Objective
Students will read about the effects of weather on agricultural production and explore the Oklahoma Mesonet site to find and graph local rainfall data. Students will examine weather-related works of art.

Background
Farmers and ranchers live by the weather. Crops need water and sunlight, and farm animals need to eat those plants.

The amount of rain that falls in a year is probably the most important weather-related factor for farmers and ranchers. Severe weather conditions can be a factor as well. If rainfall is low or if hail or tornadoes damage crops, the crop yields will be low, creating a shortage of product. When there is a shortage of product, the price goes up. Animals have to eat, and feed comes from crops. When crop yields are low it becomes more expensive to feed the livestock. The more expensive it is to feed livestock, the more expensive it becomes for the consumer to purchase the meat. This classic example of supply and demand all starts with the weather.

When there is adequate rainfall, there is more grass for cattle and other livestock and less need for supplementary feed. Crops are more successful, making feed that is needed less expensive. Livestock is healthier, and meat is less expensive at the grocery store.

It is not just local weather that affects local agriculture. Drought in other parts of the country affect local agriculture as well. If crops in California are sparse because of drought, livestock owners may have to buy feed from farmers as far away as Oklahoma. Because feed back in California is scarce, the California ranchers will pay higher prices. This higher demand for Oklahoma-grown feed means livestock producers in Oklahoma have to pay high prices as well.

Everyone talks about the weather, but no one can do anything about it, as the saying goes. But producers can take steps to prepare for bad weather. In Oklahoma they start by consulting the Oklahoma Mesonet, a world-class network of environmental monitoring stations. There is at least one monitoring station in each of Oklahoma’s 77 counties, with a total of 120 stations. All kinds of information is gathered from the monitoring stations every five minutes and transmitted back to the main facility located on the University of Oklahoma campus in Norman. When the data is received, it is analyzed and made available to the public within 10 minutes. Data includes current temperatures, rainfall, wind speeds, humidity, wildfire danger levels and weather predictions.

English Language Arts
1. Read and discuss background and vocabulary. Provide copies of the Reading Page.

Materials
- popcorn
- cereal squares
- peanuts
- cereal bars
- computer access

www.agclassroom.org/ok
—Students will read individually or in groups and pay close attention to how much weather can affect other things.
—Students will outline the passage.

2. Discuss cause and effect. Ask students to list some examples of cause and effect in the passage.
—Make copies of the cause and effect boxes included with this lesson. Cut out the boxes and mix them up, keeping the “Causes” separate from the “Effects.”
—Students will work individually or in groups to match the causes with the correct effects, based on the Reading Page.
—Students will use the matched cause and effect boxes to make “Cause and Effects Flip Books,” as follows.”
  • Fold a sheet of paper long ways (hot dog style).
  • Unfold the paper and make four cuts from one side of the paper to the fold, spacing them as evenly as possible. This will create five flaps.
  • Folding the paper again, write the causes on top of the flaps.
  • Lifting each flap write the corresponding effect underneath. When you hold the book, you should be able to lift flaps separately and see only the effect that matches the appropriate cause.

3. Farmers and ranchers and those involved in agriculture discuss weather on a regular basis in everyday conversation.
—Students will write fictional narratives that center around everyday discussions about weather or weather-related incidents. Narratives should include developed characters and plots.
—Students will develop narratives into skits and perform them for the class.

Social Studies
1. Discuss supply and demand and ask how the background passage illustrates the concept of supply and demand.
Students will play an auction game as follows to will help them understand supply and demand.
—Give each student five slips of paper to represent $5 total.
—In a central location, provide popcorn, peanuts and cereal squares in varied amounts, and a smaller number of cereal bars.
—Students will bid on the items in an auction.
—Write the ending price for each kind of item on the board, and discuss why some items sold for more than others. Did the bids go up as the items became more scarce?

