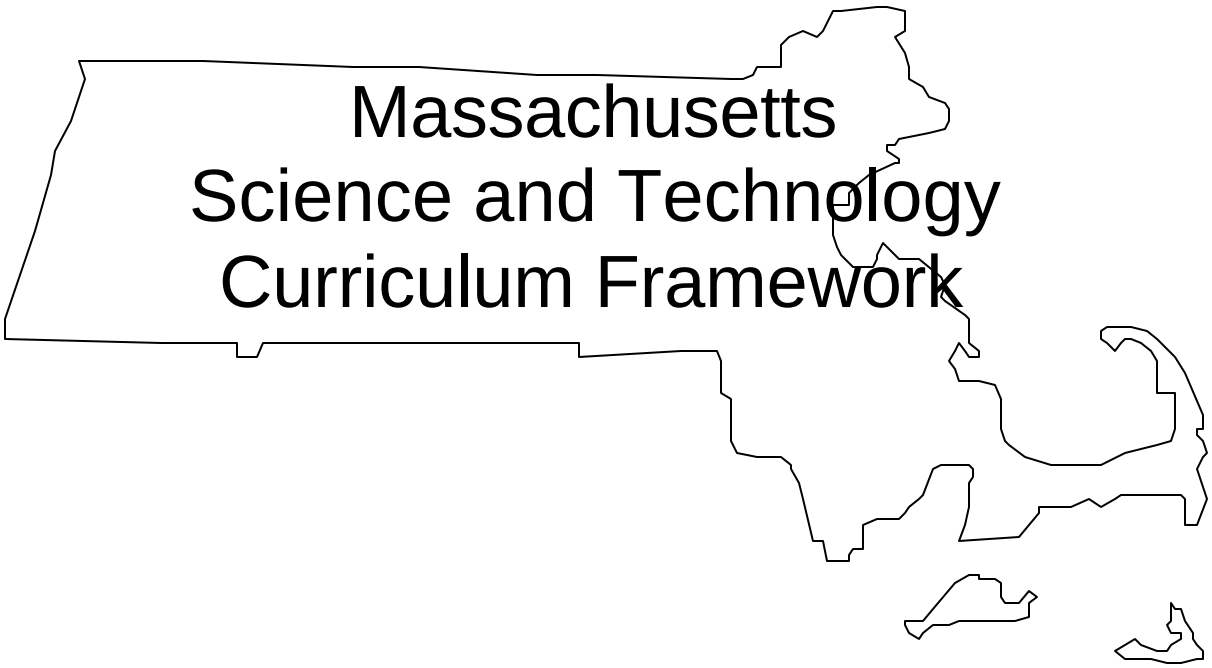
FOSS Delta Science Modules
(Delta™)
K-8

Correlation to



Massachusetts Science and Technology Curriculum Framework

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May 2005

Massachusetts Science and Technology Curriculum Framework Correlation to Delta Science Modules

The following is a correlation of the grades PreK-2, 3-5 and 6-8 portions of the Massachusetts Science and Technology Curriculum Framework to Delta Science Modules. This correlation shows representative examples of investigations and activities from the DSM program which address the Science and Technology Content Standards. A citation does not include all of the investigations or activities from DSM that might address a particular standard.

Where possible, the examples listed for Grades PreK-2 and 3-5 sections of the Strands 1-3 correlation include the suggested technology extensions.

The examples of DSM investigations cited below for Grades 6-8 are from DSM modules developed for grades 5-6 and from the first eight DSM Middle School modules, developed for Grades 6-8.

Strand 1: Earth and Space Science

Earth and Space Science Grades PreK-2 Learning Standards

Earth's Materials

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1. Recognize that water, rocks, soil, and living organisms are found on the earth's surface.	*Soil Science* Activity 1 Activity 4 Activity 7 Activity 8 Activity 9	 Pages 15 – 20 Pages 37 – 44 Pages 69 – 80 Pages 81 - 90
2. Understand that air is a mixture of gases that is all around us and that wind is moving air.	*Amazing Air* Activity 10 Activity 11	 Pages 87 – 94 Pages 95 - 99

Weather

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
3. Describe the weather changes from day to day and over the seasons.	Weather Watching Activity 1 Activity 4 Activity 5	 Pages 13 – 19 Pages 39 – 40 Pages 46 - 47

The Sun as a Source of Light and Heat

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
4. Recognize that the sun supplies heat and light to the Earth and is necessary for life.		

Periodic Phenomena

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
5. Identify some events around us that have repeating patterns, including the seasons of the year, day and night.	Sunshine and Shadows Activity 3 Activity 4 Activity 6 Activity 9	 Pages 28 – 31 Pages 33 – 39 Pages 49 – 54 Pages 72 - 75

Earth and Space Sciences Grades 3-5 Learning Standards

Rocks and Their Properties

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1. Give a simple explanation of what a mineral is and some examples, e.g., quarts, mica.	*Rocks and Minerals* Activity 10 Activity 11	 Pages 77 – 83 Pages 85 - 91
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.	*Rocks and Minerals* Activity 1 Activity 3 Activity 4 Activity 5 Activity 6	 Pages 14 - 18 Pages 31 – 32 Pages 35 – 38 Pages 41 – 45 Pages 47 - 52
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.		

