Diocese of Allentown Science Curriculum
Grade 2 Scope and Sequence

Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Complete
Enduring Knowledge 1: ***Use the scientific method, scientific tools, and safe lab procedures to solve problems.***		
Standards: • **Make purposeful observations using the appropriate senses.** • **Generate questions based on observations.** • **Identify strategies for gathering information (expert in field, books, observations, investigations, videos)** • **Conduct simple investigations.** • **Construct simple charts from data and observations.** • **Share ideas through purposeful conversation.** • **Communicate and present findings of observations (illustrations, models, writing).** • **Manipulate simple tools that aid in observation and data collection.** • **Make accurate measurements with appropriate units for the measurement tool.** A. The **Scientific Method** is the way that scientists learn and study the world around them. The steps include:	**ACTIVITY:** • Create a science handbook including Scientific Method & Scientific Process Skills • Observe objects using the appropriate senses • Classify items • Make a chart with data • Have students and parents sign a Lab Safety Contract • Include lab safety rules in science handbook • Include scientific instruments and tools, and their uses, in science handbook **LAB:** • The first lab should be a step by step practice using the Scientific Method of something they know (brushing teeth) • All labs should utilize the Scientific Method and Scientific Process Skills • Review safety rules at the beginning of every lab • Review instrument and tool name and use during every lab **INTERNET/SMART BOARD:** • Video clips • WatchKnowLearn.org	

1. Observe and ask a question 2. Form a hypothesis 3. Identify the procedure (materials and steps) 4. Follow the procedure to conduct the experiment 5. Tell what was learned from the experiment (conclusion) B. Scientists use **Scientific Process Skills** to solve problems. 1. Observing 2. Classifying 3. Measuring • Length (inches, centimeters) • Mass (ounces, grams) 4. Communication 5. Interdisciplinary Skills C. Lab Safety is a set of rules that scientists practice to safely learn and study the world around them. These rules include: 1. I will follow directions 2. I will listen carefully 3. I will keep myself and others safe 4. I will clean my area after lab	• Discovery Education **VOCABULARY: (for teacher information)** • Hypothesis: an educated guess • Procedure: the steps in an experiment • Experiment: a fair test designed to answer a question • Observations: noting and recording information • Conclusion: the result of outcome • Observing: ability to identify properties, structures, etc. through use of all senses • Classifying: ability to group, match, compare by commonality • Measuring: ability to find quantitative differences, to estimate, to calculate, etc. (standard & metric) • Communication: ability to verbally relate experiences, information and procedures with clarity • Wafting: waving a hand over a substance to draw a scent toward the nose • Scientist: a person who asks questions and tries different ways to answer them	

activities 5. I am a responsible scientist 6. Do not enter Science Lab without an adult 7. Do not eat or drink in the lab 8. Do not inhale; wafting permitted with teacher approval D. Scientific Instruments and Tools help scientists observe, describe and record the world around them. Instruments and tools include: 1. Ruler 2. Pencil 3. Balance 4. Magnifying Lens 5. Safety Goggles 6. Flashlight 7. Globe		

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Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Complete
Enduring Knowledge 2: *Seasonal weather changes occur each year.*		
Standards: • **Identify characteristics of the seasons of the year.** • **Identify characteristics of weather.** • **Describe the weather changes from day to day and over seasons.** • **Explain how precipitation, air temperature, wind and cloud cover make up weather in a particular place and time.** • **Distinguish among the various forms of precipitation (rain, snow, hail, freezing rain), making connections to the weather in a particular time and place.** • **Recognize and demonstrate the tools to measure features.** A. Identify the characteristics of the seasons of the year. 1. Fall 2. Winter 3. Spring 4. Summer B. Identify the characteristics of weather	**ACTIVITY:** • Identify and chart characteristics of the seasons • Make a favorite season circle graph with class data • KWL chart of weather characteristics • Keep a class weather chart identifying daily temperature, wind strength, and precipitation • Design and construct simple instruments that could be used to measure weather **LAB:** • Experiment with the amount of rain that falls from a rain maker (watering can) into a rain gauge (beaker, etc.) • Measure various forms of precipitation • Record outdoor temperatures in a sunny location and shady location, discussing the difference in temperatures • Create a weather station for the school, using classical weather tools/instruments that clearly show the physical principle that makes them work **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Temperature: how hot or cold something is • Precipitation: water that falls from clouds in the form or rain, snow, hail, freezing rain • Wind: how the air moves; warm air rises and cool air moves in to take its place • Cloud cover: there are different types: cloudy, partly cloudy, foggy	

