physical Science (Physics)	4	Basic forms of energy, which cause motion or create change.
		5	Energy can be transferred from one form to another.
3-5	Tech/Engineering	2.1	Problems that reflect the need for shelter, storage, or convenience.
6-8	Earth Science	1	Earth's common physical features can be represented with models and maps.
		2	Layers of the earth include the lithosphere, mantle, and core.
		5	Movement of the earth's crustal plates causes both slow and rapid changes in the earth's surface.
		7	Physical evidence supports theories that the earth has evolved over geologic time.
6-8	Physical Science (Physics)	11	An object's motion can be described by its position, direction of motion, and speed.
		13	Kinetic energy can be transformed into potential energy and vice versa
		14	Temperature change results from adding or taking away heat energy from a system..
		16	Heat moves in predictable ways, moving from warmer to cooler objects until reaching equilibrium.
HS	Earth Science	1.6	Conditions associated with frontal boundaries and cyclonic storms and their impact on human affairs.
		3.9	The motion of the lithospheric plates is related to convection currents in Earth's mantle
		3.10	Earthquakes, volcanoes, tsunamis, mountain building, and tectonic uplift are related to plate movements.
		3.11	Seismic data are used reveal Earth's interior structure and earthquake epicenters.
HS		2.2	Energy can be converted from gravitational potential energy to kinetic energy and vice versa.
		3.2	Heat energy will move from a higher temperature to a

			lower temperature until equilibrium is reached.
		4.1	The measurable properties of waves and the relationships among them; simple harmonic motion.
		4.5	Mechanical waves generally move faster through a solid than a liquid and faster through a liquid than a gas.
		4.6	The apparent change in frequency of waves due to the motion of a source or a receiver (the Doppler effect).
HS	Tech/Engineering	1.2	The engineering design process is used to solve problems, advance society, and modify technologies, objects, and processes.
		6.1	Information travels through various media.

Touchable Tales

PreK-2	Life Science	1	Animals and plants are living things that grow, reproduce, & need food, air, & water.
		2	Characteristics of living and nonliving things.
		3	Plants and animals have life cycles that vary.
		6	People and other animals interact with the environment through their senses.
		7	Animals and plants go through changes in appearance as the seasons change.
		8	An organism's habitat provides for its basic needs
PreK-2	Physical Science	1	Observable properties of objects include size, shape, color, weight, and texture.
PreK-2	Tech/Engineering	1.1	Characteristics of natural and human-made materials
		1.2	Possible uses for natural and human-made materials.
		2.2	Human beings and animals use parts of the body as tools.

Secret of the Cardboard Rocket

K-2	Earth Science	4	The sun supplies heat and light to the earth and is necessary for life
3-5	Earth Science	13	Earth is a part of the "solar system" that includes the sun, planets, and many moons. Earth is the third planet from the sun.

The Problem with Pluto

3-5	Earth Science	13	Earth is a part of the “solar system” that includes the sun, planets, and many moons. Earth is the third planet from the sun.
6-8	Earth Science	8	Gravity is a force that pulls all things toward the center of the earth. Gravity influences the formation and movement of the planets, stars, and solar system
		10	Properties and conditions of objects in the solar system and those on Earth.

Passport to the Universe

3-5	Earth Science	13	Earth is a part of the “solar system” that includes the sun, planets, and many moons. Earth is the third planet from the sun.
6-8	Earth Science	8	Gravity is a force that pulls all things toward the center of the earth. Gravity influences the formation and movement of the planets, stars, and solar system
		10	Properties and conditions of objects in the solar system and those on Earth.
		12	The universe contains many billions of galaxies and each galaxy contains many billions of stars.
6-8	Physical Science	5	Many elements combine in a multitude of ways to produce compounds that make up living and nonliving things.
HS	Earth Science	4.1	The Big Bang Theory and the evidence that supports it.
		4.3	The Sun, Earth, and solar system formed from a nebula of dust and gas in a spiral arm of the Milky Way Galaxy about 4.6 billion years ago

Cosmic Collisions

3-5	Earth Science	13	Earth is a part of the “solar system” that includes the sun, planets, and many moons. Earth is the third planet from the sun.
		14	Earth orbits the sun in a year’s time and rotates on its axis in approximately 24 hours. The rotation of the earth, day/night, and apparent movements of the sun, moon, and stars are connected.
6-8	Earth Science	7	Physical evidence supports theories that the earth has evolved over geologic time
		8	Gravity is a force that pulls all things toward the center of the earth. Gravity influences the formation and movement of the planets, stars, and solar system
		10	Properties and conditions of objects in the solar system and those on Earth.

