



How Weather Impacts Farms

Grade level:

2 - 5

Objective:

Learn more and investigate different kinds of weather.

Materials Needed:

- Severe Weather Info sheet

Lesson Summary

A delightful romp around farms through the season—and the many types of boots that are needed to get the job done. In this book, you will follow farm families as they work and play in boots all year long. Whether it's springtime puddle-splashing, riding at the summer fair, or herding sheep into the barn in winter, there's a type of boot for every kind of weather and activity. Each season brings adorable farm animals, farming equipment, and of course boots in this exploration of farm and country life.

Suggested Sequence of Events

- Start by asking students to recall the different types of weather they saw in the book *Farm Boots*. Make a list for the class on the board. Ask if there are any types of weather missing (Other answers could include weather extremes such as tornados, hail, wind, drought, etc. Refer to the list below.)
- Have students consider how weather conditions can affect farms.
- Organize the students into six groups. Assign each group a type of severe weather and provide them with a Severe Weather Information Sheet that correlates with their assigned type of weather. Have the groups go through the reading, watch the weather video, and create a weather report to warn farmers and ranchers about the weather event.
 - Flooding: Farmers Wait for Dry Weather
 - Extreme Cold: How Farmers Protect Crops Against Winter Weather
 - Hot and Dry: Hot, Dry Weather Takes Toll on Farm Animals
 - Wind: Iowa Farmers Face Aftermath of Powerful Derecho Windstorm
 - Hail: Area Farm Crops Damaged by Severe Weather
 - Tornado: Tornado Smacks Iowa Farm
- Weather reports can be performed live for the class or recorded. The report should describe the weather event, what to expect, and how farmers can prepare.
- Allow time for the groups to share their weather reports with the class.
- Discuss the impacts of weather to farms and how detailed forecasting can help farmers know what to expect and prepare for severe weather



Ag in the Classroom

Flooding



Flooding happens when water covers land that is usually dry. Flooding can occur from different water sources, but is typically caused by heavy rainfall or snowmelt. The heavy rains cause water to pool up quickly as the ground becomes saturated.

Floods can destroy drainage and sewage systems, buildings, and other facilities. Raw sewage and toxic

materials can be released into the flood water. People may experience electricity and phone outages and be left without sanitation systems, drinking water, or even shelter.

Floods can cause major damage to crops and pastures. Planting and harvesting schedules can be delayed or canceled. After a flood, it can take several weeks before the farmland is dry enough for heavy equipment and tractors to enter the land without creating further damage. Farmers must address issues with sediment and debris, erosion, soil and nutrient management, and crop repair.

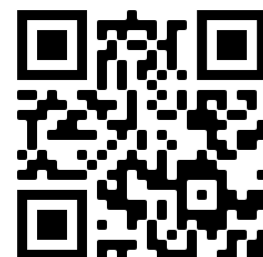
When farmers receive advance notice of a flood, they can take precautions, such as empty grain bins, move livestock and equipment to higher ground, move or chain down propane tanks, and remove power units from irrigation systems.

Engineered structures, such as dams, dikes, levees, flood gates, seawalls, drainage canals, drainage systems, pumping stations, bridges, concrete river banks, spillways, overflow basins, embankments, retention ponds, and wetlands restoration, are used to control flooding.



Watch Louisiana Farmers Wait for Dry Weather

<https://youtu.be/L8XTA0PV95w>



Extreme Cold



Extreme cold elevates the risk of damage to certain crops and stress to livestock. Farmers monitor for severe winter weather. Detailed forecasting can help farmers make decisions regarding their crops and livestock. A Winter Storm Watch means that severe winter conditions are possible. A Winter Storm Warning means severe winter conditions are expected. A Blizzard Warning means that snow and strong gusts are

expected to combine, producing blinding snow, deep drifts, and wind chill.

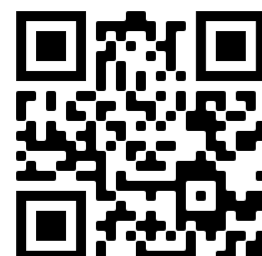
Certain crops are especially susceptible to damage due to extreme cold. The direct impact of a cold snap may not be seen for several months. Cold can freeze the cells in a plant, causing damage and interrupting the pathways for nutrients and water to flow. Cold can have a positive effect too. Some insects and pests die off as a result of extreme cold. The benefits are apparent during the following growing season.

Livestock have the same basic needs as people—shelter, food, and water. In extreme cold, animals must be kept dry and out of the wind. When possible, animals should be brought into an indoor shelter with fresh bedding. Animals need extra food during extreme cold temperatures to provide them with more energy to stay warm. Water troughs should be heated or changed frequently to avoid icing over. Farmers and employees should also take frequent breaks to warm up during winter storms.



Watch How Farmers Protect Against Winter Weather

https://youtu.be/dM6cZ_7uUds



Hot and Dry



A drought is caused by drier than normal conditions that lead to water supply issues. Hot temperatures can worsen the issues by evaporating moisture from the soil. The severity of a drought depends on the length of time the area receives below-average precipitation.

Weather satellites are used to monitor droughts. The satellites capture infrared images of Earth. These images provide information about the heat on Earth's

surface, which can be used to estimate how much water is being transferred from the land to the atmosphere through the soil and plants. From this information, scientists can make predictions and give warnings to farmers and ranchers about risks to crops and livestock.