Soil

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
4. Explain and give examples of the ways in which soil is formed (the weathering of rock by water and wind and from the decomposition of plant and animal remains).	*Erosion* Activity 1 Activity 4 Activity 10 *Soil Science* Activity 5 Activity 6 Activity 9 Activity	 Pages 14 - 18 Pages 38 - 40 Pages 83 - 88 Pages 46 – 49 Pages 51 – 56 Pages 82-88
5. Recognize and discuss the different properties of soil, including color, texture (size of particles), the ability to retain water, and the ability to support the growth of plants.	*Erosion* Activity 3 *Soil Science* Activity 3 Activity 4 Activity 8 Activity 10	 Pages 31 - 34 Pages 30 - 34 Pages 38 - 42 Pages 73 – 77 Pages 92 - 96

Weather

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
6. Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.	*Weather Forecasting* Activity 2 Activity 3 *Weather Instruments* Activity 1 Activity 2 Activity 3 *Amazing Air* Activity 1 Activity 10	 Pages 20 – 23 Pages 26 – 32 Pages 13 – 20 Pages 23 – 28 Pages 34 – 35 Pages 9 – 13 Pages 88 -93
7. Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.	*Weather Forecasting* Activity 8	 Pages 64 - 66
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.	*Weather Instruments* Activity 6 *Weather Watching* Activity 1	 Pages 52 – 56 Pages 14 - 18
9. Differentiate between weather and climate.	*Weather Instruments* Activity 12	 Pages 98 - 100

The Water Cycle

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
10. Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere.	*Water Cycle* Activity 1 Activity 2 Activity 5 Activity 13 *Oceans* Activity 5	 Pages 13 – 20 Pages 24 – 27 Pages 46 – 50 Pages 107 – 112 Pages 56 - 63
11. Give examples of how the cycling of water, both in and out of the atmosphere, has an effect on climate.	*Water Cycle* Activity 4 Activity 8 Activity 11 Activity 12 *Oceans* Activity 5	 Pages 40 – 41 Pages 69 – 74 Pages 91 – 97 Pages 99 – 105 Pages 56 - 63

Earth's History

LEARNING STANDARDS Grades 3-5	*DSM INVESTIGATION/ ACTIVITY*	*PAGE NUMBER(S)*
12. Give examples of how the surface of the earth changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes.	*Erosion* Activity 6 Activity 11 Activity 12 *Earth Movements* Activity 3 Activity 5 Activity 6 Activity 7 Activity 9 Activity 10 Activity 11	 Pages 51 – 56 Pages 91 – 96 Pages 99 – 103 Pages 30 – 35 Pages 48 – 53 Pages 56 – 60 Pages 64 – 67 Pages 79 – 84 Pages 87 – 95 Pages 97 - 101

The Earth in the Solar System

LEARNING STANDARDS Grades 3-5	*DSM INVESTIGATION/ ACTIVITY*	*PAGE NUMBER(S)*
13. Recognize that the earth is part of a system called the "solar system" that includes the sun (a star), planets, and many moons. The earth is the third planet from the sun in our solar system.	*Solar System* Activity 1 Activity 6 Activity 8	 Pages 14 – 19 Pages 52 – 56 Pages 66 - 72
14. Recognize that the earth revolves around (orbits) the sun in a year's time and that the earth rotates on its axis once approximately every 24 hours. Make connections between the rotation of the earth and day/night, and the apparent movement of the sun, moon and starts across the sky.	*Solar System* Activity 2 Activity 9	 Pages 21 – 25 Pages 73 - 81
15. Describe the changes that occur in the observable shape of the moon over the course of a month.		

Earth and Space Sciences Grades 6-8 Learning Standards

Mapping the Earth

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1. Recognize, interpret, and be able to create models of the earth's common physical features in various mapping representations, including contour maps.	*Earth Processes* Activity 1 Activity 7 Activity 10 *Earth, Moon, and Sun* Activity 13 *Oceans* Activity 4	 Pages 7 – 13 Pages 55 – 64 Pages 78 – 81 Pages 106 – 110 Pages 43 - 54

Earth's Structure

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
2. Describe the layers of the solid earth, incl. the lithosphere, the hot convecting mantle, and the dense metallic core.	*Earth's Processes* Activity 2 Activity 3	 Pages 15 – 19 Pages 21 - 28

Heat Transfer in the Earth System

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
3. Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through the earth's system.	*Earth Processes* Activity 12 *Solar Energy* Activity 2 Activity 11 Activity 12	 Pages 90 – 92 Pages 13 – 19 Pages 72 – 74 Pages 78 - 81
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.	*Weather Forecasting* Activity 7 *Solar Energy* Activity 4 Activity 5 Activity 8	 Page 61 Pages 28 – 31 Pages 33 – 37 Pages 54 – 57

