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Topic	SOL	Essential Knowledge and Skills	Related SOL	When Taught	Instructional Strategies	Classroom Assessment Methods	Resources
Scientific Investigation, Reasoning, and Logic ***Investigation Skills and the Nature of Science***	**6.1** **The student will plan and conduct investigations in which** **a) observations are made involving fine discrimination between similar objects and organisms;** **b) a classification system is developed based on multiple attributes;** **c) precise and approximate measures are recorded;** **d) scale models are used to estimate distance, volume, and quantity;** **e) hypotheses are stated in ways that identify the independent (manipulated) and dependent (responding) variables;**	**<u>The student will be able to</u>:** **Design** an experiment in which one variable is manipulated over many trials. **Collect**, **record**, **analyze**, and **report** data using metric terminology. **Organize** and **communicate** data using graphs (bar, line, and pie), charts, and diagrams. **Design** models that explain a sequence. For example, students should be able to describe the sequence of events involved in the process of photosynthesis. **Propose** hypotheses or predictions from observed patterns. **Demonstrate** an understanding of the nature of science and how it is developed and applied.	Math 6.8 6.2 6.18 6.1 6.9 6.20 6.10 English 6.8 6.2 6.7 Social Studies USI.1c Science 6.1-6.9	1st 9 Weeks and 1st 6 Weeks (10 Day Intro-duction) 2nd – 4th 9 Weeks 2nd – 6th 6 Weeks (Inte-grate through out the year)	▪ "By Golly By Gum" from AIMS to illustrate variables. Use terminology manipulated and responding variable. ▪ Point a flashlight at a screen. Discover if the difference from the light to the screen had any effect on the size of the illuminated area. ▪ Provide examples of situations where students will identify the manipulated and responding variables. Example: Monitoring the growth of plants that are watered with a variety of liquids. ▪ Do activities where changing the variable might directly affect a hypothesis ▪ Develop a classification system for items given. Students define characteristics for the system. ▪ Have students work in pairs. They sit back to back. One student describes the object, while the other must identify it. ▪ Students perform a series of lab activities in which they make measurements such as finding	▪ Student demonstrations ▪ Classroom observations ▪ Student laboratory reports ▪ Quizzes ▪ Tests ▪ Accurate completion of laboratory activities	▪ *Teaching and Learning the Basic Science Skills* videotape teacher training series, site guide: http://www.pen.k12.va.us/VDOE/Instruction/sol.html ▪ VDOE PC and Macintosh Image Processing software and training videotapes ▪ SOL assessment blueprints and sample items ▪ AIMS-Science Process Skills- www.aimedu.org ▪ Project Learning Tree @ www.plt.org ▪ Discovery Channel Web Site @ www.discoveryschool.com

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Scientific Investigation, Reasoning, and Logic (con't) ***Investigation Skills and the Nature of Science***	**6.1 (con't)** **f) a method is devised to test the validity of predictions and inferences;** **g) one variable is manipulated over time with many repeated trials;** **h) data are collected, recorded, analyzed, and reported using appropriate metric measurement;** **i) data are organized and communicated through graphical representation (graphs, charts, and models are designed to explain a sequence; and** **j) an understanding of the diagrams);** **k) nature of science is developed and reinforced.**	**Make observations** that can be used to discriminate similar objects and organisms, paying attention to fine detail. **Develop** a classification key that uses numerous characteristics **Make** precise and consistent measurements and estimations **Create** approximate scale models to determine an understanding of distance, volume, and quality **Differentiate** between independent (manipulated) and dependent (responding) variables in a hypothesis **Compare** and **contrast** predictions and inferences. Analyze and judge the evidence, observations, scientific principles, and data used in making predictions and inferences			volume, mass, length, etc. using the metric system. To incorporate investigation skills, students make predictions on the approximate measurement prior to finding the precise measurement. ▪ Have students work in groups to design a parachute. Use 6 drinking straws, 2 sheets of tissue paper and kite string. The goal is to get a raw egg safely to the ground. ▪ Have students to design a boat using a 9" X 9" sheet of aluminum foil. The goal is to see which boat can float holding the most golf balls. (buoyancy) ▪ Given one sheet of 81/2" X 11 paper and glue have students design a platform that is 3" high. Design for strength. Test by adding dictionaries ▪ M & M candy lab. Students predict which color occurs most frequently in a bag of M & M's. Students then collect data and report it in the form of a bar graph and a line graph.		▪ Environmental Protection Agency @ www.epa.gov ▪ Playground Physics @ www.lyra.colorado.edu/sbo/mary/play ▪ www.sciencspot.net ▪ Project WET Activities: - Adventures in Density - H20 Olympics - Is There Water On Zork? - Thirsty Plants - What's the Solution? - Hanging Together - Sparkling Water ***Disclaimer: The teacher should review all sites prior to exposing them to the students.**

