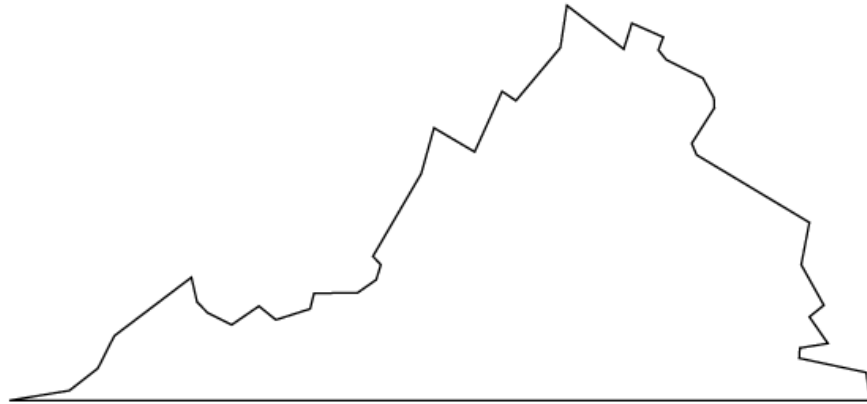




Delta Science Modules  
(DSM™)  
Grades K-8  
Correlation With

***Virginia  
Standards of Learning***



# **Correlation of the Virginia Standards of Learning with the Delta Science Modules (DSM)**

The following correlation of the Virginia Standards of Learning to the Delta Science Modules (DSM) is to show representative examples of investigations and activities that address listed standards and their concepts. A citation does not reflect all of the investigations or activities from DSM that might address a particular standard or concept.

*April 2005*

## Kindergarten Standards of Learning

<i>Science Standard</i>	<i>Correlation By Page Numbers</i>
<b>K.1 The student will conduct investigations in which:</b>	
a) basic properties of objects are identified by direct observation;	<i>The DSM module <u>Properties</u> addresses this standard in all of its activities.</i>
b) observations are made from multiple positions to achieve different perspectives;	All DSM modules are inquiry based and students observe and ask questions. Some examples are: <u>Sunshine and Shadows</u> Activity 1 pages 13 - 17
c) objects are described both pictorially and verbally;	All DSM Activities/Investigations have given students opportunities for discourse and to think reflectively. Communicating (talking, drawing, explaining and acting) is done through student data and response sheets. Other forms of communication include tables, graphs, charts, and models. These resources are used to access and document student progress. Some examples of these include: <u>Sunshine and Shadows</u> Activity 2 page 20
d) a set of objects is sequenced according to size;	<u>Finding the Moon</u> Activity 2 pages 25 – 26 <u>Properties</u> Activity 3 pages 28 – 29
e) a set of objects is separated into two groups based on a single physical attribute;	<u>Properties</u> Activity 4 pages 33 - 36 Activity 11 pages 83 - 85 <u>From Seed to Plant</u> Activity 1 pages 16 - 19

f) nonstandard units are used to measure common objects;	
g) a question is developed from one or more observations;	All DSM modules have students conduct scientific investigations and students must identify questions. Some examples include: <u>Sunshine and Shadows</u> Activity 8 pages 68 – 69 <u>Finding the Moon</u> Activity 6 pages 57 – 59 Activity 7 pages 66 - 67
h) picture graphs are constructed using 10 or fewer units;	
i) an unseen member in a sequence of objects is predicted; and	All DSM modules provide the opportunity to make predictions and carry out those predictions through the investigations. <u>Sunshine and Shadows</u> Activity 10 page 78 <u>Properties</u> Activity 9 pages 68 - 72
j) unusual or unexpected results in an activity are recognized.	All DSM modules have students conduct scientific investigations that require reasonable explanations based on observations. Some examples include:
<b>K 2. Students will investigate and understand that humans have senses that allow one to seek, find, take in, and react or respond to information in order to learn about one’s surroundings. Key concepts include:</b>	
a) five senses and corresponding sensing organ (taste-tongue, touch-skin, smell-nose, hearing-ears, and sight-eyes); and	All DSM modules encourage students to use their senses and simple instruments to make observations. Some examples from kindergarten are: <i>The grade 2 -3 module <u>Using Your Senses</u> addresses this standard.</i>
b) sensory descriptors (sweet, sour, bitter, salty, rough/smooth, hard/soft, cold, warm, hot, loud/soft, high/low, bright/dull).	<i>The grade 2 -3 module <u>Using Your Senses</u> addresses this standard.</i>

<b>K 3. The student will investigate and understand that magnets have an effect on some materials, make some things move without touching them, and have useful applications. Key concepts include:</b>	
a) attraction/nonattraction, push/pull, attract/repel, and metal/nonmetal; and	<u>Properties</u> Activity 11 pages 81 - 86
b) useful applications (refrigerator magnet, can opener, magnetized screwdriver, and magnetic games).	
<b>K 4. The student will investigate and understand that the position, motion, and physical properties of an object can be described. Key concepts include:</b>	
a) colors (red, orange, yellow, green, blue, purple), white, and black;	<u>Properties</u> Activity 3 pages 26 – 31
b) shapes (circle, triangle, square, and rectangle) and forms (flexible/stiff, straight/curved);	<u>Properties</u> Activity 4 pages 34 – 39
c) textures (rough/smooth) and feel (hard/soft);	<u>Properties</u> Activity 5 pages 42 – 45
d) relative size and weight (big/little, large/small, heavy/light, wide/thin, long/short); and	<u>Properties</u> Activity 6 pages 48 - 51
e) position (over/under, in/out, above/below, left/right) and speed (fast/slow).	<u>Sunshine and Shadows</u> Activity 7 pages 57 – 61 Activity 9 pages 72 - 75
<b>K 5. The student will investigate and understand that water flows and has properties that can be observed and tested. Key concepts include:</b>	
a) water occurs in different states (solid, liquid, gas);	<u>Investigating Water</u> Activity 4 pages 37 -39 Activity 9 pages 71 - 79 Activity 10 pages 81 - 88
b) the natural flow of water is downhill; and	<u>Investigating Water</u> Activity 4 pages 36 – 37
c) some materials float in water while others sink.	<u>Investigating Water</u> Activity 5 pages 41 - 45
<b>K 6. The student will investigate and understand basic needs and life processes of plants and animals. Key concepts include:</b>	

a) living things change as they grow and need food, water, and air to survive;	
b) plants and animals live and die (go through a life cycle); and	<u>From Seed to Plant</u> Activity 13 pages 99 - 101
c) offspring of plants and animals are similar but not identical to their parents and one another.	<i>The DSM module <u>Plant and Animal Life Cycle</u> designed for grades 3 – 4 addresses this standard in the activities 2 and 10.</i>
<b>K.7 The student will investigate and understand that shadows occur when light is blocked by an object.</b> <b>Key concepts include:</b>	
a) shadows occur in nature when sunlight is blocked by an object; and	<u>Sunshine and Shadows</u> Activity 3 page 28
b) shadows can be produced by blocking artificial light sources.	<u>Sunshine and Shadows</u> Activity 3 page 28 Activity 5 pages 43 - 46
<b>K.8 The student will investigate and understand simple patterns in his/her daily life.</b> <b>Key concepts include:</b>	
a) weather observations;	
b) the shapes and forms of many common natural objects including seeds, cones, and leaves;	<u>From Seed to Plant</u> Activity 9 pages 74 - 76 Activity 10 pages 80 - 82 Activity 1 pages 17 - 19
c) animal and plant growth; and	
d) home and school routines.	
<b>K 9. The student will investigate and understand that change occurs over time, and rates may be fast or slow.</b> <b>Key concepts include:</b>	
a) natural and human-made things may change over time; and	<u>Sunshine and Shadows</u> Activity 6 Pages 49 - 54
b) changes can be noted and measured.	
<b>K 10. The student will investigate and understand that materials can be reused, recycled, and conserved.</b> <b>Key concepts include:</b>	
a) materials and objects can be used over and over again;	

b) everyday materials can be recycled; and	
c) water and energy conservation at home and in school helps preserve resources for future use.	

