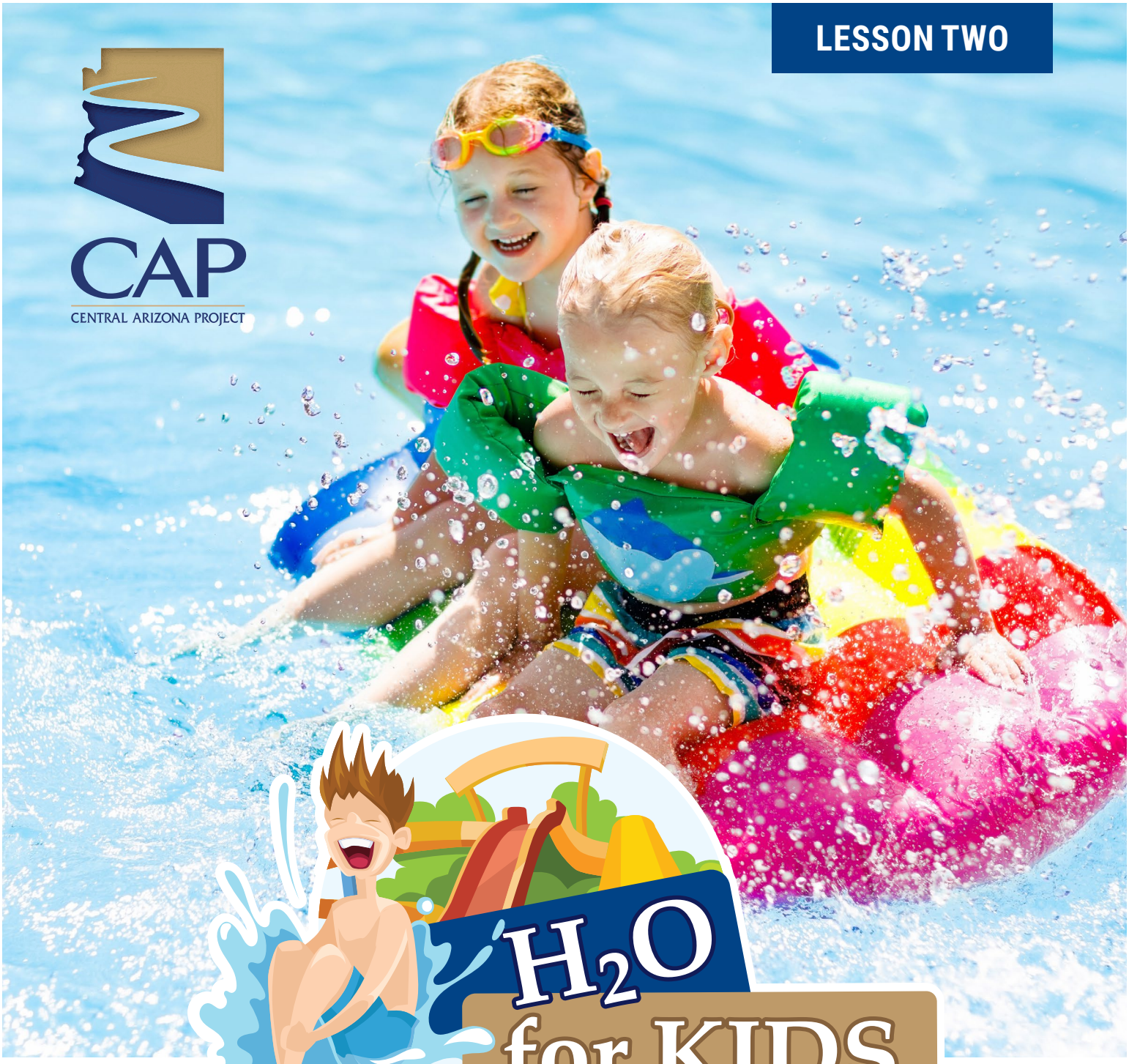
LESSON TWO

CAP
CENTRAL ARIZONA PROJECT



H_2O for KIDS

CENTRAL ARIZONA PROJECT

K-3 ELEMENTARY SCHOOL UNIT OF STUDY

Teacher's Guide

LESSON 2:
HISTORY OF WATER

Lesson 2 – Science
5 E Lesson Plan (K-3)
3d Model – AZ Science Standards

Kindergarten Standards Taught

Science: K.E1U1.4
ELA: K.W.8 / K.SL.1 / K.SL.2 / K.SL.3 / K.SL.5
Social Studies: K.SP1.1 / K.SP1.2 / K.SP1.3 / K.SP3.1 / K.G2.1 / K.H1.1
Math: K.MD.A.1