1. Types of precipitation (rain, snow, hail, freezing rain)
2. Air temperature (hot, cold, warm, cool)
  • degrees Fahrenheit
  • degrees Celsius
3. Wind (breezy, windy, calm)
4. Cloudy cover (cloudy, partly cloudy, foggy)
C. The features of weather can be measured with tools
1. Rain gauge/ruler
2. Thermometer
3. Weathervane and anemometer
	• Thermometer: measures temperature
	• Rain gauge: measures the amount of rain
	• Weathervane: measures the direction of wind
	• Anemometer: measures wind speed	

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Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Complete
Enduring Knowledge 3: *Major cloud types can be associated with particular weather conditions.*		
Standards: • **Recognize and describe the basic types of clouds, including cumulus, cirrus, stratus and cumulonimbus.** • **Explain how cloud types are associated with particular weather conditions.** A. Clouds are classified according to basic types: 1. Cumulus • Made of tiny water droplets • Tall • Puffy • Bright white 2. Cirrus • Water collects to form curves • Water droplets turn to tiny ice drops • No clear shape • Looks like curls of hair or feathers • High in the sky 3. Stratus • Hold little water	**ACTIVITY:** • Observe characteristics of clouds types • Make T chart of characteristics and drawing • Match cloud types with weather conditions • Make models of clouds using cotton balls **LAB:** • Cloud in a Bottle • Make a Cloud Wheel/Cloud Finder **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Nephologist: a scientist who studies clouds	

moisture • Lumpy, layered clouds 4. Cumulonimbus • Can't hold all water drops • Tall • Puffy • Gray B. Clouds types are associated with particular weather conditions. 1. Cumulus • Fair weather clouds 2. Cirrus • Rain clouds 3. Stratus • Weak rain clouds 4. Cumulonimbus • Thunderstorm clouds		

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Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Complete
Enduring Knowledge 4: *When severe weather is predicted, precautions can be taken.*		
Standards: • **Recognize that weather can be predicted and forecasted based on trends.** • **Give examples of severe weather.** • **Describe how to keep safe during severe weather.** A. Weather can be predicted based on weather trends, keeping track of weather over time and seasons 1. Prediction 2. Forecast B. Characteristics of severe weather: 1. Thunder 2. Lightning 3. Tornadoes 4. Strong winds 5. Heavy precipitation 6. Flood 7. Drought C. Precautions should be taken for human safety during severe weather conditions.	**ACTIVITY:** • Daily/weekly/monthly journal of weather • Class graph of data for temperature • Record data using pictographs • Present a weather forecast and weather report • Watch the weather forecast for the local area **LAB:** • Experiment with the variations in temperature using various locations and different times of day **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Prediction: a guess about what might happen based on what you already know • Forecast: the process of predicting the weather that is to come in the future based on weather maps and patterns • Meteorologist: a scientist who reports and forecasts the weather	

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Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Complete
Enduring Knowledge 5: *Earth is made up different land and water forms.*		
Standards: • **Recognize that land and water are found on earth's surface.** • **Describe various land forms and bodies of water.** A. Earth is made up of different materials: 1. Land (Solid Earth) • Rocks • Soil 2. Water (Fluid Earth) • Fresh water (3%) • Salt water (97%) B. Earth is made up of different forms: 1. Landforms • Mountain • Hill • Valley • Plain • Island • Prairie • Desert 2. Bodies of water • Ocean	**ACTIVITY:** • Create a landforms booklet • Create a bodies of water booklet **LAB:** • Observe rocks, soil, freshwater and saltwater with a magnifying lens and record characteristics **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Landform: a natural feature of a land surface • Mountain: a very high structure of land • Hill: a small structure of land • Valley: an area of low ground between two hills or mountains • Plain: a large area of level open land • Island: any land area surrounded entirely by water • Prairie: a large area of flat or rolling grassland with few or no trees • Desert: a dry area where few plants grow due to little moisture • Ocean: a huge body of salt water • Lake: a large body of fresh water surrounded by land • Pond: a small body of fresh water surrounded by land • River: large natural body of fresh water that flows into a lake or ocean • Stream: small natural body of fresh water that flows • Glacier: a large flowing river of ice that moves very slowly	