## Grade One Standards of Learning

<i>Science Standard</i>	<i>Correlation By Page Numbers</i>
<b>1.1 Student will conduct investigations in which:</b>	
a) differences in physical properties are observed using the senses;	<u>Properties</u> Activity 1 pages 14 - 17 Activity 2 pages 20 - 24
b) simple tools are used to enhance observations;	
c) objects or events are classified and arranged according to attributes or properties;	<u>Properties</u> Activity 2 pages 20 - 24 Activity 13 pages 96 - 100
d) observations and data are communicated orally and with simple graphs, pictures, written statements, and numbers;	<u>Sunshine and Shadows</u> Activity 5, page 50 Activity 6 page 61 Science Challenge Activity 7 pages 65 - 68
e) length, mass, and volume are measured using standard and nonstandard units;	
f) predictions are based on patterns of observation rather than random guesses;	<u>Sunshine and Shadows</u> Activity 5 pages 43 - 47 Activity 7 pages 57 -62 Activity 10 pages 78 - 81
g) simple experiments are conducted to answer questions; and	<u>Finding the Moon</u> Activity 8, page 74 <u>Investigating Water</u> Activity 1 pages 14 - 20 Activity 5 pages 41 -46 Activity 7 pages 55 -61 Activity 12 pages 95 - 100

h) inferences are made and conclusions are drawn about familiar objects and events.	<u>Investigating Water</u> Activity 12 pages 95 - 100
<b>1.2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include:</b>	
a) objects may have straight, circular, and back and forth motions;	<u>Finding the Moon</u> Activity 3 pages 31 - 35
b) objects may vibrate and produce sound;	
c) pushes or pulls can change the movement of an object; and	<i>This standard is met in the <u>Force and Motion</u> module assigned to grades 2 – 3.</i>
d) the motion of objects may be observed in toys and in playground activities.	
<b>1.3 The student will investigate and understand how different common materials interact with water. Key concepts include:</b>	
a) some liquids will separate when mixed with water, others will not;	
b) some common solids will dissolve in water, others will not; and	<u>Investigating Water</u> Activity 7 pages 56 - 60
c) some substances will dissolve more readily in hot water than in cold water.	
<b>1.4 The student will investigate and understand that plants have life needs and functional parts and can be classified according to certain characteristics. Key concepts include:</b>	
a) needs (food, air, water, light, and a place to grow);	<u>From Seed to Plant</u> Activity 2 pages 23 - 29 Activity 3 pages 34 - 37 Activity 6 pages 54 - 57 Activity 11 pages 86 - 89
b) parts (seeds, roots, stems, leaves, blossoms, fruits); and	<u>From Seed to Plant</u> Activity 1 pages 16 - 19 Activity 3 pages 34 - 38 Activity 5 pages 45 - 51 Activity 6 pages 54 - 58

	Activity 9 pages 74 - 77 Activity 10 pages 80 - 84 Activity 13 pages 98 - 101
c) characteristics (edible/nonedible, flowering/nonflowering, evergreen/deciduous).	<u>From Seed to Plant</u> Activity 13 pages 98 – 101 <i>This standard is addressed in Activity 9 of the grade 2-3 module Classroom Plants.</i>
<b>1. 5 The student will investigate and understand that animals, including people, have life needs and specific physical characteristics and can be classified according to certain characteristics. Key concepts include:</b>	
a) life needs (air, food, water, and a suitable place to live);	<u>Finding the Moon</u> Activity 6 pages 57 – 59 <u>Observing an Aquarium</u> Activity 7 pages 70 – 77
b) physical characteristics (body coverings, body shape, appendages, and methods of movement); and	
c) other characteristics (wild/tame, water homes/land homes).	
<b>1. 6 The student will investigate and understand the basic relationships between the sun and the Earth. Key concepts include:</b>	
a) the sun is the source of heat and light that warms the land, air, and water; and	
b) night and day are caused by the rotation of the Earth.	
<b>1. 7 The student will investigate and understand the relationship of seasonal change and weather to the activities and life processes of plants and animals. Key concepts include how temperature, light, and precipitation bring about changes in:</b>	
a) plants (growth, budding, falling leaves, and wilting);	<u>From Seed to Plant</u> Activity 13 pages 98 - 101

b) animals (behaviors, hibernation, migration, body covering, and habitat); and	<u>Observing an Aquarium</u> Activity 4 pages 41 - 46 Activity 5 pages 50 - 54 Activity 7 pages 70 - 77 Activity 10 pages 97 - 106 Activity 12 pages 117-123
c) people (dress, recreation, and work).	
<b>1.8 The student will investigate and understand that natural resources are limited.</b>	
<b>Key concepts include:</b>	
a) identification of natural resources (plants and animals, water, air, land, minerals, forests, and soil);	
b) factors that affect air and water quality; and	<u>Observing an Aquarium</u> Activity 11 pages 111 - 116
c) recycling, reusing, and reducing consumption of natural resources.	

## Grade Two Standards of Learning

<i>Science Standard</i>	<i>Correlation By Page Numbers</i>
<b>2.1 The student will conduct investigations in which:</b>	
a) observation is differentiated from personal interpretation, and conclusions are drawn based on observations;	<u>Soil Science</u> Activity 1 pages 21 – 26 Activity 12 pages 108 – 113 <u>Butterflies and Moths</u> Activity 1 pages 17-20
b) observations are repeated to ensure accuracy;	
c) two or more attributes are used to classify items;	<u>Soil Science</u> Activity 1 pages 15 – 19 Activity 4 pages 37 – 42 <i>The DSM module <u>Plant and Animal Life Cycles for grades 3 -4</u> addresses this standard in activity 1.</i> <u>Amazing Air</u> Activity 1 pages 7-14
d) conditions that influence a change are defined;	<u>Soil Science</u> Activity 11 pages 100 - 103
e) length, volume, mass, and temperature measurements are made in metric (centimeters, meters, liters, degrees Celsius, grams, kilograms) and standard English units (inches, feet, yards, cups, pints, quarts, gallons, degrees Fahrenheit, ounces, pounds);	<u>States of Matter</u> Activity 6 pages 52 - 56 Activity 11 pages 90 – 95 <u>Amazing Air</u> Activity 3 pages 25 – 33 <u>Length and Capacity</u> Activity 1 pages 7-11 Activity 4 pages 27-34 Activity 5 pages 37-42

	Activity 6 pages 43-49 Activity 7 pages 49-57 Activity 8 pages 59-67 Activity 9 pages 69-76 Activity 10 pages 70-82 Activity 11 pages 83-88 Activity 12 pages 89-94
f) pictures and bar graphs are constructed using numbered axes;	
g) unexpected or unusual quantitative data are recognized; and	<u>All DSM investigations are designed to collect data and investigate its results.</u>
h) simple physical models are constructed.	<u>Sink or Float</u> Activity 12 pages 98-102 Activity 4 pages 36 - 41 Activity 6 pages 54 - 58
<b>2.2 The student will investigate and understand that natural and artificial magnets have certain characteristics and attract specific types of metals. Key concepts include:</b>	
a) magnetism, iron, magnetic/nonmagnetic, poles, attract/repel; and	
b) important applications including the magnetic compass.	
<b>2.3 The student will investigate and understand basic properties of solids, liquids, and gases. Key concepts include:</b>	
a) mass and volume; and	<u>States of Matter</u> Activity 2 pages 20 - 25
b) processes involved with changes in matter from one state to another (condensation, evaporation, melting, and freezing).	<u>States of Matter</u> Activity 4 pages 35 - 40 Activity 8 pages 66 - 72 Activity 9 pages 74 - 79
<b>2.4 The student will investigate and understand that plants and animals undergo a series of orderly changes in their life cycles. Key concepts include:</b>	

