Course: 6th Grade Adv **Course Code: 2002050** **Quarter: 3**

RESOURCES **COMMON CORE** **SCIENCE CENTER** **SYLLABUS**

Topic of Study: Weather Patterns and Their Impact on Humans (***Fusion Units #3 & #4)***

Bodies of Knowledge: Earth and Space Science

Big Ideas: 1 The Practice of Science; **2** Characteristics of Scientific Knowledge; **3** The Role of Theories, Laws, Hypotheses, and Models; **7** Earth Systems and Patterns

Essential Questions: What are the parts of the Earth system? **(3-1)** What is the atmosphere? **(3-2)** How does energy move through Earth's system? **(3-3)** What is wind? **(3-4)** How does water move in the ocean? **(3-5)**

Vocabulary: water cycle, evaporation, transpiration, sublimation, condensation, precipitation, weather, humidity, relative humidity, dew point, precipitation, air pressure, wind, visibility, air mass, jet stream, front, thunderstorm, lightening, thunder, hurricane, storm surge, tornado, sinkhole, wildfire, muck fire, weather, latitude, elevation, climate, topography, surface current

Common Inquiry Labs:

- **SC.6.E.7.4**-Analyze Weather Patterns: Lab Manuel p.113
- **SC.6.E.7.9**-Modeling Air Pressure: Lab Manuel p.122
- **SC.6.E.7.1/7.4/7.5**-How Does Color Affect Temperature?: Lab Manuel p.128
- **SC.6.E.7.2/7.4**-Modeling the Water Cycle: Lab Manuel p.167

	Technology Links:	
Lab Assistance:	**Science Links:**	**Science Fair Assistance:**
Scientific Methods Skills	*Vocabulary Strategies*	*Math in Science*
Writing in the Sciences	*Graphic Organizers and Reading Strategies*	*Planning for Science Fair and Competitions*
Cooperative Learning Activities	*Fold Notes*	
	Rubrics and Integrated Assessments	
	Test Taking Strategies	*Lessons for Substitutes*

Above Level On Level Below Level

NGSSS	Outline of Content	Targets
SC.6.E.7.4 Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere. **Cognitive Complexity: High (3-1,3)** **SC.912.E.7.3** Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere. **Cognitive Complexity: High (3-1,3)**	**Unit 3 Lesson 1(E.7.4)** **Earth System and Geosphere** 1. Earth is a system of interrelated parts. 2. The geosphere is more than the land between our feet. **Hydrosphere and Cryosphere** 1. Much of the Earth is covered with water. **Atmosphere and Biosphere** 1. The atmosphere is so much more than the air we breathe. 2. The biosphere is where life is found. **Earth's Spheres Interact** 1. Interactions between spheres keep Earth in balance.	• Investigate and present the characteristics of the different spheres of the earth geosphere, hydrosphere, cryosphere, atmosphere and biosphere.
SC.6.E.7.9 Describe how the composition and structure of the atmosphere protects life and insulates the planet. **Cognitive Complexity: Moderate (3-2)**	**Unit 3 Lesson 2 (E.7.9)** **Composition, Air Pressure, and Temperature, of the atmosphere** 1. Gases make up the atmosphere. 2. Air pressure and temperature change as altitude increases. **Structure of the atmosphere** 1. Each layer of the atmosphere had different properties. **Function of the Atmosphere** 1. The atmosphere protects and insulates the planet.	• Investigate and understand the dynamics of the greenhouse effect on the earth. • Identify and research the natural and unnatural causes of climate change in the world. • Evaluate possible solutions to climate change.
SC.6.E.7.1 Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system. **Cognitive Complexity: Moderate (3-3)** **SC.912.P.10.4** Describe heat as the energy transferred by convection, conduction, and radiation, and explain the connection of heat to change in temperature or states of matter. **Cognitive Complexity: Moderate (3-3)** **SC.6.E.7.4** Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere. **Cognitive Complexity: High (3-1,3)**	**Unit 3 Lesson 3 (E.7.1,E.7.4,E.7.5)** **Temperature, Heat, Thermal Energy, and Thermal Expansion** 1. Temperature, heat, and thermal energy can be measured. 2. Specific heat measures energy needed to increase temperature. 3. Thermal expansion occurs when objects are heated. **Radiation** 1. Radiation transfers energy through space. 2. The sun is Earth's main source of energy. **Convection** 1. Convection is the transfer of energy due to movement of matter. 2. Convection occurs as a result of uneven heating of matter and thermal expansion and contraction. **Conduction** 1. Conduction is the transfer of energy through a material. Objects must touch for conduction to occur. **2.** Conduction occurs as water, rock, and air particles touch and transfer energy.	• Make and describe observations of conduction, convection and radiation in the real world. • Explain natural occurring weather patterns as a result of convection and radiation. • Observe and compare the rate of heat loss of different substances (sand, water, soil, rock, cement) and apply it to the earth system. • Graph the rate of heat loss of different substances. • Create a model and observe convection currents.