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Topic	SOL	Essential Knowledge and Skills	Related SOL	When Taught	Instructional Strategies	Classroom Assessment Methods	Resources
Force, Motion, and Energy ***Investigating Energy and Energy Transformations***	**6.2** **The student will investigate and understand basic sources of energy, their origins, transformations, and uses. Key concepts include** **a) potential and kinetic energy;** **b) the role of the sun in the formation of most energy sources on Earth;** **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).**	**<u>The student will be able to</u>:** **Comprehend** and **apply** basic terminology related to energy sources and transformations. **Compare** and **contrast** potential and kinetic energy through common examples found in the natural environment. **Create** and **interpret** a model or diagram of an energy transformation. **Analyze** and **describe** the transformations of energy involved with the formation and burning of coal and other fossil fuels. **Compare** and **contrast** renewable and nonrenewable energy sources. **Design** an investigation that demonstrates light energy being transformed into other forms of energy. **Design** an application of the use of solar and wind energy.	English 6.1 6.2 6.3 6.4 6.7 6.8 Science 3.11 4.2 6.1 6.9	2nd 9 Weeks (10 Days) 3rd 6 Weeks (10 Days)	▪ Demonstrate potential and kinetic energy with a yo-yo. ▪ Gather a variety of materials such as a toaster, blow dryer, radio, matchers, batteries, balloon, wool, candle, lightning bugs, etc. in cooperative learning groups. Have students determine the energy transformation of each object. ▪ Provide energy games to reinforce concepts – Jeopardy, Top 5 Energy Sources, Energy Bingo. ▪ Simple experiments using rulers, blocks, and marbles/balls to show the connection between kinetic and potential energy. ▪ Have students collect pictures and small objects of examples of potential and kinetic energy. (Examples: rubber bands, pendulum swing) Conduct simple experiments using rulers, blocks, and marbles to show the connection between kinetic and potential energy.	▪ Student demonstrations ▪ Classroom observations ▪ Student laboratory reports ▪ Quizzes ▪ Tests	▪ Physical Science Activities resource site (UVA Physics Dept.) http://www.phys.virginia.edu/education/outreach/8thgradesol/home.htm ▪ Physical Science Solutions module http://www.smv.org/pubs/index.html ▪ Teaching Physics with Toys, Terrific Science Press ▪ Bill Nye – 102 Electricity Current-Matter and Energy ▪ www.discovery.com/rollercoaster ▪ www.sciencepot.net ▪ Video: - "Discovery Channel School: Roller Coaster Physics"

