



INDIGENOUS WISDOM: CENTURIES OF PUEBLO IMPACT IN NEW MEXICO

A Pueblo-Based Educational Curriculum • IndianPuebloEducation.org

MIDDLE SCHOOL CURRICULUM

2nd Edition

Title of Unit: Pueblo and Commercial Agriculture

Content Area: Science

Grade Level: 8

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Section A: Introductory Materials

Lesson Plan 1

Title of Unit: Pueblo and Commercial Agriculture

Content Area: Science

Grade Level: 8th Grade

Rationale:

Agriculture has historically played a major role in the development of cultures and communities across the world. Typically, those societies and cultures that have been able to provide adequate amounts of food have flourished. This is the case for the Pueblo Indians of New Mexico. Agriculture is at the core of Pueblo Indian culture and tradition. It is not only a means for producing nutritious food, but it also provides the foundation for many Pueblo Indian customs and traditions. Because of the cultural importance of agriculture, there are major differences between Pueblo Indian agriculture and modern commercial agriculture. This unit will allow students the opportunity to compare the two agricultural philosophies by providing a better understanding of Pueblo Indian agriculture and to gain awareness of the connection between Pueblo core values and Pueblo Indian agriculture.

Unit Goals:

1. Students will compare and contrast Pueblo Indian agriculture with contemporary commercial agriculture.
2. Students will demonstrate the communal aspects of Pueblo Indian agriculture.
3. Students will identify the different reasons why agriculture is conducted in Pueblo communities.
4. Students will explain the connection between Pueblo core values and Pueblo Indian agriculture.

Standards:

CCSS	New Mexico STEM Ready	NGSS
ELA-LITERACY.RST.6-8.7	1-SS-1 NM 5-SS-1 NM	MS-ESS3-3

Section B: Lesson Plan One

Title: Pueblo Indian Farming Philosophies

Duration: 40 to 50 minutes

Grade Level: 8th grade

Author: Anthony Dorame

Lesson Objectives: Students will be able to:

1. Identify and explain one way that Pueblo Indian agriculture differs from modern commercial agriculture.
2. Define and apply the term *acequia*.

Prerequisite Skills and Knowledge:

1. Students should have a basic understanding of agriculture and its requirements.

Materials and Resources:

1. Handout #1: *Acequia* Cleaning (photograph)
2. Handout #2: Functioning *Acequia* (photograph)
3. Handout #3: Sprinkler System (photograph)
4. Handout #4: Table
5. Handout #5: Exit Slip: 3 - 2 - 1 Activity
6. Poster Paper
7. Markers

Guiding Questions:

1. How does the concept of communal farming guide Pueblo Indian agricultural philosophies?
2. What are the major benefits of *acequias* for farming in New Mexico?

Core Values: Faith, Love, Respect, Balance

Procedure:

1. Introduce lesson. Explain to students that they will be learning about *acequias*. Ask students what they know about *acequias* and if they are aware of the *acequias* in New Mexico. Divide students into small groups. Distribute handouts #1: (*Acequia* Cleaning), #2 (Functioning *Acequia*), and #3 (Sprinkler System) and provide markers and poster paper for each group. Ask students to write two differences that they observe in the photos. (5 to 10 minutes)
2. Direct student learning by explaining to them that in Pueblo Indian communities farming is primarily a communal event, in which all community members participate together. (2 minutes)
3. Write the term *acequia* on the blackboard. Also, spell it out phonetically. Explain that an *acequia* is a community-operated watercourse used in Spain and former Spanish colonies in the Americas for irrigation. This system of irrigation was adopted by Pueblo Indian communities after the arrival of the Spaniards. *Acequia* is a Spanish word. (2 minutes)

4. Explain that Handout #1 depicts a community preparing the *acequia* for spring irrigation. During these times, community members strengthen their relationships with one another and with their land. This is a very important aspect of Pueblo Indian agriculture. Explain that the communal effort behind *acequia* cleaning is an important aspect of Pueblo Indian agriculture. Handout #2 shows a functioning community *acequia*. (2 minutes)
5. Now explain Handout #3, which depicts the commercial method of irrigation that uses sprinkler systems. This method of farming is individualistic and uses machines. (2 minutes)
6. On the board or projected on a screen present the same table provided in Handout #4 and ask students to copy it. Or photocopies of the Handout #4 can be provided to students. As a class discuss the *advantages* and *disadvantages* to each method of irrigation, entering their ideas into the table. See resources listed under "Notes to Teacher" for additional information. (5 to 10 minutes)
7. Ask students to discuss in small groups other benefits of working as a community to conduct agriculture and allow them to report their understandings to the class. (10 to 15 minutes)
8. Closure: 3 - 2 - 1 Activity. Distribute Handout #5: 3 - 2 - 1 Activity. Ask students to identify three facts or ideas that they learned about *acequias* and Pueblo agriculture, two facts or ideas that they found interesting, and one question about the lesson. Collect the exit slips at the end of class. (5 to 7 minutes)
9. Extension: Invite a Pueblo Indian farmer into the classroom to explain more about the *acequia* system and its importance to Pueblo Indian agriculture.

