WAKE COUNTY PUBLIC SCHOOL SYSTEM

Middle School Programs
Building Healthy Core Learning
7th Grade Science

How's the Weather Up There?

Unit Outcomes At the end of this unit, your student should be able to:	**Key Vocabulary** Terms to deepen the student's understanding
✓ Describe the composition of the Earth's atmosphere based on mixture of gases and properties. ✓ Identify the layers of the atmosphere and compare their properties, including the differences in pressure and temperature. ✓ Describe how the water moving through the Earth's atmosphere (water cycle) affects the weather patterns on Earth. ✓ Determine how the movement of air masses, high and low pressure systems, and frontal boundaries are factors in weather. ✓ Justify that storms are a result of interactions between moving air masses, high and low pressure systems, and frontal boundaries. ✓ Conclude that the differences in air pressure cause Earth's winds and weather changes. ✓ Analyze weather data from direct observations and measurement to determine weather conditions. ✓ Interpret weather maps, satellites, and radars to determine weather conditions. ✓ Categorize clouds according to their elevation and shape, and describe the kind of weather associated with each type of cloud. ✓ Describe how ocean currents affect the weather. ✓ Describe how convection moves heat from one place to another and how it is a factor in weather events. ✓ Determine the cause of wind and explain how wind speed is affected by air pressure and the rotation of the Earth. ✓ Debate how humans can affect air quality in both positive and negative ways.	**General Weather** ✓ Altitude ✓ Atmosphere ✓ Air Density ✓ Air Pressure ✓ Weather ✓ Meteorologist ✓ Humidity ✓ Dew Point ✓ Fog ✓ Convection ✓ Wind ✓ Global Winds ✓ Jet Stream ✓ Coriolis Effect **Water Cycle** ✓ Condensation ✓ Precipitation ✓ Runoff ✓ Transpiration ✓ Water Vapor ✓ Water Cycle ✓ Evaporation **Layers of the Atmosphere** ✓ Exosphere ✓ Ionosphere ✓ Mesosphere ✓ Stratosphere ✓ Thermosphere ✓ Troposphere **Cloud Types** ✓ Stratus ✓ Cumulus ✓ Cirrus ✓ Cumulonimbus **Air Quality** ✓ Pollution ✓ Smog ✓ Particulate Matter ✓ Acid Rain ✓ Environmental Protection Agency ✓ Ozone Layer **Fronts & Severe Weather** ✓ Stationary Front ✓ Occluded Front ✓ Hurricane ✓ Tornado ✓ Thunderstorm ✓ Storm Surge ✓ Air Mass ✓ Front ✓ Cold Front ✓ Warm Front **Weather Instruments** ✓ Barometer ✓ Anemometer ✓ Wind Vane ✓ Thermometer ✓ Psychrometer ✓ Satellite ✓ Radar
Key Standards Addressed Connections to Common Core/NC Essential Standards	**Where This Unit Fits** Connections to prior and future learning
7.E.1.1 – Compare the composition, properties and structure of Earth's atmosphere to include: mixtures of gases and differences in temperature and pressure within layers. 7.E.1.2 – Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to	Coming into this unit, students should have a strong foundation in: ✓ Summarizing and comparing daily and seasonal changes in weather conditions (i.e. wind speed/direction, precipitation, and temperature), patterns and the factors that influence them (i.e. jet

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the weather patterns on Earth. 7.E.1.3 – Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result. 7.E.1.4 – Predict weather conditions and patterns based on information obtained from: weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity and air pressure); weather maps, satellites and radar; cloud shapes and types and associated elevation. 7.E.1.5 – Explain the influence of convection, global winds and the jet stream on weather and climatic conditions. 7.E.1.6 – Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship.	stream, water currents, and seasons). ✓ Recognizing the tools that scientists use for observing, recording, and predicting weather changes from day to day and during the season. ✓ Predicting upcoming weather events from weather data collected through observation and measurements. This unit builds to the following future skills and concepts: ✓ Explain water as an energy agent (currents and heat transfer). ✓ Explain the formation of typical air masses and the weather systems that result from air mass interactions. ✓ Explain how cyclonic storms form based on the interactions of air masses. ✓ Explain changes in global climate due to natural processes. ✓ Predict the weather using available weather maps and data (including surface, upper atmospheric winds, and satellite imagery).
Additional Resources Materials to support understanding and enrichment	**"Learning Checks"** Questions Parents Can Use to Assess Understanding
✓ ck12.org (Atmosphere, Weather, and Climate) ✓ Study Jams ✓ Discovery Ed (Air Pressure, Jet Streams, Trade Winds and Weather Fronts) ✓ EdHeads ✓ NOAA National Severe Storms Laboratory ✓ Learner.org ✓ Weather Basics ✓ The Weather Channel	✓ What is air made of? ✓ How are the layers of the atmosphere arranged? ✓ How do the layers of the atmosphere compare? ✓ What happens to the Earth's atmosphere as the altitude increases? ✓ How does the water cycle work with atmospheric conditions to create weather? ✓ How does air mass movement affect the weather? ✓ How can you predict the weather using maps, satellites, radars and other weather instruments? ✓ How can clouds help you predict the weather? ✓ What causes wind and how does it affect our weather? ✓ What are some ways, both naturally and by humans, pollution can get into our air? ✓ How can humans improve air quality?