



GeoCivics Lesson: *You can be a water protector too!*

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Teacher(s): Ashley Alarcon	Lesson Title: You can be a water protector too!	Grade Level: 4th Grade
Notes: This lesson focuses on Westward Expansion through the lens of an Indigenous person as it explores water before colonization. The lesson tells the story of how Indigenous people utilized water as well as the land for many things they needed to survive without necessarily changing it. During westward expansion, the treatment of land and water changed dramatically. However, the Indigenous perspective on natural resources has always stayed the same; we see the land as a relative and water as life.		
Pre-existing Knowledge: Students should have a brief understanding of the Water Cycle and Westward Expansion.		
Overview of Content: The water cycle shows the continuous movement of water within the Earth and atmosphere. It is a complex system that includes many different processes. Liquid water evaporates into water vapor, condenses to form clouds, and precipitates back to earth in the form of rain and snow. Water in different phases moves through the atmosphere (transportation). Liquid water flows across land (runoff), into the ground (infiltration and percolation), and through the ground (groundwater). Groundwater moves into plants (plant uptake) and evaporates from plants into the atmosphere (transpiration). Solid ice and snow can turn directly into gas (sublimation). The opposite can also take place when water vapor becomes solid (deposition). -- NOAA A significant push toward the west coast of North America began in the 1810s. It was intensified by the belief in manifest destiny, federally issued Indian removal acts, and economic promise. Pioneers traveled to Oregon and California using a network of trails leading west. In 1893 historian Frederick Jackson Turner declared the frontier closed, citing the 1890 census as evidence, and with that, the period of westward expansion ended. -- NAT GEO On March 28, 1830, Congress passed the Indian Removal Act, beginning the forced relocation of thousands of Native Americans in what became known as the Trail of Tears. Not all members of		

Congress supported the Indian Removal Act. Tennessee Rep. Davy¹ Crockett was a vocal opponent, for instance. Native Americans opposed removal from their ancestral lands, resulting in a long series of battles with local white settlers. But the forced relocation proved popular with voters. It freed more than 25 million acres of fertile, lucrative farmland to mostly white settlements in Georgia, Florida, North Carolina, Tennessee, Alabama, Mississippi, and Arkansas. More than 46,000 Native Americans were forced—sometimes by the U.S. military—to abandon their homes and relocate to “Indian Territory” that eventually became the state of Oklahoma. More than 4,000 died on the journey—of disease, starvation, and exposure to extreme weather. Today, the Trail of Tears is a National Historic Trail stretching from Tennessee to Oklahoma. It specifically chronicles the removal of the Cherokee in 1838-1839, the largest contingent on the Trail of Tears. -- NAT GEO

Purpose: The lesson focuses on water usage and preservation while exploring cultural differences between the Indigenous perspectives and today’s mainstream cultural perspective on water. The lesson tells the story of how Indigenous people utilized water as well as the land for many things they needed to survive without necessarily changing it. During westward expansion, the treatment of land and water changed dramatically. However, the Indigenous perspective on natural resources has always stayed the same; we see the land as a relative and water as life.

National Social Studies Standard(s):

NCSS.1. CULTURE 1.2 PROCESSES –1.2.2:

Learners will be able to: Explore and describe similarities and differences in the ways various cultural groups meet similar needs and concerns.

National Geography Standard(s):

NSS-G.K-12.5:

- Understand how human actions modify the physical environment.
- Understand how physical systems affect human systems.
- Understand the changes that occur in the meaning, use, distribution, and importance of resources.

Arizona State Social Studies Standard(s):

4.H2.1 Describe the cycles of conflict and compromise that occurred in the Americas during the convergence of Europeans, American Indians, and Africans in the Americas before and after European exploration.

4.G3.1 Explain how the location and use of resources affect human settlement and movement. Key concepts include but are not limited to theories about the peoples of the Americas, the Columbian Exchange, the treatment of indigenous people, triangular trade, and searches for trade routes to Asia that led to the exploration and settlement of the Americas.

ELA Standards:

CCSS.ELA-Literacy.RL.4.1: Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

CCSS.ELA-Literacy.W.4.1b: Provide reasons that are supported by facts and details.

CCSS.ELA-Literacy.W.4.1c: Link opinions and reasons using words and phrases.

