**Sixth Grade Science Pacing Guide- First Semester**

**First Grading Period**

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| **Strand/Content Statement** | **Duration** | **Clear Learning Targets** | **Resources** | **Vocabulary** |
| **Students must use scientific processes, with appropriate laboratory safety techniques, to construct knowledge and understanding.** | 6 weeks:  2 days per lesson x 11 lessons = 22 days, plus 8 days for final project | * I can identify questions that can be answered through scientific investigations. * I can design and conduct a scientific investigation. * I can use appropriate mathematics, tools, and techniques to gather data and information. * I can analyze and interpret data. * I can develop descriptions, models, explanations, and predictions. * I can think critically and logically to connect evidence and explanations. * I can recognize and analyze alternative explanations and predictions. * I can communicate scientific procedures and explanations. | STC (Science and Technology Concepts) Elementary Module: **“Microworlds”** by the Smithsonian Institution’s National Science Resources Center, Lessons 1-11  “Water Quality Project” designed and written by Dr. Natalie Barman (Science Coach) - saved on Trimble Middle School’s web server | Observation  Hand lens  Magnification  Image  Properties  Inference  Five Senses  Convex  Concave  Transparent  Opaque  Microscopic  Specimen  Eyepiece  Body  Clip  Stage  Mirror  Knob  Wet-mount slide  Well slide |
| **Cells are the fundamental units of life.**  **Cells carry on specific functions that sustain life.** | 3 Weeks | * I can understand that all living things are composed of cells. * I can understand that different body tissues and organs are made of different kinds of cells. * I can describe how the structure of specialized cells that form tissues (e.g., xylem, phloem, connective, muscle, nervous) relates to the function that the cells perform. * I can understand that the way cells function are similar in all living things. * I can understand that many basic functions of organisms occur in cells. * I can explain how cells take in nutrients and energy to perform work, like making various molecules required by that cell or organism. * I can explain that every cell is covered by a membrane that controls what can enter and leave the cell. | Science textbook by Harcourt - Unit A, Chapter 1, Lesson 1  Plant and Animal Cells foam models, posters, and magnetic kits  Microscopes and sample slides of plant and animal cells  Pictures of animal and plant cells to label and color | Nucleus  Cell Membrane  Vacuole  Mitochondria  Cytoplasm  Cell Wall  Chloroplast  Chromosome  Nuclear Membrane  DNA |

**Second Grading Period**

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| **Strand/Content Statement** | **Duration** | **Clear Learning Targets** | **Resources** | **Vocabulary** |
| **All cells come from pre-existing cells.** | 2 weeks | * I can understand that cells repeatedly divide resulting in more cells and growth and repair in multicellular organisms. * I can describe the role of mitosis in single-celled organisms and multicellular organisms. | Science textbook by Harcourt - Unit A, Chapter 1, Lesson 2 | Mitosis  Meiosis  Gene  Chromosome  DNA |
| **Living systems at all levels of organization demonstrate the complementary nature of structure and function.** | 5 Weeks | * I can describe how different organ systems interact to enable complex multicellular organisms to survive. * I can explain the organization within organisms as including cells, tissues, organs, organ systems, and whole organisms. * I can explain that all of the parts of an organism function as a whole to perform the tasks necessary for the survival of the organism. * I can understand that organisms have diverse body plans, symmetry, and internal structures that contribute to their being able to survive in their environments. * I can identify general distinctions among the cells of organisms that support classifying some as plants, some as animals, and some that do not fit neatly into either group. | Science textbook by Harcourt - Reference section in back of book  Buckle Down Workbooks - Lesson on Levels of Organization  Body Systems Posters  RAFT Writing Project | Organelle  Cell  Tissue  Organ  Organ System  Respiratory  Circulatory  Nervous  Skeletal  Muscular  Immune  Digestive |
| **There are two categories of energy: kinetic and potential.**  **An object’s motion can be described by its speed and direction in which it is moving.** | 1 week  1 week | * I can recognize that substances in motion have kinetic energy. * I can recognize that substances can have energy as a result of their position (potential energy). * I can recall that an object can have potential energy due to its position relative to another object and can have kinetic energy due to its motion. * I can classify the energy at each stage in the design as kinetic, potential, or a combination of the two. * I can recognize that increasing height increases gravitational potential energy. * I can measure and graph an object’s position and speed as function of time * I can recognize that faster objects have steeper lines on position vs. time graphs and slower objects have less steep lines. * I can calculate the average speed of an object given the distance and time. * I can recognize that motion describes the change in position of an object (characterized by speed and direction) as time changes. | Science textbook by Harcourt - Unit E, Chapter 3, Lesson 1  How High Will Each Ball Bounce? lab (from SILAS workshop at Ohio Univ.)  Model cars, plastic track or cardboard ramps, timers, graph paper, meter sticks | Energy  Kinetic Energy  Potential Energy  Thermal Energy  Law of Conservation of Energy  Distance  Rate  Speed  Motion |

