Grade 8 Spiraled Science

Unit	Content/Theme/Focus	PA Core Standards or Eligible Content	Materials	Activities	Formative Assessments	Summative Assessments
Studying Life	Chapter 1: Studying Life *1.1: Measurement* *1.2: Thinking Like a Scientists* *1.3: Graphing* *Lab Safety*	3.1.7.B6 - Understand how theories are developed. - Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. - Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. - Describe relationships using inference and prediction. - Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations. - Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories. - Analyze alternative explanations and understanding that science advances through legitimate skepticism. - Use mathematics in all aspects of scientific inquiry. - Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection.	**Investigation 1A:** Metric tape measure, Pencil, Graph paper **Spaghetti Tower:** Spaghetti, marshmallows, tape **Measurement Stations:** Triple-beam balance, graduated cylinders, metric rulers and meter sticks, hot plates, thermometers	Investigation 1A: Measurement and Data Spaghetti Tower Measurement Stations Ecological Interactions Activity Adaptations for Survival Investigation 17B	Using data from Investigation 1A to create line graph Measurement stations: accurate use of scientific measuring tools	Lab Safety Quiz Nature of Science Quiz
Unit 1: Ecology & Evolution	*Chapter 5: Ecosystems* *5.1: Ecosystems, Energy, and Nutrients* *5.2: Food Chains and Food Webs* *5.3: Ecosystems -a Natural Balance* *Chapter 6: Biomes* *6.1: Climates and Biomes* *6.2: Deserts and Grasslands* *6.3: Temperate Forests and Rainforests* *6.4: Taigas and Tundras* *Chapter 13: Evolution* *13.1 - Evidence for Evolution* *13.2 - How Evolution Works* *13.3 - Natural Selection*	3.1.6.A2 Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers. 3.1.7.A2 Describes how organisms obtain and use energy throughout their lives. 3.1.6.A5 Describe basic structures that plants and animals have that contribute to their ability to make or find food and reproduce. 3.1.7.A6 Identify the levels of organization from cell to organism. 3.1.6.C1 Differentiate between instinctive and learned animal behaviors that relate to survival. 3.1.7.C1 Describe how natural selection is an underlying factor in a population's ability to adapt to changes. 3.1.8.C1 Explain how reproductive success coupled with advantageous traits over many generations contributes to natural selection. 3.1.7.C2 Explain why the extinction of a species may occur when the environment changes. Explain that mutations can alter a gene and are the original source of new variations in a population. 3.1.7.C3 CONSTANCY AND CHANGE: Identify evidence drawn from geology, fossils, and comparative anatomy that provides the basis for the theory of evolution.	*See Below*	Spaghetti Tower Investigation 17B: The Mammalian Eye	Investigation 17B	Ecology Quiz Unit Test: Ecology and Evolution

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Unit 1 Materials						
Spaghetti Tower: Uncooked spaghetti, Mini marshmallow, Tape, Wax paper **Measurement Stations:** Triple-beam balances, Meter stick/measuring tape, Graduated cylinders, beakers, Objects for measuring **Ecological Interactions Activity:** Beads, Pie Pans, Cups **Argument Driven Food Web:** Organism Cards **Adaptations for Survival:** Beads, Pie Pans, Cups, Spoons, Chopsticks, Tweezers, Toothpicks **Investigation 17B:** Preserved sheep's eye, Forceps, Dissection probes, Dissection scissors, Dissection tray, Vinyl or latex gloves, Apron, Goggles, Paper towels, Plastic trash bag						