CCSS.ELA-Literacy.W.4.8: Recall relevant information from experiences.

ISTE Teacher *or* Student Standard:

- Students communicate complex ideas clearly and effectively by creating or using a variety of digital objects such as visualizations, models, or simulations.
- Students break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.

Language Functions:

- Comparing & Contrasting
- Analyzing
- Inferring, Predicting, Hypothesizing
- Justifying & Persuading
- Solving Problems/Problem Solving

Culturally Responsive Lesson Strategies:

- **Higher Order Thinking:** This lesson creates many opportunities for higher-order applications and creative thinking, in several ways as originated from the students.
- **Voice:** This lesson allows places for students to work together cooperatively or share their learning experiences, strengths, backgrounds, interests, and needs with the instructor and each other.
- **Differentiation:** The lesson's assignment provides several different opportunities for individual learners to express their learning in various ways.

Objective(s):

- Students will be able to analyze water pollution and make real-life connections.
- Students will be able to describe at least two ways to prevent and clean up water pollution.
- Students will be able to construct and support an evidence-based argument about the availability of water and its impact on life.
- Students will be able to construct and support an evidence-based argument about water preservation and its importance.

SIOP (highlight one or more SIOP elements you will include in your lesson plan to support EMLs)

SIOP Elements		
Preparation Adapting content Linking to background Linking to past learning Strategies used	Scaffolding Modeling Guided practice Independent practice Comprehensible input	Grouping Option Whole class Small groups Partners Independent

Integrating Processes	Application	Assessment
Reading Writing Speaking Listening	Hands-On Meaningful Linked to objectives Promotes engagement	Individual Group Written Oral

Evidence of Mastery (Measurable):

Formative: The Water Observation Assessment will ask students to describe their learning throughout the Who Polluted the Colorado River activity and make connections.

Summative: The students will explain their point of view about whether or not society needs to take a stand and protect our water by using textual evidence from the book We Are Water Protectors and what they have learned through the Who Polluted the Colorado River activity. Students who score a (9) or higher on the rubric show mastery of the content.

*Rubric in separate document.

Two Inquiry Questions:

1. *What are the main sources of water pollution?*
2. *What types of changes occurred in the use, distribution, and importance of water following Westward Expansion?*

Key vocabulary:

- **Pollution:** The introduction of harmful materials into the environment.
- **Sacred:** Worthy of respect
- **Water Preservation:** The practice of using water efficiently to reduce unnecessary water usage.
- **Steward:** Someone who manages the land

Materials

- Inflatable Globe
- Outlined Map of the United States: Every student needs a copy.
https://commons.wikimedia.org/wiki/File:United_States_Administrative_Divisions_Blank.png
- Colorado River Map - Projected. Also, it has many additional resources that can be used to enrich the lesson or used as an extension. <https://tentribespartnership.org/>
- Blue Colored Pencil
- Black Marker
- Indigenous Storytelling Preface
- “We Are Water Protectors” Book by Carole Lindstrom
- Projector
- Power Point
- Water Observation Assessment Worksheet

- End of Unit Assessment Worksheet
- Vocabulary Worksheet

Who Polluted the Colorado River Science

Experiment

- A clear gallon bucket or container.
- Small plastic canisters to hold the pollution materials.
<https://upload.wikimedia.org/wikipedia/commons/8/89/Coloradorivermapnew1.jpg>
- Ten Tribes Partnership Map: Keepers of the River website provides an outlined map of the tribes that live and rely on the thed.Colorado River. - Projected
<https://tentribespartnership.org/wp-content/uploads/2019/12/WaterStudy.pdf>
- Black and white, Cut-Out Images to tape on canisters.
- 6-12 Cotton Balls (Clean - Up Materials)
- Strainer (Clean - Up Materials)

Pollution Materials in canisters:

- **Trees:** Dry, Crumbled Leaves
- **Building Site:** ½ TSP of Sand or Clay
- **Farm/Barnyard:** Coffee grounds mixed with water.
- **Fishing:** Pieces of dental floss or string.
- **Family Picnics:** Small shreds of paper and/or pieces of plastic grocery bags.
- **Factory:** ½ TSP of diluted red food coloring.
- **Traffic/Car Oil:** ½ TSP of Vegetable Oil
- **Motorboat Oil:** ½ TSP of Dawn Dish Soap
- **Family Car Wash:** Soapy Water
- **Optional** - Plastic animal figures and rocks

Engage

Teacher Will:

Part A

1. The teacher will explain to the students that they will have the opportunity to toss an inflatable globe to each other, and that they are to note where their fingers land on the globe.
2. The teacher will record the number of tosses and how many fingers land on a body of water each time. The data should be displayed so all students can see it.
3. The teacher will then review some of the key points of the water cycle:
 - a.) The Earth’s surface is made up of approximately 71% of water.

