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| **3rd Grade Water and Climate** | | |
| **Content Area:** Science | | |
| **Unit Title:** **Water and Climate** | | |
| **Target Course/Grade Level: 3** | | |
| **Unit Summary:**  Water is the most important substance on Earth. Water dominates the surface of our planet, changes the face of the land, and defines life.  **Primary interdisciplinary connections:**  ELA/Literacy:  RI: 1: Ask and answer questions.  RI: 1: Ask and answer questions to demonstrate understanding of a text.  RI 2: Determine the main idea of a text.  RI 2: Determine the main idea of a text; recount key details.  RI 3: Describe in a text the steps in technical procedures.  RI 3: Describe the relationship between scientific ideas.  RI 3: Describe the relationship between scientific concepts using language that pertains to cause and effect.  RI 4: Determine the meaning of domain-specific words and phrases in a text.  RI 5: Use text features to locate information.  RI 6: Distinguish their own point of view from that of the author of a text.  RI 7: Use information gained from illustrations to demonstrate understanding of the text.  RI 8: Describe logical connections in text.  RI 9: Compare and contrast two texts on the same topic.  RF 3: Apply word analysis skills in decoding words.  RF 4: Read with fluency, purpose, and understanding.  RF 4: Read with fluency.  RF 4c: Use context to confirm word understandings.  W 2: Write informative texts  W 5: Strengthen writing by revising and editing.  W 7: Conduct a short research project.  W 8 : Gather information from print; take brief notes and sort evidence into categories provided.  SL 1: Engage in collaborative discussions.  SL 2: Determine main ideas and supporting details of information presented in diverse formats.  SL 2: Determine main ideas from information presented orally.  SL 3: Ask and answer questions about speaker’s information.  SL 4: Recount an experience.  SL 4: Report on a topic or text.  SL 6: Speak in complete sentences to provide requested details.  L 4: Use glossaries to determine or clarify the precise meaning of key words.  L 4: Determine or clarify the meaning of unknown words.  L 5: Demonstrate understanding of word relationships  L 6: Acquire and use domain-specific words.  Mathematics  MP.2 Reason abstractly and quantitatively. (3-ESS2-1),(3-ESS2-2)  MP.4 Model with mathematics. (3-ESS2-1),(3-ESS2-2)  MP.5 Use appropriate tools strategically. (3-ESS2-1)  3.MD.A.2 Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l). Add, subtract, multiply, or divide to solve  one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent  the problem. (3-ESS2-1)  3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less”  problems using information presented in bar graphs. (3-ESS2-1)  MP.2 Reason abstractly and quantitatively. (3-ESS3-1)  MP.4 Model with mathematics. (3-ESS3-1) | | |
| **21st Century Themes:**  Digital media will be used incorporated in project presentations. This module will develop students’ abilities to do and understand scientific inquiry. Students will identify questions, design and conduct scientific investigations to answer those questions, employ tools to gather, analyze, and interpret data. They will use data to construct reasonable explanations, develop and communicate investigations and evidence and understand that scientists use different kinds of investigations and tools to develop explanations using evidence and knowledge. This module will develop and extend students’ understandings about science and technology. Students will work collaboratively in teams and use tools and scientific techniques to make better observations. | | |
| **Unit Rationale**  Weather is driven by the Sun and involves the movement of water over the earth through evaporation, condensation, precipitation, and runoff—the water cycle. Climate is determined in part by the amount of precipitation in a region and by temperature fluctuations. Human societies depend on water, and new technologies are being engineered to conserve and protect this natural resource, to provide for the needs of people around the world.  These powerful pervasive ideas are introduced to grade 3 students in the Water and Climate Module. It provides students with experiences to explore the properties of water, the water cycle and weather, interactions between water and other earth materials, and how humans use water as a natural resource. | | |
| **Learning Targets** | | |
