

ELM 573 Lesson Plan Assignment Fall 2020: LESSON #1

STUDENT NAMES: Meaghan Martin and Maggie Rabil	
Category	Description
Overview	This second grade <u>in-person introductory lesson</u> will begin a new unit on weather where students will take a look at various weather conditions and learn how to describe them using qualitative and quantitative methods. Students will specifically observe temperature, wind direction, wind speed, and precipitation as well as how it impacts weather pattern predictions.
NC Essential Standard	NCES.2.E.1.2 - NCES.2.E.1.2 - Summarize weather conditions using qualitative and quantitative measures to describe: temperature, wind direction, wind speed, precipitation.
Next Generation Science Standards (NGSS) Performance Expectation/s	<p>K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.</p> <p>Scientific Practices: <i>Analyzing and Interpreting Data</i> Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.</p> <p>Connections to Nature of Science: <i>Science Knowledge is Based on Empirical Evidence</i> Scientists look for patterns and order when making observations about the world.</p> <p>Crosscutting Concepts: <i>Patterns</i> Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.</p>
Prerequisite Knowledge	<p>K.E.1 Understand change and observable patterns of weather that occur from day to day and throughout the year.</p> <ul style="list-style-type: none"> ● K.E.1.1 Infer that change is something that happens to many things in the environment based on observations made using one or more of their senses. ● K.E.1.2 Summarize daily weather conditions noting changes that occur from day to day and throughout the year. ● K.E.1.3 Compare weather patterns that occur from season to season.
New Content to be learned	Overview: Students will explore weather using quantitative and qualitative methods. To do so, they will observe temperature, wind direction, wind speed, and precipitation, as well as how they are used to determine daily weather conditions.

	<p>2.E.1.2 Unpacking</p> <p>Students know that numbers are used to describe air temperature, wind speed, and the amount of precipitation that occurs. Students know that wind direction is described using cardinal directions (N, S, E, W) and numbers. Students know how to measure air temperature with a thermometer, wind direction with a windsock or vane, wind speed with an anemometer, and precipitation with a rain gauge.</p> <p>Key Terms/Definitions:</p> <ul style="list-style-type: none"> ● <u>Weather</u> - the day to day or hour to hour change in the atmosphere; this includes wind, lightning, storms, hurricanes, tornadoes, rain, hail, snow, and lots more ● <u>Air Temperature</u> - a measure of how hot or cold the air is ● <u>Wind Speed</u> - the speed of the weather-related air movement from one place to the next ● <u>Wind Direction</u> - the direction the wind is coming from, such as from north, east, south, and west ● <u>Precipitation</u> - rain, snow, sleet, or hail that falls to the ground ● <u>Cardinal Directions</u> - the four main directions or points of the compass, which include the following: north, east, south, and west ● <u>Compass Rose</u> - a figure on a compass, map, nautical chart, or monument used to display the orientation of the following cardinal directions: north, east, south, and west, as well as their intermediate points ● <u>Thermometer</u> - an instrument for measuring or showing temperature (i.e. how hot or cold something is) ● <u>Windsock/Vane</u> - a device with a freely rotating pointer used to indicate the direction of the wind ● <u>Anemometer</u> - a device used to measure wind speed ● <u>Rain Gauge</u> - an instrument used by meteorologists and hydrologists to measure precipitation (i.e. rain, snow, hail, or sleet) in a certain amount of time; it usually measures in millimeters
<p>Anticipated Misconceptions</p>	<ul style="list-style-type: none"> ● Students may make incorrect assumptions about weather based on visual cues (i.e. students may think, “The sun is out so it must be warm outside.” but it could still be cold when the sun is shining) (Henriques, 2000). ● Students may hear tales and stories about Mother Nature and believe them (Henriques, 2000). ● Students may apply television/video game weather information and think it is happening in real-time for their location (i.e. Never Fairies/Disney Fairies, Jack Frost, seeing a hologram/fake tornado in a show) (Henriques, 2000).
<p>Goals/Learning Objectives Resource: Bloom's Taxonomy and Learning Outcomes</p>	<p>Students will be able to <u>describe</u> the weather using qualitative and quantitative methods.</p> <p>Students will be able to <u>recognize</u> how temperature, wind speed, wind direction, and precipitation impact daily weather conditions.</p>