Assessment:

1. Student participation in group discussion
2. Completion of comparison table
3. Quality of responses on the exit slip

Modifications/Accommodations:

1. Presentation accommodations: Work with fewer items per page or line and/or materials in a larger print size; Have a designated reader; Hear instructions orally; Have another student share class notes with him or her; Be given a written list of instructions
2. Response accommodations: Give responses in a form (oral or written) that's easier for him or her; Dictate answers to a scribe; Use a spelling dictionary or electronic spell-checker; Use a word processor to type notes or give responses in class
3. Setting accommodations: Work in a different setting, such as a quiet room with few distractions; Sit where he or she learns best;
4. Timing accommodations: Take more time to complete a task; Have extra time to process oral information and directions; Take frequent breaks, such as after completing a task

5. Scheduling accommodations: Take more time to complete a project
6. Organization skills accommodations: Mark texts with a highlighter
7. Assignment modifications: Write shorter papers; Answer fewer or different questions; Create alternate projects or assignments
8. Curriculum modifications: Be excused from particular projects

Notes to Teacher:

1. For information about *acequias*, see *Acequias* by Eric Romero (2009) in *Nuevo México: An Anthology of History*, Las Vegas, NM: SOMOS Unlimited, pp.337-346.
2. For information about northern New Mexico *acequias*, see *New Mexico's Ancient Irrigation Systems Help Protect Scarce Water Supply* by Monica Ortiz Uribe: <http://www.scpr.org/programs/take-two/2014/04/07/36798/new-mexicos-ancient-irrigation-systems-help-protect/>. Students can listen to the report from the Fronteras Desk.
3. For cultural links to ditch cleaning, listen to a sample of songs from Picuris Pueblo. Ditch cleaning songs were recorded by Indian House Records in 1970: *Ditch Cleaning and Picnic Songs of Picuris Pueblo* by Ramos Duran of Picuris Pueblo. Indian House, catalog no. IH 1051.
4. Pros and Cons of different types of irrigation systems. University of Missouri: <https://extension.missouri.edu/programs/irrigation/irrigation-system-pros-and-cons/>
5. Hydrological Impacts of Traditional Community Irrigation Systems in New Mexico. NMSU: <https://aces.nmsu.edu/academics/waterresearch/documents/hydrologicalimpacts.pdf>
6. Benefits of Traditional acequia irrigation systems. Farmprogress: <https://www.farmprogress.com/irrigation/benefits-traditional-acequia-irrigation-systems>

Attachments:

1. Handout #1: *Acequia* Cleaning
2. Handout #2: Functioning *Acequia*
3. Handout #3: Sprinkler System
4. Handout #4: Table
5. Handout #5: Exit Slip: 3 - 2 - 1 Activity

Handout #1: Acequia Cleaning



Photo courtesy of <http://www.lasacequias.org/sembrando/acequia-limpia-in-chamisa>

Handout #2: Functioning Acequia



Photo courtesy of http://albuquerque.about.com/od/New_Mexico_Culture/ss/Acequias-And-Ditches.htm

Handout C: Sprinkler System



Photo Courtesy of:

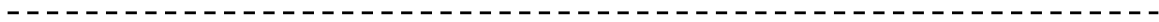
<https://www.flickr.com/photos/jdutter/7455166886/in/set-72157630315449548/>

Handout #4: Table

	Advantages	Disadvantages
Acequias		
Sprinkler Systems		

Handout #5: Exit Slip – 3 – 2 – 1

EXIT SLIP	
3	Things that I learned today..
2	Things that I found interesting..
1	Question I still have..



Handout #5: Exit Slip – 3 – 2 – 1

EXIT SLIP	
3	Things that I learned today..
2	Things that I found interesting..
1	Question I still have..

Lesson Plan Two

Title: Farming for Economics or Farming for Culture?

