INTRODUCTION
In these lessons, students will monitor the weather over a given period of time, noting patterns and observing weather phenomena. They will create a rain gauge to collect their own measurements of precipitation and make logical predictions on seasonal weather patterns. Weather refers to the short-term conditions of the atmosphere, and can change from season to season, day-to-day, hour-to-hour or minute-to-minute. It describes the conditions outside right now in a specific place. If it is hot or cold, clear our cloudy, that’s a way to describe today’s weather. Rain, snow, wind, hurricanes, tornados - these are all weather events.

NEW YORK STATE SCIENCE LEARNING STANDARDS
K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.
K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.
K-PS3-1. Make observations to determine the effect of sunlight on Earth’s surface.
1-ESS1-2. Make observations at different times of year to relate the amount of daylight to the time of year.
2-ESS1-1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.
5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

OBJECTIVES
- Identify, compare, and describe the various types of weather and forms of precipitation.
- Observe and predict seasonal weather patterns.
- Learn to measure precipitation using a tool the students have engineered.
- Collect data over a period of time.
- Learn new weather vocabulary and their appropriate usage.

VOCABULARY
1. Observation: a statement about something you have noticed, a comment or remark.
2. Precipitation: the liquid and solid water particles that fall from clouds and reach the ground.
3. Temperature: a degree of hotness or coldness that can be measured using a thermometer.
4. Weather: the daily state of the atmosphere, or air, in any given place.
5. Climate: the long-term average of weather, typically averaged over a period of 50 years.

TEACHER STRATEGY
1. Ask students if they know what weather is? Climate? Discuss what the difference is, and give examples.
2. Have students watch the videos What’s the difference between weather and climate?
3. Explain to students they will be monitoring the weather over a given period of time (1 week is good). Go over the Weather Observation Activity sheet. NOTE: students will need a thermometer to record temperature.
4. Create a Rain Gauge activity.
5. After one week of observations, have students discuss their findings, using the Reflection and Observation sheet. For younger students have a group discussion using the questions as a guide.
6. If you use this activity in different seasons wrap up the lesson by discussing, and comparing and contrasting the differences in each season.
7. Extension: have students draw what they see in each season when observation the weather outside.
Meteorologists are scientists who study the weather. They track things like temperature, cloud cover, precipitation, and other conditions each day throughout the year. They can compare the data they collect to other years, making predictions for the future and seeing how the weather today might be different from the past. By using the weather observation chart, you can collect data and see how the weather changes over a week. Complete this activity for one week, as close to each of the four seasons that you are in school, to see how weather might vary throughout the year where you live! You are the scientist!

**Temperature**: To measure temperature you can use your thermometer or check online on a website like HRECOS where scientists track the weather and upload their data.

**Cloud Cover** can be measured by looking up at the sky and estimating how much of the sky is covered by clouds.

- If there are no clouds in the sky, write "Clear" on your Observation Chart
- If there are some clouds in the sky, write "Partly Cloudy" on your chart
- If more than half of the sky is filled with clouds, write "Cloudy" on your chart

**Precipitation**: Every day record if there was any precipitation like rain, snow, sleet, or hail.

If there is precipitation, measure how many inches there was using your rain gauge or by looking online!

Be sure to fill out your Weather Observation Chart at the same time every day so your data is accurate!
# Weather Observation Chart

<table>
<thead>
<tr>
<th>DATE</th>
<th>NAME</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

### Precipitation

<table>
<thead>
<tr>
<th></th>
<th>Type (rain, snow)</th>
<th>Amount (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
<td></td>
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<tr>
<td>Thursday</td>
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<tr>
<td>Friday</td>
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<tr>
<td>Saturday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Temperature:**
  - Monday: _____ °F
  - Tuesday: _____ °F
  - Wednesday: _____ °F
  - Thursday: _____ °F
  - Friday: _____ °F
  - Saturday: _____ °F
  - Sunday: _____ °F

- **Cloud Cover:**
  - Monday: _____
  - Tuesday: _____
  - Wednesday: _____
  - Thursday: _____
  - Friday: _____
  - Saturday: _____
  - Sunday: _____

- **Precipitation:**
  - Monday: _____ (in.) _____ (cm)
  - Tuesday: _____ (in.) _____ (cm)
  - Wednesday: _____ (in.) _____ (cm)
  - Thursday: _____ (in.) _____ (cm)
  - Friday: _____ (in.) _____ (cm)
  - Saturday: _____ (in.) _____ (cm)
  - Sunday: _____ (in.) _____ (cm)
**MAKE YOUR OWN RAIN GAUGE**

In this activity you will be learning how to make your own rain gauge. Rain is one form of precipitation that is part of the earth’s water cycle. As evaporated water cools and forms clouds, these clouds become heavy and eventually rain will fall and make its way down to the Earth’s surface! Everywhere on Earth receives some form of precipitation, however because different places have different climates, it rains more in some places than in others. A rain gauge helps us to measure how much rain our location receives. We can then compare rain levels throughout the different seasons and to different places around the world as well!

**Materials Needed:**
- A 1-liter bottle
- A ruler
- Scissors
- Your weather observation chart
- A marker or pen
- Tape

**Instructions:**

*Note= Teachers may have to prep components from steps 1-3 prior to experiment for younger students, or help with cutting and construction in lower grades.*

1. Take your plastic bottle and using scissors cut the bottle in half.
2. Remove the cap from the mouth of the bottle.
3. Next, take the top of the bottle and turn it upside down so that the mouth acts like a funnel into the larger bottom half of the bottle. Use your tape to secure the two pieces of your bottle together.
4. Now, take your ruler and marker. Holding your ruler up against the bottle, make a line with your marker every half inch and label these lines. (ex. \(\frac{1}{2}\), 1", 1.5", 2)
5. When you are finished, put your rain gauge outside! After it rains, observe how many inches of rain there has been and record this amount on your weather observation chart. Empty the rain gauge after you have recorded your data so that it does not overflow!
Questions to think about while observing the weather:

- What were the highest and lowest temperatures you recorded?

- Were there any days with more than one type of weather?

- What types of weather did you see?

- How would you describe the weather in the winter? How is the winter different than the summer season?