

UNIT OVERVIEW

STAGE ONE: Identify Desired Results		
Established Goals/Standards	2.2a – 2.2d	Long-Term Transfer Goal
	2.1a-2.1i	<i>At the end of this unit, students will use what they have learned to independently...</i> Apply their understanding of climatology by using mathematics and computational thinking to construct a timeline of how Rochester's climate has changed over time and predict what the future climate will look like
	Meaning	
	Enduring Understandings <i>Students will understand that...</i> U1. Differential heating of Earth's surface causes variation of density in Earth's atmosphere U2. Maps and scientific tools help us make predictions U3. Earth's atmosphere has changed throughout geologic time and continues to change. U4. Location affects climate	Essential Questions <i>Students will consider such questions as...</i> 1. How has Rochester changed throughout time and how do we know? <ul style="list-style-type: none"> • Why doesn't every location in New York have the same weather at the same time? • How is the air I breathe similar/different than the air breathed by the first living organisms on Earth?
	Acquisition	
<i>What knowledge will students learn as part of this unit?</i> 1. The transfer of heat energy within the atmosphere, the hydrosphere, and Earth's interior results in the formation of regions of different densities. These density differences result in motion. 2. Seasonal changes can be explained 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,	<i>What skills will students learn as part of this unit?</i> 1. Scholars will use models to represent and revise their thinking overtime. 2. Scholars will make qualitative and quantitative observations 3. Scholars will make predictions based on observations and data 4. Scholars will ask questions based on observation and data 5. Scholars will use and become proficient with certain tables and diagrams in the Earth Science Reference Tables. 6. Scholars will look at maps to predict climate 7. Scholars will create a model for climate change	

	<p>hurricanes, flooding, and severe weather.</p> <ol style="list-style-type: none">3. Insolation (solar radiation) heats Earth's surface and atmosphere unequally due to variations in:<ul style="list-style-type: none">¥ 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.4. A location's climate is influenced by latitude, proximity to large bodies of water, ocean currents, prevailing winds, vegetative cover, elevation, and mountain ranges.5. Temperature and precipitation patterns are altered by:<ul style="list-style-type: none">¥ 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.6. Earth's early atmosphere formed as a result of the outgassing of water vapor, carbon dioxide, nitrogen, and lesser amounts of other gases from its interior.	
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STAGE TWO: Determine Acceptable Evidence

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	Assessment Evidence
<p>Criteria for/to assess understanding: <i>(This is used to build the scoring tool.)</i></p> <p>1. Understand that geographic location affects climate</p> <p>2. Understand how plate tectonics play a role in Rochester's changing climate</p> <p>3. Identify and explain key geologic events that affected climate</p> <p>4. Identify and explain human activities that impact climate</p>	<p>Performance Task focused on Transfer:</p> <p>For this performance task scholars will apply their understanding of climatology to construct a timeline of how Rochester's climate has changed over time and predict what the future climate will look like by exploring the implications of scientific findings of the natural world on society. They will do this by analyzing historic geologic events, creating a model of the factors impacting climate now, and make a prediction on how natural and human impacts may change the future climate.</p> <p>Other Assessment Evidence:</p> <ul style="list-style-type: none"> • Daily bridge activities • Daily summary narratives (Claim/Evidence/Connections Sheet) • Ticket out the door, daily closure questions • Daily reflective tool • Two formal NYS style assessments • Bi-weekly NYS style quiz • Academic circles held in class (Think, Pair, Share) • Gallery Walks • BBKs

T, M, A (Code for Transfer, Meaning Making and Acquisition)	STAGE THREE: Plan Learning Experiences	
	<p>Learning Events:</p> <ol style="list-style-type: none"> 1. Introduce final project 2. Creation of climograph-scholars will look at key variables used to define climate 3. Layers of the atmosphere- scholars will familiarize themselves with the characteristics of the atmosphere 4. Lab on insolation in relation to latitude – scholars will do a lab on how latitude affects insolation 5. Lab on absorption based on color –scholars will do a lab on how color affect absorptions rates 6. Lab on absorption based on material – scholars will do a lab on how material affects absorption rate in terms of specific heat 7. Phase change – scholars will look at phase change in water in terms of heat energy gained and loss 8. Water Cycle – scholars will look at why and how water moves throughout earth 9. Porosity/Permeability – scholars will familiarize themselves with the factors that affect movement of water 10. Groundwater 11. Water contamination – scholars will look at current events and how humans impact the water cycle 12. Air movement – scholars will determine if air can apply a force and relate understanding of density to why air moves 13. Convection Cells 14. Planetary Winds – scholars will look at air movement on a global scale and be able to explain why it is happening 15. Land/Sea Breeze – scholars will look at air movement on a local scale 16. Ocean Currents 	<p>Evidence of learning: (<i>formative assessment</i>)</p> <ul style="list-style-type: none"> • Daily bridge activities • Daily summary narratives (Claim/Evidence/Connections Sheet) • Ticket out the door, daily closure questions • Two formal NYS style assessments. • Collaborative conversations held in class • Gallery Walks • Workshop activities • 5 week revisits of EQ • Labs • Maps created in class

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| | <ol style="list-style-type: none">17. Hurricanes – scholars will track a hurricane and use data to explain what variables strengthen and weaken a hurricane18. Reintroduce Project – share criteria/look at rubric19. Air mass – scholars will look at the characteristics of specific air masses20. Front –Scholars will explore what happens when two air masses collide21. Dew Point – scholars will do a lab to determine dew point22. High Pressure vs. Low Pressure23. Weather Tools – scholars will familiarize themselves with the tools that measure weather variables24. Station Models – scholars will be able to use universal weather symbols to understand information shared on a weather map25. Weather Maps – scholars will create their own weather maps when provided weather variables. | |
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