Science
1. As a class visit the Oklahoma Mesonet website, http://www.

www.agclassroom.org/ok
—Explain that the Oklahoma Mesonet is not just a tool for tracking the weather but also an important tool for farmers. Click on Agriculture and discuss some of the data provided for farmers. Why would this information be important?
—Take some time to look at the elements of the website. What is the difference between climate and weather? (See Vocabulary.) Where would you click to find rainfall for the past month? For the past year?
—Click on “Weather.” At the top of the page, click on “Change Mesonet Site” and find the location on the map nearest to your school.
—Click on Rainfall.
—Click on the Rainfall by Month table
—Students will graph monthly rainfall data for the most recent year.
—Students will graph the 1981-2010 normal data (top line of the table,) and compare with the data for the most recent year.
—Has rainfall in the most recent year increased or decreased compared with the normal?
2. Students will select one of the data categories listed on the weather page and design their own investigations based on the data.

Visual Art
1. Use online search engines to find some or all of the following works of art and project them on a whiteboard to discuss as a class.
   • Frederic Remington, Stampede
   • Leon Lhermitte, The Harvest
   • Grant Wood, Fall Plowing
   • Van Gogh, Reaper With Wheat Field and Sun
   • Grant Wood, January
   • Grant Wood, Storm Coming
   • Thomas Harte Benton, The Hailstorm
   • Thomas Harte Benton, Cardling Wheat
   • Martin Johnson Heade, Newburyport Meadows
—Use the following questions to discuss the depiction of weather in each of the works of art.
   • What agricultural activity is shown in this painting?
   • What is the weather like in this painting? How do you know?
   • How do you think the weather will impact the agricultural activity?
   • How does the artist use color and shadow to depict the weather?
   • How does the artist use movement to depict the weather?
   • What effect does the depiction of weather have on the mood set by the painting? How does it make you feel? Is the scene inviting? Scary?

Extra Reading
Weather Matters

Farmers and ranchers depend on the weather. Crops need water and sunlight. Farm animals need to eat the crops.

Rainfall is the most important weather-related factor for farmers and ranchers. Severe weather conditions can cause problems, too. If rainfall is low or if hail or tornadoes damage crops, there will be less crop to harvest. When there is less crop to harvest, the price goes up. Animals have to eat, and feed comes from crops. When there is less feed it is more expensive to feed the livestock. The more expensive it is to feed livestock, the more expensive it becomes for the consumer to buy the meat. This is an example of supply and demand. When the supply of feed is low, the demand is greater, causing prices to go up. This cycle all starts with the weather.

When there is enough rainfall, there is more grass for livestock and less need for expensive feed. Crops are more successful, so feed is less expensive. Livestock is healthier, and meat costs less at the grocery store.

It is not just local weather that affects local agriculture. If drought causes crops to fail in California, livestock owners may have to buy feed from farmers in Oklahoma. Because feed back in California is scarce, California ranchers will pay higher prices. This higher demand for Oklahoma-grown feed means livestock producers in Oklahoma have to pay high prices as well.

Everyone talks about the weather, but no one can do anything about it, as the saying goes. But producers can take steps to prepare for bad weather. In Oklahoma they start by consulting the Oklahoma Mesonet, a network of environmental monitoring stations. There is at least one monitoring station in each of Oklahoma’s 77 counties, with a total of 120 stations. All kinds of information is gathered from the monitoring stations every five minutes and transmitted back to the main facility on the University of Oklahoma campus in Norman. When the data is received, it is analyzed and made available to the public within 10 minutes. Data includes current temperatures, rainfall, wind speeds, humidity, wildfire danger levels and weather predictions.
## Cause and Effect Chart

<table>
<thead>
<tr>
<th>CAUSE</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainfall is low.</td>
<td>Crop yield will be low.</td>
</tr>
<tr>
<td>Hail or tornadoes damage crops.</td>
<td>Creates shortage of product.</td>
</tr>
<tr>
<td>Crop yield is low.</td>
<td>More expensive to feed livestock</td>
</tr>
<tr>
<td>Feeding livestock is expensive.</td>
<td>More expensive for consumer to purchase meat.</td>
</tr>
<tr>
<td>Adequate rainfall; Crops more successful.</td>
<td>More grass for cattle and other livestock.</td>
</tr>
<tr>
<td>More successful crops</td>
<td>More successful crops  Less expensive livestock feed; Less expensive meat at the store</td>
</tr>
</tbody>
</table>

Oklahoma Ag in the Classroom is a program of the Oklahoma Cooperative Extension Service, the Oklahoma Department of Agriculture, Food and Forestry and the Oklahoma State Department of Education.