Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 1*: Use the Scientific Method, processing skills, equipment, and lab safety to solve problems.*		
A. Understand each step of the scientific method: Question or Problem, Hypothesis, Procedure, Observations, Data and Conclusion **B. Explain and emphasize that the experiment is trying to prove the established hypothesis and not proving it is still important.** **C. Students will be able to define and understand the terms control, variable, and follow an experimental model using the scientific method to answer a scientific problem.**	• Use a simple activity to demonstrate the above steps. Reiterate throughout the year during laboratory experiences. • Continue to model and introduce the creation of Data Charts and Scientific Analysis. • Model a false hypothesis and the actions taken to explain the result. • Students need to understand the difference between a scientific demonstration and a scientific experiment. • Continue to emphasize throughout the year utilizing lab experiences. • Encourage and engage in the use of Lab Reports and Lab Journals.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 2: *The dynamic Earth can be studied as individual systems including water bodies and land formations.*		
A. Explain and identify in a general overview, the Earth's land features. **B. Identify various forms of water on Earth: Oceans, rivers, waterfalls, glaciers, etc.** **C. Identify the four interdependent spheres of the earth; Lithosphere, Hydrosphere, Biosphere, Atmosphere.** **D. Identify the exterior and interior of the Earth's layers to understand Earth's composition, their relationship to the spheres and the reason for life.** **E. Identify specifically the layers of Atmosphere and explain their composition and purpose.** **F. Relate the composition of the Earth back to the Creation Story in order to relate the act of creation to the physical experience of humans and their physical environment.**	• The student needs to understand both the meaning and working applications of landforms, relief maps, and topographical maps to understand their living space. • Have student report on what they know about the above as either a survey or homework project and then present in class before getting into the formal lesson. • Build a mountain and weather it with water, wind, and various materials to break down and see what forms. • Locate geographic representations of example formations. • Identify and locate the Oceans of the world, major rivers, significant waterfalls and continental glaciers. • The student needs to define what and where each of these spheres is located on Earth and their importance to both the Earth's and our existence. • The student needs to understand the following layers of the Earth: crust, upper mantle, lower mantle, outer core and inner core. • Student can build a model or draw a chart of the Earth labeling each area. • Distinguish the differences between the types of biomes; desert, tundra, tropical rain forest, deciduous and temperate forests, grasslands and ocean. • Have students report on the type of biomes that exist using poster, report, PowerPoint, etc. either individually or collaboratively. • View Discovery or United Streaming video allowing the student to engage in a visual understanding. • Students will need to understand the composition of gases in the atmosphere, such as nitrogen gas represents 78% of the atmosphere. • Have student review the Creation Story and its elements in appreciation of the connection between science and religion.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 3: *The Water Cycle and Carbon and Nitrogen Cycles affect Earth's weather and climate.*		
A. Explain the following terms associated with the water cycle: evaporation, condensation, precipitation, watershed, runoff, ground water, etc. **B. Analyze the interactions between the Earth's atmosphere and the bodies of water (ocean).** **C. Explain and demonstrate the carbon dioxide cycle and analyze the interactions between Earth's surface and atmosphere.** **D. Analyze the interactions between Earth's atmosphere and Earth's surface on the nitrogen cycle.** **E. Understand how the weather affects and is affected by the carbon and nitrogen cycles in an environment.**	• Students can draw a diagram of the Water Cycle noting its continual ongoing cycle. • Demonstrate the working of the Water Cycle by creating the elements of the water cycle using a glass jar. • Have students journal their observations and discuss tying back to the concepts and explanation of the cycle. • Create a model of hydrologic cycle that focuses on the transfer of water in and out of the atmosphere. • Demonstrate processes in the laboratory. • The student needs to understand what the carbon cycle is and its importance to our survival. • The student can make a model or chart of the carbon cycle. • The student needs to understand what the nitrogen cycle is and its importance to our survival. • The student can make a model or chart of the nitrogen cycle. • Have students research certain ethical topics, such as over fertilization. Form an opinion and present based on research findings.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 4: *The elements of weather are important factors that determine weather and weather patterns.*		
A. Identify weather associated terms that cause and contribute to weather conditions such as air temperature, air pressure, air masses, wind direction, humidity, etc. **B. Collect weather data in the area such as daily high and low temperatures, precipitation measures, atmospheric conditions, etc.** **C. Students will know that there are various types of clouds which have varying characteristics.**	• Students can conduct air pressure experiments to understand its nature. • Have students study a weather map and learn how to give a daily weather report based on this information. • Have students make weather predictions based on changes in air masses, air pressure, etc. • Have students watch a weather report given on the Weather Channel and discuss and analyze its components. • Have students analyze how these factors affect the weather conditions in their area. • The student can chart and plot these conditions by using local newspaper weather forecast information on a daily. • Demonstrate how a cloud is formed using the Cloud in the Bottle Experiment. • Students can create a diagram of clouds, noting the types and labeling.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 5: *Weather can be observed and measured utilizing various weather instrumentation.*		
A. Identify various tools and instruments used to collect weather information such as thermometers, wind vanes, anemometer, barometer and rain gauge.	• The student needs to understand how these tools and instruments work. • Student can build an anemometer to capture wind speed and conduct a test of the use of the instrument. • Students can construct a barometer to understand how air pressure is measures. • Construct a rain gauge and collect data for a period of time and analyze results.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 6: *Climate is the result of weather patterns.*		