SC.6.E.7.5 Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land. **Cognitive Complexity: High (3-3,4)**		
SC.6.E.7.3 Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation. **Cognitive Complexity: High (3-4,5)** **SC.6.E.7.5** Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land. **Cognitive Complexity: High (3-3,4)**	**Unit 3 Lesson 4 (E.7.3, E.7.5)** **The movement of Air** 1. Wind is caused as air moves from areas of high pressure to areas of low pressure. 2. Belts of high-pressure and low-pressure air stretch around the globe and, combined with the rotation of the Earth, produce and patterns. **Global Winds** 1. Convection cells, pressure belts, and winds combine with the Coriolis Effect to produce global winds. **Local Winds** 1. Local winds, which move short, variable distances, are caused by uneven heating of land and water. **Unit 3 Lesson 5 (E.7.3)** **Surface Currents in the Ocean** 1. Surface currents are stream-like movements of water or near the ocean's surface. **Deep Currents in the Ocean** 1. Currents that occur deep in the ocean are caused by differences in water density. 2. Surface currents and deep currents together can form convection currents. **Upwelling** 1. Upwelling occurs when dense, cold water rises and brings nutrients to the ocean's surface. **Ocean Circulation** 1. As ocean currents travel, they move energy and matter.	• . Investigate the different factors that affect weather. • Identify tools that are used to measure weather. • Record and graph temperature and precipitation over a period of time. • Define a problem about a factor of weather and design an experiment to test their hypothesis. • Infer the possible weather from given data and conditions.
SC.6.E.7.2 Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate. **Cognitive**	**Unit 4 Lesson 1 (E7.2, E.7.4)** **Water Cycle and Change of State** 1. The water cycle is the movement of water on Earth. 2. The three states of matter are solid, liquid, and gas.	• Describe and explain the interactions of water between the different spheres of the earth (water cycle).

Complexity: High (4-1,2,3,6) **SC.6.E.7.3** Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation. **Cognitive Complexity: High (3-4,5)** **SC.6.E.7.4** Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere. **Cognitive Complexity: High (3-1,3)** **SC.912.E.7.5** Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions. **Cognitive Complexity: High (3-1,3)**	**Water in the Atmosphere** 1. Water reaches the atmosphere by evaporation, transpiration, and sublimation. 2. Water vapor can condense to form droplets of liquid water in the atmosphere. 3. Precipitation is any form of water, such as rain or snow, that falls to Earth's surface. **Water in the Oceans and on Land** 1. Water circulates in ocean currents. 2. Water flows as runoff over Earth's land. 3. Water seeps into the ground. 4. Water is stored in snow and ice. **Transport of Matter and Energy** 1. The water cycle transports matter and energy. **Unit 4 Lesson 2 (E.7.2,E.7.3)** **Elements of Weather** 1. Explain how each of the following relates to weather: temperature, humidity, precipitation, air pressure, wind direction and speed, visibility. **Measuring Elements of Weather** 1. Describe how each of these is measured: temperature, humidity, precipitation, air pressure, wind direction and speed. 2. Describe technology that is used in weather data collection. **Unit 4 Lesson 3 (E.7.2, E.7.3)** **Water Cycle Influences** 1. Explain ways in which the water cycle influences weather. **Patterns in the Atmosphere** 1. Air Masses and Fronts 2. Pressure Systems 3. Global Winds and Jet Streams **Patterns In the Ocean** 1. Describe how ocean currents influence weather.	• Create a water cycle model and observe the effects of different student synthesized variables.
SC.6.E.7.8 Describe ways human beings protect themselves from hazardous weather and sun exposure. **Cognitive Complexity: Moderate (3-4)** **SC.912.E.7.6** Relate the formation of severe weather to the various physical factors. **Cognitive Complexity: Moderate (3-4)**	**Unit 4 Lesson 4 (E. 7.8)** **Hazardous Weather** 1. Thunderstorms 2. Hurricanes 3. Tornados **Safety and Weather** 1. Thunderstorms 2. Hurricanes 3. Tornadoes 4. Sun and Heat Exposure	• Describe the major types of hazardous weather and the ways human beings can protect themselves from hazardous weather and from sun exposure.

SC.6.E.7.7 Investigate how natural disasters have affected human life in Florida. **Cognitive Complexity: High (3-5)**	**Unit 4 Lesson 5 (E.7.7)** **Thunderstorms and Tornadoes** 1. Florida experience frequent thunderstorms, which can cause serious damage. 2. The violent winds of tornadoes can be exceptionally dangerous. **Hurricanes and Floods** 1. Hurricanes are more common in Florida than in any other state. 2. Flooding in Florida damages property and can cause serious injuries. **Other Natural Disasters** 1. Sinkholes are unique geologic formations that are common in Florida. 2. Although uncommon, cold weather can have devastating impacts on Florida. 3. Wildfires can destroy areas of Florida land.	• Describe the natural disasters that affect Florida, including their economic impact and their effects on people.
SC.6.E.7.2 Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate. **Cognitive Complexity: High (4-1,2,3,6)** **SC.6.E.7.5** Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land. **Cognitive Complexity: High (3-3,4)** **SC.6.E.7.6** Differentiate between weather and climate. **Cognitive Complexity: Moderate (3-6)**	**Unit 4 Lesson 6 (E.7.2,E. 7.5,E.7.6)** **Climate Versus Weather** 1. Distinguish between climate and weather. 2. Identify the two main factors that determine climate. **Solar Energy and Climate** 1. Heat from the sun is a key factor of climate. 2. Explain the effect of sun's energy on precipitation, winds. 3. Describe how winds can affect climate. **Other Factors That Affect Climate** 1. Explain the effects of topography and elevation on climate. 2. Explain how mountains affect precipitation. 3. Explain the effect of large bodies of water and surface currents on climate. **Climate Zones** 1. Scientists have identified three major climate zones. 2. Explain how latitude is related to air temperature. 3. Locate the polar, temperate and	• Differentiate between weather and climate. • Predict the effects of weather and climate on different ecosystems. • Classify the different climate regions of the world and the factors that create them.

	tropical climate zones.	