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	Students will be able to <u>explain</u> and <u>give examples</u> of what the weather would be like under specific conditions.
Interdisciplinary Connections	<ul style="list-style-type: none"> ● Literature Connection <ul style="list-style-type: none"> ○ Read a children’s book about weather (i.e. <u>The Meteorologist in Me</u> by Brittney Shipp). ● Social Studies Connection <ul style="list-style-type: none"> ○ Look at geography/maps to view changing weather based on location.
Essential Question or Problem Based Learning Focus	How can you qualitatively and quantitatively describe weather using temperature, wind speed, wind direction, and precipitation?
Materials	<ul style="list-style-type: none"> ● Projector with soundbar to show/play video ● YouTube video of Brittney Shipp ● Book titled <u>The Meteorologist in Me</u> by Brittney Shipp ● Photographs of different weather conditions ● “Weather Observation Stations” worksheet for students to write down their observations ● Whiteboard, colored markers, sticky notes, and masking tape to create a vocabulary word wall at the front of the classroom ● Exit ticket prediction sheet titled “Exit Ticket”
<p>Opening/Engagement</p> <p>Procedures:</p> <ul style="list-style-type: none"> ● Opening question: Who can tell me what a meteorologist is? <ul style="list-style-type: none"> ○ (Answer: A meteorologist is someone who observes and predicts weather conditions to share with the public. For example, they may predict rain for the next couple of days.) ● Watch: Introduce Brittney Shipp and show a quick YouTube video of her being a real-life meteorologist. <ul style="list-style-type: none"> ○ https://youtu.be/8c7eXneF4sA (video of Brittney Shipp’s weather segment) ● Read: <u>The Meteorologist in Me</u> by Brittney Shipp. (Literature Connection) <ul style="list-style-type: none"> ○ https://youtu.be/8zjsz8AfmQE?t=110 (Brittney Shipp reading her book <u>The Meteorologist in Me</u> aloud) 	
<p>Exploration</p> <p>Procedures:</p> <ul style="list-style-type: none"> ● Photographs of different weather conditions from different geographical locations are placed around the room. Students are broken into small groups to make observations of the pictures. (Social Studies Connection) <ul style="list-style-type: none"> ○ Students will write their observations of each picture in a worksheet titled “Weather Observation Stations” (one column for qualitative analysis and one for quantitative analysis). 	
<p>Explanation</p> <p>Procedures:</p> <ul style="list-style-type: none"> ● The class returns together to discuss their observations of the pictures. ● The teacher will follow the Q-R-E tactic with additional probing to get more authentic/in-depth answers from students. ● Introduce students to new weather terminology. 	
<p>Elaboration</p> <p>Procedures:</p>	

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- The class creates a vocabulary word wall to define key terms/definitions (i.e. precipitation, wind speed, wind direction, and temperature).
 - https://jamboard.google.com/d/1hVGR53ASmIHqj7tkG_rg_vE0IKsEn5hQsmGRuT-aWAI/viewer
- Students can compare and contrast the weather seen in the pictures with what is happening outside the classroom.

Evaluation

Assessment:

- Give an informal assessment/exit ticket. (*Grading*: mark as either complete or incomplete)
 - Students will make a prediction of tomorrow's weather based on what was discussed today (i.e. make an educated guess/hypothesis about temperature, wind speed, wind direction, and precipitation).

References

Henriques, L. (2000). *Children's misconceptions about weather: A review of the literature*. National Association of Research in Science Teaching. <https://web.csulb.edu/~lhenriqu/NARST2000.htm>

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Weather Observation Stations

Name:	Qualitative Observations	Quantitative Observations
Station #1		
Station #2		
Station #3		
Station #4		
Station #5		

Name: _____

Date: _____

Exit Ticket

Predict tomorrow's weather using the terms we discussed in class today!