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Topic	SOL	Essential Knowledge and Skills	Related SOL	When Taught	Instructional Strategies	Classroom Assessment Methods	Resources
Force, Motion, and Energy (con't) ***Investigating Energy and Energy Transformations***	**6.2 (con't)**	**Chart** and **analyze** the energy a person uses during a 24-hour period and determine the sources. **Compare** and **contrast** energy sources in terms of their origins, how they are utilized, and their availability. **Analyze** the advantages and disadvantages of using various energy sources. **Analyze** and **describe** how the United States energy use has changed over time. **Predict** the potential impact of unanticipated energy shortages.			▪ Use a yo-yo to demonstrate these two forms of energy and follow the scientific method as a class to determine the variables. ▪ Have student's hypothesize results they will get with different variables. ▪ Teaching Physics with Toys, Terrific Science - Press Push-N-Go – pages 123-132 - The Toy That Returns – pages 133-139 - Physics with Toys at Darda Coaster – pages 141-151 - Exploring Energy with an Explorer Gun – pages 153-160 - Bounceability – pages 161-168 - Energy Toys Learning Center – pages 169-175 - Gear Up with a Lego Heli-Tractor – pages 181-185 ▪ Lesson 7 – Motion pages 65-82		▪ Bill Nye Videos: - Hands-On: General Science Activities ▪ Project WET Activities: - Energetic Water - Thirsty Plants - Incredible Journey - Water Models - Geyser Guts - Piece It Together ***Disclaimer: The teacher should review all sites prior to exposing them to the students.**

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Topic	SOL	Essential Knowledge and Skills	Related SOL	When Taught	Instructional Strategies	Classroom Assessment Methods	Resources
Force, Motion, and Energy (con't) ***Investigating Solar Energy***	**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** **a) the Earth's energy budget;** **b) the role of radiation and convection in the distribution of energy;** **c) the motion of the atmosphere and the oceans;** **d) cloud formation; and** **e) the role of heat energy in weather-related phenomena including thunderstorms and hurricanes.**	**<u>The student will be able to</u>:** **Comprehend** and **apply** basic terminology related to solar energy including wave length, ultraviolet, visible, infrared radiation, reflection and absorption **Analyze** and **interpret** a chart or diagram showing the Earth's energy budget. **Analyze**, **model**, and **explain** the Greenhouse Effect in terms of the energy entering and leaving the atmosphere. **Design** an investigation to determine the effect of sunlight on the heating of a surface. **Analyze** the role of heating and cooling in the formation of clouds. **Order** the sequence of events that takes place in the formation of a cloud. **Analyze** and **explain** how convection currents occur, and how they distribute heat energy in the atmosphere and oceans.	English 6.4 6.7 6.8 Science 3.9 4.6	2nd 9 Weeks (13 Days) 2nd 6 Weeks (13 Days)	▪ Looking at Earth from Space - Introduction to Mid-Latitude Weather Systems – pages 9-16 - Wave Motion and the General Circulation – pages 17-23 - Clouds – pages 44-54 - Additional Common Weather Patterns – pages 55-60 ▪ Box of Sunshine	▪ Student demonstrations ▪ Classroom observations ▪ Student laboratory reports ▪ Quizzes ▪ Tests ▪ Projects	▪ Looking at Earth from Space http://kids.earth.nasa.gov/guide/earth_and_space.pdf ▪ The Growing Classroom ▪ Project WET Activities: - Energetic Water - Thirsty Plants - Incredible Journey - Water Models - Geyser Guts - Piece It Together ***Disclaimer: The teacher should review all sites prior to exposing them to the students.**