Duration: (45-55 minutes)

Grade Level: 8th Grade

Lesson Objectives: Students will be able to:

1. Explain how and why Pueblo Indians farm to produce healthy food and for ceremonial purposes.
2. Explain how contemporary commercial agriculture is conducted for economic purposes.
3. Describe the ways that agriculture is important to many different people in New Mexico.

Prerequisite Skills and Knowledge:

Materials and Resources:

1. Handout #1: Photograph of Crop Duster
2. Handout #2: Photograph of Pueblo Indian Cornfields
3. Handout #3: Overview of New Mexico Agriculture
4. Handout #4: Photograph of Harvest (1912)
5. Handout #5: Photograph of Agricultural Products
6. Handout #6: Pueblo Indian Corn Dance by Tonita Pefia of San Ildefonso Pueblo
7. Handout #7: Venn Diagram Activity

Guiding Questions:

1. What is the role of culture and ceremony in Pueblo Indian agriculture?
2. What is the role of economics in modern commercial agriculture?
3. What are major differences between commercial agriculture and Pueblo Indian agriculture?

Core Values: Respect, Faith, Balance

Procedure:

1. Admit Slip: As students enter the classroom, give one index card to each student and ask them to identify three to five reasons (on one side of the card) why people continue to farm in the 21st century. Have the students hold on to the index cards because they will use the backside of the card as exit slips. (5 minutes)
2. Introduce lesson by telling students they will be comparing Pueblo Indian agriculture to modern commercial agriculture. Ask students if they have ever observed or visited a farm at a Pueblo community in New Mexico. Follow up with a question about their knowledge of commercial farming. (2 minutes)
3. Organize students into small groups and provide them with handouts #1: Photograph of Crop Duster and #2: Photograph of Pueblo Indian Cornfields. Ask each group to study the handouts quietly for two minutes. Ask students to share within their group. Then ask each group to report the differences they observe.

Write student observations on the blackboard to compile class observations. (10 to 15 minutes)

4. Distribute handouts #3: Overview of New Mexico Agriculture, #4: Photograph of Harvest (1912), #5: Photograph of Agricultural Products, and #6: Pueblo Indian Corn Dance by Tonita Pefia of San Ildefonso Pueblo. Explain to students that the Corn Dance is how Pueblo Indian people give thanks and appreciation for a bountiful harvest. Websites are provided for each handout in the event that additional information is needed. (3 minutes)
5. Give students time to study the handouts and to discuss the reasons why people farm. After a brief discussion of the reasons why people engage in farming, ask students to draw on information from the previous lesson on commercial farming and ask students to discuss the purposes for commercial farming. Explain to the class that economic profit typically drives contemporary commercial agriculture. The primary objective is to earn money. Contrast that by telling students that culture and the need for healthy food are the primary reasons that Pueblo Indian people farm. (5 minutes)
6. Distribute the handout #7 Venn Diagram or ask students to draw a Venn Diagram similar to the one in the handout. The purpose of this activity is for students to compare and contrast the similarities and differences between Pueblo Indian agriculture and modern commercial agriculture. It is highly recommended that the resources provided in the section under "Notes to Teacher" be made available for students as they work on their Venn Diagrams. Allow adequate time for students to engage in a concluding discussion where they are asked to compare the differences in farming philosophies. (15 minutes)
7. Closure: Exit Slip. Ask students to complete the following sentence and write their responses on the back of the index card used earlier in class as an admit slip: One thing that I learned today is ... Collect the Venn Diagrams and Admit/Exit Slips at the end of class. (5 minutes)

Assessment:

1. Venn Diagram
2. Quality of student contributions to small- and large-group discussions: Look for understanding of the differences between contemporary agriculture and Pueblo Indian agriculture.
3. Admit and Exit Slips

Modifications/Accommodations:

1. Presentation accommodations: Work with fewer items per page or line and/or materials in a larger print size; Have a designated reader; Hear instructions orally; Record a lesson, instead of taking notes; Have another student share class notes with him or her; Be given an outline of a lesson; Use visual presentations of verbal material, such as word webs and visual organizers; Be given a written list of instructions.