• Lake • Pond • River • Stream • Glacier	• Geologist: a scientist who studies the earth • Hydrologist: a scientist who studies bodies water	

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Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Complete
Enduring Knowledge 6: *The water cycle is a changing of water through phases.*		
Standards: • **Describe how water on earth cycles in different forms and in different locations.** • **Give examples of how the cycling water has an effect on weather.** A. Water can change states at various stages of the water cycle. 1. Evaporation • Liquid changes to a gas. • Liquid water becomes water vapor. • Occurs because the temperature increases 2. Condensation • Gas changes to a liquid. • Water vapor becomes liquid water. • Occurs because temperature decreases B. Water moves through the environment in the water cycle 1. Evaporation • Sun heats up water (liquid) in bodies of water and changes it	**ACTIVITY:** • KWL chart of water states • KWL chart of water cycle • Draw the water cycle **LAB:** • Conduct simple demonstrations showing evaporation ▪ Water left in sunlight evaporates. ▪ Water heated on stove produces water vapor that fills a balloon. • Conduct simple demonstrations showing condensation ▪ Condensation forms on the outside of a cold can of soda. ▪ Condensation occurs when the water vapor in the balloon cools and changes to a liquid. **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Water cycle: the path water takes, and the changes it goes through, as it cycles through the environment • Evaporation: the change of water from a liquid state to a gas state, due to an increase in temperature • Condensation: the process by which water changes from a gas to a liquid state, due to a decrease in temperature • Precipitation: water that falls from clouds in the form or rain, snow, sleet, hail • Collection: when water returns to bodies of water or groundwater	

to water vapor (gas) and moves into the air. 2. Condensation • The water vapor rises, cools, changes back to water droplets (liquid) and forms clouds in the air. 3. Precipitation • When the air cannot hold any more condensation in the clouds, precipitation occurs. The water (liquid) falls back to the earth in the form of rain, snow, hail, or freezing rain. 4. Collection • The water returns to bodies of water or soaks into land to become groundwater.	• Water vapor: the gaseous state of water • Hydrologist: a scientist who studies water and the water cycle	

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Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Complete
Enduring Knowledge 7: *The sun, planets, and moon are a part of the solar system.*		
Standards: • **Recognize that the earth is part of a system called the 'Solar System' that includes the sun (a star), planets and Earth's moon.** A. Sun 1. The sun is a star (made of gases). 2. Central object in our solar system 3. Largest object in our solar system • More than 1 million Earths would fit inside the sun 4. It produces heat and light. 5. It can create shadows. 6. It can only be seen in the daytime. B. Planets 1. Inner planets: rocky bodies close to the Sun • Mercury • Venus • Earth • Mars	**ACTIVITY:** • Venn Diagram: compare and contrast characteristics of the sun, Earth and moon by observing photos • Measure shadows at different times of the day • Experiment with reflection using flashlights and mirrors • Make sundial **LAB:** • Examine a model of the sun, planets and Earth's moon • Label picture of solar system including sun, planets and Earth's moon • Experiment how moon reflects the sun with an orange covered in foil and a flashlight • Experiment how craters are created using flour and marbles **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Solar system: includes the Sun and all the objects that orbit around it, due to gravity • Sun: a star; a large ball of gases • Planet: large rounded object that orbits the sun • Moon: an object that orbits Earth • Reflect: when light bounces off an object • Crater: hole on the surface of the moon • Astronomer: a scientist that studies space	

2. Outer plants: large gaseous bodies further away from the Sun • Jupiter • Saturn • Uranus • Neptune 3. Pluto is in a category of its own; it is not gaseous, but made up of mostly frozen water and rock. C. Moon (Earth's moon) 1. The moon reflects light from the sun; it does not make its own light. 2. The moon is present in the sky both day and night. 3. Craters are holes in the surface of the moon; may have resulted from collisions with asteroids or other objects in space.		

