

# History of Irrigation on the Great Plains

## Objective

Students will create an augmented reality video using a smart phone or tablet application (app) to educate consumers about the source of their food.

## Background

People have been finding ways to irrigate crops for centuries. Around 900 AD, ancestors of the Pueblo people in Arizona and New Mexico dug elaborate irrigation works using implements of stone and bone. The Pueblo method made use of canals to flood tilled land that was located around and immediately below the lower end of the canal. The canal started from small creeks in the hills. As the course of the canal approached its end, its gradient was gradually reduced in order to flood the field whenever there was a heavy shower in the hills.

About 500 years later these methods were adopted by ancient people living in what is now the Oklahoma Panhandle. Archaeologists have found irrigation canals extending from what is now Beaver County into what is now Ellis and Woodward counties. The canals were dug with picks and gouges made from the bones of elk and bison. The loose dirt was shoveled into carriers made of rawhide or wicker with shovels shaped from the shoulder blades of the same animals. It was then transported to a dumping place on the backs, shoulders or heads of ancient men and women.

Archaeologists believe the people who developed these irrigation systems had previously lived in areas in the eastern US, where rainfall was more plentiful. They probably were forced from that area by warfare. When they tried to grow the same crops they had grown in their previous home, they found the rainfall was inadequate. These people probably learned irrigation methods used by the Pueblo people when they passed through their lands on hunting trips.

In the 1840s Mormons in Utah found they could soften their crusty soils by damming a creek. During the same period, prospectors in California discovered that water diverted to gold mining sluices produced lush plant growth in the desert. Congress passed several laws in the next few decades to help western states develop irrigation systems.

Small-scale irrigation in the 19th century involved diverting water onto fields by using windmills to pump water from shallow aquifers. Large scale irrigation began with the Reclamation Act of 1902 that authorized the Secretary of Interior to construct reservoirs, diversion dams and distribution canals in the West, including the Plains states. New pump technologies of the 30s made it possible to lift water from the Ogallala and other formations of the High Plains aquifer.

New technology provided an economical means for expanding irrigation after 1960. Deep wells were drilled, and powerful electric pumps brought groundwater up to the surface. The wells fed surface sprinkler systems that moved across fields automatically. With sprinkler irrigation it

## Oklahoma Academic Standards

### GRADE 3

Social Studies Content—2.1;  
3.1C,2AB; 4.3,5

### GRADE 4

Social Studies Content—  
1.1ADE, 3,4,5

## Vocabulary

**aquifer**—a water-bearing layer of rock, sand, or gravel capable of absorbing water

**canal**—an artificial waterway for boats or for draining or irrigating land

**divert**—to turn from one course or use to another

**drought**—a period of dryness that causes extensive damage to crops or prevents their successful growth

**furrow**—a trench in the earth made by a plow

**gradient**—a part sloping upward or downward

**irrigation**—the watering of land by artificial means to foster plant growth

**reservoir**—a place where something is kept in store; especially an artificial or natural lake where water is collected as a water supply

**sluice**—an artificial passage for water with a gate for controlling its flow or changing its direction

**tilled**—worked by plowing, sowing, and raising crops on or in

## Materials

computer and/or library resources for research

sand or garden soil

dish pans, aluminum pans or other containers for holding sand or garden soil

became possible to raise almost any feed grain. The ability to grow feed grains helped stimulate the growth of the cattle industry in the Plains states.

Sources: Thoburn, Joseph B., "Ancient irrigation ditches on the Plains," *Chronicles of Oklahoma*, Vol. 9, No. 1, March, 1931; Kromm, David E., "Irrigation," from Wishart, David, ed., *Encyclopedia of the Great Plains*, University of Nebraska, 2004.

## Social Studies

1. Read and discuss the vocabulary and background.
  - Students will create a time line from the information in the background.
  - Students will use online or library resources to identify the states included in the Great Plains.
  - Students will use the US map included with this lesson to color in the Great Plains States.
  - Students will develop symbols to show the states mentioned in the background where irrigation systems were first developed.
  - Students will use online or library resources to find the major rivers of the Great Plains region.
  - Students will use the map of Oklahoma counties included with this lesson to locate the counties mentioned in the background where evidence of ancient irrigation systems have been found.
2. Students will use online or library sources to research the history of irrigation around the world.
  - Students will identify countries or regions in the same latitude as the American Great Plains region and compare irrigation techniques with those used here.
  - Students will present the information to the class in the media of their choice (PowerPoint, poster, irrigation model, etc.)
3. Review the description of the ancient pueblo irrigation systems found in paragraph one of the background.
  - Students will use mounds of sand or garden soil to design irrigation systems similar to the Pueblo system described in the background.