Earth's History

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
5. Describe how movement of the earth's crustal plates causes both slow changes in the earth's surface (e.g. formation of mountains and ocean basins), and rapid ones	*Earth Processes* Activity 5 Activity 11 Activity 13 Activity 14	 Pages 39 – 43 Pages 83 – 88 Pages 96 – 101 Pages 106 - 110

(e.g. volcanic eruptions and earthquakes).		
6. Describe and give examples of ways in which the earth's surface is built up and torn down by natural processes, including deposition of sediments, rock formation, erosion, and weathering.	*Erosion* Activity 1 Activity 5 Activity 9 *Earth Processes* Activity 3 Activity 4 Activity 6	 Pages 14 – 18 Pages 44 – 49 Pages 76 – 80 Pages 21 – 28 Pages 31 – 36 Pages 48 - 52
7. Explain and give ex. of how physical evidence, such as fossils and surface features of glaciation, supports theories that earth has evolved over geologic time.	*Erosion* Activity 2 Activity 12	 Pages 22 – 24 Pages 100 - 103

Earth and Space

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
8. Recognize that gravity is a force that pulls all things on and near the earth toward the center of the earth. Gravity plays a major role in the formation of planets, stars and solar system and in determining their motions.		
9. Describe lunar and solar eclipses, the observed moon phases, and tides. Relate them to the relative positions of the earth, moon, and sun.	*Earth, Moon, and Sun* Activity 2 Activity 10 Activity 11 Activity 12 *Oceans* Activity 9	 Pages 16, 19 Pages 80 – 85 Pages 88 – 92 Pages 96 – 101 Pages 100 - 110
10. Compare and contrast properties and conditions of objects in the solar system (i.e., sun, planets, and moons) to those on Earth (i.e., gravitational force, distance from the sun, speed, movement, temperature, and atmospheric conditions).	*Earth, Moon, and Sun* Activity 3 Activity 5 Activity 7 *Astronomy* Activity 4	 Pages 26 – 27 Pages 38 – 42 Pages 57 – 58 Pages 35 -41
11. Explain how the tilt of the earth and its revolution around the sun result in an uneven heating of the earth, which in turn causes the seasons.	*Earth, Moon, and Sun* Activity 6 Activity 8 Activity 9 *Astronomy* Activity 2 Activity 5	 Pages 49 – 51 Pages 62 – 67 Pages 69 – 78 Pages 17 – 22 Pages 43 - 50
12. Recognize that the universe contains many billions of galaxies, and that	*Astronomy* Activity 11	 Pages 93 - 97

each galaxy contains many billions of stars.		

Strand 2: Life Science (Biology)

Life Science Grades PreK-2 Learning Standards

Characteristics of Living Things

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1. Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air, and water.	Observing an Aquarium Activity 1 Classroom Plants Activity 5 From Seed to Plant Activity 8 *Plant and Animal Populations* Activity 1 Activity 5 Activity 9	 Pages 17 – 20 Pages 49 – 52 Pages 68 – 71 Pages 17 – 22 Pages 53 – 57 Pages 87 - 91
2. Differentiate between living and nonliving things. Group both living things and nonliving things according to the characteristics that they share.	Butterflies and Moths Activity 2 Observing an Aquarium Activity 2 From Seed to Plant Activity 1	 Pages 25 – 29 Pages 25 – 27 Pages 15 - 19

Life Cycles

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
3. Recognize that plants and animals have life cycles, and that life cycles vary for different living things.	*Butterflies and Moths* Activity 1 Activity 6 Activity 9 Activity 11 From Seed to Plant Activity 13 Plant and Animal Populations Activity 4 Activity 7	 Pages 15 – 19 Pages 53 – 59 Pages 79 – 87 Pages 97 – 102, 104 Ext. Pages 97 – 102 Pages 45 – 48 Pages 70 - 75

Heredity

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
4. Describe ways in which many plants and animals closely resemble their parents in observed appearance.	Observing an Aquarium Activity 10	 Pages 99 - 106

Evolution and Biodiversity

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
5. Recognize that fossils provide us with information about living things that inhabited the earth years ago.		

Living Things and Their Environment

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
6. Recognize that people and other animals interact with the environment through their senses of sight, hearing, touch, smell and taste.	<u>Using Your Senses</u> Activity 1 Activity 5 Activity 8 Activity 9 Activity 10 Activity 11 Activity 12 <u>Butterflies and Moths</u> Activity 7 Activity 10 <u>Observing an Aquarium</u> Activity 11 *<u>Plant and Animal Populations</u>* Activity 4	 Pages 13 – 18 Pages 45 – 52 Pages 67 – 73 Pages 75 – 78 Pages 81 – 88 Pages 89 – 95 Pages 97 – 103 Pages 61 – 68 Pages 89 – 95 Pages 110 – 114 Pages 45 - 50
7. Recognize changes in appearance that animals and plants go through as the seasons change.	<u>Butterflies and Moths</u> Activity 3 Activity 8 <u>Classroom Plants</u> Activity 3 <u>From Seed to Plant</u> Activity 4	 Pages 32 – 36 Pages 73 – 75 Pages 31 – 36 Pages 42 - 43
8. Identify ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air and shelter).	<u>Butterflies and Moths</u> Activity 4 <u>Observing an Aquarium</u> Activity 3 Activity 4 Activity 5 Activity 6	 Pages 41 – 44 Pages 32 – 37 Pages 41 – 45 Pages 49 – 53 Pages 59 - 65