Student Will:

Part A

1. When a student catches the globe, they will count how many of their fingers land on a body of water. Then, share the number with the class.
2. The students will observe the data collected/recorded and draw conclusions.

- b.) Approximately 97% of the water is ocean water.
- c.) Approximately 3% of the Earth’s water is considered fresh. Additional water facts and information can be found here: <https://www.usbr.gov/mp/arwec/water-facts-ww-water-sup.html>

(Grouping Option: Whole Class)

Part B

1. The teacher will then explain to the class that during this lesson they will be focusing specifically on the body of water known as the Colorado River because it is a significant water source for Arizona and the surrounding states. The teacher will then give each student a copy of the Outlined Map of the United States. The teacher will then project the Colorado River Map showing the states it flows through and have students color in the Colorado River on their own maps.
2. Next, the teacher will project the Ten Tribes Partnership Map that identifies the tribes that live and rely on the Colorado River and have students label the tribes and territories on their own maps.
3. The teacher will explain that water is a precious resource that we use every day and need for survival. Indigenous people have a history with the land and water that is so rich it must be told. At this time, the teacher can read the Indigenous Storytelling Preface to the class.

Part B

Each student will review an outlined map of the United States.

1. The students will color in the Colorado River on their own maps to match the projected map and discuss the states that the river flows through.
2. The students will label the (10) tribes and their territories on their maps with a black marker.

(Application: Promotes Engagement)

Explore

Teacher Will:

IQ: What are the main sources of water pollution?

The teacher should have a clear gallon container with water filled nearly to the top. The container should be centered so all students can see it. Then, prepare and label the small canisters with materials for the **Who Polluted the Colorado River**

Student Will:

The students will receive a canister and observe the label/contents.

Science Experiment. Then the teacher will distribute the labeled canisters to students.

1. The teacher will explain to the students that their canister matches an image icon that the teacher will hold at one point during the story. The student at that time should bring up the canister and pour their materials into the water.

Part B

Introduction: The teacher will explain that he/she will be telling a story about the Colorado River and how it has drastically changed since Westward Expansion and that they will have a role in the story.

1. The teacher will ask the students what they know about Westward Expansion and facilitate a class discussion about how it led to changes to the lands and water.
2. The class will be pretending that the water is the Colorado River hundreds of years ago during the time when Indigenous people occupied the lands. The river water was beautiful, it glistened in the sun and it was home to many animals.
3. The teacher will give each student a copy of the Water Observation worksheet. Then, ask students to answer questions (1-3). The teacher should then call on students and ask them to share their responses aloud with the class.
 - a. ***Describe the water.***
 - b. ***Would you drink this water?***
 - c. ***Would you eat the fish and other animals that come from it?***

The teacher will continue the story by explaining that eventually, more people traveled to this land and this is known as present-day Westward Expansion. Colonizers quickly realized that the soil was rich for farming, the land was full of wildlife, and the different lakes and rivers such as the Colorado River had plenty of food and water to

1. When the teacher holds the image icon up that is on their canister, the students will bring up their canister and pour their materials into the water.
2. Students will use accommodations as needed such as pictorial prompts and engaging in a meaningful peer discussion with additional reflection time to answer specific questions.

Part B: Completing Water Observation Worksheet

Introduction: The students will share their prior knowledge of Westward Expansion as part of a whole group discussion.

(Preparation: Linking to Background)

1. After the introduction, students will answer *Questions 1-3* on their Water Observation worksheet.
2. Students will answer *Question 4* on their worksheet.

drink. The teacher will ask the students to answer question 4 on their worksheet and call on some students to share their answers aloud.

d. How do you think the colonizers treated the river?

Story Continued...

