**Unifying Theme: Investigating Weather Systems**

| Essential Standards and Clarifying Objectives |
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| **5.E.1 Understand weather patterns and phenomena, making connection to the weather in a particular place and time.** |
| **5.E.1.1** Compare daily and seasonal changes in weather conditions (including wind speed and direction, precipitation, and temperature) and patterns. |
| **5.E.1.2** Predict upcoming weather events from weather data collected through observation and measurements. |
| **5.E.1.3** Explain how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation. |
| **5.P.2 Understand the interactions of matter and energy and the changes that occur.** |
| **5.P.2.1** Explain how the sun's energy impacts the processes of the water cycle (including evaporation, transpiration, condensation, precipitation and run-off). |
| **5.P.3 Explain how the properties of some materials change as a result of heating and cooling.** |
| **5.P.3.1** Explain the effects of the transfer of heat (either by direct contact or at a distance) that occurs between objects at different temperatures (conduction, convection, or radiation). |
| **5.P.3.2** Explain how heating and cooling affect some materials and how this relates to their purpose and practical applications. |
| **Unpacking**<br>What does this clarifying objective mean a child will know, understand and be able to do? |
| **5.E.1.1** Students know that weather can change from day to day, and that many factors are measured to describe and predict weather conditions. For example, wind speed and direction, precipitation, temperature, and air pressure. Students know that in different latitudes and hemispheres there are different and sometimes opposite seasonal weather patterns. |
| **5.E.1.2** Students know that one can collect and compare weather data in order to predict the likelihood of a particular weather condition occurring. Students know how to read basic weather instruments: thermometer, barometer, anemometer, wind vane, and rain gauge. Students also can identify atmospheric conditions (presence and type of clouds [stratus, cirrus, cumulus], fronts) that are associated with predictable weather patterns. Students can make basic weather predictions using these skills. |
| **5.E.1.3** Students know that local weather conditions are influenced by global factors such as air and water currents. The jet stream is an air current in the upper atmosphere, located over North America that has a powerful influence on the weather conditions there. The jet stream flows from the west to the east and changes location depending on global conditions. The Gulf stream is a warm water surface current in the Atlantic ocean that moves from the south of Florida up the eastern seaboard and then across the Atlantic. |

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| The Gulf stream moderates weather along the eastern seaboard, warming the air and land there during cooler months. In the Pacific, there is an oscillation of water temperatures know as El Nino/La Nina. This oscillation impacts the climate of North and South America for long periods of time. Hurricanes are major storms that form over warm ocean water and are caused by global weather patterns. |
| **5.P.2.1** Students know that the sun provides the energy that is a driving force for most biotic and abiotic cycles on the surface of the earth. Students know that the sun's energy fuels the water cycle and impacts different aspects of the water cycle (evaporation, transpiration, condensation, precipitation). |
| **5.P.3.1** Students know that when warmer things are put with cooler things, the warmer things lose heat and the cool things gain it until they are all at the same temperature. Students know that a warmer object can warm a cooler object by contact or at a distance. Conduction is the transfer of thermal energy between things that are touching. Conduction can happen within one object. For example, thermal energy can be conducted through the handle of a metal pot. Convection is the movement of thermal energy by the movement of liquids or gases. Convection in the oceans and atmosphere helps to move thermal energy around Earth and is an important factor influencing weather and climate. Radiation is the transfer of energy by electromagnetic waves. Electromagnetic waves can carry energy through places with or without any matter. The sun is the main source of electromagnetic energy on Earth. Part of this energy, light, is used by producers to make food. Radiation can also happen in other circumstances. For example, sitting in front of a fireplace. |
| **5.P.3.2** Students know that heating and cooling can cause changes in the properties of materials, but not all materials respond the same way to being heated and cooled. Students know that heating and cooling cause changes in the properties of materials, such as water turning into steam by boiling water and water turning into ice by freezing. Students know and notice that many kinds of changes occur faster at higher temperatures. Students know that come materials conduct heat much better than other, and poor conductors can reduce heat loss. |