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Matter ***Investigating Atoms***	**6.4** **The student will investigate and understand that all matter is made up of atoms. Key concepts include** **a) atoms are made up of electrons, protons, and neutrons;** **b) atoms of any element are alike but are different from atoms of other elements;** **c) elements may be represented by chemical symbols;** **d) two or more atoms may be chemically combined;** **e) compounds may be represented by chemical formulas;** f) **chemical equations can be used to model chemical changes; and**	**<u>The student will be able to</u>:** **Create** and **interpret** a simplified model of the structure of an atom **Compare** and **contrast** the atomic structure of two different elements **Differentiate** between an atom and an element **Explain** that atoms are represented by symbols **Identify** the name and number of each element present in a simple molecule or compound such as O_2, H_2O, CO_2, or $CaCO_3$. *DPS Goal 6.4a*: **Classify** the three subatomic particles: proton, neutron, and electron *DPS Goal 6.4b*: **Identify** properties and give examples of mixtures and solutions and physical and chemical changes.	Science 3.3 6.1	2nd 9 Weeks (18 Days) 3rd 6 Weeks (18 Days)	▪ Using materials such as cardboard, construction paper, colored pencils, string, and cotton to construct models of atoms. Label and color code. ▪ Construct models of atoms using colored marshmallows. Students label the nucleus, electrons, and neutrons or make a key to differentiate between colors of marshmallows. ▪ Construct models of molecules/compounds using toothpicks, gumdrops, clay, or other materials. ▪ Using a periodic table, prepare a list of elements with their # of protons. Have students write the atomic # for each element. ▪ Assign each student an element and have him design a poster of that element. Then put everyone's together to build a large periodic table. ▪ Divide the class in half and then in half again. Give ½ of each team a set of cards marked with atomic number 1-18. Give the other ½ set with chemical symbols for the 1st 18 elements.	▪ Student demonstrations ▪ Classroom observations ▪ Student laboratory reports ▪ Quizzes ▪ Tests ▪ Models ▪ Projects	▪ Physical Science Activities resource site (UVA Physics Dept.) http://www.phys.virginia.edu/education/outreach/8thgradesol/home.htm ▪ Physical Science Solutions module http://www.smv.org/pubs/index.html ▪ *The World of the Atom* – United Learning Videos on Matter ▪ *Teaching Science in the Elementary School* by Donna Wolfinger ▪ www.sciencespot.net ***Disclaimer: The teacher should review all sites prior to exposing them to the students.**

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Matter (con't) ***Investigating Atoms***	**6.4 (con't)** **g) a limited number of elements comprise the largest portion of the solid Earth, living matter, the oceans, and the atmosphere.**	**Model** a simple chemical change with an equation, and account for all atoms. **Distinguish** the types of elements and number of each element in the chemical equation. (balancing equations will further be developed in Physical Science). **Name** some of the predominant elements found in the atmosphere, the oceans, living matter, and in the Earth's crust; including silicon, aluminum, iron, sodium, calcium, potassium, magnesium, hydrogen, oxygen, nitrogen, and carbon.			Challenge teams to see how quickly they can match the number with the symbol. ▪ Adopt an element – Refer to resource www.sciencespot.net		▪ Project Wet Activities: - Hanging Together - Molecules in Motion

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Matter (con't) ***Investigating Water***	**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** **a) water as the universal solvent;** **b) the properties of water in all three states;** **c) the action of water in physical and chemical weathering;** **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**	**<u>The student will be able to</u>:** **Comprehend** and **apply** key terminology related to water and its properties and uses. **Model** and **explain** the shape and composition of a water molecule. **Design** an investigation to determine the relative density of liquid and solid water at various temperatures. **Compare** the relative density of liquid and solid water at various temperatures. **Comprehend** the adhesive and cohesive properties of water. **Design** an investigation to determine the effects of heat on the states of water. **Model** and **explain** why ice is less dense than liquid water. **Relate** the three states of water to the water cycle. **Design** an investigation to demonstrate the ability of water to dissolve materials.	English 6.3 6.7 6.8 Science K.5 1.3 2.3	4th 9 Weeks (20 Days) 5th 6 weeks (14 days 6th 6 weeks (6 days)	▪ Project WET - H2O Olympics – page 30 - The Incredible Journey – page161 - Is There Water on Zork? – Page 43 - Hanging Together – page 35 - Adventures in Density – pages 25 - A Drop in the Bucket – page 238 - Geyser Guts – page 144 - Water Works – page 274 - Poison Pump – page 93 - Super Sleuths – page 107 - A-maz-ing Water – page 219 ▪ Aquatic WILD - How Wet Is Our Planet? – page 7 - The Growing Classroom - Round About – page 185 - Water, Water Everywhere - Splash - The Water Planet – pages 39-41 - Sum of All Parts – pages 77-80 (Virginia Naturally)	▪ Student demonstrations ▪ Classroom observations ▪ Student laboratory reports ▪ Quizzes ▪ Tests ▪ Models ▪ Projects	▪ Project WET ▪ Aquatic WILD ▪ www.usgs.gov/education ▪ Water Quality - Potential Sources of Pollution ▪ The Growing Classroom by Robert Jaffe and Gary Appel, Addison-Wesley Publishing Co. ▪ <u>Hands-On General Science Activities</u> – Walker & Wood ▪ Virginia Naturally ▪ Environmental Science Activities Kit – Michael L. Roa ▪ WOW: The Wonders of the Wetlands ▪ Chesapeake Bay: Introduction to an Ecosystem