Life Science Grades 3-5 Learning Standards

Characteristics of Plants and Animals

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1. Classify plants and animals according to the physical characteristics that they share.	Classroom Plants Activity 1 *Plant and Animal Life Cycles* Activity 1 *Insect Life* Activity 1 Activity 5 Activity 6 Activity 12	 Pages 18 – 20 Pages 15 – 20 Pages 9 - 11 Pages 36 – 37 Pages 43 – 44 Pages 79 - 82

Plant and Animal Structures and Functions

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
2. Identify the structures in plants (leaves, roots, flowers, stem, bark, wood) that are responsible for food production, support, water transport, reproduction, growth, and protection.	Classroom Plants Activity 6 Activity 7 Activity 8 *Plant and Animal Life Cycles* Activity 3	 Pages 57 – 62 Pages 66 – 70 Pages 75 – 78 Pages 34 - 40
3. Recognize that plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death.	Classroom Plants Activity 2 Activity 9 *Plant and Animal Life Cycles* Activity 2 Activity 9 Activity 10	 Pages 23 - 28 Pages 82 -85 Pages 24 – 30 Pages 83- 89 Pages 91 - 96
4. Describe the major stages that characterize the life cycle of the frog and butterfly as they go through metamorphosis.	*Butterflies and Moths* Activity 2 Activity 6 Activity 9 Activity 11	 Pages 23 – 29 Pages 53 – 58 Pages 79 – 86 Pages 97 - 104
5. Differentiate between observed characteristics of plants and animals that are fully inherited (e.g., color of flower, shape of leaves, color of eyes, number of appendages) and characteristics that are affected by the climate or environment (e.g., browning of leaves due to too much sun, language spoken).	*Plant and Animal Life Cycles* Activity 8 Activity 11 *Insect Life* Activity 11	 Pages 76 – 80 Pages 97 – 103 Pages 97 - 104

Adaptations of Living Things

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
6. Give examples of how inherited characteristics may change over time as adaptations to changes in the environment that enable organisms to survive, e.g., shape of beak or feet, placement of eyes on head, length of neck, shape of teeth, color.	*Butterflies and Moths* Activity 10 *Using Your Senses* Activity 1 Activity 5 Activity 8 Activity 10 *Dinosaurs and Fossils* Activity 3 Activity 8 *Insect Life* Activity 9 Activity 11 Activity 12 *Pond Life* Activity 8 Activity 9 Activity 10	 Pages 89 – 94 Pages 14 – 19 Pages 46 – 51 Pages 68 – 72 Pages 82 – 87 Pages 30 – 33 Pages 61 – 64 Pages 61-64 Pages 74-77 Pages 80 – 82 Pages 58 – 61 Pages 64 – 67 Pages 70 - 73
7. Give examples of how changes in the environment (drought, cold) have caused some plants and animals to die or move to new locations (migration).	*Dinosaurs and Fossils* Activity 1 *Animal Behavior* Activity 5	 Pages 13 – 15 Pages 32 - 37
8. Describe how organisms meet some of their needs in an environment by using behaviors (patterns of activities) in response to information (stimuli) received from the environment. Recognize that some animal behaviors are instinctive (e.g., turtles burying their eggs), and others are learned (e.g. humans building fires for warmth, chimpanzees learning how to use tools).	Classroom Plants Activity 11 *Butterflies and Moths* Activity 3 Activity 7 Activity 8 *Using Your Senses* Activity 9 *Insect Life* Activity 8 *Animal Behavior* Activity 5 Activity 6 Activity 7 Activity 11 Activity 12 *Pond Life* Activity 8 Activity 9 Activity 10 Activity 11	 Pages 99 – 102 Pages 32 – 36 Pages 61 – 68 Pages 71 – 77 Pages 76 – 78 Pages 56 – 59 Pages 32 – 37 Pages 40 – 44 Pages 46 – 52 Pages 72 – 75 Pages 78 – 82 Pages 58 – 61 Pages 63 – 67 Pages 69 – 73 Pages 75 - 80
9. Recognize plant behaviors, such as the way seedlings' stems grow toward light and their roots grow downward in response to gravity. Recognize that many plants and animals can survive harsh environments because of seasonal behaviors e.g., in winter, some trees shed	*Food Chains and Webs* Activity 2	 Page 27

leaves, some animals hibernate, others migrate.		
10. Give examples of how organisms can cause changes in their environment to ensure survival. Explain how some of these changes may affect the ecosystem.	*Food Chains and Webs* Activity 11 Activity 12 *Pollution* Activity 2 Activity 6 *Animal Behavior* Activity 4 Activity 7 *Small Things and Microscopes* Activity 13 *Plant and Animal Populations* Activity 12	Pages 90 – 94 Pages 97 – 101 Pages 19 – 24 Pages 47 – 51 Pages 25 – 29 Pages 45 - 52 Pages 80 – 83 Pages 113 - 116