A. A region's climate is generated by the climate system, which has five components: atmosphere, hydrosphere, cryosphere, lithosphere and biosphere. **B. There are five climate zones in the world: Tropical, Dry, Moderate, Continental and Polar.** **C. Differentiate weather as a result of short-term variations and climate as the result of long-term patterns.** **D. Identify how climate affects the Earth's conditions**	• Have students research the five climates that exist in the World: Tropical, Dry, Moderate, Continental and Polar. • Create climatographs for various locations around the Earth and categorize the climate based on yearly patterns of temperature and precipitation. • Have students work in groups and assign different cities throughout the world to compare temperature versus rainfall.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 7: *Ecosystems and Biomes are climatically similar areas of Earth.*		
A. Explain what an ecosystem and biomes are and how they fit together in our environment. **B. Distinguish the difference between the types of biomes.**	• The student needs to define what an ecosystem is and what a biome is and how they fit together. • In groups, students can discuss various biomes and how they differ from each other. • Compare and contrast desert, tundra, tropical rain forest, forests and grasslands.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 8: *Severe Weather, Global Climate change and Global Warming impact the Earth's surface.*		
A. Understand what climate change is. **B. Recognize that human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in the Earth's surface temperature.** **C. Introduce severe weather and briefly describe factors including latitude, altitude, topography, and atmospheric conditions that lead to severe weather.**	• Explore examples of climate changes and theories surrounding it. • Students will research the causes and effects of Global Warming and create a montage. • Thunderstorms, tornadoes, waterspouts, cyclones, hurricanes, blizzards, hail, flooding, droughts, etc. are all examples of severe weather. • Students can build a tornado in a bottle and explain how it works. • Students can be assigned a research paper on a weather phenomena and a poster with oral presentation.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 9: *Potential and Kinetic Energies work to produce changes in the motion of objects.*		
A. Compare and contrast potential and kinetic energy. **B. Explain the concept of Centripetal Force.**	• Model the relationship between the height of an object and its potential energy. • Relate the potential and kinetic energies of a roller coaster on various points of its path. Model using the roller coaster model. • Demonstrate centripetal force with bucket simulation.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 10: *Force can be observed and measured.*		
A. Recognize when two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from another object. **B. Understand that a force is a push and pull that acts on an object. Introduce Work = Force x Distance.** **C. Recognize that forces have magnitude and direction.** **D. Predict an object's relative speed, path, or how far it will travel using various forces and surfaces; introduce the basic unit Newton.**	• Demonstrate and introduce the idea of applying a force and how to determine whether work was done. • Emphasize making an argument using evidence to state a conclusion. • Examine examples of forces, calculating them and how to solve a problem using this method. • Introduce Speed = Distance/Time (in seconds)	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 11: *Newton's Three Laws of Motion explain how force and mass interact to create motion or change a motion.*		
A. Identify motion as an object changing position. **B. Understand that an object in motion at a constant velocity will continue at the same velocity unless acted on by an unbalanced force.** **C. Explain and demonstrate the concept of Inertia in terms of an objects resistance to a change in its motion.** **D. Identify how momentum is related to the forces acting on an object.** **E. Describe the acceleration of an object is dependent on its mass and the force applied** **F. Recognize when one object exerts a force on another object, there is an equal and opposite force applied from the second object back to the first.**	• Calculate the speed of an object when given distance and time. • Compare the motion of an object acted on by balanced forces with the motion of an object acted on by unbalanced forces. • Perform various inertia experiments, capture data and analyze results. • Test various vehicles with differing mass and note different rates of momentum • Calculate Force (Newtons) from the calculation: Force = Mass x Acceleration. • Demonstrate using Newton's Cradle. • Demonstrate using traveling balloon on a string.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 12: *Gravity and Friction are forces of Nature.*		
A. Gravity is a force exerted on all objects from the Earth and all objects exert gravity on one another. **B. Identify weight as a measure of how strongly an object is pulled toward the ground by gravity and that gravity is not constant in the universe.** **C. Friction is a force that affects the motion of objects. It can be both useful and harmful.** **D. Demonstrate and explain the frictional force acting on an object with the use of a physical model.**	• Investigate, construct and generalize rules to demonstrate the effect of the force of gravity has on balls of different sizes and weights. • Have students engage in an activity where they measure their weight based on the specific gravity of various planets. • Have students note that their weight changes but their mass does not change. Students need to understand the difference between weight and mass. • Demonstrate various examples of friction. • The student can demonstrate the effects of friction on motion by developing a series of different demonstrations with a toy vehicle over different surfaces to see how friction can change the speed of an object. • Explore how friction can be helpful using examples, as well as, harmful. • Measure the amount of friction using various materials such as sandpaper, silk, etc.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 13: *Magnetism and Buoyancy are forces of Nature.*		
A. Magnetism is a force exerted on magnets and other magnetic objects. It is affected by distance. **B. Buoyancy is a force exerted by liquids and gases**. **C. Define density and explain how buoyancy is affected by the density of matter.**	• Create a magnet experiment whereby students test various materials to see if they are magnetic. Students will draw an overall conclusion about magnets and magnetic objects. • Create a sink versus float lab so that students can understand the principles of buoyancy • Conduct density lab using straws, colored water and salt. • Compare the density of liquids. • Measure density and capture data.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 14: ***There are six basic types of simple machines and they are designed to help us work more efficiently. Complex machines are made up of one or more simple machines.***		
A. Introduce simple machines: lever, pulley, wedge, screw, inclined plane, wheel and axle. **B. Identify simple machines within complex machines.**	• Provide hands-on opportunities to explore how various simple machines work. • Give different complex machines to different students or teams and allow them to identify the simple machines and their jobs.	

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Completed
Enduring Knowledge 15: *Engineering Design can be used to demonstrate the physical law of motion, as well as, the workings of machines.*		
A. Understand basic machine design and function.	• Students will design and create a complex machine using Rube Goldberg method to perform a specific task, i.e. a machine that can pop a balloon.	