<p>a) some animals (frogs and butterflies) undergo distinct stages during their lives while others generally resemble their parents; and</p>	<p><i>The DSM module <u>Butterflies and Moths</u> addresses this standard in its activities especially, but not limited to, in the following:</i>  Activity 6 pages 55 - 58  Activity 11 pages 99 – 104  <i>The DSM module <u>Plant and Animal Life Cycle</u> designed for grades 3 – 4 addresses this standard.</i></p>
<p>b) flowering plants undergo many changes from the formation of the flower to the development of the fruit.</p>	<p><u>Classroom Plants</u>  Activity 9 pages 82 - 85  Activity 10 pages 88-94</p>
<p><b>2.5 The student will investigate and understand that living things are part of a system. Key concepts include:</b></p>	
<p>a) living organisms are interdependent with their living and nonliving surroundings; and</p>	<p><u>Butterflies and Moths</u>  Activity 8 pages 72 - 77  Activity 3 pages 32 - 37</p>
<p>b) habitats change over time due to many influences.</p>	
<p><b>2.6 The student will investigate and understand basic types, changes, and patterns of weather. Key concepts include:</b></p>	
<p>a) temperature, wind, precipitation, drought, flood, and storms; and</p>	<p><u>Weather Watching</u>  Activity 2 pages 22 – 27  Activity 5 pages 45 – 50  Activity 7 pages 61 – 67  Activity 8 pages 69 – 75  Activity 9 pages 78 – 85  Activity 10 pages 88 - 99</p>
<p>b) the uses and importance of measuring and recording weather data.</p>	<p><u>Weather Watching</u>  Activity 2 page 31  Activity 12 pages 110 - 115</p>
<p><b>2.7 The student will investigate and understand that weather and seasonal changes affect plants, animals, and their surroundings. Key concepts include:</b></p>	
<p>a) effects on growth and behavior of living things (migration, hibernation, camouflage, adaptation, dormancy); and</p>	<p><u>Weather Watching</u>  Activity 1 pages 13 - 18</p>

b) weathering and erosion of the land surface.	<u>Soil Science</u> Activity 5 pages 46 - 49
<b>2. 8 The student will investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature. Key concepts include:</b>	
a) important plant products (fiber, cotton, oil, spices, lumber, rubber, medicines, and paper);	<u>Classroom Plants</u> Activity 12 pages 106 - 111
b) the availability of plant products affects the development of a geographic area; and	
c) plants provide homes and food for many animals and prevent soil from washing away.	<u>Soil Science</u> Activity 6 pages 52 – 56 Activity 8 pages 71 – 77 Activity 10 pages 92 - 96

## Grade Three Standards of Learning

<i>Science Standard</i>	<i>Correlation By Page Numbers</i>
<b>3.1 The student will plan and conduct investigations in which:</b>	
a) Predictions and observations are made	All DSM investigations provide opportunity to make predictions and observations. <u>Earth Movements</u> Activity 6 pages 55 – 60 <u>Looking at Liquids</u> Activity 3 pages 23-28 Activity 4 pages 29-34 Activity 6 pages 43-48 Activity 7 pages 49-55 Activity 8 pages 57-62 Activity 9 pages 62-70 <u>Animal Behavior</u> Activity 1 pages 7-12 Activity 2 pages 13-17 <u>Insect Life</u> Activity 3 pages 23-28
b) Objects with similar characteristics are classified into at least two sets and two subsets;	<u>Soil Science</u> Activity 3 pages 31 – 35 <u>Plant and Animal Life Cycles</u> Activity 1 pages 15 – 21 <u>Powders and Crystals</u> Activity 1 pages 7-11 Activity 2 pages 13-19 Activity 3 pages 21-25 <u>Insect Life</u> Activity 6 pages 41-46
c) Questions are developed to formulate	Students ask questions and answer them using investigations

hypotheses;	throughout all of the DSM units. <u>Earth Movements</u> Activity 9 pages 79 - 86 <u>Powders and Crystals</u> Activity 4 pages 27-32 Activity 12 pages 87-92
d) volume is measured to the nearest milliliter and liter;	<u>States of Matter</u> Activity 2 page 20 <u>Measuring</u> Activity 7 pages 51-56 Activity 8 pages 57-64 <u>Length and Capacity</u> Activity 10 pages 77-80 Activity 11 pages 83-88
e) length is measured to the nearest centimeter;	<u>Measuring</u> Activity 5 pages 37-44 Activity 6 pages 45-50 <u>Length and Capacity</u> Activity 1 pages 7-12 Activity 4 pages 27-34 Activity 6 pages 43-48 Activity 7 pages 49-57
f) mass is measured to the nearest gram;	<u>Measuring</u> Activity 10 pages 71-77
g) data are gathered, charted, and graphed (line plot, picture graph, and bar graph);	<u>Solar System</u> Activity 1 page 16 <u>Length and Capacity</u> Activity 4 page 32
h) temperature is measured to the nearest degree Celsius;	<u>Weather Watching</u> Activity 2 pages 22 – 27 <u>Weather Instruments</u> Activity 1 pages 13 – 19 <u>Measuring</u> Activity 12 pages 87-96
i) time is measured to the nearest minute;	<u>Measuring</u>

	Activity 13 pages 97-103
j) inferences are made and conclusions are drawn; and	All DSM Modules provide opportunity to make inferences and draw conclusions. <u>Earth Movements</u> Activity 9 pages 55 -60 <u>Dinosaurs and Fossils</u> Activity 8 pages 64 - 69 <u>Animal Behavior</u> Activity 11 pages 71-75 <u>Insect Life</u> Activity 8 pages 55-60 Activity 9 pages 61-64
k) natural events are sequenced chronologically.	
<b>3.2 The student will investigate and understand simple machines and their uses. Key concepts include:</b>	
a) types of simple machines (lever, screw, pulley, wheel and axle, inclined plane, and wedge);	<i>The <u>Force and Motion</u> module addresses this standard in its activities numbered 3 through 11.</i> <i>The <u>Simple Machines</u> module for grades 5 -6 addresses this standard.</i>
b) how simple machines function;	<i>The <u>Force and Motion</u> module addresses this standard in its activities numbered 3 through 11.</i> <i>The <u>Simple Machines</u> module for grades 5 -6 addresses this standard.</i>
c) compound machines (scissors, wheelbarrow, and bicycle); and	
d) examples of simple and compound machines found in the school, home, and work environment.	<u>Force and Motion</u> Activity 12 pages 112 – 116 <u>Simple Machines (grades 5 – 6</u> Activity 12 pages 91 - 95
<b>3.3 The student will investigate and understand that objects are made of materials that can be described by their physical properties. Key concepts include:</b>	
a) objects are made of one or more materials;	
b) materials are composed of parts that are too small to be seen without magnification; and	<u>Small Things and Microscopes</u> Activity 1 pages 7-11

	<p>Activity 3 pages 19-22  Activity 4 pages 25-30  Activity 7 pages 43-47  Activity 8 pages 49-53  Activity 9 pages 55-59</p>
c) physical properties remain the same as the material is reduced in size.	<p><u>Small Things and Microscopes</u>  Activity 1 pages 7-11  Activity 2 pages 13-17  Activity 4 pages 25-30  Activity 5 pages 31-35</p>
<b>3. 4 The student will investigate and understand that behavioral and physical adaptations allow animals to respond to life needs. Key concepts include:</b>	
a) methods of gathering and storing food, finding shelter, defending themselves, and rearing young, and	<p><u>Butterflies and Moths</u>  Activity 8 pages 72 - 76  Activity 3 pages 32 - 36  Activity 10 pages 90 – 93  <u>Animal Behavior</u>  Activity 4 pages 25-29  Activity 12 pages 77-81  <u>Insect Life</u>  Activity 12 pages 79-83</p>
b) hibernation, migration, camouflage, mimicry, instinct, and learned behavior.	<p><u>Butterflies and Moths</u>  Activity 3 pages 32 – 36  Activity 8 pages 72 – 76  <u>Animal Behavior</u>  Activity 9 pages 59-63  Activity 10 pages 65-69  <u>Insect Life</u>  Activity 11 pages 73-78</p>
<b>3. 5 The student will investigate and understand relationships among organisms in aquatic and terrestrial food chains. Key concepts include:</b>	
a) producer, consumer, decomposer;	<p><u>Food Chains and Webs</u>  Activity 3 pages 32 - 36  Activity 9 pages 74 -78</p>

