

Title: Irrigation in the West

Key Words: Irrigation, Settlement, Hohokam, Spanish, Reclamation Act

Grade Level: 6-12

Time Allotted: 90 Minutes

Lesson Overview	This lesson looks at the critical role irrigation has played in the settlement of the American southwest. Students and teacher will discuss the reasons why irrigation was necessary and the various groups (Hohokam, Spanish colonizers, U.S. government) who used it to their advantage in the Southwest. The main tool of the lesson is an interactive Wikipage.
Guiding Question(s)	1. What are the limiting climate factors to living in the American southwest? 2. Who were some of the groups settling the Southwest? How did each group deal with the arid landscape? 3. How did each group use available technology to modify the landscape and thus make it more inhabitable? 4. How did the irrigation of the Southwest represent a global convergence of technology? 5. What was the environmental or ecological legacy of irrigation in the American Southwest?

Learning Objectives (SWBAT – Students Will Be Able to)

1. Students will be able to identify the climate factors that limit settlement in the American southwest.
2. Students will have a basic chronology of the groups who settled the region and the difficulties they faced in regards to the landscape.
3. Students will be able to identify the technology used by each group to modify the environment.
4. Students will realize that irrigation in the Southwest represents a global convergence of technology.

5. Students will be able to list the positive and negative impacts of irrigation on the environment of the Southwest.

Standards of Learning:

Virginia SOL:

World Geography 2b. The student will analyze how selected physical and ecological processes shape the Earth's surface by describing how humans influence the environment and are influenced by it.

U.S. History II:

- USII 2. The student will use maps, globes, photographs, pictures, or tables for
- a) explaining how physical features and climate influenced the movement of people westward
- USII.4 The student will demonstrate knowledge of how life changed after the Civil War by
- a) identifying the reasons for westward expansion, including its impact on American Indians

OAH Historical Skills Taught:

1. **Chronological Thinking**-students will gain a historical understanding of the progression of western irrigation from Pre-Columbian groups through present –day.
2. **Historical Comprehension**- students will develop historical comprehension skills by analyzing the arguments in favor of irrigation through the words of those involved

Assessment Tool(s) –

Two assessment pieces will be used with this lesson.

1. Guided Practice Sheet: this should be completed by students during the PowerPoint introduction and as they move through the Wikipage on irrigation.
2. Irrigation Assessment Questions: a menu of assessment questions is provided; teachers may wish to eliminate questions or have students write responses to all five questions. These could also be distributed as classroom exit slips.

Materials/Resources

1. Wikipage: <http://irrigationinthewest.wikispaces.com/>
2. Introductory and closure PowerPoint, including talking points
3. Guided Notes and Question Sheet- 2 documents, 1 contains answers
4. Irrigation in the West Assessment Pages (Full page of 5 questions and two files each with one "Exit Slip" question.
5. Background essay found on Classroom Practice page

Modifications (to meet needs of diverse learners)

1. Heterogeneous grouping could be utilized for students of mixed abilities.
2. Number of assessment questions can be reduced
3. Lesson could be jigsawed by having groups of students assigned to a particular irrigating group and then reporting back
4. Teachers may want to work through the wikipage with students

Instructional Procedures/Process (How will you guide your students through this activity)

1. Prior to class familiarize yourself with the history of irrigation by reading the background essay.
2. Distribute Guided Practice Worksheet Practice at beginning of class or have it on student desks as they enter the classroom.
3. Use the PowerPoint to introduce the American Southwest and irrigation to the students. Use the talking points provided for each slide to enhance discussion. Students should be answering questions 1-9 on the guided notes sheet at this time. Use the following talking points to guide yourself and the class through the PowerPoint .

Talking Points for Irrigation in the American Southwest Power Point

Slide 1: Title Slide

Slide 2:

-Use this slide as a "bell ringer." Students should begin writing their responses as soon as possible to get the lesson moving along. Some possible responses might include specific states or cities, landforms (Grand Canyon, Colorado River), or climate features

Slide 3: Mental Map

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-Mental concepts of regions are important in studying geography. To this end, have students draw a mental map of the American Southwest before showing them Slide 4. Also ask them to brainstorm some places associated with this region, i.e. Grand Canyon, Las Vegas, Phoenix, specific states, etc. The point here is for them to really put this region in their mindset.

Slide 4: The American Southwest

-Allow students a few minutes to compare their mental maps to the actual map on the screen. Have them look for similarities between their map and also what is lacking from their map. Note to the students that this is a modern political map of the region showing states and borders. It does not include physical features; their maps may reflect physical features. It is imperative that the students contextualize the region being addressed. Ask the students if anyone has ever visited this region. If so, have them describe their experiences.

Slide 5: The Climate of the Southwest

-Be sure students realize that climate is essentially average weather. The main item they should get from looking at the climate graphs, aside from the answers to the corresponding questions, is that this region is especially dry.

Slide 6: What we think the Southwest should look like.

-Once again before showing them this slide, ask students to describe the landscape of the Southwest. Maybe ask them what colors predominate or if there would be many farms. They could even make a quick sketch. By showing them the picture the goal is to reinforce the aridity of this land.

Slide 7: What some parts actually look like.

-Impart on the students that a scene like this could only happen because of a change to the climate. Refer them back to the climate graphs to demonstrate that this picture is an unnatural occurrence. At this point ask them what causes the discrepancy between slides 6 and 7.