Energy and Living Things

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
11. Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers and decomposers.	*Food Chains and Webs* Activity 3 This standard is addressed in the grades 6 – 8 module of *Plants in our World*	Pages 32 - 36

Life Sciences Grades 6-8 Learning Standards

Classification of Organisms

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1. Classify organisms into the currently recognized kingdoms according to characteristics that they share. Be familiar with organisms from each kingdom.	*Fungi – Small Wonders* Activity 1	Pages 8 – 10

Cells and Systems

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
2. Recognize that all organisms are composed of cells, and that many organisms are single-celled (unicellular), e.g., bacteria, yeast. In these single-celled organisms, one cell must carry out all the basic functions of life.	*Fungi – Small Wonders* Activity 4 *DNA – From Genes to Proteins* Activity 11	Pages 26 – 29 Pages 75 - 80
3. Compare and contrast plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, cytoplasm, chloroplasts, mitochondria, vacuoles).	*Plants in Our World* Activity 1 *DNA – From Genes to Proteins* Activity 3 Activity 4 Activity 5	Pages 8 – 12 Pages 19 – 23 Pages 26 – 30 Pages 32 - 35
4. Recognize that within cells, many of the basic functions of organisms (e.g., extracting energy from food and getting rid of waste) are carried out. The way in which cells function is similar in all living organisms.	*Fungi – Small Wonders* Activity 3 Activity 4	Pages 26 - 29 Pages 32 – 33,35

Systems in Living Things

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
5. Describe the hierarchical organization of multicellular organisms from cells to tissues to organs to systems to organisms.	*You and Your Body* Activity 2 Activity 4 Activity 6	Pages 20 – 24 Pages 35 – 38 Pages 51 - 52
6.Identify the general functions of the major systems of the human body (digestion, respiration, reproduction,	*DNA – From Genes to Proteins* Activity 7 *You and Your Body*	Pages 45 – 52

circulation, excretion, protection from disease, and movement, control and coordination) and describe ways that these systems interact with each other.	Activity 1 Activity 2 Activity 3 Activity 4 Activity 5 Activity 6 Activity 7 Activity 8	Pages 15 – 17 Pages 20 – 24 Pages 28 – 31 Pages 35 – 38 Pages 42 – 46 Pages 51 – 52 Pages 57 – 59 Pages 62 - 65

Reproduction and Heredity

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
7. Recognize that every organism requires a set of instructions that specifies its traits. These instructions are stored in the organism's chromosomes. Heredity is the passage of these instructions from one generation to another.	*DNA – From Genes to Proteins* Activity 7 Activity 6 Activity 9 Activity 10	 Pages 45 - 51 Pages 37 - 43 Page 67 Pages 69 - 73
8. Recognize that hereditary information is contained in genes located in the chromosomes of each cell. A human cell contains about 30,000 different genes on 23 different chromosomes.	*DNA – From Genes to Proteins* Activity 2 Activity 5 Activity 10	 Pages 13 - 18 Pages 31 – 35 Pages 69 - 73
9. Compare sexual reproduction (offspring inherit half of their genes from each parent) with asexual reproduction (offspring is an identical copy of the parent's cell).	*DNA – From Genes to Proteins* Activity 1 Activity 7	 Pages 7 - 11 Pages 45 - 51

Evolution and Biodiversity

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
10. Give examples of ways in which genetic variation and environmental factors are causes of evolution and the diversity of organisms.	*DNA – From Genes to Proteins* Activity 12 Activity 13	 Pages 81 – 88 Pages 89 - 93
11.Recognize that evidence drawn from geology, fossils, and comparative anatomy provide the basis for the theory of evolution.		
12. Relate the extinction of species to a mismatch of adaptation and the environment.		

Living Things and Their Environment

LEARNING STANDARDS Grades 6-8	*DSM INVESTIGATION/ ACTIVITY*	*PAGE NUMBER(S)*
13. Give examples of ways in which organisms interact and have different functions within an ecosystem that enable the ecosystem to survive.	The *Pond Life* module addresses this standard in all of its activities.	

Energy and Living Things

LEARNING STANDARDS Grades 6-8	*DSM INVESTIGATION/ ACTIVITY*	*PAGE NUMBER(S)*
14. Explain the roles and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.		
15. Explain how dead plants and animals are broken down by other living organisms and how this process contributes to the system as a whole.		
16. Recognize that producers (plants that contain chlorophyll) use the energy from sunlight to make sugars from carbon dioxide and water through a process called photosynthesis. This food can be used immediately, stored for later use, or used by other organisms.		

Changes in Ecosystems over Time

LEARNING STANDARDS Grades 6-8	*DSM INVESTIGATION/ ACTIVITY*	*PAGE NUMBER(S)*
17. Identify ways in which ecosystems have changed throughout geologic time in response to physical conditions, interactions among organisms, and the actions of humans. Describe how changes may be catastrophes such as volcanic eruptions or ice storms.		
18. Recognize that biological evolution accounts for the diversity of species developed through gradual processes over many generations.		