	<p>Activity 12 pages 97 – 102</p> <p><u>Plant and Animal Life Cycles</u></p> <p>Activity 12 pages 107 - 112</p>
b) herbivore, carnivore, omnivore; and	<p><u>Food Chains and Webs</u></p> <p>Activity 8 pages 68 - 72</p> <p>Activity 10 pages 82 - 87</p> <p>Activity 12 pages 97 – 102</p>
c) predator - prey.	<p><u>Food Chains and Webs</u></p> <p>Activity 11 pages 90 – 95</p> <p><u>Insect Life</u></p> <p>Activity 10 pages 67-70</p>
<b>3. 6 The student will investigate and understand that environments support a diversity of plants and animals that share limited resources. Key concepts include:</b>	
a) water-related environments (pond, marshland, swamp, stream, river, and ocean environments);	<p><u>Small Things and Microscopes</u></p> <p>Activity 10 pages 61-66</p> <p>Activity 11 pages 67-71</p>
b) dry-land environments (desert, grassland, rain forest, and forest environments); and	
c) population and community.	
<b>3. 7 The student will investigate and understand the major components of soil, its origin, and importance to plants and animals including humans. Key concepts include:</b>	
a) soil provides the support and nutrients necessary for plant growth;	<p><u>Soil Science</u></p> <p>Activity 8 pages 70 – 77</p> <p><u>Classroom Plants</u></p> <p>Activity 4 pages 41 – 45</p> <p><u>Food Chains and Webs</u></p> <p>Activity 1 pages 16 - 20</p> <p>Activity 2 pages 23 - 28</p>
b) topsoil is a natural product of subsoil and bedrock;	<p><u>Food Chains and Webs</u></p> <p>Activity 1 pages 16 - 20</p>
c) rock, clay, silt, sand, and humus are components of soils; and	<p><u>Soil Science</u></p> <p>Activity 2 pages 22 – 26</p> <p>Activity 3 pages 30 – 34</p> <p>Activity 4 pages 38 – 42</p>

	<u>Food Chains and Webs</u> Activity 1 pages 16 - 20
d) soil is a natural resource and should be conserved.	<u>Soil Science</u> Activity 10 pages 92 - 96
<b>3.8 The student will investigate and understand basic patterns and cycles occurring in nature.</b> <b>Key concepts include:</b>	
a) patterns of natural events (day and night, seasonal changes, phases of the moon, and tides); and	<i>The K-1 curriculum on Finding the Moon addresses this standard.</i>
b) animal and plant life cycles.	
<b>3.9 The student will investigate and understand the water cycle and its relationship to life on Earth.</b> <b>Key concepts include:</b>	
a) the energy from the sun drives the water cycle;	<u>Weather Instruments</u> Activity 7 pages 59 - 66 Activity 11 pages 89 – 96 <u>Water Cycle</u> <i>This entire module goes into the water cycle in depth.</i>
b) processes involved in the water cycle (evaporation, condensation, precipitation);	<u>Weather Watching</u> Activity 7 pages 62 – 67 <u>Weather Instruments</u> Activity 7 pages 59 – 66 <u>Water Cycle</u> <i>This entire module goes into the water cycle in depth.</i>
c) water is essential for living things; and	<u>Water Cycle</u> Activity 3 pages 31 - 36 <u>Classroom Plants</u> Activity 5 pages 49 - 53
d) water supply and water conservation.	
<b>3.10 The student will investigate and understand that natural events and human influences can affect the survival of species.</b> <b>Key concepts include:</b>	
a) the interdependency of plants and animals;	<u>Soil Science</u> Activity 9 pages 82 – 88 <i>This standard is addressed in the grade 5-6 DSM module <u>Pond Life</u>.</i>

b) human effects on the quality of air, water, and habitat;	<u>Soil Science</u> Activity 11 pages 100 - 103
c) the effects of fire, flood, disease, and erosion on organisms; and	<u>Soil Science</u> Activity 12 pages 108 - 113
d) conservation and resource renewal.	
<b>3. 11 The student will investigate and understand different sources of energy.</b>	
<b>Key concepts include:</b>	
a) the sun's ability to produce light and heat energy;	
b) sources of energy (sunlight, water, wind);	<u>Water Cycle</u> Activity 13 pages 107 – 113
c) fossil fuels (coal, oil, natural gas) and wood; and	
d) renewable and nonrenewable energy resources.	

## Grade Four Standards of Learning

<i>Science Standard</i>	<i>Correlation By Page Numbers</i>
<b>4.1 The student will plan and conduct investigations in which:</b>	
a) distinctions are made among observations, conclusions, inferences, and predictions;	Students conduct investigations in each DSM module that allow them to make observations, predictions, inferences, and conclusions. Some examples are: <u>Earth Movements</u> Activity 8, 9 pages 71 - 90 <u>Dinosaurs and Fossils</u> Activity 1 pages 13 – 18 <u>Insect Life</u> Activity 5 pages 35-39
b) hypotheses are formulated based on cause and effect relationships;	Students develop questions, form hypothesis, make predictions and seek answers to the questions by experimentation throughout the DSM units. Some examples are: <u>Food Chains and Webs</u> Activity 3 pages 31 - 36 <u>Powders and Crystals</u> Activity 12 pages 87-92
c) variables that must be held constant in an experimental situation are defined;	<u>Food Chains and Webs</u> Activity 3 pages 31 – 36 <u>Animal Behavior</u> Activity 3 pages 19-23 Activity 5 pages 31-37 Activity 6 pages 39-43 Activity 7 pages 43-51 Activity 11 pages 71-75 Activity 12 pages 77-81
d) appropriate instruments are selected to measure linear distance, volume, mass, and	<u>Weather Instruments</u> <i>Much of this module encompasses selecting instruments to</i>

temperature;	<i>measure various variables.</i> <u>Measuring</u> Activity 5 pages 37-44 Activity 9 pages 65-70 Activity 11 pages 79-86 Activity 13 pages 97-103
e) appropriate metric measures are used to collect, record, and report data;	<u>Solar System</u> Activity 5, pages 45-48 <u>Measuring</u> Activity 3 pages 21-27
f) data are displayed using bar and basic line graphs;	<u>Dinosaurs and Fossils</u> Activity 6 pages 47 - 53
g) numerical data that are contradictory or unusual in experimental results are recognized; and	Students can encounter contradictory or unusual data in experiments involving numerical data. Results are shared and recognized in class discussion.
h) predictions are made based on data from picture graphs, bar graphs, and basic line graphs.	Students develop questions, form hypothesis, make predictions and seek answers to the questions by experimentation throughout DSM investigations.
<b>4.2 The student will investigate and understand characteristics and interaction of moving objects.</b> <b>Key concepts include:</b>	
a) motion is described by an object's direction and speed;	
b) forces cause changes in motion;	<i>The DSM module <u>Simple Machines</u> for grades 5-6 meets this standard.</i>
c) friction is a force that opposes motion; and	<i>The DSM module <u>Simple Machines</u> for grades 5 -6 meets this standard.</i>
d) moving objects have kinetic energy.	
<b>4.3 The student will investigate and understand the characteristics of electricity.</b> <b>Key concepts include:</b>	
a) conductors and insulators;	
b) basic circuits (open/closed, parallel/series);	<i>The DSM module <u>Electrical Connections</u> for grades 6-8 addresses this standard in activities 8,9, and 10.</i>
c) static electricity;	<i>The DSM module <u>Electrical Connections</u> for grades 6-8 addresses this standard in activity 1.</i>