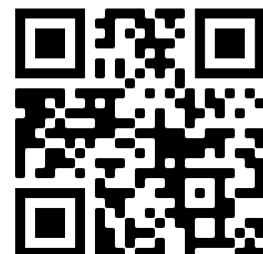
Warm temperatures and low rainfall cause stress to growing crops. High temperatures can cause some crops to ripen faster, reducing the quality at the end of the season. Heat can also create an environment for crop diseases, pests, and weeds.

Drought and heat can devastate pastures and create livestock feed shortages. High temperatures increase animal water consumption, which may occur at the same time water availability is limited. Animals may experience diminished milk production, lower fertility rates, decreased daily weight gain, and increased susceptibility to disease and parasites.



Watch Hot, Dry Weather Takes Toll on Farm Animals

<https://youtu.be/bWVC6oXFepc>



Wind



Wind storms can level planted fields and cause destruction to buildings and structures. Strong winds can pull plants and trees out of the ground or knock them over. They can also dry out plants, move soil and cause erosion, and move and disperse seeds. Winds pick up dust and dirt particles which can damage crops by creating wounds on the plant where pests (fungi, insects, disease) can enter. Uprooted and loose branches

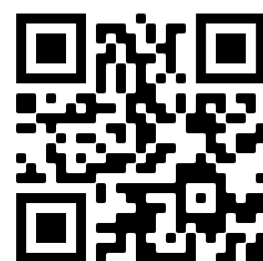
cause expensive damage when blown onto buildings and farm equipment. A severe windstorm can toss soil, sand, and larger objects at incredible speeds, causing severe damage to fields and structures.

In areas with loose soil or a lack of crops or cover crops, soil erosion can be caused by strong winds. Wind erosion moves soil from one location to another by the power of the wind. Soil loss, sand-blasted crops, transportation delays, and financial losses are the resulting effects of wind erosion. Stripping away the fertile top layers of the soil and organic matter, wind-blown soil can bury or sandblast pastures, crops, and fences.

Common across the Midwest and Great Plains, a derecho is a widespread, long-lasting, powerful wind storm. A cluster or complex of storms can be classified as a derecho if the damage path is at least 240 miles long and winds are greater than 58 mph for most of the life of the storm. The hurricane-force winds of a derecho wreak havoc on crops by bending or uprooting plants and hiding debris in fields that can damage combines.



Watch Iowa Farmers Face Aftermath of Powerful Derecho Windstorm
<https://youtu.be/k7fZrDovHrl>



Hail



Hail is frozen precipitation formed when updrafts in thunderstorms carry raindrops up into extremely cold areas of the atmosphere. The hailstones continue to grow in size until they're too heavy to be supported by the updraft and fall to the ground. The more intense the updraft, the longer the hailstones stay in the cold atmosphere and the larger they become. Severe hail typically accompanies other severe weather such as high winds,

flooding rains, and tornadoes.

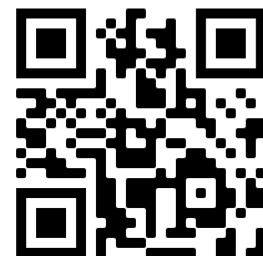
A strong hailstorm can tear through a field and destroy or severely damage a farmer's crop. The damage done by a hailstorm depends on the size and the frequency of the individual pieces of hail. The bigger the hail, the bigger the damage. Hailstones can cause major damage to crops by tearing leaves, breaking or bruising stalks, knocking fruit off plants, bruising fruits and vegetables, killing seedlings, and damaging tree bark and branches. Injured plants, with leaves damaged and torn by hailstones, may not be able to complete photosynthesis. Hail that accumulates without destroying the plant may freeze the growing point, resulting in disease or death of the plant.

Farm animals are susceptible to injury and death when exposed to hailstorms. Shelters, tall brush, and trees can provide protection for animals.



Watch Area Farm Crops Damaged by Severe Weather

<https://youtu.be/GZafkQMJVbc>



Tornado



Every year, between 600 and 1,400 tornadoes are reported in the United States. Tornadoes are violently rotating columns of air that descend from thunderstorm cloud systems in a funnel shape. Tornadoes may strike quickly, with little or no warning. They can travel at speeds up to 60 miles per hour (mph), with wind speeds as high as almost 400 mph in the tornado's center. Tornadoes are dangerous and destructive because their energy is concentrated in a small

area. Wind speeds can cause vehicles to become airborne, destroy buildings, and turn debris into lethal missiles. The sound of a tornado can be compared to a freight train or jet engines. The biggest threat to living creatures during a tornado is from flying debris and being tossed around in the wind.

On a farm, tornadoes can injure, displace, or kill livestock, damage crops, disperse seeds, uproot trees, cause power outages, and damage farm equipment and buildings. Tornadoes can rip the tops from silos, level field crops, and destroy harvested products awaiting shipment.

Farmers monitor forecasts for severe weather. A Tornado Watch is issued when weather conditions favor the formation of tornadoes. A Tornado Warning is issued when a tornado funnel is sighted or indicated by weather radar. Farmers can prepare for tornadoes by securing animals and livestock, stockpiling emergency supplies of feed, water, medicine, veterinary supplies, and fuel, and tying down heavy farm equipment or placing them under cover. If a farmer is caught in their field during a tornado, they should move away from farm equipment, find a low-lying area, such as a ditch, and cover their head with their arms to protect from flying debris.



Tornado Smacks Iowa Farm
<https://youtu.be/KRsYlgTTDXM>