Unit	Content/Theme/Focus	PA Core Standards or Eligible Content	Materials	Activities	Formative Assessments	Summative Assessments
Unit 1: Elements, Molecules, and Compounds	Chapter 13: The Atom *13.1: Fundamental Particles and Forces* *13.2: Electrons in the Atom* Chapter 14: Elements and the Periodic Table *14.1: The Periodic Table of Elements* *14.2: Properties of the Elements* Chapter 15: Molecules and Compounds *15.1: Compounds and Chemical Bonds* *15.2: Electrons and Chemical Bonds*	3.2.6.A4 Differentiate between physical changes and chemical changes. 3.2.7.A4 Describe how reactants change into products in simple chemical reactions. 3.2.8.A4 Compare and contrast physical and chemical changes in terms of products. 3.2.8.A2 Identify characteristics of elements derived from the periodic table. 3.2.7.A1 Differentiate between elements, compounds, and mixtures. Identify groups of elements that have similar properties. 3.2.7.A1 Differentiate between elements, compounds, and mixtures. 3.2.8.A2 Identify characteristics of elements derived from the periodic table. 3.2.6.A3 Explain and give examples of how mass is conserved in a closed system. 3.2.7.A3 Explain how energy transfer can affect the chemical and physical properties of matter. 3.2.8.A3 Explain how changes in matter are accompanied by changes in energy. 3.2.7.A4 Describe how reactants change into products in simple chemical reactions. 3.2.8.A4 Compare and contrast physical and chemical changes in terms of products.	*See Below*	Investigation 13A: The Atom Investigation 13B: Building the Elements Investigation 14A: The Periodic Table Investigation 14B: Periodic Table Group Challenge Investigation 15A: Chemical Bonds Investigation 15B: Molecules and Compounds		
Unit 2: Chemical Reactions	Chapter 16: Acids, Bases, and Solutions *16.1: Water and Solutions* *16.2: Acids, Bases, and pH* Chapter 17: Chemical Reactions *17.1: Understanding Chemical Reactions* *17.2: Energy and Chemical Reactions* Chapter 18: The Chemistry of Living Systems *18.1: The Chemistry of Carbon* *18.2: Proteins, Fats, and Nucleic Acids*	3.2.6.A4 Differentiate between physical changes and chemical changes. 3.2.7.A4 Describe how reactants change into products in simple chemical reactions. 3.2.8.A4 Compare and contrast physical and chemical changes in terms of products. 3.2.8.A2 Identify characteristics of elements derived from the periodic table. 3.2.7.A1 Differentiate between elements, compounds, and mixtures.	See Below	Investigation 16A: Solubility Investigation 16B: Acids, Bases, and pH Investigation 17A: Chemical Reactions Investigation 17B: Conservation of Mass		
Investigation 13A						
Investigation 13B						
Investigation 14A						
Investigation 14B						
Investigation 15A						
Investigation 15B						
Investigation 16A						
Investigation 16B						
Investigation 17A						
Investigation 17B						

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Unit 1: The Solar System	Chapter 17: The Solar System *17.1: About the Solar System* *17.2: The Planets* *17.3: Other Solar System Objects* Chapter 18: Earth, the Moon, and the Sun *18.1: Earth and its Moon* *18.2: Earth Cycles* *18.3: The Sun* Chapter 7: Gravity and Space (Taught with Earth Science Chapter 18) *7.1: Gravity* *7.2: The Solar System* *7.3: The Sun and the Stars* **Physical Science Textbook**	3.3.6.B1 Compare and contrast the size, composition, and surface features of the planets that comprise the solar system as well as the objects orbiting them. Recognize the role of gravity as a force that pulls all things on or near the earth toward the center of the earth and in the formation of the solar system and the motions of objects in the solar system. Explain why the planets orbit the sun in nearly circular paths. 3.3.7.B1 Explain how gravity is the major force in the formation of the planets, stars, and the solar system. Describe gravity as a major force in determining the motions of planets, stars, and the solar system. Compare and contrast properties and conditions of objects in the solar system to those on Earth. 3.3.6.B1 Explain how the tilt of the earth and its revolution around the sun cause an uneven heating of the earth which in turn causes the seasons and weather patterns. 3.3.7.B1 Describe gravity as a major force in determining the motions of planets, stars, and the solar system. Compare and contrast properties and conditions of objects in the solar system to those on Earth.	*See Below*	Investigation 17A: Planets in Motion Investigation 17B: Solar System Investigation 18A: Days and Months Investigation 18B: Earth's Seasons Investigation 7A: Phases of the Moon Investigation 7B: The Size of the Solar System		

Investigation 17A: 4 working flashlights, Masking tape, Black electrical tape, Large open space for parts 1 and 2, Classroom clock
Investigation 17B:
Investigation 18A: Protractor, Two pieces of 20-by-26-centimeter cardboard (or a file folder), Scissors, Small metric ruler, Tape, Navigational compass, Flashlight, 2-or-3 inch foam ball, Pencil or popsicle stick
Investigation 18B: Globe, Velcro tabs, 100-watt light source, Solar (PV) cell, Digital meter, Tape measure or meter stick
Investigation 7A: Flashlight (bright LED is best), 6-inch plastic foam sphere (spray-painted gray), 12-inch green paper circle, Pencil, Masking tape
Investigation 7B: Metric track and field tape measure (25 m or more) or a trundle wheel)