Colonizers quickly started farming and creating **barnyards** for their farm animals such as cows, pigs, chickens, and horses. When it rained, the excess water from the barns that contained animal droppings drained into a creek behind the farm. Eventually, the creek water makes its way to the Colorado River. The teacher will instruct students to complete Part A Question on their Water Observation worksheets.

4. Next, industrialization starts to occur. The towns alongside the river evolve into cities and **factories** which are formed to create cars, furniture, clothes, and shoes for the growing population. The **factories** eventually leak production chemicals and other pollutants into the nearby bodies of water that in the course of time make their way into the Colorado River.

5. The teacher will instruct students to complete Part B Questions on their worksheets. Industrialization brings street and water traffic. **Car** debris from the booming city traffic makes its way into the river. **Motor Oil** from boats and cars makes its way into the Colorado River.

2. The teacher will instruct students to complete Part C Questions on their worksheet.
3. The cities continue to grow and **building sites** continue to appear. The building sites leak hazardous liquids into the Colorado River.
4. Families start to enjoy the shoreline of the Colorado River more. They have **family picnics** even on windy days. Through

3.a. The student with the **barnyard** materials will pour them into the water.

(Application: Hands On)

3.b. Students will observe and reflect on the change in water quality while responding to the Part A. questions on their Water Observation worksheet.

4. The student with the **factory** pollutants will pour them into the water.

(Application: Hands On)

5. Students will observe and reflect on the change in water quality while responding to the Part B. questions on their Water Observation worksheet.

6. The students with the **car** and **motor oil** debris will pour them into the water.

(Application: Hands On)

7. Students will observe and reflect on the change in water quality while responding to the Part C. questions on their Water

carelessness and lousy weather, the excess trash makes its way into the river.

5. The Colorado River quickly becomes the hot spot for **fishing**. Fishermen from all over the United States come to fish. However, they often lose their fishing line and it gets lost in the water.
6. The teacher will instruct students to complete Part D Questions on their worksheets.
7. The teacher will tell students that the water is now polluted and it is now time for the students to create possible solutions for a river cleanup using only the two materials provided: cotton balls and a strainer. The teacher should emphasize that all of the debris has to go somewhere so solutions should include where all debris will go after they are removed from the river. The teacher will call on students and follow their instructions on how to clean up the river.

Observation worksheets.

8. The student with the **building site's** liquid will pour it into the water.
(Application: Hands On)
9. The student with the **family picnic** debris will pour it into the water.
(Application: Hands On)
10. The student with the **fishing** debris will pour it into the water.
(Application: Hands On)
11. Students will observe and reflect on the change in water quality while responding to the Part D. questions on their Water Observation worksheets.
12. Students will share aloud their ideas for a river cleanup and direct the teacher on how to use the cleanup materials.
(Integrating Processes: Listening & Speaking)
(Application: Meaningful)

Explain

<p>Teacher Will:</p> <ol style="list-style-type: none"> 1. The teacher will group students together into small groups and give them approximately 30 minutes to work together to share their learning and to complete the Water Observations Assessment. 2. After the assessment, the teacher will ask students to share their responses and support a class discussion. 3. The teacher can strategically pair students as needed to support students' collaboration on completing the assessment. 	<p>Student Will:</p> <ol style="list-style-type: none"> 1. Students will collaborate with peers sharing their understandings as they complete the Water Observations Assessment. (Assessment: Group; Written) 2. After completing their assessments, students will share their responses with the whole class and engage in a class discussion. (Integrating Processes: Listening & Speaking)
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Elaborate

<p>Teacher Will: <i>IQ: What types of changes occurred in the use, distribution, and importance of water following Westward Expansion?</i></p> <ol style="list-style-type: none"> 1. The teacher will lead into Day #2 by reviewing the Who Polluted the Colorado River activity. 2. The teacher will then introduce the read-aloud <u><i>We Are the Water Protectors</i></u>. The teacher will use the book to make connections on how water has been continuously polluted, but also how the Indigenous people continue to view water as sacred. <p>Part A Before reading the story, the teacher should go over the key vocabulary terms with the students. The teacher will project the PowerPoint presentation so each student can complete the Vocabulary Worksheet. Students should be given enough time to write the definition for each term. (Scaffolding: Guided Practice)</p>	<p>Student Will:</p> <p>Part A Students will write the definition for each term on their Vocabulary Worksheets.</p> <p>Part B 1) The students will listen to the read-aloud of</p>
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Part B