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Matter (con't) ***Investigating Water***	**6.5 (con't)** **g) the importance of protecting and maintaining water resources.**	**Design** an investigation to determine the presence of water in plant material (e.g., a fruit). **Infer** how the unique properties of water are key to the life processes of organisms. **Design** an investigation to model the action of freezing water on rock material. **Design** an investigation to model the action of acidified water on building materials such as concrete, limestone, or marble. **Chart**, **record**, and **describe** evidence of chemical weathering in the local environment. **Explain** the role of water in power generation. **Analyze** and **explain** the difference in average winter temperatures among areas in central and western Virginia and cities and counties along the Chesapeake Bay and Atlantic coast. **Describe** the importance of careful management of water resources.					▪ Project WET Activities: - Adventures in Density - H20 Olympics - Is There Water On Zork? - Thirsty Plants - What's the Solution? - Hanging Together - The Incredible Journey ***Disclaimer: The teacher should review all sites prior to exposing them to the students.**

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Matter (con't) ***Investigating Air and the Atmosphere***	**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** **a) air as a mixture of gaseous elements and compounds;** **b) air pressure, temperature, and humidity;** **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;** **f) basic information from weather maps including fronts, systems, and basic measurements; and**	**<u>The student will be able to</u>:** **Comprehend** and **apply** basic terminology related to air and the atmosphere. **Identify** the composition and physical characteristics of the atmosphere. **Analyze** and **interpret** charts and graphs of the atmosphere in terms of temperature and pressure. **Measure** and **record** air temperature, air pressure, and humidity in using appropriate units of measurement and tools. **Analyze** and **explain** some of the effects that natural events and human activities may have on weather, atmosphere, and climate. **Map** the movement of cold and warm fronts, and interpret their effects on observable weather conditions.	English 6.3 6.7 6.8 Social Studies USI.1f USI.2b Science 4.6	3rd 9 Weeks (20 Days) 4th 6 weeks (7 days) 5th 6 weeks (13 days)	▪ Journey to the Planet Earth – Air Unit ▪ Piece it Together – Project WET ▪ Looking at Earth from Space (NASA) ▪ Indoor Air Pollution Solutions – pages 21-26 (Virginia Naturally) ▪ Environmental Science Activities – Activity 15, pages 139-143 ▪ Global Warming – Activity 13, pages 121-129 ▪ Detecting Air Pollution – Activity 14, pages 130-138 Acidic Precipitator ▪ Project WET: Wet Vacation – pages 206-207	▪ Student demonstrations ▪ Classroom observations ▪ Student laboratory reports ▪ Quizzes ▪ Tests ▪ Projects	▪ Looking at Earth from Space – http://kids.earth.nasa.gov/guide/earth_and_space.pdf ▪ The Journey To The Planet Earth ▪ Environmental Science Activities – Michael Roa ▪ Project WET ▪ NASA ▪ Virginia Naturally ▪ http://spacelink.nasa.gov - Instructional materials: NASA Educational Products - Exploring Earth From Space Lithograph Set - Cloud Patterns ▪ www.sciencespot.net

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Matter (con't) ***Investigating Air and the Atmosphere***	**6.6 (con't)** **g) the importance of protecting and maintaining air quality.**	**Design** an investigation to relate temperature, barometric pressure, and humidity to changing weather conditions. **Interpret** basic weather maps, and make forecasts based on the information presented. **Compare** and **contrast** cloud types, and relate cloud types to weather conditions. **Compare** and **contrast** types of precipitation. **Compare** and **contrast** weather-related phenomena including thunderstorms, tornadoes, hurricanes, and drought. **Evaluate** their own roles in protecting air quality.					***Disclaimer: The teacher should review all sites prior to exposing them to the students.**