| Disciplinary Core Ideas  **PS1.A: Structures and properties of Matter**  Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (Extended from grade 2)  **ESS2.C: The roles of water in Earth’s surface processes**  Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (Extended from grade 2) Nearly all of Earth’s available water is in the ocean. (From grade 5)  **ESS3.C: Human impacts on Earth systems**  Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth’s resources and environments. (From grade 5)  **ESS2.D: Weather and climate:**  Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. Climate describes a range of an area’s typical weather conditions and the extent to which those conditions vary over years.  **ESS2.D: Weather and climate**  Climate describes a range of an area’s typical weather conditions and the extent to which those conditions vary over years.  **ESS3.B: Natural hazards**  A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.  **ESS3.A: Natural resources**  Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (Extended from kindergarten)  **ETS1.A: Defining and delimiting engineering problems**  Possible solutions are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account.  **ETS1.B: Developing possible solutions**  At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs.  **ETS1.C: Optimizing the design solution**  Different solutions need to be tested in order to determine which of them best solves the  problem, given the criteria and the constraints | | |
| **PE #** | **Performance Expectations** | |
| 3-ESS2-1. | Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. | |
| 3-ESS2-2. | Obtain and combine information to describe climates in different regions of the world. | |
| 3-ESS3-1. | Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.\*` | |
| 3-5-ETS1-1. | Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost. | |
| 3-5-ETS1-2. | Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem. | |
| 3-5-ETS1-3. | Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.  The performance expectations above were developed using the following elements from. | |
| **Unit Essential Questions**   * What happens when water falls on different surfaces? * How does water move on a slope? * How much water can a dry sponge soak up? * What happens outdoors when rain falls on natural materials? * How can you measure temperature accurately? * What happens to water when it gets hot? cold? * What happens when hot or cold water is put into room-temperature water? * How does water change when it gets really cold? * Where should an animal go to stay warm or to stay cool? * What does the weather forecast tell us? * What happens to wet paper towels overnight? * What else affects how fast water evaporates? * What causes moisture to form on the side of a cup? * What are typical weather conditions in our region? * How do we describe different climates? * How do people deal with natural hazards such as floods? * What happens when water is mixed with other earth materials? * Do soils in the schoolyard drain water at the same rate? * What is needed to make a waterwheel system function well? | | **Unit Enduring Understandings**   * Water forms beads on waterproof materials and soaks into absorbent materials. * Water moves downhill. The angle of the slope and the amount of water affect flow. * Temperature is a measure of how hot matter is. * Water expands when heated and contracts when cooled. * A material that floats in water is less dense than the water; a material that sinks is more dense. * Cold water is more dense than warm water. * Water expands when it freezes; ice is less dense than liquid water. * Ice melts when heated; water freezes when cooled. * Weather is measured using observations and tools such as thermometers, wind vanes, and rain gauges. * Evaporation is the process by which liquid (water) changes into gas (water vapor). * High temperatures, greater surface area, and moving air (wind) increase the rate of evaporation. * Condensation is the process by which gas (water vapor) changes into liquid water; it occurs on a cool surface. * Evaporation and condensation contribute to the movement of water through the water cycle. * Typical weather in a region often varies with seasons. High and low temperatures and amount of precipitation are the main ways to describe seasonal weather changes. * The Sun’s energy drives weather. * Weather data in tables and in graphic displays, may show patterns over time. * Climate is the average or typical weather that can be expected to occur in a region, based on long-term observation and data analysis. * Weather-related natural hazards include tornadoes, hailstorms, blizzards, lightning, floods, and drought. * People often modify their homes and their way of life to deal with floods. * Wetland protection and restoration is one way to prevent floods. * Soil is rock particles mixed with organic material called humus. * Soils retain more water than rock particles alone. * Water drains more easily through some earth materials than through others. * The energy of flowing water can be used to do work; waterwheels are machines powered by flowing water. |
| Unit Learning Targets -  Students engage in science and engineering practices while investigating water, weather, and climate, and explore the crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; and systems and system models. They are introduced to the nature of science, how science affects everyday life, and the influence of engineering, technology, and science on society and the natural world. | | |
| **Evidence of Learning** | | |
| **Embedded Assessments:**   * Response Sheets * Performance Assessments * Science Notebook Entries   **Benchmark Assessments:**   * Investigation I-Checks * Surveys * Post-Test | | |
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