



Marietta City Schools

District Unit Planner

*Grade 4 Science*

<b>Theme</b>	<i>Unit 3 Forecasting Weather</i>	<b>Unit duration</b>	<i>7 weeks</i>
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**Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?***

**GSE Standards**

Georgia Standards:

**S4E3. Obtain, evaluate, and communicate information to demonstrate the water cycle.**

a. Plan and carry out investigations to observe the flow of energy in water as it changes states from solid (ice) to liquid (water) to gas (water vapor) and changes from gas to liquid to solid.

**S4E4. Obtain, evaluate, and communicate information to predict weather events and infer weather patterns using weather charts/maps and collected weather data.**

- a. Construct an explanation of how weather instruments (thermometer, rain gauge, barometer, wind vane, and anemometer) are used in gathering weather data and making forecasts.
- b. Interpret data from weather maps, including fronts (warm, cold, and stationary), temperature, pressure, and precipitation to make an informed prediction about tomorrow's weather.
- c. Ask questions and use observations of cloud types (cirrus, stratus, and cumulus) and data of weather conditions to predict weather events.

Construct an explanation based on research to communicate the difference between weather and climate.

**Unit Objectives:**

- collect, analyze, and predict the weather for their local area.
- differentiate between weather and climate.
- develop models of the water cycle that demonstrate multiple paths.
- plan and carry out investigations to observe the flow of energy in water.
- explain what instruments are necessary for weather collection and why it is necessary in forecasting.
- observe, chart, and record weather data using weather instruments, weather maps, cloud observations and knowledge of the water cycle to make an informed forecast for the local area.
- differentiate between weather and climate.
- explore weather instruments and their function.

- explore weather fronts and interpret them on a weather map.
- ask questions about cloud types and the water cycle to determine the types of weather associated with them.
- investigate the flow of energy as water changes states.
- collect data, analyze, and predict/forecast of tomorrow's weather.
- engage in personal reflection on forecasting efforts via written and oral communication.
- practice predicting the weather using the local forecasts as a model for communication.
- discuss the water cycle as a factor in predicting the weather.

**Unit Phenomena:** [Microburst rainstorm](#) – after watching this video, have students notice and wonder. Record their ideas on a T-chart and refer back to it throughout the unit.

**Page Keeley Probes:** Page Keeley probes can be used as phenomena. They are intended to elicit student understanding about science concepts. Starting a unit or lesson with a probe will help you uncover misconceptions and see what students already know about a topic. Using a probe at the beginning of a lesson and then at the end of the lesson serves the purposes of pretesting and then formatively evaluating student thinking. **Below is a list of probes from Page Keeley's book Uncovering Student Ideas in Science, that are appropriate for this unit.**

This book has been purchased for your grade level by the Office of Academic Achievement and can be found in your media center.

- Wet Jeans (Volume 1)
- What are Clouds Made Of? (Volume 3)
- Where Did Water Come From? (Volume 3)
- Rainfall (Volume 3)

<p><b>Science &amp; Engineering Practices:</b></p> <ul style="list-style-type: none"> <li>• Asking questions and defining problems</li> <li>• Developing and using models</li> <li>• Analyze and Interpret data</li> <li>• Construct explanations</li> <li>• Plan and carry out investigations</li> <li>• Obtaining, evaluating, and communicating</li> </ul>	<p><b>Disciplinary Core Ideas:</b></p> <ul style="list-style-type: none"> <li>● States of water</li> <li>● Water cycle</li> <li>● Weather instruments</li> <li>● Weather maps</li> <li>● Cloud types</li> <li>● Weather and climate</li> </ul>	<p><b>Crosscutting Concepts:</b></p> <ul style="list-style-type: none"> <li>• Patterns</li> <li>• Energy and Matter</li> <li>• Systems and system models</li> </ul>
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**Misconceptions:**

- The water cycle involves freezing and melting of water.
- Water only evaporates from the ocean or lakes.
- When water boils and bubbles come up the bubbles are air.
- The white substance coming from boiling water is smoke.
- Water in an open container is absorbed by the container.
- Condensation on the outside of a container is water that seeped through the container itself (or sweated through the walls of the container). Raindrops look like tear drops.
- Rain falls out of the sky when the clouds evaporate.

- Rain comes from holes in clouds.
- Rain comes from clouds sweating.
- Rain comes from clouds melting.
- Rain falls from funnels in the clouds.
- Thunder occurs when two clouds collide.
- A wind vane points to where the wind is coming from.