2. Response accommodations: Give responses in a form (oral or written) that's easier for him or her; Dictate answers to a scribe; Use a spelling dictionary or electronic spell-checker; Use a word processor to type notes or give responses in class
3. Setting accommodations: Work in a different setting, such as a quiet room with few distractions; Sit where he or she learns best;
4. Timing accommodations: Take more time to complete a task; Have extra time to process oral information and directions; Take frequent breaks, such as after completing a task
5. Scheduling accommodations: Take more time to complete a project
6. Organization skills accommodations: Mark texts with a highlighter
7. Assignment modifications: Write shorter papers; Answer fewer or different questions; Create alternate projects or assignments
8. Curriculum modifications: Be excused from particular projects

Notes to Teacher:

1. Pros and Cons of different types of irrigation systems. University of Missouri: <https://extension.missouri.edu/programs/irrigation/irrigation-system-pros-and-cons/>
2. Hydrological Impacts of Traditional Community Irrigation Systems in New Mexico. NMSU: <https://aces.nmsu.edu/academics/waterresearch/documents/hydrologicalimpacts.pdf>
3. Benefits of Traditional acequia irrigation systems. Farmprogress: <https://www.farmprogress.com/irrigation/benefits-traditional-acequia-irrigation-systems>

Attachments:

1. Handout #1: Photograph of Crop Duster
2. Handout #2: Photograph of Pueblo Indian Cornfields
3. Handout #3: Overview of New Mexico Agriculture
4. Handout #4: Photograph of Harvest (1912)
5. Handout #5: Photograph of Agricultural Products
6. Handout #6: Pueblo Indian Corn Dance by Tonita Pefia of San Ildefonso Pueblo
7. Handout #7: Venn Diagram Activity

Handout #1: Photograph of Crop Duster

Contemporary Commercial Farm using a "crop duster" to apply chemicals. Notice the large size of the fields.



Photo courtesy of <http://www.panoramio.com/photo/37699518>

Handout #2: Pueblo Indian Cornfields



Photo courtesy of http://grandcanyonhistory.clas.asu.edu/sites_adjacentlands_hopireservation.html



Photo courtesy of <http://georgehhuely.photoshelter.com/image/I0000GeHXyAvP8Oo>

Handout #3: Overview of New Mexico Agriculture

Source: NASDA <http://www.nasda.org/9383/States/NM.aspx>

Through securing the food supply, promoting trade, and protecting our natural resources and environment, the New Mexico Department of Agriculture is a producer, consumer and regulatory agency that plays a fundamental role in multiple sectors of New Mexico's agricultural and consumer services industries.

New Mexico's agricultural history is long and diverse, from very early planting and trading of corn and squash to cattle drives. New Mexico's livestock production began with the earliest days of cattle barons when the Goodnight Loving Trail and the Chisum Trail were used extensively to move cattle north. The livestock industry remains significant to New Mexico's economy with over 1.5 million head feeding on rangeland and feedlots. Today, agriculture continues to expand its contribution to the state's economy and recognition. Agriculture is one of the state's principal industries with cash receipts approaching \$3 billion annually and directly supports over 23,000 jobs in the state.

Consistent production of high-quality alfalfa contributes to the state's ranking as the seventh highest milk and eighth highest cheese producing state in the nation. New Mexico's individual dairy herds are the largest in the country with milk production per cow second only to Arizona. Milk production supports several of the biggest cheese manufacturing plants in the country, and from 2002-2005, milk production in New Mexico increased by 10 percent. New Mexico also boasts the highest concentration of pecan production in the world and is one of the top three pecan producing states in the nation. New Mexico leads in cash receipts for pecan production with superior quality nuts and some of the largest orchards.

New Mexico's agriculture is as diverse as the state's culture, geography, and climate. Produce grown across the state includes onions, potatoes, pumpkins, watermelons, lettuce, cabbage, corn, and beans. The state supplies 85% of the nation's fresh onions during June, and remains the country's largest producer of her most famous export - chile peppers. Due to New Mexico's ability to produce a variety of fruits, vegetables, nuts, grains, and nursery products, the state enjoys growth of local Farmers' Markets. Forty-seven markets provide a wide assortment of specialty local grown fruits, vegetables and herbs, including organically certified products.

