Subject: Science Grade: 7 Unit #: 2 Title: Meteorology

UNIT OVERVIEW

<table>
<tr><th colspan="3">STAGE ONE: Identify Desired Results</th></tr>
<tr><td rowspan="6">Established Goals/ Standards

2.1a Nearly all the atmosphere is confined to a thin shell surrounding Earth. The atmosphere is a mixture of gases, including nitrogen and oxygen with small amounts of water vapor, carbon dioxide, and other trace gases. The atmosphere is stratified into layers, each having distinct properties. Nearly all weather occurs in the lowest layer of the atmosphere.
2.1j Water circulates through the atmosphere, lithosphere, and hydrosphere in what is known as the water cycle.
2.2i Weather describes the conditions of the atmosphere at a given location for a short period of time.
2.2j Climate is the characteristic weather that prevails from season to season and year to year.
2.2k The uneven heating of Earth's surface is the cause of weather.
2.2l Air masses form when air remains nearly stationary over a large section of Earth's surface and takes on the conditions of temperature and humidity from that location. Weather conditions at a location are determined primarily by temperature,</td><td colspan="2">Long-Term Transfer Goal</td></tr>
<tr><td colspan="2">At the end of this unit, students will use what they have learned to independently…

Students will understand that changes in the atmosphere provide evidence to predict future weather patterns demonstrated by analyzing weather maps and accurately predicting a weather forecast.</td></tr>
<tr><td colspan="2">Meaning</td></tr>
<tr><td>Enduring Understandings
Students will understand that…

The atmosphere is in layers based on physical properties like density and humidity

The movement of air from regions of high to low pressure produces the formation of fronts which causes predictable changes in weather.</td><td>Essential Questions
Students will consider such questions as…

How does weather in Rochester change over time and how do we know?</td></tr>
<tr><td colspan="2">Acquisition</td></tr>
<tr><td>What knowledge will students learn as part of this unit?

● Identify and correctly use key terms- air mass, air pressure, atmosphere, atom, barometer, climate, condensation, conduction, convection, equator, evaporation, front, global warming, greenhouse effect/gases, humidity, hydrosphere,</td><td>What skills will students learn as part of this unit?

• Read non-fictional text for information while employing reading strategies.
• Read weather maps to forecast the weather
• Explain what happens when air masses collide and the impact this has on an area.
• Describe and interpret the water cycle model
• Scientific skills (asking questions, gathering and analyzing data, making predictions, drawing conclusions based on evidence)</td></tr>
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humidity, and pressure of air masses over that location. 2.2n The movement of air masses is determined by prevailing winds and upper air currents. 2.2o Fronts are boundaries between air masses. Precipitation is likely to occur at these boundaries. 2.2p High-pressure systems generally bring fair weather. Low-pressure systems usually bring cloudy, unstable conditions. The general movement of highs and lows is from west to east across the United States. 2.2q Hazardous weather conditions include thunderstorms, tornadoes, hurricanes, ice storms, and blizzards. Humans can prepare for and respond to these conditions if given sufficient warning. 2.2r Substances enter the atmosphere naturally and from human activity. Some of these substances include dust from volcanic eruptions and greenhouse gases such as carbon dioxide, methane, and water vapor. These substances can affect weather, climate, and living things.	precipitation, weather, water cycle ● Density differences cause convection cells which create wind ● Air masses are classified by temperature and humidity ● 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.	

STAGE TWO: Determine Acceptable Evidence	
	Assessment Evidence

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<td rowspan="2">Criteria to assess understanding: (This is used to build the scoring tool.)
Students will be able to explain how the movement of air from regions of high to low pressure produces the formation of fronts which causes predictable changes in weather through a rubric driven weather forecast project in which students analyze weather maps, create a skit for a weather forecast, and accurately predict the weather forecast through a presentation.
The atmosphere is a mixture of gases that is stratified into layers, each having distinct properties. Nearly all weather occurs in the lowest layer of the atmosphere..
Weather (short term) vs. climate (long term)</td>
<td>Performance Task focused on Transfer:

Weather forecast project in which students analyze weather maps, create a skit for a weather forecast, and accurately predict the weather forecast through a presentation.</td>
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<td>Other Assessment Evidence:

Using a map to identify and describe the different types of air masses
Interpretation of weather maps including fronts and pressure systems
Student constructed explanation of the water cycle
Summary responses: claim with evidence (5 week assessment rubric)
Chalk Talk</td>
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● Air masses take on the conditions of temperature and humidity from that location. ● Water cycle ● Different types of precipitation occur at fronts and you can use fronts to predict future weather ● High pressure systems = dry, sunny weather ● Low pressure systems = cloudy, wet weather ● Human activities affect weather and climate	

T, M, A *(Code for Transfer, Meaning Making and Acquisition)*	**STAGE THREE: Plan Learning Experiences**	
	Learning Events:	Evidence of learning: *(formative assessment)*
A	Lesson 1: Layers of the atmosphere reading and diagram. Focus on the troposphere and make an initial claim answering the essential question, "How does weather in Rochester change over time and how do we know?" *Exemplar on project board	Bellwork/Bridge Ticket out the door Graphic organizers Stop and think questions Reflect questions Assessment rubrics Whole group/small group discussions Summary Closure
A, M	Lesson 2: Weather vs. Climate and severe weather (video clips and chalk talk)	
A, M	Lesson 3: How do we get weather? Uneven heating of the earth stations (direct vs. indirect heating, hydrosphere vs. lithosphere, light vs. dark)	
A, M, T	Lesson 4: How does air move? Two bottles with balloons for hot air rising and cold air sinking. Wind chamber demo	
A, M	Lesson 5: Pressure systems drive the movement of air (wind), short readings, cloud in a bottle, and isobars	
M, T	Lesson 6: Does air have mass lab and demos *5 week assessment claim and evidence with air having mass	
A	Lesson 7: Air masses introduction stations (predictions on different air masses based on pictures at different locations), reading on air masses, and Punnett Square for air masses *Revisit essential question "How does weather in Rochester change over time and how do we know?" *Exemplar on project board	
A, M	Lesson 8: Review air masses, front tank demo and dry ice demo, online simulation and reading on cold, warm, and stationary fronts	
A, M	Lesson 9: Front and air mass stations with poster *exemplar on project board	
M	Lesson 10: Weather maps and data collection from different regions. Graphic organizer and questions that make explicit connections between high and low pressure with cloud coverage and warm and cold front with precipitation and temperature.	

T A M, T T T	*exemplar on project board <u>Lesson 11 - 14</u>: Weather forecasting project, map creation, skit writing, formal presentation <u>Lesson 15</u>: Where does precipitation come from? The water cycle puzzle activity. Label water cycle diagram, water cycle demo with ring stand, potential water cycle poster <u>Lesson 16</u>: Human impact: acid rain reading and activity. Global warming articles and demo, end with link to biodiversity *5 week assessment “Do we have acid rain in Rochester?” <u>Lesson 17</u>: Review stations <u>Lesson 18</u>: Test	