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Dear Teacher,

Thank you for participating in the *Conservation Kids Program*.

Conservation Kids is an interdisciplinary program that has been specifically designed for first through third grade learners and focuses on the water cycle, water supply, and water conservation in Oro Valley and the Tucson Basin. It poses three questions:

- Where does our water come from?
- Where does it go?
- What can we do to conserve this vital natural resource?

In answering these questions, these concepts are addressed:

- the water cycle (with emphasis on the states of water: solid-liquid-gas)
- water supply (groundwater, Colorado River water, reclaimed water)
- water conservation

***Conservation Kids* is a three-part program:**

PART ONE includes three fun pre- and post-visit classroom activities. Conducting these activities in advance ensures that students will get the most out of the on-site presentation. Evaluate these lessons and modify as needed based on the grade level and abilities of your students. (Follow-up/Extension Ideas are also provided, and can be completed before or after the on-site presentation.)

PART TWO includes a lively and interactive one-hour on-site presentation. Students play a water cycle game, participate in demonstrations with a groundwater model, and discover how to be Conservation Kids and make “every drop count.” At the end of the presentation, all students receive a water smart cup to take home.

PART THREE includes a twelve-page activity booklet full of mazes and word searches, pages to color, and new fun facts to discover. This fun booklet will help students remember the many things they learned from their special visitor, Dr. Faucet.

To prepare for Dr. Faucet’s visit:

- Coordinate with other teachers to schedule two or three presentations in a row and reserve **one room** (classroom, library, MPR, etc.). The students from each class will rotate through this room.
- Have a large table cleared for presentation materials, with floor space in front where the students can sit.
- Have a TV/DVD player (or a computer connected to a Smart Board or projector) available in the room.

See you soon!

Dr. Faucet

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Activity 1: Wondering About Water

Activity Overview

This activity involves a short class discussion in which students share observations about the physical properties of water, consider what they already know about water, and begin to place this in the context of science concepts.

Arizona Department of Education Academic Standards

Please refer to the Arizona Department of Education Academic Standards section for the ADE standards addressed by this lesson.

Learning Outcomes

Students will be able to:

- Describe water using multiple senses.
- Compare the solid, liquid and gas forms of water.
- Compare water with other earth materials like soil, rocks, wood and air.
- List the places in the water cycle where water is found on Earth.

Materials

- Cups of water, ice, soil, rocks, pieces of wood
- Pictures of water in the environment as rain, snow, rivers, lakes, etc.

Instructions (estimated time 60 minutes)

Use the following questions to guide a short discussion about water. Enhance the discussion using the collected materials where appropriate.

1. Is water important to us?

- Yes, it's very important! Like all living things, we must have water to live!

2. What can we observe about water with our five senses?

- Eyes / sight?
- Ears / sound?
- Nose / smell?
- Mouth / taste?
- Hands, Feet, Body / touch?

3. *What else do we know about water?*

- Welcome a variety of observations.
- It can be a solid, liquid, or gas.
- It is a material that comes from the earth.

4. *How is water similar to or different from other objects or materials (like soil, rocks, wood, air, etc.)?*

- Welcome a variety of observations.
- Nothing else occurs as solid, liquid, and gas within the range of temperatures commonly found on Earth.

5. *Where in our natural environment can we find water?*

- In washes, streams, rivers, puddles, lakes, etc. – This is called **surface water**.
- Underground between rocks, sand, and clay – This is **groundwater** and the layers of rock, sand, and clay that hold it are called an **aquifer**.
- Falling from the sky as rain or snow – This is **precipitation**.
- Flowing down the street, in washes, etc. after rain – We call this **runoff**.
- In the atmosphere as water vapor, after **evaporation** from a liquid to a gas form.

All this water is part of the water cycle. The **water cycle** includes all the places we find water and all the ways water moves around in the environment. We'll explore this more in our next activity!

Activity 2: Water Cycle in the Desert

Activity Overview

Completing this crossword puzzle serves to introduce students to a variety of vocabulary words related to the water cycle. These concepts will be explored more fully during the special presentation by Dr. Faucet.

Arizona Department of Education Academic Standards

Please refer to the Arizona Department of Education Academic Standards section for the ADE standards addressed by this lesson.

Learning Outcomes

Students will be able to:

- Define and describe words related to the water cycle.
- Describe places water can be in the desert.

Materials

- *Water Cycle Words* - display using an overhead projector or Smart Board
- *Water Cycle Crossword Clues* and *Water Cycle Crossword Puzzle* – one photocopy of each per student

Instructions (estimated time 60 minutes)

1. Use the *Water Cycle Words* (displayed using an overhead projector or Smart Board) and the definitions below to guide students as they complete the *Water Cycle Crossword Puzzle* using the *Water Cycle Crossword Clues*.
2. Students may also color the *Water Cycle Crossword Clues*.