1. Next, the teacher will explain that We Are the Water Protectors is classified as a historical fiction book. It is based on the real event of the Dakota Access Pipeline, but some other parts have been made up. It is a story about Native Americans fighting to protect the water from harm. The teacher should encourage students to pay close attention to the events that occur in the story. As the teacher then reads the book, throughout the read-aloud, stop and highlight the colorful images.
2. After the reading, the teacher should have students complete a Think - Pair - Share activity discussing the three questions below. Then, ask students to share their answers using the sentence frames provided. The teacher can write the sentence frames on the board beforehand for students to reference.

a.) According to the story, what makes water so important? Do you agree or disagree?

I agree/disagree with the story that water is so important because _____

b.) What was the problem and solution in the story?

The problem was _____

The problem was solved by _____

c.) What do the water protectors do to protect the Earth from the Black Snake?

According to the story, _____ protects the Earth from the Black Snake by _____.

3. After the class discussion, the teacher will ask students to refer back to the Vocabulary Worksheet and now draw a picture for each

We Are the Water Protectors by Carole Lindstrom and think about how this relates to what they learned from the Colorado River Science Experiment. They will also consider what it means to be a water protector and be ready to share their thinking with the whole class after the reading.

- 2) After the story, students will engage in a Think-Pair- Share with partners to answer the questions using the sentence frames as an accommodation.

(Grouping Options: Partners)

(Integrating Processes: listening & Speaking)

- 3) Using what they learned from the story and connecting this to the word meanings, the students will draw a picture on their Vocabulary Worksheets to illustrate the meaning of each vocabulary word.

vocabulary term based on what they learned from the story.

(Application: Meaningful)

Evaluate

Teacher Will:

1. The teacher will share the End of Unit Assessment rubric with the students and explain the grading criteria including using details from the story, and activity to support their point of view as well as the punctuation, and vocabulary expectation to write their explanatory paragraphs about agreeing or disagreeing with the main character Nokomis from We Are Water Protectors book. The teacher will give students approximately 30 - 45 minutes to complete the End of It Unit Assessment.
2. The teacher will walk around the room and support students as needed through reading questions aloud and/or guiding students to their Vocabulary Worksheet.

Student Will:

1. Students will take the Final Assessment independently. **(Assessment: Individual; Written)**
2. Students may use their Vocabulary Worksheet as a reference when answering the questions.

Sources

Outlined Map of the United States -

https://commons.wikimedia.org/wiki/File:United_States_Administrative_Divisions_Blank.png

Colorado River Map -

<https://upload.wikimedia.org/wikipedia/commons/8/89/Coloradorivermapnew1.jpg>

Ten Tribes Partnership: Keepers of the River Website -

<https://tentribespartnership.org/>

<https://tentribespartnership.org/wp-content/uploads/2019/12/WaterStudy.pdf>

Bureau of Reclamation - Water Facts - Worldwide Water Supply Information

<https://www.usbr.gov/mp/arwec/water-facts-ww-water-sup.html>

Arizona Department of Environmental Quality (Superfund) -

https://azdeq.gov/NPL_Sites

United States & Federal Superfund Resource -

https://en.wikipedia.org/wiki/List_of_Superfund_sites

Lesson Icons -

[https://commons.wikimedia.org/w/index.php?search=icons&title=Special:MediaSearch&go=Go&type=i
mage](https://commons.wikimedia.org/w/index.php?search=icons&title=Special:MediaSearch&go=Go&type=image)

“Who Polluted The Colorado River Science Experiment” modified from Population Education:

<https://populationeducation.org/>

Extensions:

- 1.) Students can complete the Home Water Usage Survey with their families. The teacher can present the class data and facilitate a class discussion about how much water is being used and consider possible solutions on how to preserve water in their homes, school, or community.
- 2.) The teacher can use the following Superfund sites so students can make connections to local Arizona potential threats to public health and the environment (https://azdeq.gov/NPL_Sites) or use the United States & Federal Superfund resource link to explore other states (https://en.wikipedia.org/wiki/List_of_Superfund_sites).