What is Weather and What Causes It?
East High School
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Stage 1 Desired Results

Key Idea 2: Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Key Idea 3: Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.

Transfer

Students will be able to independently use their learning to…
Science

At the end of this unit, students will use what they have learned to independently…
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.

Unit Goal: Students will understand how astronomical motions cause Rochester's weather to change over time and how, using science process skills, they can predict future weather based on analysis of variables and data. Students will create a ***weather forecast*** that demonstrates the skills of a meteorologist and knowledge of weather and the factors that cause weather.

Meaning

UNDERSTANDINGS
Students will understand that…
Science
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

ESSENTIAL QUESTIONS
Overarching Question: What is weather and what causes it

Science
EQ: Where did these differences come from in the first place?

	described by the hydrologic (water) cycle. • 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. • 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. Weather variables are interrelated. For example: • temperature and humidity affect	Does air have mass? How do you know? How does water cycle throughout the Earth system? What causes wind? How can I use observations of the sky predict air pressure? What causes the clouds and how can they give me clues to future weather? How does weather change over time? How does a meteorologist predict the weather? What tools do they use to predict the weather?

	air pressure and probability of precipitation • air pressure gradient controls wind velocity Air temperature, dewpoint, cloud formation, and precipitation are affected by the expansion and contraction of air due to vertical atmospheric movement. Weather variables can be represented in a variety of formats including radar and satellite images, weather maps (including station models, isobars, and fronts), atmos- pheric cross-sections, and computer models. Atmospheric moisture, temperature and pressure distributions; jet streams, wind; air masses and frontal boundaries; and the movement of cyclonic systems and associ- ated tornadoes, thunderstorms, and hurricanes occur in observable patterns. Loss of property, personal injury, and loss of life can be reduced by effective emergency preparedness.	

	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, hurricanes, flooding, and severe weather.	
	Acquisition	
	Students will know…. • Density differences cause convection cells which create wind • Water cycle model • Air has mass • Sky conditions can give us clues to the current air pressure. • Weather maps are tools used to forecast the weather. • When air masses collide the boundary separating them is a front. This is where most precipitation occurs and the teeth point in the direction of movement. • Weather moves, in the United States from West to the East.	***Students will be able to….*** - 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. -Read weather maps to forecast the weather -Create a weather map out of weather variables and present it to the public -Describe and diagram what happens when a substance is heating both macro and microscopically and how this creates convection cells. -Explain what happens when air masses collide and the impact this has on an area.

Stage 2 - Evidence

Evaluative Criteria	**Assessment Evidence**
Science: Attached rubric	PERFORMANCE TASK(S):

	*Create a **weather forecast*** that demonstrates the skills of a meteorologist and knowledge of weather and the factors that cause weather. Water cycle model that is revisited and reflected on throughout the unit. "Rate" local meteorologist project where students watch and rate meteorologists based on accuracy and descriptions of weather variables that cause weather. *This forecast will be assessed using a pre-determined rubric.*
	OTHER EVIDENCE: Science: Daily summaries/closures. Summative formal NYS style assessment.
Stage 3 – Learning Plan	