		12	The universe contains many billions of galaxies and each galaxy contains many billions of stars.
6-8	Physical Science	5	Many elements combine in a multitude of ways to produce compounds that make up living and nonliving things.
HS	Earth Science	1.2	Characteristics of electromagnetic radiation and its impact on life and Earth's systems.
		4.1	The Big Bang Theory and the evidence that supports it.
		4.2	Influence of gravity and inertia on the rotation and revolution of orbiting bodies; Sun-Earth-moon relationships.
		4.3	The Sun, Earth, and solar system formed from a nebula of dust and gas in a spiral arm of the Milky Way Galaxy about 4.6 billion years ago
The Earth, the Moon and the Sun			
3-5	Earth Science	13	Earth is a part of the "solar system" that includes the sun, planets, and many moons. Earth is the third planet from the sun.
		14	Earth orbits the sun in a year's time and rotates on its axis in approximately 24 hours. The rotation of the earth, day/night, and apparent movements of the sun, moon, and stars are connected
		15	Changes occur in the observable shape of the moon over a month.
6-8	Earth Science	8	Gravity is a force that pulls all things toward the center of the earth. Gravity influences the formation and movement of the planets, stars, and solar system.
		9	Lunar and solar eclipses, moon phases, and tides are related to relative positions of the earth, moon, and sun.
		10	Properties and conditions of objects in the solar system and those on Earth.
		11	Earth's tilt and its revolution around the sun result in uneven heating, causing the seasons.
HS	Earth Science	1.5	The revolution of Earth around the Sun and the inclination of Earth on its axis cause Earth's seasonal variations.
		4.2	Influence of gravity and inertia on the rotation and revolution of orbiting bodies; Sun-Earth-moon relationships.
		4.3	The Sun, Earth, and solar system formed from a nebula of dust and gas in a spiral arm of the Milky Way Galaxy about 4.6 billion years ago.

Stars and Constellations

3-5	Earth Science	13	Earth is a part of the “solar system” that includes the sun, planets, and many moons. Earth is the third planet from the sun.
		14	Earth orbits the sun in a year’s time and rotates on its axis in approximately 24 hours. The rotation of the earth, day/night, and apparent movements of the sun, moon, and stars are connected
6-8	Earth Science	8	Gravity is a force that pulls all things toward the center of the earth. Gravity influences the formation and movement of the planets, stars, and solar system.
		10	Properties and conditions of objects in the solar system and those on Earth.
		12	The universe contains many billions of galaxies and each galaxy contains many billions of stars.
HS	Earth Science	4.1	The Big Bang Theory and the evidence that supports it.
		4.2	Influence of gravity and inertia on the rotation and revolution of orbiting bodies; Sun-Earth-moon relationships.
		4.3	The Sun, Earth, and solar system formed from a nebula of dust and gas in a spiral arm of the Milky Way Galaxy about 4.6 billion years ago.

Zula Patrol: Under the Weather

K-2	Earth Science	3	Weather changes from day to day and over the seasons.
		2	Air is a mixture of gases all around us and wind is moving air.

One World One Sky: Big Bird’s Adventure

Mathematics

PreK-K	Geometry	K.G.4	Identify positions of objects in space, and use appropriate language (e.g., beside, inside, next to, close to, above, below, apart) to describe and compare their relative positions
PreK-K	Measurement	K.M.1	Recognize and compare the attributes of length, volume/capacity, weight, area, and time using appropriate language, e.g., longer, taller, shorter, same length; heavier, lighter, same weight; holds more, holds less, holds the same amount.
PreK-K	Data Analysis, Statistic and Probability	K.D.1	Collect, sort, organize, and draw conclusions about data using concrete objects, pictures, numbers, and graphs
Gr. 1-	Measurement	2.M.1	Identify parts of the day (e.g., morning, afternoon,

2			evening), days of the week, and months of the year. Identify dates using a calendar.
		2.M.3	Compare the length, weight, area, and volume of two or more objects by using direct comparison
PreK-K	Data Analysis, Statistic and Probability	K.D.1	Collect, sort, organize, and draw conclusions about data using concrete objects, pictures, numbers, and graphs
Gr. 1-2		2.D.1	Use interviews, surveys, and observations to gather data about themselves and their surroundings.
Science, Engineering and Technology			
K-2	Earth Science	1	Water, rocks, soil, and living organisms are found on the earth's surface
		2	Air is a mixture of gases all around us and wind is moving air.
		4	The sun supplies heat and light to the earth and is necessary for life
		5	Events around us have repeating patterns, including the seasons of the year, day, and night.
K-2	Physical Science (Physics)	3	Objects can move in various ways
		4	Change the motion of an object by applying a force. The greater the force, the greater the change in motion