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Living Systems ***Investigating Watersheds and Wetlands***	**6.7** **The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include** **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**	**<u>The student will be able to</u>:** **Comprehend** and **apply** basic terminology related to watersheds. **Use** topographic maps to **determine** the location and size of Virginia's regional watershed systems. **Locate** their own local watershed and the rivers and streams associated with it. **Design** an investigation to model the effects of stream flow on various slopes. **Analyze** and **explain** the functioning of wetlands and appraise the value of wetlands to humans. **Describe** an example of a wetland. **Explain** what an estuary is and why it is important to people. **Propose** ways to maintain water quality within a watershed.	English 6.3 6.7 6.8 Science 3.6 3.10 4.8	4th 9 Weeks (20 Days) 6th 6 Weeks (20 Days)	▪ Journey to the Planet Earth – Water Unit ▪ Project WILD – Science and Civics ▪ Color Me A Watershed – page 30 ▪ Where Does Water Run? – pages 148-157 ▪ Project WET: - Rainy Day Hike – page 186 - Back to the Future – page 293 - A Grave Mistake – page 311 - People of the Bog – page 89 - Branching Out – page 129 - Life in the Fast Lane – page 79 - Salt Marsh Players – page 99 - The Pucker Effect – page 338 - Capture, Store & Release – page 133 - Wetland Soils in Living Colors – page 212 - Get the Ground Water Picture – page 136 ▪ Virginia Naturally - What's Your Watershed Address? – pages 95-102	▪ Student demonstrations ▪ Classroom observations ▪ Student laboratory reports ▪ Quizzes ▪ Tests ▪ Projects	▪ Journey to the Planet Earth ▪ Project WET ▪ Project WILD ▪ Science and Civics: Sustaining Wild Life ▪ Virginia Naturally ▪ Watersheds: Where We Live Poster 16618 ▪ www.water.usgs.gov/wsci - Science in Your Watershed ▪ Project WET Activities: - MacroInvertebrate Mayhem - Color Me A Watershed - Just Passing Through - The Price Is Right - A-Mazing-Water - Nature Rules! - Where Are the Frogs?

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Living Systems (con't) ***Investigating Watersheds and Wetlands***	**6.7 (con't)** **g) water monitoring and analysis using field equipment including hand-held technology.**	**Explain** the factors that affect water quality in a watershed and how those factors can affect an ecosystem. **Forecast** potential water-related issues that may become important in the future. **Locate** and **critique** a media article or editorial (print or electronic) concerning water use or water quality. Analyze and evaluate the science concepts involved. **Argue** for and against commercially developing a parcel of land containing a large wetland area. **Design** and **defend** a land-use model that minimizes negative impact. **Measure**, **record**, and **analyze** a variety of water quality indicators and describe what they mean.					***Disclaimer: The teacher should review all sites prior to exposing them to the students.**