First Grade Standards Taught

Science: E1U1.5
ELA: 1.W.8 / 1.SL.1 / 1.SL.2 / 1.SL.3
Social Studies: 1.SP1.2 / 1.SP1.3 / 1.SP3.3 / 1.G2.1 / 1.G1.2
1.G2.3 / 1.H1.3

Second Grade Standards Taught

Science: 2.E1U1.5 / 2.E1U3.7
ELA: 2.RI.1 / 2.RI.3 / 2.RI.10 / 2.W.2 / 2.SL.1
Social Studies: 2.SP1.2 / 2.SP3.3 / 2.SP3.4 / 2.SP4.1 / 2.SP4.2
2.H1.1 / 2.H1.2 / 2.H1.3 / 2.G1.1 / 2.G2.1 / 2.G1.2 / 2.G2.3

Third Grade Standards Taught

ELA: 3.RI.1 / 3.RI.3 / 3.RI.10 / 3.W.2 / 3.SL.1
Social Studies: 3.SP4.1 / 3.SP3.1 / 3.SP3.3 / 3.SP3.5 / 3.SP3.6
3.SP3.7 / 3.H1.1 / 3.H2.1 / 3.G1.1 / 3.G2.1 / 3.G4.1 / 3.E2.1
3.E2.2

3D Science Crosscutting Concept – Life Science

Crosscutting Concept: Cause and Effect/Structure and Function

Essential Question

Where does water come from in Arizona?

Supporting Questions

1. What is the history of water in Arizona?
2. How did people in the past impact our water supply today?
3. How can we use what we know about water to help in the future?

Objective:

Students will be able to explain the history of water in Arizona and describe its importance to people today.

Materials:

- Poster paper
- Index cards
- Downloadable resources
- Video access
- STEM materials (see lesson)

Anticipatory Set:

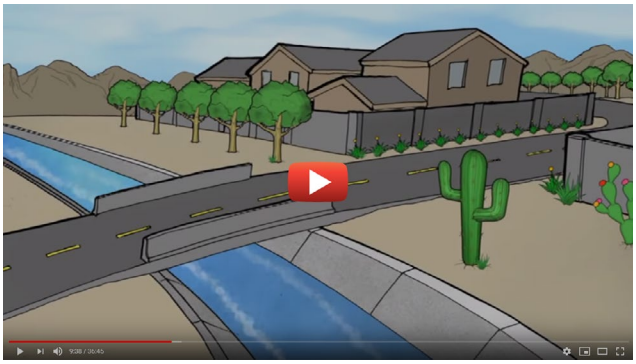
Arizona is located in the desert. Where do we get our water?

Discuss: Water doesn't just come straight from a faucet. Where does the water in the faucet come from? How does it get from the water source to our classroom or homes? Elicit responses from students as a formative assessment of their knowledge about water and water sources.

Supporting Question 1

What is the history of water in Arizona?

Watch the CAP video from YouTube about the history of Arizona water:



VIDEO:
http://bit.ly/WaterStoryVideo2

VIDEO (extended version):
http://bit.ly/WaterStoryVideo

A video script of the video can be accessed at: https://www.srpnet.com/education/pdfx/AZ_WaterStory_Video_LP.pdf