Tomorrow's Date: _____

	Your Prediction	Why do you predict this?
Temperature		
Wind Speed		
Wind Direction		
Precipitation		

Do you have any other questions about what we learned today? If so, please list them below:

ELM 573 Lesson Plan Assignment Fall 2020: LESSON #2

STUDENT NAME: Meaghan Martin and Maggie Rabil	
Category	Description
Overview	This second grade <u>in-person concluding lesson plan</u> will wrap up students' exploration of weather conditions with an inquiry-based, hands-on experience. Students will take on the role of a meteorologist by using scientific tools such as a thermometer, windsock/vane, anemometer, and rain gauge to make observations about local weather conditions independently. After students record and collect data, they will use graphical displays to present their findings.
NC Essential Standard	NCES.2.E.1.4 - Recognize the tools that scientists use for observing, recording, and predicting weather changes from day to day and during the seasons.
Next Generation Science Standards (NGSS) Performance Expectation/s	<p>3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.</p> <p>Scientific Practices: <i>Analyzing and Interpreting Data</i> Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships.</p> <p>Crosscutting Concepts: <i>Patterns</i> Patterns of change can be used to make predictions.</p>
Prerequisite Knowledge	<p>K.E.1 Understand change and observable patterns of weather that occur from day to day and throughout the year.</p> <ul style="list-style-type: none"> ● K.E.1.1 Infer that change is something that happens to many things in the environment based on observations made using one or more of their senses. ● K.E.1.2 Summarize daily weather conditions noting changes that occur from day to day and throughout the year. ● K.E.1.3 Compare weather patterns that occur from season to season.
New Content to be learned	<p>Overview: Students will understand how to measure varying weather elements (i.e. temperature, wind direction, wind speed, and precipitation) using proper scientific tools. By using these tools, students can collect and record data to make observations and predictions of weather changes.</p> <p>2.E.1.4 Unpacking Students are familiar with manual and electronic weather instruments, sensors, and computers as well as how they can produce a 'running</p>

	<p>record' of weather changes that occur over time by collecting and recording data. This collection of data can be analyzed as a basis for predicting weather trends.</p> <p>Key Terms/Definitions:</p> <ul style="list-style-type: none"> ● <u>Air Temperature</u> - a measure of how hot or cold the air is ● <u>Wind Speed</u> - the speed of the weather-related air movement from one place to the next ● <u>Wind Direction</u> - the direction the wind is coming from, such as from north, east, south, and west ● <u>Precipitation</u> - rain, snow, sleet, or hail that falls to the ground ● <u>Cardinal Directions</u> - the four main directions or points of the compass, which include the following: north, east, south, and west ● <u>Compass Rose</u> - a figure on a compass, map, nautical chart, or monument used to display the orientation of the following cardinal directions: north, east, south, and west, as well as their intermediate points ● <u>Thermometer</u> - an instrument for measuring or showing temperature (i.e. how hot or cold something is) ● <u>Windsock/Vane</u> - a device with a freely rotating pointer used to indicate the direction of the wind ● <u>Anemometer</u> - a device used to measure wind speed ● <u>Rain Gauge</u> - an instrument used by meteorologists and hydrologists to measure precipitation (i.e. rain, snow, hail, or sleet) in a certain amount of time; it usually measures in millimeters ● <u>Weather</u> - the day to day or hour to hour change in the atmosphere; this includes wind, lightning, storms, hurricanes, tornadoes, rain, hail, snow, and lots more ● <u>Climate</u> - the kinds of weather that usually happen in an area at different times of the year ● <u>Seasons</u> - a part of a year; in most areas of the world, there are four seasons in a year: spring, summer, fall, and winter ● <u>Weather Trends</u> - a prediction of what the weather will be like in the future ● <u>Weather Conditions</u> - the combination of temperature, wind, clouds, and precipitation present ● <u>Patterns of Weather</u> - a climatic tendency ● <u>Collecting Data</u> - gathering and measuring information to answer relevant questions, evaluate outcomes, and make predictions about future trends ● <u>Recording Data</u> - set in writing the objectives and resources available for a study/experiment ● <u>Predicting</u> - to declare or tell in advance
<p>Anticipated Misconceptions</p>	<ul style="list-style-type: none"> ● Students may believe that changing seasons causes change in the weather (Fries-Gaither, 2008).

