

How do meteorologist study the climate of Rochester? How has it changed in the past and how are our actions changing our climate?

East High School

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Stage 1 Desired Results	
<p>Key Idea 2: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.</p> <p>Key Idea 3: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.</p>	Transfer
	<p><i>Students will be able to independently use their learning to...</i></p> <p>Science</p> <p><i>At the end of this unit, students will use what they have learned to independently...</i></p> <p>LONG TERM GOAL: Students will begin to study their year investigation of the essential question "How do Astronomical and Earth events and processes cause Rochester, NY to change over time". This year investigation will end in a field study to the Rochester Gorge off Seth Green Drive in the City of Rochester where students figure out if the claims made by scientists are true: Rochester, NY was once underneath water! They will do this by looking at sedimentary rocks and fossils from the outcrop. This will allow students to pull together concepts learned throughout the entire half-year investigation. This culminating project ties the whole year together.</p> <p><i>Unit Goal: Students will understand how astronomical motions and position on Earth cause climate. The main take away is how tectonics cause Rochester's Climate to change over time and how it is not constant. This is then extended to show how humans are causing this climate to change and how to be a force for change.</i></p>
	Meaning
<p>UNDERSTANDINGS</p> <p><i>Students will understand that...</i></p> <p>Science</p> <p>Earth has continuously been recycling water since the outgassing of water early in its history. This constant recirculation of water at and near Earth's surface is</p>	<p>ESSENTIAL QUESTIONS</p> <p>Overarching Question: How do meteorologist study the climate of Rochester? How has it changed in the past and how are our actions changing our climate?</p> <p>Science</p> <p>How does insolation drive differences in</p>

	<p>described by the hydrologic (water) cycle.</p> <p>Water is returned from the atmosphere to Earth's surface by precipitation. Water returns to the atmosphere by evaporation or transpiration from plants. A portion of the precipitation becomes runoff over the land or infiltrates into the ground to become stored in the soil or groundwater below the water table. Soil capillarity influences these processes.</p> <p>The amount of precipitation that seeps into the ground or runs off is influenced by climate, slope of the land, soil, rock type, vegetation, land use, and degree of saturation. Porosity, permeability, and water retention affect runoff and infiltration.</p> <p>Weather variables are interrelated. For example:</p> <p>temperature and humidity affect air pressure and probability of precipitation air pressure gradient controls wind velocity</p> <p>Seasonal changes can be explained</p>	<p>average weather? How does this energy get transferred throughout the Earth system? How does the revolution of Rochester around the Sun cause Rochester, NY to change over the year?</p> <p>How do oceans thousands of miles away causes Rochester's climate to change over time? How can we use cyclical patterns to predict Rochester's future climate? How have plate tectonics caused Rochester's climate to change over time? How are our actions causing Rochester's climate to change? What can we do about it?</p>
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using concepts of density and heat energy. These changes include the shifting of global temperature zones, the shifting of planetary wind and ocean current patterns, the occurrence of monsoons, hurricanes, flooding, and severe weather.

Climate variations, structure, and characteristics of bedrock influence the development of landscape features including mountains, plateaus, plains, valleys, ridges, escarpments, and stream drainage patterns.

Insolation (solar radiation) heats Earth's surface and atmosphere unequally due to variations in:

- the intensity caused by differences in atmospheric transparency and angle of incidence which vary with time of day, latitude, and season
- characteristics of the materials absorbing the energy such as color, texture, transparency, state of matter, and specific

heat

- duration, which varies with seasons and latitude.

The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's surface occurs as the result of radiation, convection, and conduction. • Heating of Earth's surface and atmosphere by the Sun drives convection within the atmosphere and oceans, producing winds and ocean currents.

A location's climate is influenced by latitude, proximity to large bodies of water, ocean currents, prevailing winds, vegetative cover, elevation, and mountain ranges.

Temperature and precipitation patterns are altered by:

- natural events such as El Niño and volcanic eruptions
- human influences including deforestation, urbanization, and the production of greenhouse gases such as carbon dioxide and methane.

Acquisition		
	<p><i>Students will know....</i></p> <ul style="list-style-type: none"> • Density differences cause convection cells that facilitate energy transfer • Water cycle model • Latitude's impact on climate • El Niño and La Nina • Weather maps are tools used to forecast the weather. • Conductions, radiation • Climate change and the greenhouse effect. 	<p><i>Students will be able to....</i></p> <ul style="list-style-type: none"> -Look at maps to predict climate -Create a model for climate change -Create models representing energy transfer -Make qualitative and quantitative observations and predictions. - Employ the skills of a scientist through the generation of research questions and implementation of a strategic approach to answering self-generated questions -Read non-fictional text for information while employing reading strategies.

Stage 2 - Evidence

Evaluative Criteria	Assessment Evidence
Science: Attached rubric	<p>PERFORMANCE TASK(S):</p> <p><i>Students will design a model that represents a "land" with a perfect climate and then compare this to the climate of Rochester.</i></p>
	<p>OTHER EVIDENCE:</p> <p>Science: Daily summaries/closures. Summative formal NYS style assessment.</p>

Stage 3 – Learning Plan

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