### **Math/ELA Connections/STEM Connections**

ELAGSE4RI3: Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

ELAGSE4RI4: Determine the meaning of general academic language and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area.

ELAGSE4RI7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.

ELAGSE4RI10: By the end of the year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4-5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

ELAGSE4W2: Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

ELAGSE4W4: Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.

ELAGSE4W7: Conduct short research projects that build knowledge through investigation of different aspects of a topic.

MGSE4.MD.1 Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec.

- Understand the relationship between gallons, cups, quarts, and pints.
- Express larger units in terms of smaller units within the same measurement system.
- Record measurement equivalents in a two-column table.

MGSE4.MD.2. Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

MGSE4.NF.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of the comparisons with the symbols  $>$ ,  $=$ , or  $<$ , and justify the conclusions by using visual models.

MGSE4.G.1 Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.

STEM:

Students create their own [weather station](#) to predict the weather.

Students solve a simple design problem by building a miniature house with a constrained set of materials which will withstand a particular season's weather.

[The Weather House – Design and Construction Lesson](#)

**Discovery Education Science Techbook** – (Log into your DE account using your Google credentials to access DE links) You will find station rotation activities such as leveled reading passages, interactives, hands-on labs, virtual labs, video clips, and more on the **Explore** page in each Techbook unit.

[About Climate](#)  
[The Water Cycle](#)

**Hands-on Activities**

[Which way does the wind blow?](#)  
[Climate Research - Independent](#)  
[Hands-On Activity: Climate Charades](#)  
[Water Cycle in a Bag](#)  
[A Weather Tale of Two Cities](#)  
[Comparing Regional Temperatures](#)  
[Fair or Stormy](#)  
[Summer Storms – Individual Experience](#)  
[Sweltering Summer – Measuring Temperature](#)

**Essential Questions**

**Factual—**

1. Explain the difference between weather and climate?
2. How do we forecast the weather?
3. How do fronts interact to produce different weather patterns?

**Inferential—**

1. How is weather similar and different on other planets as compared to our weather on Earth?
2. What is the relationship between the water cycle and weather?
3. How do scientists use observations of cloud types in weather forecasting?

**Critical Thinking-**

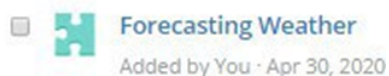
1. What are the driving forces of weather?
2. What are some of the improvements being made in the scientific community to improve weather predictions?

Tier II Words- High Frequency Multiple Meaning	Tier III Words- Subject/ Content Related Words
rain, weather, cold, hot, clouds, instrument, storms, ice, maps, air	thermometer, rain gauge, barometer, wind vane, and anemometer, cirrus, stratus, and cumulus, warm front, cold front, stationary front

**Assessments**

Below is an assessment bank of questions. You can choose questions based on standard/element and DOK level. Please use this assessment bank to create a post test, daily warm up, etc. The file is editable and can be used as needed for your students.

Question Bank You will find an AMP science assessment in Schoology in the 4<sup>th</sup> Grade Assessment Team folder.



Objective or Content	Learning Experiences	Differentiation Considerations
<p><b>CLE 1-3:</b> S4E3. Obtain, evaluate, and communicate information to demonstrate the water cycle.</p> <p>S4E4. Obtain, evaluate, and communicate information to predict weather events and infer weather patterns using weather charts/maps and collected weather data.</p>	<p><a href="#">Forecasting the Weather GaDOE Instructional Segment</a> This segment will have students continue to collect and analyze data to predict the weather for their local area, differentiate between weather and climate, and develop models of the various ways water cycles through evaporation, precipitation and condensation.</p> <p><a href="#">Watching Weather SIEMENS STEM Day Activity</a> Students will make their own weather station consisting of actual and simplified versions of real weather equipment. They will use that equipment to make observations about the local weather.</p>	<p>Student Choice Performance Tasks Reflection and Goal Setting Learning Stations Choice Boards Formative Probes Science Journaling Multi-sensory activities Assistive Technology Flexible Grouping Multiple Means of Representation</p>

**Recommended High Quality Complex Text By Lexile Band**

*Meteorologist* By Matt Mullins

*Weather and Climate Through the Infographics* By Rebecca Rowell

*Clouds* By Valerie Bodden

*Junior Scientists: Experiment With Weather* By Tamra B. Orr

*Weather Robots* By Christine Zuchora-Walske

*A Project Guide to Wind, Weather and the Atmosphere* By Marylou Morano Kjelle