Slide 8: What is Irrigation

- Before showing this slide, you could ask students to brainstorm some answers to the question, "What is Irrigation?" Once the class has a basic understanding of irrigation, see if they can recall ever seeing irrigation practiced. Students should define irrigation on their guided notes sheet.

-Explain to the students that humans do modify or change the land to make it habitable. In geography this is called human environmental interaction and it has been occurring since the earliest humans. Ask students what type of consequences possibly occur when we change our landscape. Are they positive or negative or both?

Slide 9: Why was irrigation necessary

-Students should see that based on the criteria given this region is a desert. It lacks natural rainfall and irrigation is needed for settlement.

Slide 10: What role has irrigation played

-By now it should be apparent to student that not many could live in a region this dry without a consistent supply of water. Water is our most necessary resource. At this point, ask the students how long they could survive without it? The purpose of this slide is to show that without irrigation provided water very few could permanently settle in this region.

Slide 11: Irrigation Groups

-Mention to the students that despite its aridity, this region has had a long history of settlement. This settlement predates the arrival of Europeans. While the groups settling here have different origins, they all share a legacy of irrigation.

Slides 12, 13, and 14: Specific Groups

-These slides give brief overviews of each group and their settlement of the Southwest. Make sure students know the time span here is almost 1500 years. There will be more information about each group on the wikipage but some brief notes regarding each group are below. At this point, direct students to questions 7-9 on the guided notes sheet where they will record a brief summary of each group. Questions 7-9 along with slides 12-14 help to visually introduce the groups being discussed. As the teacher, you should impart the information below to the students. They can simply record several of the group's facts to answer each question. Reiterate to them that they will find more information about each group when they get to the wikisite.

Hohokam- (Slide 12)

- name means those who are gone
- they dwelled in the region from about 600 to 1300, and then vanished
- since no written records remain, knowledge comes from archaeology

Spanish- (Slide 13)

- The Spanish had a twofold reason for exploring the Southwest, gold and conversion of souls.
- Francisco Coronado explored the lands of the Southwest in the 16th century, but it was Don Juan de Onate who established the first Spanish settlement in the Southwest at the end of the 16th century.
- As more Spanish colonizers migrated north from Mexico in the 16th and 17th centuries, they also realized the need for irrigation.

NOTE: Included on this slide (Slide 13) is a quote from Francisco Coronado. It is the first of several primary quotes about this region that students will see during the lesson. It is included here so the teacher can help students to break down its meaning. This is also a good time to tell students that primary sources are of extreme value when dealing with historical concepts.

The quote is taken from the journal of Coronado during his expedition of the Southwest. It provides an early account from a European source of the climate conditions of the region. The Historical Source Question on the guided practice asks students, "What

evidence does Coronado give about the aridity of the Southwest?" Student answers should include the mention of little rain and very few fruits or trees.

U.S Government- (Slide 14)

- Small scale irrigation continued even as the southwest became part of the United States.
- Towards the end of the 19th Century irrigation became somewhat of a political issue.
- Up to this point the federal government stayed out of irrigation projects. With the many failures of private enterprise attempts, however, momentum for government backed projects grew.
- The 20th century would see massive irrigation undertakings by the U.S. government.

Methods of Irrigation (Slide 15)

- This slide directs students to the Wikipage.

4. At this point, more advanced classes will be ready to work independently the Wikipage activity. Slower moving classes may benefit from some initial guidance through the first few questions utilizing the webpages on the guided practice sheet.

For differentiation: When students get to the section of the Wikipage dealing with each group, students can be divided into groups responsible for dealing only with one of the three irrigating groups. A jigsaw format could be used to ensure students obtain required information.

5. At this point students should have finished the wikisite and should no longer be on the wikisite. If necessary, refocus the class to discuss what they discovered during the wikisite activity. The next steps will serve as the closure piece of the lesson.

Closure

6. Discuss the Website Reflection Question & on the Guided Notes Sheet before Returning to the PowerPoint.

Website Reflection:

Having now gone through the wikipage please list some of your thoughts regarding irrigation in the Southwest. Why was it done? Do you see it as a positive or a negative? What is the relationship between population and irrigation?

7. Have students take a few moments to complete the conclusions questions on the student handout.

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- 8.** Return to the PowerPoint and show/discuss slides 16-18 while using their responses from the conclusion questions to discuss the positive and negative impacts of irrigation.

These slides function to help answer any remaining questions the students have concerning the role of irrigation in the Southwest. Key points to address with the students include: the obvious need for water and the measures taken to acquire it; the succession of advancements in the scope and size of irrigation and how these advancements allowed for more population; and, the environmental changes brought about by these projects especially the U.S. government. Of particular note to World Geography teachers is the link between the shrinking of the Sea of Cortez and the Shrinking of the Aral Sea in central Asia (WG. 2)

- 9.** The teacher may choose to lead a brief discussion of the answers to the guided practice sheet (or can be graded and returned/discussed).

- pay particular focus to each group's differing methods of irrigation
- make sure students see the connection between irrigation and settlement

- 10.** The assessment options are formatted so teachers can pick and choose which questions they want to include on the final assessment. Please feel free to modify the Assessment page to fit your needs. Also included are two files of single "Exit Slip" questions that can be used as stand alone assessments. The method in which these are given to students can also be adapted by teachers, i.e. jigsaw format, exit slip, take home assessment, reduced questions, etc.