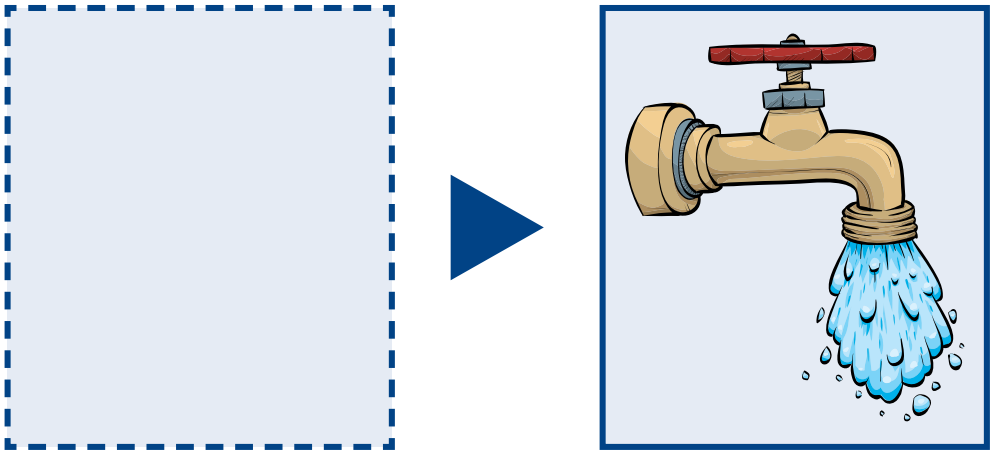
Watch Part 1 (The Water We Take for Granted) and discuss with the class the source of the water.

Cause and Effect Model

Formative performance task:

Have students draw how water gets to the faucet. Discuss examples from students. Why are some examples different than others? Are they still correct? Why or why not?

What are some ways that we use water? Extend the model with examples of water use.



Supporting Question 2

How did people in the past impact our water supply today?

3D Science Crosscutting Concept: Cause and Effect/Structure and Function

Vocabulary Review Objective:

Students will create vocabulary word cards by writing or drawing definitions on index cards.

Since this lesson is history-based, it will need a review of basic vocabulary to understand this part of the lesson. Have students make vocabulary cards on index cards with the word and the corresponding definitions. They can refer to these terms throughout the lesson.

Vocabulary Key Terms:

1. **Desert:** land area that receives less than 10 inches of rain in a year
2. **Drought:** a period of extended time without rain
3. **River:** a large natural stream of water flowing to the sea, a lake, or another such stream
4. **Groundwater:** water found under the surface of the ground in the spaces between the rocks and sand
5. **Canal:** an artificial waterway used to transport water

The importance of canals in Arizona's history Objective:

Students will describe the Hohokam Indian canal system by observing details in a picture.

Watch Part 2 of the Arizona Water Story about the Hohokam Indians, then discuss the picture of the Hohokam Indians*

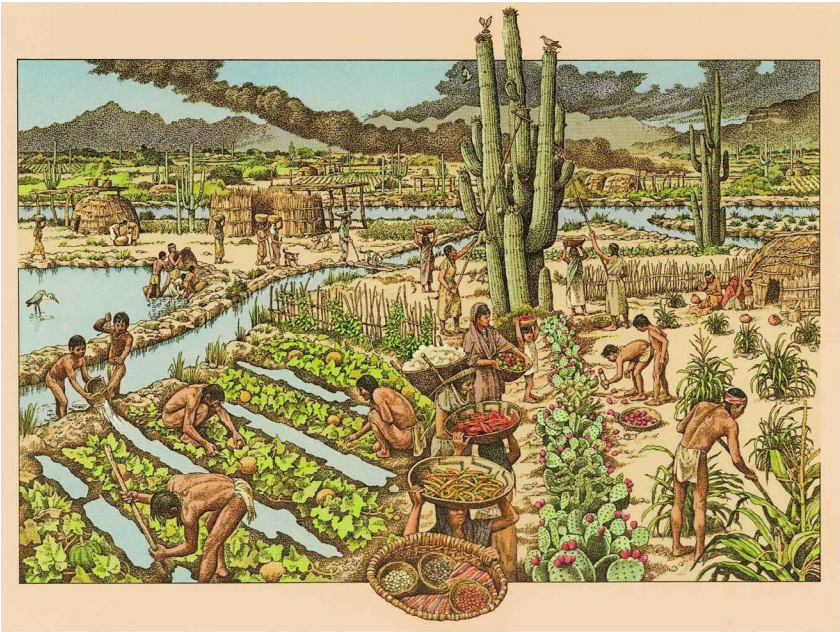
*Optional – use downloadable resource, "Hohokam Indian Canals"

Formative Assessment:

Discuss the canals and have students describe how the Hohokam are using the canals.