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Interrelation-ships in Earth/Space Systems ***Investigating the Solar System***	**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** **a) the, sun, moon, Earth, other planets and their moons, meteors, asteroids, and comets;** **b) relative size of and distance between planets;** **c) the role of gravity;** **d) revolution and rotation;** **e) the mechanics of day and night and phases of the moon;** **f) the unique properties of Earth as a planet;** **g) the relationship of the Earth's tilt and seasons;**	**<u>The student will be able to</u>:** **Design** and **interpret** a scale model of the solar system (A scale model may be a physical representation of an object or concept. It can also be a mathematical representation that uses factors such as ratios, proportions, and percentages). **Explain** the role of gravity in the solar system. **Compare** and **contrast** revolution and rotation and apply these terms to the relative movements of planets (and moons). **Model** and **describe** how day and night and the phases of the moon occur **Describe** the nine planets, their moons, meteors, asteroids, and comets; and their relative positions from the sun. **Describe** the unique characteristics of planet Earth, including its surface, atmosphere, presence of water, and magnetic field.	English 6.3 6.7 6.8 Social Studies USI.1g Science 3.8 4.7 6.1	1st 9 Weeks (30 Days) 1st 6 weeks (17 days) 2nd 6 weeks (13 days)	▪ Project Learning Tree: "Our Changing World" – page 86 ▪ Lesson 10: Planets ▪ 10-1A: Spaced-Out Family – pages 117-120 ▪ 10-2: Bringing The Solar System Down To Earth – pages 121-125 ▪ 10-3: Astonishing Planetary Discovery – pages 126-132 ▪ Lesson 11: Stars ▪ 11-1: Starlight Starbright – pages 133-137 ▪ 11-2: Star Chamber – pages 138-144 ▪ Lesson 12: The Moon ▪ 12-1: The Moon (Man in the Moon) – pages 145-150 ▪ 12-2: Moon Madness ▪ Lesson 13: Space Travel ▪ 13-1: The Space Shuttle – pages 155-162 ▪ Research and present an oral report on one of the celestial bodies ▪ Interpret data on high and low tides and formulate ideas as to how the tides change ▪ Make observations about the phases of the moon. Keep a chart for a period of one month.	▪ Student demonstrations ▪ Classroom observations ▪ Student laboratory reports ▪ Quizzes ▪ Tests ▪ Projects	▪ Project Learning Tree ▪ Hands-On General Science Activities w/Real-Life Applications – Walker & Wood ▪ http://spacelink.nasa.gov - Instructional Materials: NASA Educational Products - Our Mission to Planet Earth - Suited for Spacewalking - Earth & Mars – As Different As They Are Alike (Educational Wallsheets) - Mars Pathfinder Poster (information on back of poster) - Exploring Earth from Space, Lithograph Set

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Interrelation-ships in Earth/Space Systems (con't) ***Investigating the Solar System***	**6.8 (con't)** **h) the cause of tides; and** **i) the history and technology of space exploration.**	**Analyze** scientific evidence that indicates the age of the Earth. **Model** and **describe** how the Earth's axial tilt and its annual orbit causes the seasons **Discuss** the relationship between the gravitational pull of the moon and the cycle of tides **Compare** and **contrast** the ideas of Ptolemy, Aristotle, Copernicus, and Galileo related to the solar system **Interpret** events of the history of the space program **Create** and **interpret** a timeline highlighting the advancements in solar system exploration over the past half century. This should include information on the first modern rockets, artificial satellites, orbital missions, missions to the moon, Mars robotic explorers, and exploration of the outer planets.			▪ Create a model that demonstrates the mechanics of day and night ▪ Compare and contrast the different international space programs ▪ Identify central issues and problems connected with the technology of space exploration ▪ Construct a scale model of the solar system ▪ Calculate student's weight on Earth, the moon, and other planets. Compute your gravity factors on the moon and planets to determine how far and high they can jump and throw an object on other planetary bodies ▪ Construct model rockets and discuss flight patterns ▪ Research an explorer and create a trading card		- Mars Pathfinder Lithograph Set - Solar System Lithograph Set ▪ *The Earth in Space Teacher Training Module* in development (to be posted @ *http://www.smv.org/pubs/index.html* ▪ NASA Space Resources electronic publications http://spacelink.nasa.gov/.index.html ▪ NASA Education Homepage *http://education.nasa.gov* ▪ AIMS "Out of This World" ▪ www.discovery.com ▪ Book "Eye in the Sky" – History of the Hubble telescope.