Strand 3: Physical Sciences (Chemistry and Physics)

Physical Sciences Grades PreK-2 Learning Standards

Observable Properties of Objects

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1.Sort objects by observable properties such as size, shape, color, weight, and texture.	<u>Sink or Float</u> Activity 2 <u>Investigating Water</u> Activity 1 Activity 6 <u>Properties</u> Activity 1 Activity 3 Activity 4 Activity 5 Activity 13 <u>Length and Capacity</u> Activity 1 Activity 2 Activity 3 <u>Powders and Crystals (the 3-5 DSM module addresses this standard.</u> Activity 1	 Pages 21 – 27 Pages 14 -18 Pages 48 – 52 Pages 13 – 17 Pages 25 – 31 Pages 33 – 37 Pages 41 – 44 Pages 96 – 99 Pages 8 – 11 Pages 14 – 17 Pages 20 – 24 Pages 7 - 10

States of Matter

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
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.	<u>Investigating Water</u> Activity 4 Activity 9 <u>Properties</u> Activity 9	 Pages 35 - 39 Pages 73 – 78 Pages 67 - 72

Position and Motion of Objects

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
3. Describe the various ways that things can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.	*<u>Force and Motion</u>* Activity 1	Page 15 Step 1
4.Demonstrate that the way to change the motion of an object is to apply a force (give it a push or pull). The greater the force, the greater the change	*<u>Force and Motion</u>* Activity 1	Pages 17 - 22

in the motion of the object		
5. Recognize that under some conditions, objects can be balanced.		

The Physical Sciences Grades 3-5 Learning Standards

Properties of Objects and Materials
States of Matter

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
2.Compare and contrast solids, liquids, and gases based on the basic properties of each of these states of matter.	*Sink or Float* Activity 2 *States of Matter* Activity 2 Activity 3 Activity 4 Activity 8 Activity 9 Activity 10 *Looking at Liquids* Activity 11	Pages 22 – 26 Page 24 Page 32 Pages 36 – 39 Pages 66 – 71 Pages 74 – 78 Pages 82 – 87 Pages 77 - 81
3.Describe how water can be changed from one state to another by adding or taking away heat.	*States of Matter* Activity 5 Activity 11 *Looking at Liquids* Activity 11 *Solar Energy (the 6 – 8 DSM module)* Activity 13	Pages 42 – 48 Pages 90 – 95 Pages 77 – 81 Pages 85 -87

Forms of Energy

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
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.	*Magnets* Activity 3 *Color and Light* Activity 5	Pages 25 – 26 Pages 46 - 51
5. Give examples of how energy can be transferred from one form to another.	*Color and Light* Activity 1 Activity 4	Pages 14 – 17 Pages 37 - 43

Electrical Energy

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
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.	*Electromagnetism* Activity 4 *Electrical Connections (from the 6 – 8 DSM module)* Activity 3 Activity 6	Pages 50 – 55 Pages 19 – 23 Pages 38 - 42
7. Identify and classify objects and materials that conduct electricity and objects and materials that are insulators of	*Electromagnetism* Activity 11 *Electrical Connections (from*	Pages 78 – 82

electricity.	*the 6-8 DSM module)* Activity 7	Pages 47 - 31
8. Explain how electromagnets can be made, and give examples of how they can be used.	*Electromagnetism* Activity 5 Activity 6 Activity 8 Activity 9 Activity 10 *Electrical Connections (from the 6-8 DSM module)* Activity 1 Activity 2 Activity 4 Activity	 Pages 37 – 41 Pages 44 – 46 Pages 58 – 60 Pages 64 - 67 Pages 70 – 76 Pages 7- 12 Pages 14 – 17 Pages 27 - 30

Magnetic Energy

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
9. Recognize that magnets have poles that repel and attract each other.	*Magnets* Activity 1 Activity 6	 Pages 13 – 17 Pages 41 - 44
10. Identify and classify objects and materials that a magnet will attract and objects and materials that a magnet will not attract.	*Magnets* Activity 2 Activity 3 *Electromagnetism* Activity 1	 Pages 20 – 22 Pages 25 - 26 Page 14

Sound Energy

11. Recognize that sound is produced by vibrating objects and requires a medium through which to travel. Relate the rate of vibration to the pitch of the sound.		

Light Energy

12. Recognize that light travels in a straight line until it strikes an object or travels from one medium to another, and that light can be reflected, refracted, and absorbed.	*.Color and Light* Activity 6 *Lenses and Mirrors* Activity 1 Activity 2 Activity 4 Activity 5 Activity 8	 Page 57 Pages 7 – 12 Pages 14 – 18 Pages 28 – 32 Pages 36 – 39 Pages 55 - 65