d) the ability of electrical energy to be transformed into heat, light, and mechanical energy;	
e) simple electromagnets and magnetism: and	<u>Magnets</u> Activity 11 pages 72 - 76 Activity 2 pages 20 - 23 Activity 3 pages 26 - 34
f) historical contributions in understanding electricity.	
<b>4.4 The student will investigate and understand basic plant anatomy and life processes. Key concepts include:</b>	
a) the structures of typical plants (leaves, stems, roots, and flowers);	<u>Plant and Animal Life Cycles</u> Activity 8 pages 75-79
b) processes and structures involved with reproduction (pollination, stamen, pistil, sepal, embryo, spore, and seed);	<u>Plant and Animal Life Cycles</u> Activity 3 pages 35 -40 Activity 7 pages 67 - 73 Activity 9 pages 85 - 90
c) photosynthesis (sunlight, chlorophyll, water, carbon dioxide, oxygen, and sugar); and	
d) dormancy.	
<b>4.5 The student will investigate and understand how plants and animals in an ecosystem interact with one another and the nonliving environment. Key concepts include:</b>	
a) behavioral and structural adaptations;	<i>This standard is addressed in the grade 5-6 DSM module <u>Pond Life</u>.</i> <u>Animal Behavior</u> Activity 8 pages 53-57 Activity 9 pages 59-63 Activity 10 pages 65-69
b) organization of communities;	
c) flow of energy through food webs;	<u>Food Chains and Webs</u> Activity 12 pages 97 - 102
d) habitats and niches;	<i>This standard is addressed in the grade 5-6 DSM module <u>Pond Life</u>.</i>
e) life cycles; and	

f) influence of human activity on ecosystems.	
<b>4.6 The student will investigate and understand how weather conditions and phenomena occur and can be predicted.</b>	
<b>Key concepts include:</b>	
a) weather measurements and meteorological tools (air pressure-barometer, wind speed-anemometer, rainfall-rain gauge, and temperature-thermometer);	<u>Weather Instruments</u> Activities 1, and 2. Pages 14 - 28 <i>This module studies and uses a variety of weather instruments to allow the students to gain understanding in air pressure, humidity, precipitation, etc.</i>
b) weather phenomena (fronts, clouds, and storms).	
<b>4.7 The student will investigate and understand the relationships among the Earth, moon, and sun.</b>	
<b>Key concepts include:</b>	
a) the motions of the Earth, moon, and sun (revolution and rotation);	<u>Solar System</u> Activity 2 page 23 Activity 9, pages 75 - 79
b) the causes for the Earth's seasons and phases of the moon;	
c) the relative size, position, age, and makeup of the Earth, moon, and sun; and	<u>Solar System</u> Activity 6 pages 53 - 57
d) historical contributions in understanding the Earth-moon-sun system.	
<b>4.8 The student will investigate and understand important Virginia natural resources.</b>	
<b>Key concepts include:</b>	
a) watershed and water resources;	
b) animals and plants;	Some concepts that could be appropriate for Virginia include:
c) minerals, rocks, ores, and energy sources; and	Some concepts that could be appropriate for Virginia include:
d) forests, soil, and land.	Some concepts that could be appropriate for Virginia include:

## Grade Five Standards of Learning

<i>Science Standard</i>	<i>Correlation By Page Numbers</i>
<b>5.1 The student will plan and conduct investigations in which:</b>	
a) rocks, minerals, and organisms are identified using a classification key;	<u>Rocks and Minerals</u> Activity 3 pages 30 - 33 Activity 4 pages 36 - 39 Activity 5 pages 42 - 45
b) estimations of length, mass, and volume are made;	<u>Measuring</u> Activity 1 pages 7-13
c) appropriate instruments are selected and used for making quantitative observations of length, mass, volume, and elapsed time;	<u>Measuring</u> Activity 5 pages 37-43 Activity 9 pages 65-70 Activity 11 pages 79-85 Activity 13 pages 97-103
d) accurate measurements are made using basic tools (thermometer, meter stick, balance, graduated cylinder);	<u>Weather Instruments</u> Activity 1, 2, 3 pages 13 – 36 <u>Measuring</u> Activity 5 pages 37-43 Activity 9 pages 65-70 Activity 11 pages 79-85 Activity 13 pages 97-103
e) data are collected, recorded, and reported using the appropriate graphical representation (graphs, charts, diagrams);	<u>Weather Instruments</u> Activity 6 pages 51 - 57 <u>Rocks and Minerals</u> Activity 3 pages 30 -33 Activity 4 pages 36 – 39 Activity 9 pages 70 – 75 Activity 12 pages 93 – 98 <u>Pollution</u>

	<p>Activity 12 pages 83 -87</p> <p><u>Solar Energy</u></p> <p>Activity 2 pages13 - 20</p> <p>Activity 3 pages21 - 26</p> <p>Activity 4 pages27 - 32</p> <p>Activity 5 pages33 - 38</p> <p>Activity 7 pages 47 - 52</p> <p>Activity 8 pages 53 - 58</p>
f) predictions are made using patterns, and simple graphical data are extrapolated;	<p><u>Solar Energy</u></p> <p>Activity 3 pages 21 - 26</p> <p>Activity 7 pages 47 - 52</p>
g) manipulated and responding variables are identified; and	<p><u>Solar Energy</u></p> <p>Activity 9 pages 59 – 64</p> <p><u>Animal Behavior</u></p> <p>Activity 3 pages 19-23</p> <p>Activity 5 pages 31-37</p> <p>Activity 6 pages 39-44</p> <p>Activity 7 pages 45-51</p> <p>Activity 11 pages 71-75</p> <p>Activity 12 pages 77-80</p>
h) an understanding of the nature of science is developed and reinforced.	DSM modules are inquiry based and developing an understanding of science is inherent in the progra
<b>5.2 The student will investigate and understand how sound is transmitted and is used as a means of communication.</b>	
<b>Key concepts include:</b>	
a) frequency, waves, wavelength, vibration;	
b) the ability of different media (solids, liquids, and gases) to transmit sound; and	
c) uses and applications (voice, sonar, animal sounds, and musical instruments).	
<b>5.3 The student will investigate and understand basic characteristics of visible light and how it behaves.</b>	
<b>Key concepts include:</b>	
a) the visible spectrum and light waves;	
b) refraction of light through water and prisms;	<p><u>Color and Light</u></p> <p>Activity 1 pages 13 - 18</p>

	Activity 4 pages 37 - 42 Activity 6 pages 53 – 59 <u>Lenses and Mirrors</u> Activity 8 pages 55-66
c) reflection of light from reflective surfaces (mirrors);	<u>Lenses and Mirrors</u> Activity 1 pages 5-12 Activity 4 pages 27-34 Activity 5 pages 35-40 Activity 6 pages 41-46 Activity 7 pages 47-54
d) opaque, transparent, and translucent; and	
e) historical contributions in understanding light.	
<b>5.4 The student will investigate and understand that matter is anything that has mass; takes up space; and occurs as a solid, liquid, or gas. Key concepts include:</b>	
a) atoms, elements, molecules, and compounds;	
b) mixtures including solutions; and	<u>Powders and Crystals</u> Activity 5 pages 35-42 Activity 6 pages 43-48 Activity 7 pages 49-54 Activity 10 pages 71-80
c) effect of heat on the states of matter.	<u>Powders and Crystals</u> Activity 9 pages 63-69
<b>5.5 The student will investigate and understand that organisms are made of cells and have distinguishing characteristics. Key concepts include:</b>	
a) basic cell structures and functions;	<i>This standard is addressed in the DSM module <u>DNA – From Genes to Proteins</u> designed for grades 6 – 8.</i>
b) kingdoms of living things;	<u>Fungi – Small Wonders</u> <i>This DSM module addresses the Kingdom Fungi entirely.</i>
c) vascular and nonvascular plants; and	
d) vertebrates and invertebrates.	
<b>5.6 The student will investigate and understand characteristics of the ocean environment. Key concepts include:</b>	
a) geological characteristics (continental shelf,	<i>The DSM module <u>Earth Processes</u> created for grades 6 – 8</i>