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Enduring Knowledge 8: ***The moon is Earth's only natural satellite that has an observable pattern.***		
Standards: • **Recognize that moon is a natural satellite of the earth and has a specific pattern of movement.** • **Describe the changes that occur in the observable shape of the moon over the course of a month.** A. The moon is a natural satellite. 1. The moon orbits the earth. 2. It travels with the earth around the sun. B. The visible shape of the moon follows a predictable cycle which takes about 1 month. 1. Part of the moon is in shadow over the course of a month. 2. These patterns are called phases. ▪ Full moon ▪ New moon ▪ Quarter moon ▪ Crescent moon	**ACTIVITY:** • Create a phases of the moon calendar over a month • Phases of the moon flip book **LAB:** • Oreo cookie lab to represent the phases of the moon **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Natural satellite: a moon that orbits another body • Phases: changes in the appearance of the moon as we view it from Earth • Orbit: the path an object takes as it moves around another object • Lunar scientist: a scientist who studies the moon	

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Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Complete
Enduring Knowledge 9: *Stars can be observed and described by arrangement.*		
Standards: • **Recognize that stars are observable in the night sky.** • **Recognize that one star, our Sun, is a part of the solar system.** • **Recognize the patterns of constellations and the apparent movement of stars across the sky.** A. Star 1. Huge mass of burning gas 2. Stars are not a part of our solar system, except for our Sun. • Very far away 3. Too many to count and scattered unevenly B. Constellations 1. Patterns of stars visible from Earth in the night sky 2. Pattern of stars stay the same as they appear to move across the sky 3. Positions of constellations in the sky change over the course	**ACTIVITY:** • Observe photos of stars • Observe a star map • Identify constellations and names • Complete dot to dot constellations • Observe different constellations that can be seen in different seasons **LAB:** • Make a constellation tube **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Star: a huge mass of burning gas • Constellation: patterns of stars visible from Earth	

of a year 4. Have assigned names with specific boundaries		

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Enduring Knowledge 10: *Motions in the solar system include rotation and revolution.*		
Standards: • **Recognize that the earth revolves (orbits) around the sun in a year's time and that the earth rotates on its axis once every 24 hours.** • **Make connections between the rotation of the earth and day/night and the apparent movement of the sun, moon and stars across the sky.** A. The earth moves through the sky in two ways 1. Rotation: the spinning of Earth on its axis • One rotation takes 24 hours. • Causes day and night • The part of the earth facing the sun has daylight. • The part facing away from the sun has night. • Rotation of the earth moves to the left 2. Revolution: to travel in a	**ACTIVITY:** • Have students pretend to be the earth rotating; spinning ▪ Place hand on heart like for the Pledge of Allegiance ▪ Push that shoulder back with hand ▪ Turn body to left • Have students pretend to be the earth revolving around the sun; orbiting • Use models to show day and night • Have students pretend to be the moon moving around the earth **LAB:** • Make Earth, Moon Orbits model • Observe the sun at different times of the day **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Rotation: the spinning of Earth on its axis • Axis: an imaginary straight line that runs between the North and South poles • Revolution: to travel in a closed path around an object such as Earth moves around the Sun in an orbit	

closed path around an object such as Earth moves around the Sun in an orbit • One revolution take 365 days • Causes calendar year B. The moon moves through the sky. 1. Revolution: movement around the earth in an orbit • One orbit takes 28 days (~ 1 month) • Causes phases of the moon C. Different planets take different amounts of time to revolve around the sun because of their distance from the sun.		

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Enduring Knowledge 11: *Energy can lead to changes.*		
Standards: • **Recognize that energy is the ability to cause motion or create change.** A. Energy is the ability to cause motion or create change. 1. Energy is involved in all physical processes 2. Energy is useful 3. Simple stationary objects do not produce energy(cardboard box)	**ACTIVITY:** • KWL chart of energy and forms **INTERNET/SMART BOARD:** • Video clips **VOCABULARY:** • Energy: the ability to cause motion or create change • Motion: the act of moving • Physicist: a scientist who studies energy	

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Learning Standard	Ideas for Developing Investigations and Learning Experiences	Date Complete
Enduring Knowledge 12: *Energy comes in different forms.*		
Standards: • **Identify the basic forms of energy** A. There are basic forms of energy • Light • Sound • Thermal • Electrical • Mechanical	**ACTIVITY:** • KWL chart of energy and forms • Energy scavenger hunt **INTERNET/SMART BOARD:** • Video clips	