Physical Sciences
Grades 6-8 Learning Standards

Properties of Matter

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1. Differentiate between weight and mass, recognizing that weight is the amount of gravitational pull on an object.	*Measuring (from the 3-5 DSM module)* Activity 8 Activity 9 *Newton's Toy Box* Activity 3	 Pages 58 – 63 Pages 66 - 69 Pages 21 - 23
2. Differentiate between volume and mass. Define density.	*Measuring (from the 3-5 DSM module)* Activity 8 Activity 9 *Length and Capacity (from the 3- 5 DSM module)* Activity 8 Activity 9	 Pages 58 – 63 Pages 66 - 69 Pages 61 – 66 Pages 70 - 75
3. Recognize that the measurement of volume and mass requires understanding of the sensitivity of measurement tools (e.g. rulers, graduated cylinders, balances) and knowledge and appropriate use of digits.	*Many of the DSM modules involve the students using measurement tools in the investigations.*	
4. Explain and give examples of how mass is conserved in a closed system.	*Newton's Toy Box* Activity 13	Pages 68 - 69

Elements, Compounds, and Mixtures

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
5. Recognize that there are more than 100 elements that combine in a multitude of ways to produce compounds that make up all of the living and nonliving things that we encounter.	*Chemical Interactions* Activity 3	Pages 24 - 27
6. Differentiate between an atom (the smallest unit of an element that maintains the characteristics of that element) and a molecule (the smallest unit of a compound that maintains the characteristics of that compound).	*Chemical Interactions* Activity 4 Activity 5	Pages 31 – 35 Pages 39 - 42

7. Give basic examples of elements and compounds.	*Chemical Interactions* Activity 6	Pages 45 - 50
8. Differentiate between mixtures and pure substances.	*Chemical Interactions* Activity 3	Pages 24 - 27
9. Recognize that a substance (element or compound) has a melting point and a boiling point, both of which are independent of the amount of the sample.	*Chemical Interactions* Activity 6	Pages 45 - 50
10. Differentiate between physical changes and chemical changes.	*Chemical Interactions* Activity 12	Pages 88 - 91

Motion

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
11. Explain and give examples of how the motion of an object can be described by its position, direction of motion, and speed.	*Newton's Toy Box* Activity 5 Activity 7 Activity 8 Activity 9	Pages 32 – 34 Pages 40 – 42 Pages 46 – 49 Pages 52 - 54
12. Graph and interpret distance vs. time graphs for constant speed.		

Forms of Energy

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
13. Differentiate between potential and kinetic energy. Identify situations where kinetic energy is transformed into potential energy and vice versa.	*Newton's Toy Box* Activity 8 Activity 10	Pages 45 - 49 Pages 56 - 58

Heat Energy

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
14. Recognize that heat is a form of energy and that temperature change results from adding or taking away heat from a system.	*Solar Energy* Activity 11 Activity 12	Pages 71 – 76 Pages 77 - 82

15. Explain the effect of heat on particle motion through a description of what happens to particles during a change of phase.	*Solar Energy* Activity 5	Pages 34 - 36
16. Give examples of how heat moves in predictable ways, moving from warmer objects to cooler ones until they reach equilibrium.	*Solar Energy* Activity 2 Activity 3 Activity 5	Pages 15 – 18 Pages 22 – 24 Pages 34 - 36

Technology/Engineering

Grades PreK-2 Learning Standards

1. Materials and Tools

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1.1 Identify and describe characteristics of natural materials (e.g., wood, cotton, fur, wool) and human-made materials (e.g., plastic, Styrofoam)		
1.2 Identify and explain some possible uses for natural materials (e.g. wood, cotton, fur, wool) and human-made materials (e.g., plastic, Styrofoam).		
1.3 Identify and describe the safe and proper use of tools and materials (e.g., glue, scissors, tape, ruler, paper, toothpicks, straws, spools) to construct simple structures.		

2. Engineering Design

LEARNING STANDARDS Grades PreK-2:	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
2.1 Identify tools and simple machines used for a specific purpose e.g., ramp, wheel, pulley, lever.	<u>*Force and Motions*</u> Activity 3 Activity 5 Activity 6 Activity 7 Activity 8 Activity 9 Activity 10 Activity 11 All the activities in this curriculum meet the standards. <u>*Simple Machines*</u> Activity 2 Activity 4 *All the activities in this curriculum meet this standard.* <u>*Famous Scientists*</u> Activity 2	 Pages 32 - 39 Pages 50 – 55 Pages 57 – 63 Pages 66 – 70 Pages 74 – 81 Pages 84 – 89 Pages 92 – 98 Pages 102 -110 Pages 20 – 24 Pages 33 – 36 Pages 21 - 27
2.2 Describe how human		

beings use parts of the body as tools (e.g., teeth for cutting, hands for grasping and catching), and compare their use with the ways in which animals use those parts of their bodies.		