**Third Grading Period- Second Semester**

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| **Strand/Content Statement** | **Duration** | **Clear Learning Targets** | **Resources** | **Vocabulary** |
| **All matter is made up of small particles called atoms.** | 3 weeks | * I can understand that each atom takes up space, has mass, and is in constant motion. * I can define mass as the amount of matter in an object. * I can recognize that elements are a class of substances composed of a single kind of atom. * I can define molecules as the combination of two or more atoms that are joined together chemically. * I can define compounds as being composed of two or more different elements. * I can recognize that each element and compound has properties, which are independent of the amount of the sample. * I can describe the behavior of atomic particles for each state of * matter (solid, liquid, gas) | Science textbook by Harcourt - Unit E, Chapter 1, Lessons 1-2  Model of an atom, Periodic Table poster, Element Bingo game  Inquiry in Action curriculum by the American Chemical Society - Chapter 1: “Molecules in Motion” and Chapter 7: “Density” | Atom  Nucleus  Proton  Neutron  Electron  Atomic number  Molecule  Element  Compound  Periodic table  Solid  Liquid  Gas  Mass  Density |
| **Changes of state are explained by a model of matter composed of atoms and/or molecules that are in motion.** | 3 weeks | * I can recognize that neither atoms nor molecules themselves are changed in structure when substances undergo changes of state. * I can recognize that thermal energy is a measure of the motion of the atoms and molecules in a substance. * I can recognize that mass is conserved when substances undergo changes of state. * I can match the properties of a state of matter with a picture of a sample representative of a specific state of matter. * I can identify the states of matter (solid, liquid, gas). | Science textbook by Harcourt - Unit E, Chapter 1, Lesson 3  Inquiry in Action curriculum by the American Chemical Society - Chapter 6: “States of Matter,”  “Magic Melting Blocks” demonstration | Thermal Energy Conservation of Mass |
| **Students must use scientific processes, with appropriate laboratory safety techniques, to construct knowledge and understanding.** | Every Friday for 5-6 weeks before the Science Fair | * I can identify questions that can be answered through scientific investigations. * I can design and conduct a scientific investigation. * I can use appropriate mathematics, tools, and techniques to gather data and information. * I can analyze and interpret data. * I can develop descriptions, models, explanations, and predictions. * I can think critically and logically to connect evidence and explanations. * I can recognize and analyze alternative explanations and predictions. * I can communicate scientific procedures and explanations. | Science Fair - Introduction, Procedures, and Rubrics |  |

**Fourth Grading Period**

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| **Strand/Content Statement** | **Duration** | **Clear Learning Targets** | **Resources** | **Vocabulary** |
| **Minerals have specific, quantifiable properties.** | 2 weeks | * I can define minerals as naturally occurring, inorganic solids that have a distinct chemical composition and form in specific environments. * I can identify the common rock-forming minerals (e.g., calcite, halite, dolomite, gypsum, quartzes, feldspars, micas, talc, kaolinite, chalk, topaz, corundum). * I can identify the different processes and/or environments in which minerals can form (e.g., evaporation, chemical processes, sedimentary, igneous, or metamorphic). * I can recognize that minerals have measurable properties that can be used for identification and/or classification. | Science textbook by Harcourt - Unit D, Chapter 2, Lesson 1  Hardness and Streak Mineral Testing Kits  Samples of Minerals Kits  Mineral Posters | Mineral  Mohs Scale  Streak  Luster  Fracture  Cleavage |
| **Igneous, metamorphic and sedimentary rocks have unique characteristics that can be used for identification and/or classification.**  **Igneous, metamorphic, and sedimentary rocks form in different ways.** | 4 weeks | * I can explain that most rocks are composed of one or more minerals. * I can explain that there are a few types of sedimentary rocks that contain organic material, such as coal. * I can identify rocks by their composition, the types of minerals present, the mineral arrangement, and/or the mineral shape and size. * I can recognize that each type of rock has a unique history based upon the environmental conditions that existed when it formed. * I can explain how igneous rocks form. * I can explain how metamorphic rocks form. * I can explain how sedimentary rocks form. * I can identify the main components of the rock cycle. | Science textbook by Harcourt - Unit D, Chapter 2, Lessons 1-4  Samples of Igneous, Metamorphic, and Sedimentary Rocks Kits | Magma  Lava  Igneous  Weathering  Erosion  Deposition  Sedimentation  Cementation  Metamorphic  Rock Cycle |
| **Soil is unconsolidated material that contains nutrient matter and weathered rock.**  **Rocks, minerals, and soils have common and practical uses.** | 2 weeks | * I can recognize that soil formation occurs at different rates and is based on environmental conditions, types of existing bedrock, and rates of weathering. * I can recognize that soil layers are called horizons and each horizon has properties that can be measured. * I can identify the types of conditions that may contribute to the formation of soil or lack of formation of soil. * I can use specific tools to measure soil characteristics and properties (e.g., permeability, porosity, texture, color). * I can recognize that all manufactured material requires some kind of geological resource, most of which are nonrenewable. * I can identify rocks, minerals, and soil as examples of nonrenewable geological resources. * I can recognize that the characteristics of soil, rocks, and minerals determine how they can be used. * I can identify examples of different ways that soil, rocks, and minerals can be used. | Get the Dirt on Soil booklets by the Nutrients for Life Foundation (free resource)  Soil Testing Kits  Nutrients in Periodic Table Poster | Fertile  Organic  Inorganic  Nutrients  Nitrogen  Potassium  Phosphorous  Deficiency  Producer  Consumer |