slope, rise);	<i>addresses this standard.</i>
b) physical characteristics (depth, salinity, major currents); and	
c) biological characteristics (ecosystems).	
<b>5.7 The student will investigate and understand how the Earth’s surface is constantly changing. Key concepts include:</b>	
a) the rock cycle including the identification of rock types;	<i>The DSM module <u>Earth Processes</u> created for grades 6 – 8 addresses this standard in Activity 6.</i>
b) Earth history and fossil evidence;	<i>The DSM module <u>Dinosaurs and Fossils</u> for grades 3 – 4 addresses this standard.</i>
c) the basic structure of the Earth’s interior;	<i>The DSM module <u>Earth Processes</u> created for grades 6 – 8 addresses this standard in Activity 2.</i>
d) plate tectonics (earthquakes and volcanoes);	<i>The DSM module <u>Earth Processes</u> created for grades 6 – 8 addresses this standard in Activities 5, 8, and 14</i>
e) weathering and erosion; and	<u>Erosion</u> Activity 1 pages 13 - 19 Activity 2 pages 21 - 27 Activity 11 pages 91 - 97 Activity 12 pages 99 – 104 <i>The DSM module <u>Earth Processes</u> created for grades 6 -8 addresses this standard in Activity 3.</i>
f) human impact.	

## Grade Six Standards of Learning

<i>Science Standard</i>	<i>Correlation By Page Numbers</i>
<b>6.1 The student will plan and conduct investigations in which:</b>	
a) observations are made involving fine discrimination between similar objects and organisms;	
b) a classification system is developed based on multiple attributes;	<u>Rocks and Minerals</u> Activity 9 pages 70 -76 <u>Chemical Interactions</u> Activity 4 pages 29-36 <u>Insect Life</u> Activity 6 pages 41-46
c) precise and approximate measures are recorded;	<u>Earth Processes</u> Activity 9 pages 69-73
d) scale models are used to estimate distance, volume, and quantity;	<u>Astronomy</u> Activity 2 pages 17 – 22 <u>Earth, Moon, and Sun</u> Activity 5 pages 37 - 44
e) hypotheses are stated in ways that identify the independent (manipulated) and dependent (responding) variables;	<u>Lenses and Mirrors</u> Activity 12 pages 89-93 <u>Chemical Interactions</u> Activity 2 pages 15-22
f) a method is devised to test the validity of predictions and inferences;	<u>Astronomy</u> Activity 2 pages 17 - 22
g) one variable is manipulated over time with many repeated trials;	<u>Chemical Interactions</u> Activity 2 pages 17-22
h) data are collected, recorded, analyzed, and reported using appropriate metric measurement;	<u>Solar Energy</u> Activity 2 pages 13-20 Activity 3 pages 21-26 Activity 4 pages 27-31

	Activity 5 pages 33 - 37 Activity 8 pages 53 - 58
i) data are organized and communicated through graphical representation (graphs, charts, and diagrams);	<u>Chemical Interactions</u> Activity 2 pages 17-22 Activity 8 page 60
j) models are designed to explain a sequence; and	<u>Flight and Rocketry</u> Activity 2 pages 25 - 31 Activity 4 pages 47 - 54 Activity 6 pages 66 - 71 Activity 12 pages 123 – 129 <u>Earth, Moon, and Sun</u> Activity 5 pages 37-44 Activity 7 pages 53-60
k) an understanding of the nature of science is developed and reinforced.	DSM modules are inquiry based and developing an understanding of science is inherent in the program.
<b>6.2 The student will investigate and understand basic sources of energy, their origins, transformations, and uses. Key concepts include:</b>	
a) potential and kinetic energy;	
b) the role of the sun in the formation of most energy sources on Earth;	<u>Solar Energy</u> Activity 2 pages 13-20
c) nonrenewable energy sources (fossil fuels, including petroleum, natural gas, and coal);	
d) renewable energy sources (wood, wind, hydro, geothermal, tidal, and solar); and	
e) energy transformations (heat/light to mechanical, chemical, and electrical energy).	
<b>6.3 The student will investigate and understand the role of solar energy in driving most natural processes within the atmosphere, the hydrosphere, and on the Earth's surface. Key concepts include:</b>	
a) the Earth's energy budget;	<u>Solar Energy</u> The activities one through eight address this standard.
b) the role of radiation and convection in the distribution of energy;	<u>Solar Energy</u> Activity 11 pages 71 - 76 Activity 12 pages 77-81

	<u>Earth Processes</u> Activity 12 pages 89-93 Activity 13 pages 95-104
c) the motion of the atmosphere and the oceans;	<u>Earth Processes</u> Activity 13 pages 95-104
d) cloud formation; and	
e) the role of heat energy in weather-related phenomena including thunderstorms and hurricanes.	
<b>6.4 The student will investigate and understand that all matter is made up of atoms. Key concepts include:</b>	
a) atoms are made up of electrons, protons, and neutrons;	<u>Chemical Interactions</u> Activity 4 pages 29-35
b) atoms of any element are alike but are different from atoms of other elements;	<u>Chemical Interactions</u> Activity 4 pages 29-35
c) elements may be represented by chemical symbols;	<u>Chemical Interactions</u> Activity 4 pages 29-35
d) two or more atoms may be chemically combined;	<u>Chemical Interactions</u> Activity 5 pages 37-41
e) compounds may be represented by chemical formulas;	<u>Chemical Interactions</u> Activity 6 pages 43-52 Activity 7 pages 53-58 Activity 9 pages 65-72
f) chemical equations can be used to model chemical changes; and	<u>Chemical Interactions</u> Activity 7 pages 53-58
g) a limited number of elements comprise the largest portion of the solid Earth, living matter, the oceans, and the atmosphere.	
<b>6.5 The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. Key concepts include:</b>	
a) water as the universal solvent;	
b) the properties of water in all three states;	<u>Chemical Interactions</u> Activity 1 pages 7-13
c) the action of water in physical and chemical	<u>Erosion</u>

weathering;	Activity 2 pages 21 - 27 Activity 3 pages 30 - 35 Activity 6 pages 52 - 57 Activity 7 pages 60 - 65 Activity 10 pages 84 - 89 Activity 12 pages 100 - 104
d) the ability of large bodies of water to store heat and moderate climate;	
e) the origin and occurrence of water on Earth;	
f) the importance of water for agriculture, power generation, and public health; and	
g) the importance of protecting and maintaining water resources.	<u>Pollution</u> Activity 5 pages 40-45 Activity 6 pages 48 - 52 Activity 7 pages 54 - 56 Activity 9 pages 66-69
<b>6.6 The student will investigate and understand the properties of air and the structure and dynamics of the Earth's atmosphere. Key concepts include:</b>	
a) air as a mixture of gaseous elements and compounds;	<u>Flight and Rocketry</u> Activity 1 pages 13-21
b) air pressure, temperature, and humidity;	<u>Weather Forecasting</u> Activity 4 pages 33 - 40 Activity 5 pages 41 - 47 Activity 3 pages 25 -32
c) how the atmosphere changes with altitude;	
d) natural and human-caused changes to the atmosphere;	
e) the relationship of atmospheric measures and weather conditions;	<u>Weather Forecasting</u> Activity 4 pages 33 – 40
f) basic information from weather maps including fronts, systems, and basic measurements; and	<u>Weather Forecasting</u> Activity 7 pages 55 - 61
g) the importance of protecting and maintaining air quality.	
<b>6.7 The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include:</b>	

a) the health of ecosystems and the abiotic factors of a watershed;	
b) the location and structure of Virginia’s regional watershed systems;	
c) divides, tributaries, river systems, and river and stream processes;	
d) wetlands;	
e) estuaries;	
f) major conservation, health, and safety issues associated with watersheds; and	
g) water monitoring and analysis using field equipment including hand-held technology.	
<b>6.8 The student will investigate and understand the organization of the solar system and the relationships among the various bodies that comprise it. Key concepts include:</b>	
a) the, sun, moon, Earth, other planets and their moons, meteors, asteroids, and comets;	<u>Astronomy</u> Activity 6 pages 53 – 59 <u>Earth, Moon, and Sun</u> Activity 3 pages 23-28 Activity 4 pages 29-35
b) relative size of and distance between planets;	<u>Earth, Moon, and Sun</u> Activity 3 pages 23 - 28 Activity 4 pages 29-35 Activity 5 pages 37-44
c) the role of gravity;	<u>Earth, Moon, and Sun</u> Activity 12 pages 95-104
d) revolution and rotation;	<u>Astronomy</u> Activity 4 pages 35 – 42 <u>Earth, Moon, and Sun</u> Activity 861-68
e) the mechanics of day and night and phases of the moon;	<u>Astronomy</u> Activity 2 pages 17 -22 <u>Earth, Moon, and Sun</u> Activity 6 pages 45-52 Activity 7 pages 53-60