Technology/Engineering
Grades 3-5 Learning Standards

1. Materials and Tools

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1.1 Identify materials used to accomplish a design task based on a specific property, i.e., weight, strength, hardness, and flexibility.		
1.2 Identify and explain the appropriate materials and tools (e.g., hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) to construct a given prototype safely.	*Force and Motion* Activity 12 *Simple Machines*	Pages 111 - 117

2. Engineering Design

LEARNING STANDARDS Grades 3-5	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
2.1. Identify a problem that reflects the need for shelter, storage, or convenience.		
2.2. Describe different ways in which a problem can be represented, e.g., sketches, diagrams, graphic organizers, and lists.		
2.3. Identify relevant design features (e.g., size, shape, weight) for building a prototype of a solution to a given problem.	*Simple Machines* Activity 3 Famous Scientists Activity 4	Pages 27 – 30 Pages 37 - 42
2.4. Compare natural systems with mechanical systems that are designed to serve similar purposes, e.g., a bird's wings as compared to an airplane's wings.	*Simple Machines* Activity 4	Pages 34

Technology/Engineering

Grades 6-8 Learning Standards

1. Materials, Tools, and Machines

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
1.1 Given a design task, identify appropriate materials (e.g., wood, paper, plastic, aggregates, ceramics, metals, solvents, adhesives) based upon specific properties and characteristics (e.g., weight, strength, hardness, and flexibility).	*Simple Machines* Activity 6	Pages 50 - 54
1.2 Identify and explain appropriate measuring tools, hand tools, and power tools used to hold, lift, carry, fasten, and separate, and explain their safe and proper use.	*Simple Machines* Activity 12	Pages 91 - 94
1.3 Identify and explain the safe and proper use of measuring tools, hand tools, and machines (e.g., band saw, drill press, sanders, hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners) needed to construct a prototype of an engineering design.	*Simple Machines* Activity 2 Activity 11 All activities in this curriculum meet this standard.	Pages 20 - 23 Pages 84 - 88

2. Engineering Design

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
2.1 Identify and explain the steps of the engineering design process, i.e. identify the need or the 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.		
2.2 Demonstrate methods of representing solutions to a design problem, e.g., sketches, orthographic projections, multiview drawings.		
2.3 Describe and explain the purpose of a given prototype.	*Simple Machines* Activity 5	Pages 40 - 46
2.4 Identify appropriate materials, tools, and machines needed to construct a prototype of a given engineering design.		
2.5 Explain how such design features as size, weight, shape, function, and cost limitations would affect the construction of a given prototype.	*Simple Machines* Activity 6	Pages 50 - 54
2.6 Identify the five elements of a universal systems model: goal, inputs, processes, outputs, and feedback.		

3. Communication Technologies

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
3.1 Identify and explain the components of a communication system, i.e. source, encoder, transmitter, receiver, decoder, storage, retrieval, and destination.		
3.2 Identify and explain the appropriate tools, machines, and electronic devices (e.g. drawing tools, computer-aided design, and cameras) used to produce and/or reproduce design solutions (e.g., engineering drawings, prototypes, and reports).		
3.3 Identify and compare communication technologies and systems, i.e. audio, visual, printed, and mass communication.		
3.4 Identify and explain how		

symbols and icons (e.g., international symbols and graphics) are used to communicate a message.		

4. Manufacturing Technologies

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
4.1 Describe and explain the manufacturing systems of custom and mass production.		
4.2 Explain and give examples of the impacts of interchangeable parts, components of mass-produced products, and the use of automation, e.g., robotics.		
4.3 Describe a manufacturing organization, e.g., corporate structure, research and development, production, marketing, quality control, distribution.		
4.4 Explain basic processes in manufacturing systems, e.g., cutting, shaping, assembling, joining, finishing, quality control, and safety.		*Pages 23-24* *Pages 18-21*

5. Construction Technologies

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
5.1 Describe and explain parts of a structure, e.g., foundation, flooring, decking, call, roofing systems.		
5.2 Identify and describe three major types of bridges (e.g., arch, beam, and suspension) and their appropriate uses (e.g., site, span, resources, load).		
5.3 Explain how the forces of tension, compression, torsion, bending, and shear affect the performance of bridges.		
5.4 Describe and explain the effects of loads and structural shapes on bridges.		

6. Transportation Technologies

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
6.1 Identify and compare examples of transportation systems and devices that operate on each of the following: land, air, water, and space.	*Flight and Rocketry* Activity 3	Pages 34 - 42
6.2 Given a transportation problem, explain a possible solution using the universal systems model.	*Flight and Rocketry* Activity 11	Pages 113 , 119
6.3 Identify and describe three subsystems of a transportation vehicle or device, i.e. structural, propulsion, guidance, suspension, control, and support.	*Flight and Rocketry* Activity 8	Pages 82 - 88
6.4 Identify and explain lift, drag, friction, thrust, and gravity in a vehicle or device, e.g., cars, boats, airplanes, rockets.	*Flight and Rocketry* Activity 2 Activity 4 Activity 5 Activity 7 Activity 9 Activity 12	 Pages 24 – 32 Pages 45 – 52 Pages 56 – 63 Pages 74 – 79 Pages 92 – 96 Pages 121 - 128

7. Bioengineering Technologies

LEARNING STANDARDS Grades 6-8	***DSM INVESTIGATION/ ACTIVITY***	***PAGE NUMBER(S)***
7.1 Explain examples of adaptive or assistive devices, e.g., prosthetic devices, wheelchairs, eyeglasses, grab bars, hearing aids, lifts, braces.		
7.2 Describe and explain adaptive and assistive bioengineered products, e.g., food, bio-fuels, irradiation, integrated pest management.		