Pose additional questions such as:

1. How do you think the Hohokam dug the canals?
2. How did they collect the water from the canals?
3. How do you think the Hohokam used the water?



Formative Assessment:

Design a model: (Integration of STEM)

Objective: Students will create a tool that will allow them to collect water effectively.

Students will create a tool to collect water by using STEM.

- Paper
- Tape
- Foil
- Plastic wrap
- String
- Play-Doh

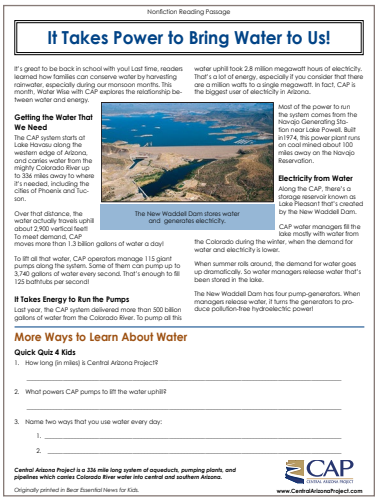
1. After inspecting the picture and observing details about the picture, students will design/plan a water collection tool. Use the suggested materials or use comparable materials from your classroom.
2. Using a sink or filled tubs of water, have students test out their water collection tool. Ask students:
    A. What did you notice about your tool?
    B. Was it able to collect water? If not, what could you have done differently?
    C. If it was able to collect water, how much was it able to collect?
4. Social Science Connection
    A. Do you think it was easy for the Hohokam to collect water from nearby lakes or streams?
    B. How did the canals make it easier to collect water?

Supporting Question 3

How can we use what we know about water to help in the future?

The Hohokam Indians created a system of canals to transport water easily. How do we get water today?

Read the following article to students:



Nonfiction Reading Passage

It Takes Power to Bring Water to Us!

It's great to be back in school with you! Last time, readers learned how families can conserve water by harvesting rainwater, especially during our monsoon months. This month, Water Wise with CAP explores the relationship between water and energy.

Getting the Water That We Need

The CAP system starts at Lake Havasu along the western edge of Arizona, and carries water from the mighty Colorado River up to 336 miles away to where it's needed, including the cities of Phoenix and Tucson.

The New Waddell Dam stores water and generates electricity.

Over that distance, the water actually travels uphill about 2,900 vertical feet!! To meet demand, CAP moves more than 1.3 billion gallons of water a day!

To lift all that water, CAP operators manage 115 giant pumps along the system. Some of them can pump up to 3,740 gallons of water every second. That's enough to fill 125 bathtubs per second!

It Takes Energy to Run the Pumps

Last year, the CAP system delivered more than 500 billion gallons of water from the Colorado River. To pump all this water uphill took 2.8 million megawatt hours of electricity. That's a lot of energy, especially if you consider that there are a million watts to a single megawatt. In fact, CAP is the biggest user of electricity in Arizona.

Most of the power to run the system comes from the Navajo Generating Station near Lake Powell. Built in1974, this power plant runs on coal mined about 100 miles away on the Navajo Reservation.

Electricity from Water

Along the CAP, there's a storage reservoir known as Lake Pleasant that's created by the New Waddell Dam.

CAP water managers fill the lake mostly with water from the Colorado during the winter, when the demand for water and electricity is lower.

When summer rolls around, the demand for water goes up dramatically. So water managers release water that's been stored in the lake.

The New Waddell Dam has four pump-generators. When managers release water, it turns the generators to produce pollution-free hydroelectric power!

More Ways to Learn About Water

Quick Quiz 4 Kids

1. How long (in miles) is Central Arizona Project?
2. What powers CAP pumps to lift the water uphill?
3. Name two ways that you use water every day:
    1.
    2.