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	<ul style="list-style-type: none"> ● Students may think that clouds predict rain, snow, and ice as well as make it cold (i.e. cold days are caused by clouds covering the sun) (Fries-Gaither, 2008). ● Students may believe their tool is accurate 100% of the time (in reality, tools are not always accurate due to having an adjustment time, having mistakes caused by where students place devices/how students handle devices, etc.) (Fries-Gaither, 2008).
<p>Goals/Learning Objectives Resource: Blooms Taxonomy and Learning Outcomes</p>	<p>Students will be able to <u>recognize</u> and <u>classify</u> which measurement tools can be used to make weather observations.</p> <p>Students will be able to <u>determine</u> and <u>predict</u> current weather conditions based on measurement tool outputs.</p> <p>Students will be able to <u>collect</u> and <u>interpret</u> data that accurately <u>describes</u> weather.</p>
<p>Interdisciplinary Connections</p>	<ul style="list-style-type: none"> ● Math Connection <ul style="list-style-type: none"> ○ Creation of charts and tables for recording data ○ Creation of graphs to visualize and observe patterns ● Technology Connection <ul style="list-style-type: none"> ○ Create visually appealing graphs to present data using software tools (Excel/SmartBoard)
<p>Essential Question or Problem Based Learning Focus</p>	<p>How would you observe, report, and predict weather changes using scientific tools?</p>
<p>Materials</p>	<ul style="list-style-type: none"> ● Thermometer ● Windsock/Vane ● Anemometer ● Rain gauge ● “Weather Tool Prediction Activity” worksheet ● Data collection table/chart titled “Current Weather Data” ● Computers/Laptops ● Weather condition data for week prior
<p>Opening/Engagement Procedures:</p> <ul style="list-style-type: none"> ● Have weather measurement tools laid out around the room (i.e. thermometer, windsock/vane, anemometer, rain gauge). ● Students will make predictions of what each tool is used for on a small worksheet (titled “Weather Tool Prediction Activity”). 	
<p>Exploration Procedures:</p> <ul style="list-style-type: none"> ● Students will go outside and have hands-on experience using the tools. ● They will record and collect data using a thermometer, windsock/vane, anemometer, and rain gauge within a table (titled “Current Weather Data”). 	
<p>Explanation Procedures:</p> <ul style="list-style-type: none"> ● Give students weather collection data from the previous week. ● With this new information, students will add their observations taken outside. (Math Connection) ● Create graphs to visualize data within assigned groups. (Technology Connection/Math Connection) 	

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Elaboration

Procedures:

- In small groups, students will report their findings like a meteorologist. (Literature Connection from Lesson #1)

Evaluation

Assessment:

- Collect charts used for data collection and graphs for accuracy.
- Use an analytic rubric to grade students' charts.

References

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Name: _____

Date: _____

Weather Tool Prediction Activity

Weather Tool	Predictions About Tool (how to use it, what does it measure, what is it called, etc).
	
	
	
	

Name: _____

Date: _____

Current Weather Data

Tool	What Each Tool Measures	Data Reading
Thermometer		
Windssock/Vane		
Anemometer		
Rain Gauge		

Lesson 2 Rubric

Student Name: _____

Criteria	4	3	2	1	Score
Weather Tool Prediction Activity	Every tool was described in detail and students made unique predictions about every tool.	Every tool was described but students did not provide detail or make predictions.	Some tools were described and students provided little to no predictions.	None of the tools were described and no predictions were made.	
Current Weather Data Worksheet	Students accurately recorded current weather conditions for each tool.	Students accurately recorded current weather conditions for three tools.	Students accurately recorded current weather conditions for two tools.	Students accurately recorded current weather conditions for one tool.	
Group Graphs of Weather Data	The group's graph was organized and accurately displayed the collected data.	The group's graph was organized but was missing a couple of data points, making it slightly inaccurate.	The group's graph was somewhat organized and/or did not accurately display some of the collected data.	The group's graph was unorganized and therefore inaccurate due to missing multiple data points.	
Collaboration	The group was kind to each other and worked collaboratively to complete the assignment.	The group worked well together with a few minor incidents to produce the completed assignment.	The group did not work well together and not everyone contributed equally to the assignment.	The group did not work well together and students were argumentative. The collaboration was non-existent.	
Craftsmanship	The group's handwriting was neat, easy to read, and had no misspellings.	The group's handwriting was neat and easy to read but had a few misspellings.	The group's handwriting was messy and/or had multiple misspellings.	The group's handwriting was very hard to read and had multiple misspellings.	
Student Total Score =					___/20