Topic	SOL	Essential Knowledge and Skills	Related SOL	When Taught	Instructional Strategies	Classroom Assessment Methods	Resources
Interrelation-ships in Earth/Space Systems (con't) ***Investigating the Solar System***	**6.8 (con't)**				▪ Create and interpret a timeline highlighting the advancements in solar system exploration over the past half century. This should include information on the first modern rockets, artificial satellites, orbital missions, missions to the moon, Mars robotic explorers, and exploration of the outer planets.		▪ Mars Lithograph Set – http://spacelink.nasa.gov/Instructional.materials/NASA.Educational.Products/Mars.Pathfinder.Lithograph.Set/Mars.Pathfinder.Lithograph.Set.pdf ▪ Mars Pathfinder Poster – http://spacelink.nasa.gov/Instructional.materials/NASA.Educational.Products/Mars.Pathfinder.Poster/Mars.Pathfinder.Poster.pdf ***Disclaimer: The teacher should review all sites prior to exposing them to the students.**

Grade 6 Science Standards of Learning Curriculum Guide

Topic	SOL	Essential Knowledge and Skills	Related SOL	When Taught	Instructional Strategies	Classroom Assessment Methods	Resources
Resources ***Investigating the Management of Natural Resources***	**6.9** **The student will investigate and understand public policy decisions relating to the environment. Key concepts include** **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.**	**<u>The student will be able to</u>:** **Differentiate** between renewable and nonrenewable resources. **Describe** the role of local and state conservation professionals in managing natural resources. These include wildlife protection; forestry and waste management; and air, water, and soil conservation. **Analyze** resource – **Use** options in everyday activities and determine how personal choices have costs and benefits related to the generation of waste. **Analyze** how renewable and nonrenewable resources are used and managed within the home, school, and community. **Analyze** reports, media articles, and other narrative materials related to waste management and resource use to determine various perspectives concerning the costs/benefits in real-life situations.	English 6.7 6.8 Science 3.10 3.11 4.8 6.1	3rd 9 Weeks (20 Days) 4th 6 Weeks (20 Days)	▪ Project Learning Tree: ▪ "A Look at Aluminum" pg. 52 ▪ "Resources-Go-Round" pg. 82 ▪ Start a scrapbook of current event items concerning environmental problems. ▪ Write an illustrated children's story for 10 year olds about life in 2100. The story should describe life in an age without fossil fuels; identify the sources of energy used in everyday life. ▪ Make a poster illustrating common fuels, where they can be found in the U.S. and their availability. ▪ Design a simple experiment to show how various common materials decompose in the environment. ▪ Measure the amount of solid waste generated by a household over a period of time and graph the results. ▪ Develop a diagram showing the amount of waste per household and what percentage can be recycled	▪ Student demonstrations ▪ Classroom observations ▪ Student laboratory reports ▪ Quizzes ▪ Tests	▪ *Project WILD, K-12* ▪ *Project Aquatic WILD* ▪ *Project Learning Tree, K-8* ▪ *PLT – Municipal Solid Waste* module ▪ *PLT – Forest Ecology* module ▪ WILD School Sites ▪ *Project WET* ▪ *VA Natural Resources Education Guide* http://www.vanaturally.com/eduguide.htm ▪ *Environmental Science Activities Kit* by Michael L. Roa ▪ Journey to the Planet Earth – Soil Unit ▪ The Growing Classroom ▪ WWF Windows on the Wild

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Resources (con't) ***Investigating the Management of Natural Resources***	**6.9 (con't)**	**Evaluate** the impact of resource-use, waste management, and pollution prevention in the school and home environment.			▪ Compare/Contrast how different cultures over time have used and managed resources. ▪ Analyze various graphs and charts concerning resource and waste management to describe trends, make predictions, and critique decisions. ▪ The Growing Classroom – Space Travelers ▪ Project WET: - Common Water – page 232 - Every Drop Counts – page 307 - Money Down The Drain – page 328 - Dilemna Derby – page 377 ▪ Windows on the Wild ▪ Thinking About Tomorrow		▪ Project WET Activities: - The Long Haul - Sparkling Water - Sum of the Parts - The Price Is Right - Back to the Future - AfterMath - Dust Bowls and Failed Levees - The Pucker Effect - Reaching Your Limits - A Grave Mistake ***Disclaimer: The teacher should review all sites prior to exposing them to the students.**