Central Arizona Project is a 336 mile long system of aqueducts, pumping plants, and pipelines which carries Colorado River water into central and southern Arizona.

Originally printed in Bear Essential News for Kids.

CAP CENTRAL ARIZONA PROJECT

www.CentralArizonaProject.com

or watch the video about the Central Arizona Project:
*Stop the video at certain points to explain to students what is happening as the water travels.

ARTICLE:
https://library.cap-az.com/documents/education/It-Takes-Power-to-Bring-Water-to-Us.pdf

VIDEO:
http://bit.ly/CAPMirage

Formative Assessment:

Have students discuss and explain the CAP system with partners or in groups.

Question:

Knowing how far water has to travel (336 miles!) how can we use what we know to help conserve water? Discuss.

Summative Performance Task:

1. **ARGUMENT:** Since Arizona is located in the desert, obtaining water is important. Construct an argument that is supported with evidence that explains the importance of water using facts from history and today.
2. **EXTENSION:** Draw a picture that shows ancient and modern-day waterways (then and now).
3. **UNDERSTAND:** Survey family members about where water comes from in Arizona.
4. **ASSESS:** Brainstorm at least 3 things you learned about the history of water in Arizona.
5. **ACT:** Create a poster to promote awareness of Arizona's water history.

STANDARDS: KINDERGARTEN

H_2O for Kids Standards Correlations — Lesson Two

Science Standards	
K.E1U1.4	Observe, describe, ask questions, and predict seasonal weather patterns and how those patterns impact plants and animals (including humans). ***Explanation*** *- The temperature, pressure, direction, speed of movement and the amount of water vapor in the air combine to create the weather. Arizona has very dry weather, which affects the amount of water vapor, precipitation, and available water in the environment.*

ELA Standards	
K.W.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

Speaking and Listening Standards	
K.SL.1	Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and large groups. a) Follow agreed-upon rules for discussions (e.g. listening to others, taking turns speaking about the topics and texts under discussion). b) Continue a conversation through multiple exchanges.

STANDARDS: KINDERGARTEN (CONTINUED...)

K.SL.2	Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
K.SL.3	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
K.SL.5	Add drawings or other visual displays to descriptions as desired to provide additional detail.

Math Standards	
K.MD.A.1	Describe measurable attributes of a single object (e.g., length and weight).

Social Studies Standards	
K.SP1.1	Use a variety of words to reference time in the past, present, and future; identify the beginning, middle, and end of historical stories.
K.SP1.2	Explore how events of the past affect students' lives and community.
K.SP1.3	With prompting and support, generate questions about individuals and groups from stories shared.
K.SP3.1	With prompting and support, ask questions and construct responses to content studied.
K.G2.1	Explain how water and weather impacts humans.
K.H1.1	Compare one's own culture with the culture of others. a) Key cultures include those in the classroom, community, and one of Arizona's 22 Indian Nations.

STANDARDS: FIRST GRADE

H_2O for Kids Standards Correlations — Lesson Two

Science Standards	
E1U1.5	Develop and use models to represent that water can exist in different states and is found in oceans, glaciers, lakes, rivers, ponds, and the atmosphere.

ELA Standards	
1.W.8	Recall information from experiences or gather information from provided sources to answer a question.

STANDARDS: FIRST GRADE (CONTINUED...)

H_2O for Kids Standards Correlations — Lesson Two

1.SL.1	Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. a) Follow agreed-upon rules for discussions (e.g. listening to others, taking turns speaking about the topics and texts under discussion). b) Build on others' talk in conversations by linking their comments to the remarks of others. c) Ask for clarification and further explanation as needed about the topics and texts under discussion.
1.SL.2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
1.SL.3	Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding about a topic or issue.

Social Studies Standards	
1.SP1.2	Understand how events of the past affect students' lives and community.
1.SP1.3	Generate questions about individuals and groups who have shaped a significant historical change.
1.SP3.3	Generate questions about a source as it relates to an event or development.
1.G2.1	Explain how weather, climate, and other environmental characteristics affect people's lives in a place or region being studied.
1.G1.2	Describe how human activities affect the communities and the environment of places or regions.
1.G2.3	Describe the positive and negative effects of using natural resources.
1.H1.3	Examine developments from the civilization and/or culture in place or region studied.