	Activity 8 pages 61-68
f) the unique properties of Earth as a planet;	<u>Astronomy</u> Activity 2 pages 17 -22
g) the relationship of the Earth's tilt and seasons;	<u>Astronomy</u> Activity 2 pages 17 - 22 Activity 4 pages 35 - 42 Activity 5 pages 43 – 51 <u>Earth, Moon, and Sun</u> Activity 9 pages 69-78 <i>The DSM module <u>Solar Energy</u> addresses this standard in some of the activities. The module is assigned for grades 5 and 6.</i>
h) the cause of tides; and	<u>Earth, Moon, and Sun</u> Activity 12 pages
i) the history and technology of space exploration.	<u>Astronomy</u> Activity 3 pages 25 – 34 Activity 5 pages 43 - 51 Activity 11 pages 93 - 99 Activity 12 pages 101 – 109 <u>Earth, Moon, and Sun</u> Activity 7 pages 53-60 Activity 12 pages 95 - 104
<b>6.9 The student will investigate and understand public policy decisions relating to the environment.</b>	
<b>Key concepts include:</b>	
a) management of renewable resources (water, air, soil, plant life, animal life);	
b) management of nonrenewable resources (coal, oil, natural gas, nuclear power, mineral resources);	
c) the mitigation of land-use and environmental hazards through preventive measures; and	
d) cost/benefit tradeoffs in conservation policies.	

## Grade Seven Standards of Learning

<i>Science Standard</i>	<i>Correlation By Page Numbers</i>
<b>7.1 The student will plan and conduct investigations in which:</b>	
a) data are organized into tables showing repeated trials and means;	
b) variables are defined;	
c) metric units (SI - International System of Units) are used;	
d) models are constructed to illustrate and explain phenomena;	
e) sources of experimental error are identified;	Each DSM investigation includes a discussion of experimental results. Sources of experimental error would be identified here.
f) dependent variables, independent variables, and constants are identified;	
g) variables are controlled to test hypotheses and trials are repeated;	<u>Plants in Our World</u> <i>This DSM module relies heavily on experiments and controlling for different variables.</i>
h) continuous line graphs are constructed, interpreted, and used to make predictions;	
i) interpretations from the same set of data are evaluated and defended; and	<u>Plants in Our World</u> <i>This DSM module relies heavily on experiments that the students can interpret the information.</i>
j) an understanding of the nature of science is developed and reinforced.	DSM modules are inquiry based and developing an understanding of science is inherent in the program.
<b>7.2 The student will investigate and understand that all living things are composed of cells. Key concepts include:</b>	
a) cell structure and organelles (cell membrane, cell wall, cytoplasm, vacuole, mitochondrion, endoplasmic reticulum, nucleus and chloroplast);	<u>DNA – From Genes to Proteins</u> Activity 3 pages 19-23 Activity 4 pages 25-29

b) similarities and differences between plant and animal cells;	<u>DNA – From Genes to Proteins</u> Activity 12 pages 81-87 <u>Plants in Our World</u> Activity 1 pages 7-11
c) development of cell theory; and	
d) cell division (mitosis and meiosis).	<u>DNA – From Genes to Proteins</u> Activity 7 pages 45-51
<b>7.3 The student will investigate and understand that living things show patterns of cellular organization. Key concepts include:</b>	
a) cells, tissues, organs, and systems; and	
b) life functions and processes of cells, tissues, organs, and systems (respiration, removal of wastes, growth, reproduction, digestion, and cellular transport).	<u>Plants in Our World</u> Activity 2 pages 13-17 Activity 3 pages 19-22 Activity 5 pages 31-35 Activity 6 pages 37-41 Activity 8 pages 51-56 Activity 10 pages 63-68
<b>7.4 The student will investigate and understand that the basic needs of organisms must be met in order to carry out life processes. Key concepts include:</b>	
a) plant needs (light and energy sources, water, gases, nutrients);	<u>Plants in Our World</u> Activity 3 pages 19-22 Activity 5 pages 31 – 35 Activity 6 pages 37-41
b) animal needs (food, water, gases, shelter, space); and	
c) factors that influence life processes.	
<b>7.5 The student will investigate and understand how organisms can be classified. Key concepts include:</b>	
a) distinguishing characteristics among kingdoms of organisms;	
b) distinguishing characteristics of major animal and plant phyla; and	
c) the characteristics of the species.	

<b>7.6 The student will investigate and understand the basic physical and chemical processes of photosynthesis and its importance to plant and animal life. Key concepts include:</b>	
a) energy transfer between sunlight and chlorophyll;	<u>Plants in Our World</u> Activity 9 pages 57-61
b) transformation of water and carbon dioxide into sugar and oxygen; and	<u>Plants in Our World</u> Activity 8 pages 51-56
c) photosynthesis as the foundation of virtually all food webs.	<u>Plants in Our World</u> Activity 9 pages 57-61
<b>7.7 The student will investigate and understand that organisms within an ecosystem are dependent on one another and on nonliving components of the environment. Key concepts include:</b>	
a) the carbon, water, and nitrogen cycles;	
b) interactions resulting in a flow of energy and matter throughout the system;	<i>This standard is addressed in the DSM module <u>Pond Life</u> designed for grades 5-6</i>
c) complex relationships within terrestrial, freshwater, and marine ecosystems; and	<i>This standard is addressed in the DSM module <u>Pond Life</u> designed for grades 5-6</i>
d) energy flow in food webs and energy pyramids.	<u>Plants in Our World</u> Activity 12 pages 77-81
<b>7.8 The student will investigate and understand that interactions exist among members of a population. Key concepts include:</b>	
a) competition, cooperation, social hierarchy, territorial imperative; and	
b) influence of behavior on a population.	<i>This standard is addressed in the DSM module <u>Pond Life</u> designed for grades 5-6</i> Activity 5 pages 35-40 Activity 6 pages 41-47 Activity 8 pages 57-61 Activity 9 pages 63-67 Activity 10 pages 69-73
<b>7.9 The student will investigate and understand interactions among populations in a biological community. Key concepts include:</b>	
a) the relationship among producers, consumers, and	<i>This standard is addressed in the DSM module <u>Pond Life</u></i>

decomposers in food webs;	<i>designed for grades 5-6</i> <u>Fungi-Small Wonders</u> Activity 8 pages 51-56
b) the relationship of predators and prey;	<i>This standard is addressed in the DSM module <u>Pond Life</u> designed for grades 5-6</i>
c) competition and cooperation;	<u>Fungi-Small Wonders</u> Activity 11 pages 69-74
d) symbiotic relationships; and	
e) niches.	<i>This standard is addressed in the DSM module <u>Pond Life</u> designed for grades 5-6</i>
<b>7.10 The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem. Key concepts include:</b>	
a) differences between ecosystems and biomes;	
b) characteristics of land, marine, and freshwater ecosystems; and	<i>This standard is addressed in the DSM module <u>Pond Life</u> designed for grades 5-6</i> Activity 3 pages 19-24 Activity 4 pages 27-33 Activity 12 pages 81-85
c) adaptations that enable organisms to survive within a specific ecosystem.	<i>This standard is addressed in the DSM module <u>Pond Life</u> designed for grades 5-6.</i> Activity 5 pages 35-40 Activity 6 pages 41-47 Activity 8 pages 57-62 Activity 9 pages 63-69 Activity 10 pages 69-74
<b>7.11 The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic and change over time (daily, seasonal, and long term). Key concepts include:</b>	
a) phototropism, hibernation, and dormancy;	
b) factors that increase or decrease population size; and	
c) eutrophication, climate change, and catastrophic disturbances.	
<b>7.12 The student will investigate and understand the relationships between ecosystem dynamics and human activity. Key concepts include:</b>	
a) food production and harvest;	