Article courtesy of <http://www.nasda.org/9383/States/NM.aspx>

Handout #4: Photograph of Harvest (1912)

Typical Pueblo Indian harvest of corn, beans, squash and chile



Harvest, Santa Clara Pueblo c. 1912
Courtesy Museum of New Mexico Neg. No. 4128
Photo courtesy of <http://www.andreafisherpottery.com/osantaclara.html>

Handout #5: Photograph of Agricultural Products



Photo courtesy of <http://www.americanexcursionist.com/en-us/passions/people-cultures>

Handout #6: Pueblo Indian Corn Dance by Tonita Peña of San Ildefonso Pueblo

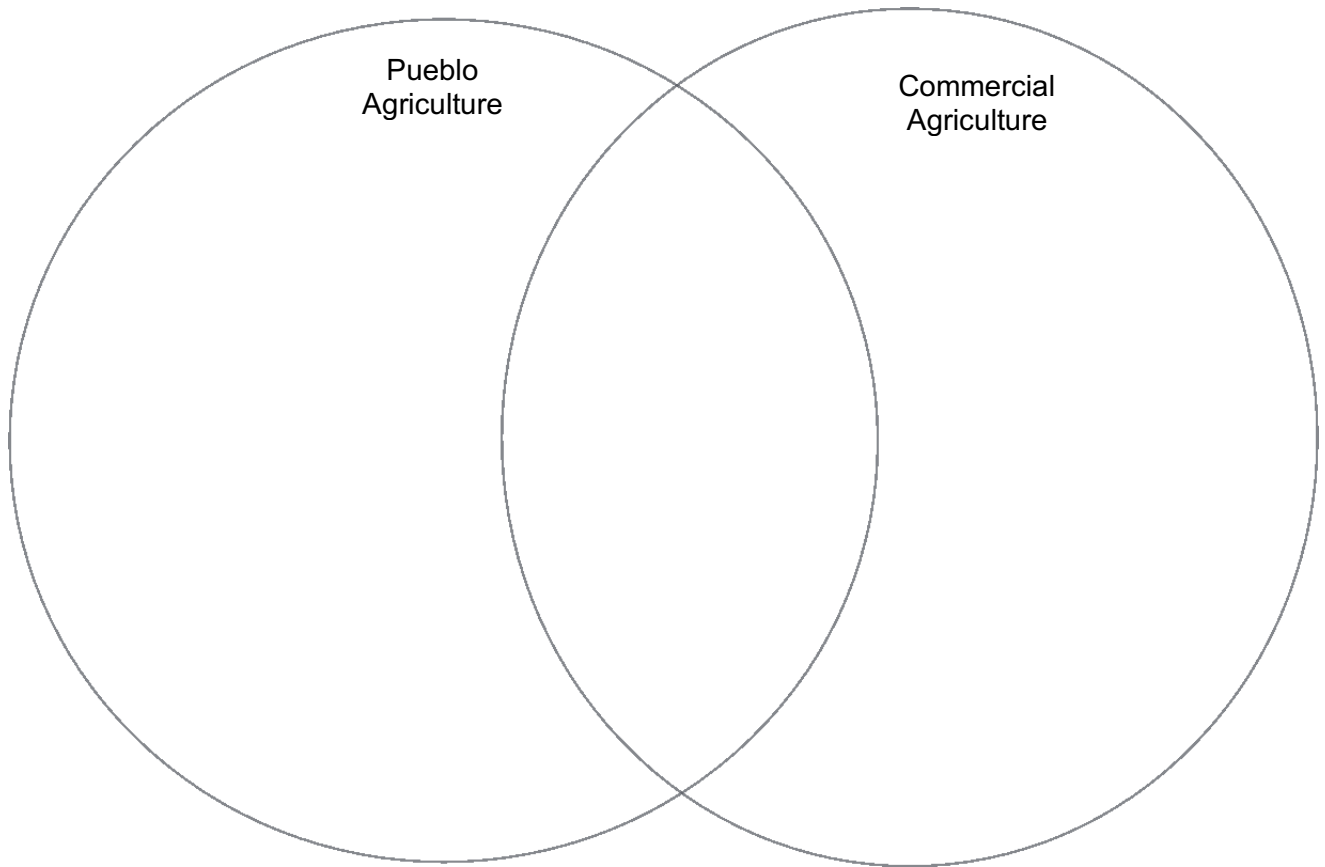


Image courtesy of <http://www.adobegallery.com/art/pueblo-fall-corn-dance-painting>

Handout #7: Venn Diagram Activity

Name: _____ Date: _____

Using the information provided, compare and contrast the similarities and differences between Pueblo Indian agriculture and modern commercial agriculture.



Section C: Culminating Activity

The production of food is one of the major goals of all agriculture. Allow students to make popcorn using blue corn that was grown in New Mexico or allow students the opportunity to make posole or chico stew in class. A fresh New Mexico grown watermelon is a wonderful dessert. Introducing students to new foods that are grown and produced in New Mexico is a great way to get them interested in agriculture. Recipes for New Mexico posole and chico stews are available on Internet.