STANDARDS: SECOND GRADE

H_2O for Kids Standards Correlations — Lesson Two

Science Standards	
2.E1U1.5	Develop and use models to represent that water can exist in different states and is found in oceans, glaciers, lakes, rivers, ponds, and the atmosphere.
2.E1U3.7	Construct an argument from evidence regarding positive and negative changes in water and land systems that impact humans and the environment.

ELA Standards	
2.RI.1	Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text.

STANDARDS: SECOND GRADE (CONTINUED...)

2.RI.3	With prompting and support, describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.
2.RI.10	By the end of the year, proficiently and independently read and comprehend informational texts, including history/social studies, science, and technical texts, in a text complexity range determined by qualitative and quantitative measures appropriate to grade 2.

Social Studies Standards	
2.SP1.2	Understand how events of the past affect students' lives and community.
2.SP3.3	Generate questions about a source as it relates to an event or development.
2.SP3.4	Gather relevant information from one or two sources.
2.SP4.1	Generate possible reasons for an event or development.
2.SP4.2	Select which reasons might be more likely than others to explain an event or development.

History Standards	
2.H1.1	Explain how individuals can make contributions to a civilization and/or culture in a place or region studied.
2.H1.2	Using primary and secondary sources, compare civilizations and/or cultures around the world and how they have changed over time in a place or region studied.
2.H1.3	Examine developments from the civilization and/or culture in a place or region studied.

Geography Standards	
2.G1.1	Use and construct maps, graphs, and other geographic representations of familiar and unfamiliar places in the world; and locate physical and human features.
2.G2.1	Explain how weather, climate, and other environmental characteristics affect people's lives in a place or region being studied.
2.G1.2	Describe how human activities affect the communities and the environment of places or regions.
2.G2.3	Describe the positive and negative effects of using natural resources.

Writing Standards	
2.W.2	Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.

STANDARDS: SECOND GRADE (CONTINUED...)

H_2O for Kids Standards Correlations — Lesson Two

Speaking and Listening Standards	
2.SL.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.

STANDARDS: THIRD GRADE

H_2O for Kids Standards Correlations — Lesson Two

Science Standards	
3.L1U1.5	Develop and use models to explain that plants and animals (including humans) have internal and external structures that serve various functions that aid in growth, survival, behavior, and reproduction.

ELA Standards	
3.W.1	Write opinion pieces on topics or texts, using reasons to support one's point of view.
3.W.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.
3.RI.3	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.
3.RI.4	Determine the meaning of general academic and domain-specific words and phrases in a text relevant to a grade 3 topic or subject area.
3.RI.7	Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).
3.RI.10	By the end of the year, proficiently and independently read and comprehend informational texts, including history/social studies, science, and technical texts, in a text complexity range determined by qualitative and quantitative measures appropriate to grade 3.

Social Studies Standards	
3.SP1.2	Compare life in specific historical time periods to life today.
3.SP1.3	Generate questions about individuals and groups who have impacted history.
3.SP3.6	Construct arguments and explanations using reasoning, examples, and details from sources.

History Standards	
3.H1.1	Utilize a variety of sources to construct a historical narrative exploring Arizona's cultures, civilizations, and innovations.

STANDARDS: THIRD GRADE (CONTINUED...)

3.H2.1	Examine how individuals and groups have worked together throughout Arizona's history.

Geography Standards	
3.G1.1	Use and construct maps and graphs to represent changes in Arizona over time. a) Key concepts include but are not limited to locating physical features including the Grand Canyon, Mogollon Rim, Colorado River, Salt River and Gila River.
3.G2.1	Explain how people modify and adapt to the Arizona environment.
3.G4.1	Describe how Arizona has changed over time.

Writing Standards	
3.W.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

Speaking and Listening Standards	
3.SL.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.

Economics Standards	
3.E2.1	Explain how availability of resources affects decision making in Arizona with respect to water and other natural resources.
3.E2.2	Describe how Arizona is connected to other states, Mexico, and other nations by movement of people, goods, and ideas.

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