Weather Matters

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.

Oklahoma Academic Standards

GRADE 3

English Language Arts—
1.R.1,3; 2.R.1,2,3; 3.R.6,7;
1.W.1,2; 3.W.1; 2.F.1

Social Studies PALS—
1.A.1,2,3, B.4,7,8
Social Studies Content—2.1; 3.1BE
Science—ESS2.1,2
Visual Art—1.1,2,3;
2.1,3,4,5; 4.4

GRADE 4

English Language Arts—
1.R.1,3; 2.R.1,2,3; 3.R.6,7;
1.W.1,2; 3.W.1; 2.F.1
Social Studies PALS—
1.A.1,2,3, B.4,7,8
Social Studies
Content—1.3,4,5
Visual Art—1.2,3,4; 2.2,5; 4.4

Materials

popcorn
cereal squares
peanuts
cereal bars

computer access

Vocabulary

adequate—enough for some need or requirement
agriculture—the science, art, or practice of cultivating the soil, producing crops, and raising livestock
analyze—to study closely and carefully
climate— the average weather conditions of a particular place or region over a period of years
consumer—a person who buys and uses up goods
crop yield—measurement of the amount of a crop that was harvested per unit of land area
cycle—a set of events or actions that happen again and again in the same order
drought—a long period of time during which there is very little or no rain
environmental—having to do with the surrounding conditions or forces such as soil, climate, and living things that influence a plant's or animal's characteristics and ability to survive
feed—food for animals
graze—to feed on growing plants
humidity—moisture in the air
livestock—farm animals (such as cows, horses, and pigs) that are kept, raised, and used by people
monitor—to watch, observe, listen to, or check something for a special purpose over a period of time
network—a system of computers and other devices that are connected to each other
prediction—a statement about what will happen or might happen in the future
product—something that is made or grown to be sold or used
purchase—to get something by paying money for it
scarce—present only in small amounts
shortage—a state in which there is not enough of something that is needed
successful—having the correct or desired result
transmit—to send (information, sound, etc.) in the form of electrical signals to a radio, television, computer, etc.
weather—the state of the air and atmosphere at a particular time and place

—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.

mesonet.org
—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

Gibbons, Gail, *Tornadoes*, Holiday House, 2010.
Seymour, Simon, *Weather*, Harper Collins, 2006.
Snedeker, Joe, *The Everything KIDS' Weather Book: From Tornadoes to Snowstorms, Puzzles, Games, and Facts That Make Weather for Kids Fun!* Adams Media, 2012

Ag Career—Meteorologist

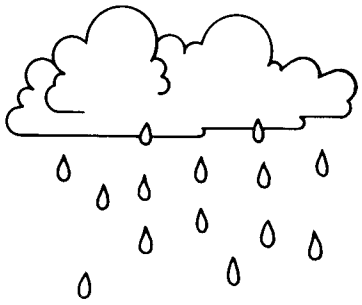
Job Description: A meteorologist uses scientific principles to explain, understand, observe, or forecast the earth's atmospheric phenomena and/or how the atmosphere affects the earth and life on the planet. Meteorologists can have many different jobs including daily weather forecasting, atmospheric research, teaching, broadcasting and supporting clients through private sector meteorological companies.
Education: Bachelor's or higher degree from a college or university. Many meteorologists have degrees in physics, chemistry, mathematics, and other fields. The broader term "atmospheric science" often is used to describe the combination of meteorology and other branches of physical science that are involved in studying the atmosphere.

Source: American Meteorological Society: https://www2.ametsoc.org/ams/index.cfm/education-careers/career-guides-tools/all-about-careers-in-meteorology/

Name_____

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.

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Cause and Effect Chart

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

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