b) change in habitat size, quality, and structure;	
c) change in species competition;	
d) population disturbances and factors that threaten and enhance species survival; and	
e) environmental issues (water supply, air quality, energy production, and waste management).	
<b>7.13 The student will investigate and understand that organisms reproduce and transmit genetic information to new generations. Key concepts include:</b>	
a) the role of DNA;	<u>DNA – From Genes to Proteins</u> <i>The entire module addresses this standard.</i>
b) the function of genes and chromosomes;	<u>DNA – From Genes to Proteins</u> Activity 1 pages 7-11 Activity 10 pages 69-74
c) genotypes and phenotypes;	<u>DNA – From Genes to Proteins</u> Activity 1 pages 7 – 11 Activity 2 pages 13-17
d) factors affecting the expression of traits;	<u>DNA – From Genes to Proteins</u> Activity 1 pages 7-11
e) characteristics that can and cannot be inherited;	
f) genetic engineering and its applications; and	<u>DNA – From Genes to Proteins</u> Activity 13 pages 89-93
g) historical contributions and significance of discoveries related to genetics.	<u>DNA – From Genes to Proteins</u> Activity 13 pages 89-93
<b>7.14 The student will investigate and understand that organisms change over time. Key concepts include:</b>	
a) the relationships of mutation, adaptation, natural selection, and extinction;	<i>This standard is addressed in the DSM module <u>Pond Life</u> designed for grades 5-6.</i>
b) evidence of evolution of different species in the fossil record; and	
c) how environmental influences, as well as genetic variation, can lead to diversity of organisms.	<u>DNA – From Genes to Proteins</u> Activity 11 pages 75-79

## Grade Eight Standards of Learning

<i>Science Standard</i>	<i>Correlation By Page Numbers</i>
<b>PS 1. The student will plan and conduct investigations in which:</b>	
a) chemicals and equipment are used safely;	All DSM modules include a safety feature in the Overview section of the teacher's guide. Safety alerts are provided for activities where appropriate.
b) length, mass, volume, density, temperature, weight, and force are accurately measured and reported using the International System of Units (SI - metric);	
c) conversions are made among metric units applying appropriate prefixes;	
d) triple beam and electronic balances, thermometers, metric rulers, graduated cylinders, and spring scales are used to gather data;	<u>Newton's Toy Box</u> <i>All the activities in this module involve the students gathering data using a variety of different tools.</i>
e) numbers are expressed in scientific notation where appropriate;	
f) research skills are utilized using a variety of resources;	
g) independent and dependent variables, constants, controls, and repeated trials are identified;	
h) data tables showing the independent and dependent variables, derived quantities, and the number of trials are constructed and interpreted;	<u>Newton's Toy Box</u> <i>All the activities in this module involve the students interpreting information from data tables.</i>
i) data tables for descriptive statistics showing specific measures of central tendency, the range of the data set, and the number of repeated trials are constructed and interpreted;	
j) frequency distributions, scattergrams, line plots, and histograms are constructed and interpreted;	

k) valid conclusions are made after analyzing data;	<u>Astronomy</u> Activity 12 pages 101-108
l) research methods are used to investigate practical problems and questions;	<u>Astronomy</u> Activity 3 pages 25 - 33 Activity 9 pages 77 - 83
m) experimental results are presented in appropriate written form; and	
n) an understanding of the nature of science is developed and reinforced.	DSM modules are inquiry based and developing an understanding of science is inherent in the program.
<b>PS.2 The student will investigate and understand the basic nature of matter. Key concepts include:</b>	
a) the particle theory of matter;	
b) elements, compounds, mixtures, acids, bases, and salts;	
c) solids, liquids, and gases;	
d) characteristics of types of matter based on physical and chemical properties;	
e) physical properties (shape, density, solubility, odor, melting point, boiling point, color); and	
f) chemical properties (acidity, basicity, combustibility, reactivity).	
<b>PS.3 The student will investigate and understand the modern and historical models of atomic structure. Key concepts include:</b>	
a) the contributions of Dalton, Thomson, Rutherford, and Bohr in understanding the atom; and	
b) the modern model of atomic structure.	
<b>PS.4 The student will investigate and understand the organization and use of the periodic table of elements to obtain information. Key concepts include</b>	
a) symbols, atomic number, atomic mass, chemical families (groups), and periods;	
b) classification of elements as metals, metalloids, and nonmetals; and	
c) simple compounds (formulas and nature of bonding).	

<b>PS. 5 The student will investigate and understand changes in matter and the relationship of these changes to the Law of Conservation of Matter and Energy. Key concepts include:</b>	
a) physical changes;	
b) nuclear reactions (products of fusion and fission and their effects on human beings and the environment); and	
c) chemical changes (types of reactions, reactants and products, and balanced equations).	
<b>PS. 6 The student will investigate and understand states and forms of energy and how energy is transferred and transformed. Key concepts include:</b>	
a) potential and kinetic energy;	
b) mechanical, chemical, and electrical energy; and	
c) heat, light, and sound.	
<b>PS. 7 The student will investigate and understand temperature scales, heat, and heat transfer. Key concepts include:</b>	
a) Celsius and Kelvin temperature scales and absolute zero;	
b) phase change, freezing point, melting point, boiling point, vaporization, and condensation;	
c) conduction, convection, radiation, and	
d) applications of heat transfer (heat engines, thermostats, refrigeration, and heat pumps).	
<b>PS. 8 The student will investigate and understand characteristics of sound and technological applications of sound waves. Key concepts include:</b>	
a) wavelength, frequency, speed, and amplitude;	
b) resonance;	
c) the nature of mechanical waves; and	
d) technological applications of sound.	
<b>PS. 9 The student will investigate and understand the nature and technological applications of light. Key concepts include:</b>	
a) the wave behavior of light (reflection, refraction, diffraction, and interference);	<i>The DSM module <u>Lenses and Mirrors</u> for grades 5-6 addresses this standard.</i>
b) images formed by lenses and mirrors; and	<i>The DSM module <u>Lenses and Mirrors</u> for grades 5-6 addresses this standard.</i>
c) the electromagnetic spectrum.	

<b>PS. 10 The student will investigate and understand scientific principles and technological applications of work, force, and motion. Key concepts include:</b>	
a) speed, velocity, and acceleration;	<u>Newton's Toy Box</u> Activity 1 pages 7-11 Activity 3 pages 19-24 Activity 4 pages 25-29 Activity 7 pages 39-44 Activity 8 pages 45-50
b) Newton's laws of motion;	<u>Newton's Toy Box</u> Activity 3 pages 19-24 Activity 7 pages 39-44 Activity 11 pages 59-62
c) work, force, mechanical advantage, efficiency, and power; and	<u>Newton's Toy Box</u> Activity 1 pages 7-11 Activity 2 pages 13-17 Activity 3 pages 19-24 Activity 13 pages 67-70
d) applications (simple machines, compound machines, powered vehicles, rockets, and restraining devices).	
<b>PS. 11 The student will investigate and understand basic principles of electricity and magnetism. Key concepts include:</b>	
a) static, current, circuits;	<u>Electrical Connections</u> Activity 1 pages 7-12 Activity 2 pages 13-18 Activity 3 pages 19-24 Activity 5 pages 31-36 Activity 6 pages 37-44
b) magnetic fields and electromagnets; and	
c) motors and generators.	<u>Electrical Connections</u> Activity 11 pages 71-76