**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 | ObservationHand lensMagnificationImagePropertiesInferenceFive SensesConvexConcaveTransparentOpaqueMicroscopicSpecimenEyepieceBodyClipStageMirrorKnobWet-mount slideWell 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 1Plant and Animal Cells foam models, posters, and magnetic kitsMicroscopes and sample slides of plant and animal cellsPictures of animal and plant cells to label and color  | NucleusCell MembraneVacuoleMitochondriaCytoplasmCell WallChloroplastChromosomeNuclear MembraneDNA |

**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 | MitosisMeiosisGene ChromosomeDNA |
| **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 bookBuckle Down Workbooks - Lesson on Levels of OrganizationBody Systems PostersRAFT Writing Project  | OrganelleCellTissueOrganOrgan SystemRespiratoryCirculatoryNervousSkeletalMuscularImmuneDigestive |
| **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 week1 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 1How High Will Each Ball Bounce? lab (from SILAS workshop at Ohio Univ.)Model cars, plastic track or cardboard ramps, timers, graph paper, meter sticks | EnergyKinetic EnergyPotential EnergyThermal EnergyLaw of Conservation of EnergyDistance Rate SpeedMotion |

**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 1-2Model of an atom, Periodic Table poster, Element Bingo gameInquiry in Action curriculum by the American Chemical Society - Chapter 1: “Molecules in Motion” and Chapter 7: “Density” | AtomNucleusProtonNeutronElectronAtomic numberMoleculeElementCompoundPeriodic tableSolidLiquidGasMassDensity |
| **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 3Inquiry 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 1Hardness and Streak Mineral Testing KitsSamples of Minerals KitsMineral Posters | MineralMohs ScaleStreakLusterFracture 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 1-4Samples of Igneous, Metamorphic, and Sedimentary Rocks Kits | MagmaLavaIgneousWeatheringErosionDepositionSedimentationCementationMetamorphicRock 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 KitsNutrients in Periodic Table Poster | FertileOrganicInorganicNutrientsNitrogenPotassiumPhosphorousDeficiencyProducerConsumer |