## Additional Reading

Brandenburg, Jim, *An American Safari: Adventures on the North American Prairie*, Walker, 1996.

Groundwater Foundation, *Rainmakers: A Photographic Story of Center Pivots*, Groundwater Foundation, 2005.

Lamadrid, Enrique R., Arrellano, Juan Estevan and Amy Cordova, *Juan the Bear and the Water of Life: La Acequia de Juan del Oso*, University of New Mexico, 2008.

Wallace, Marianne, *America's Prairies and Grasslands: Guides to Plants and Animals*, Fulcrum, 2001.

Lesson Source: Iowa Agriculture Literacy Foundation

# Great Plains States

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Use online or library references to find the states included in the Great Plains. List the states below and color them in on the map.

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# Great Plains States

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Use online or library references to find the states included in the Great Plains. List the states below and color them in on the map.

Colorado  
Kansas

Montana

Nebraska

New Mexico

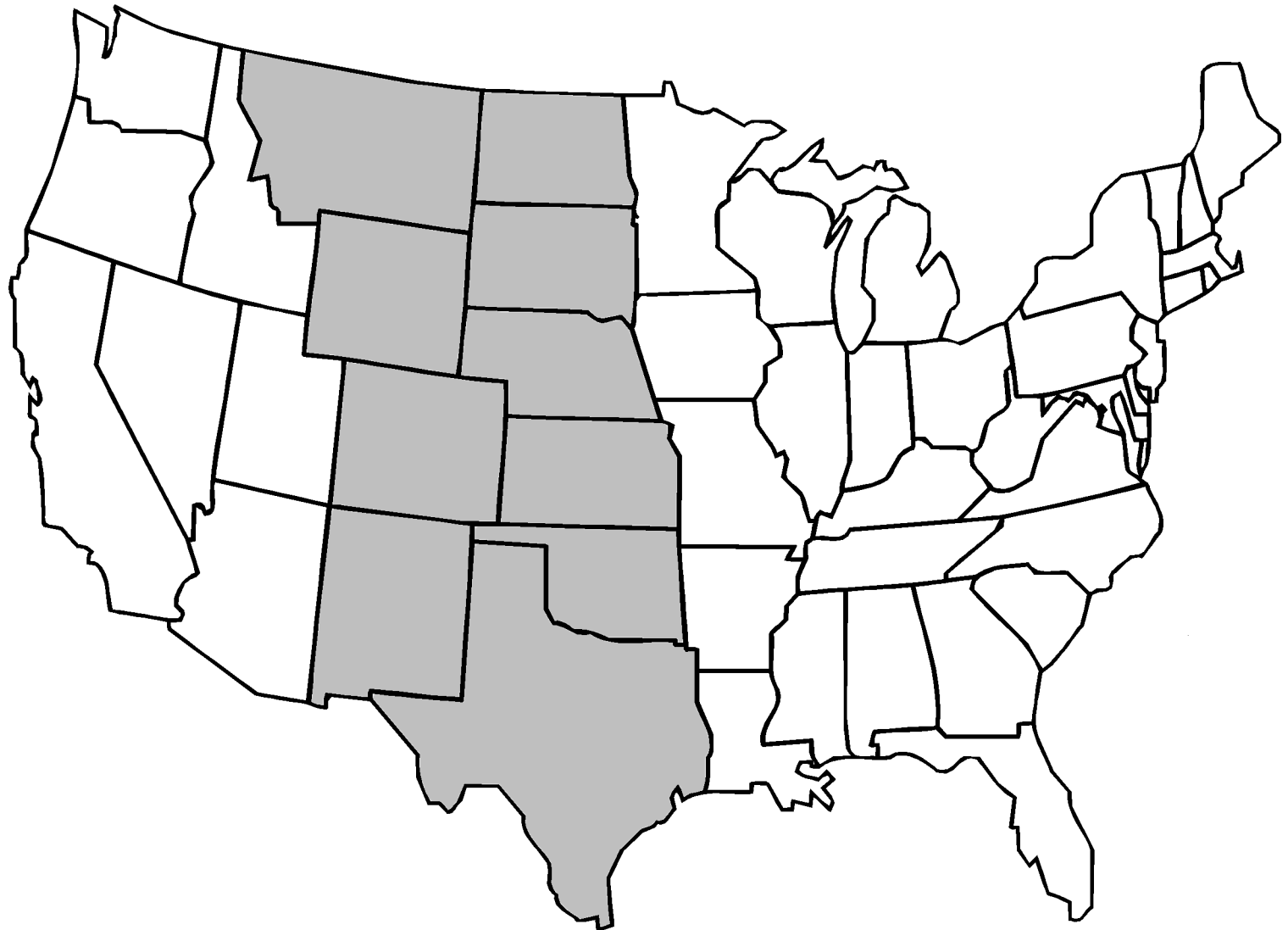
North Dakota

Oklahoma

South Dakota

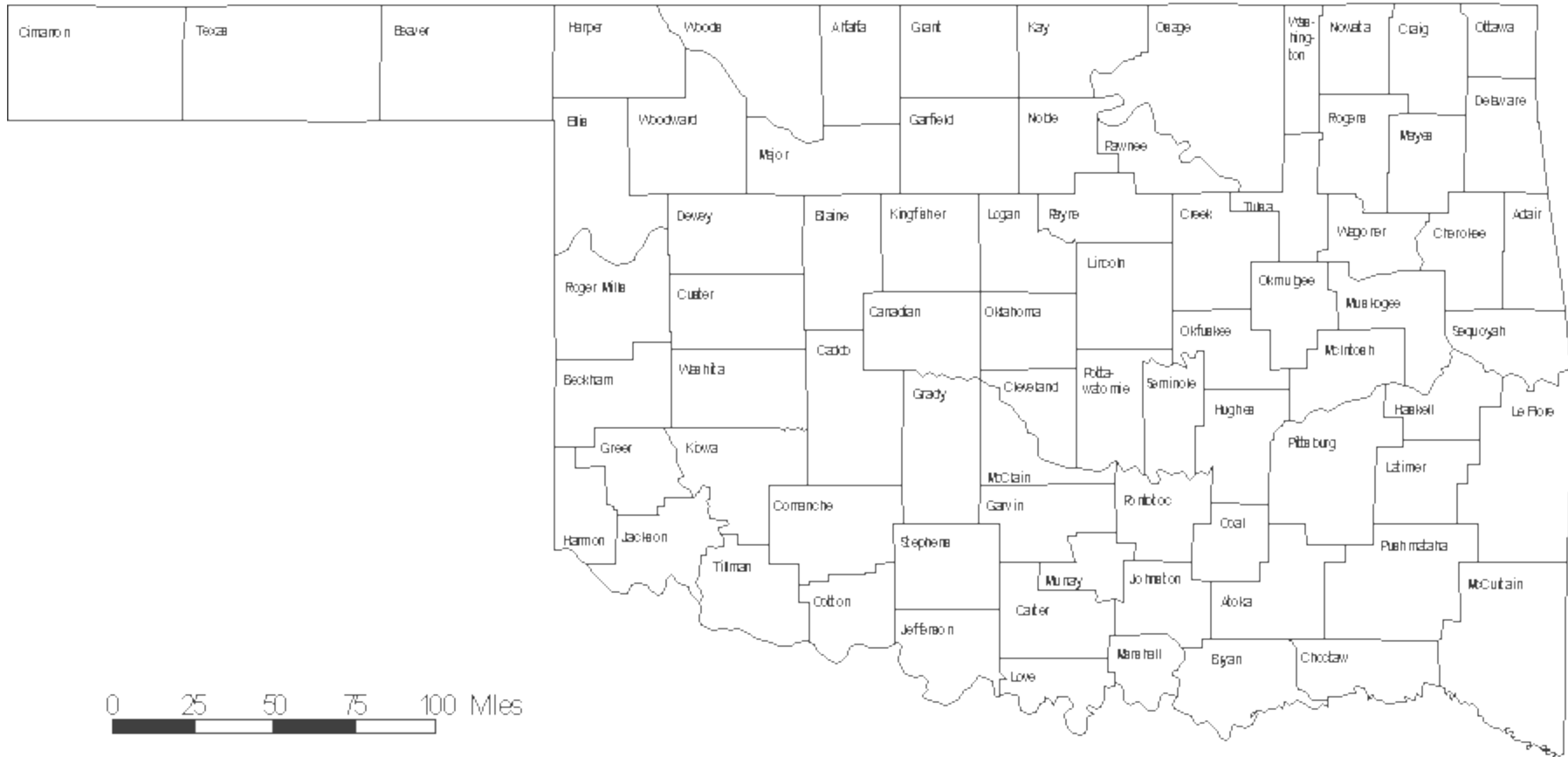
Texas

Wyoming



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.

# Oklahoma



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