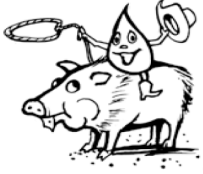
Definitions: Water Cycle Words

aquifer	underground layers of rock, sand, and clay that hold water
desert	a dry region that receives very little precipitation
evaporation	the changing of water from a liquid into a gas form
groundwater	water that is underground between rock, sand, and clay
percolation	the sinking of water underground
precipitation	water falling in liquid state (rain) or solid state (snow) from the clouds to the earth
runoff	water that flows downhill after it rains or snows
Santa Cruz River	Tucson's largest river, which now flows only after heavy rain storms
water table	the level of groundwater closest to the Earth's surface
well	a hole that humans dig down into the ground to find water

Water Cycle Words



aquifer



desert



evaporation



groundwater



percolation



precipitation



runoff



Santa Cruz River

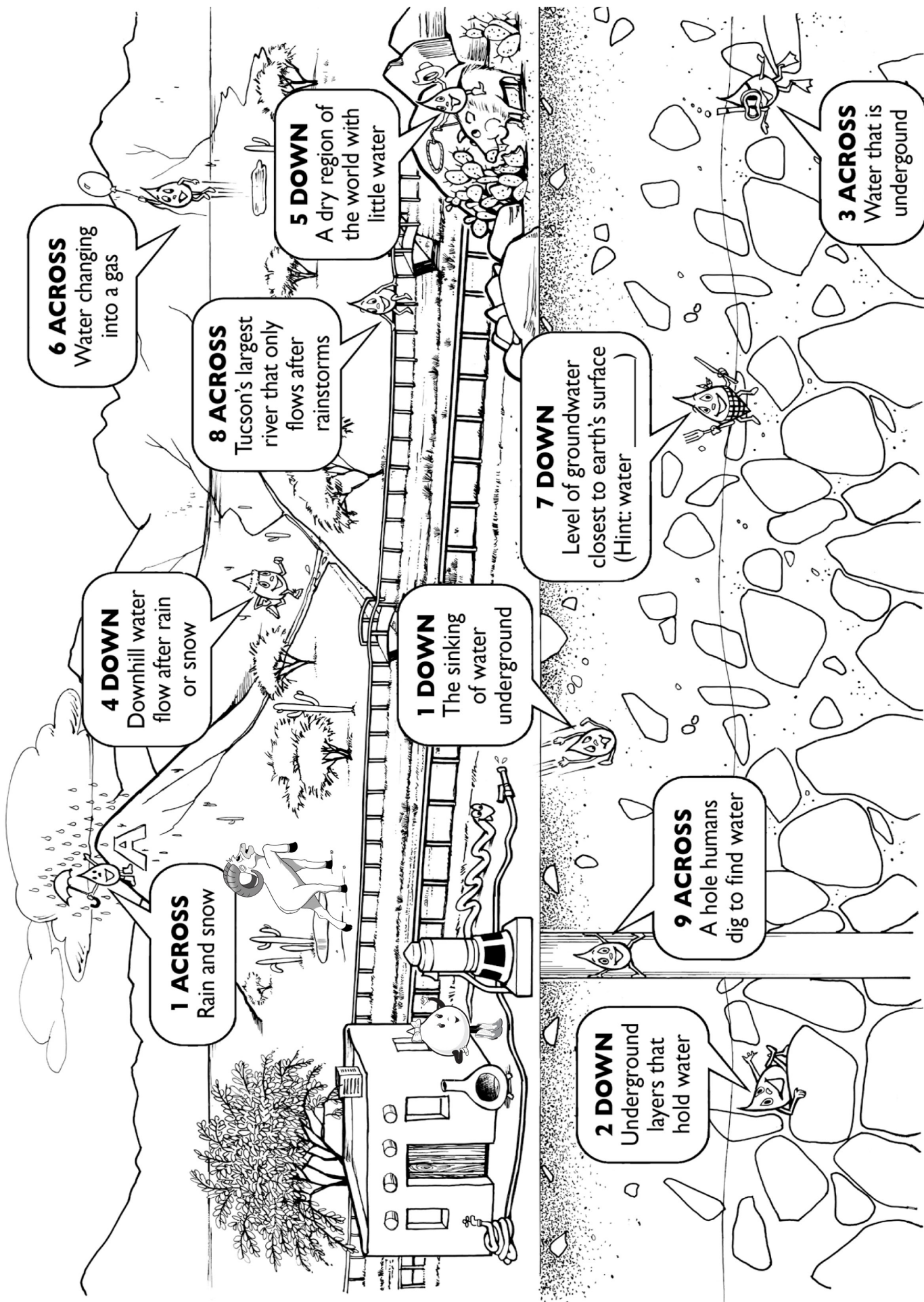


water table

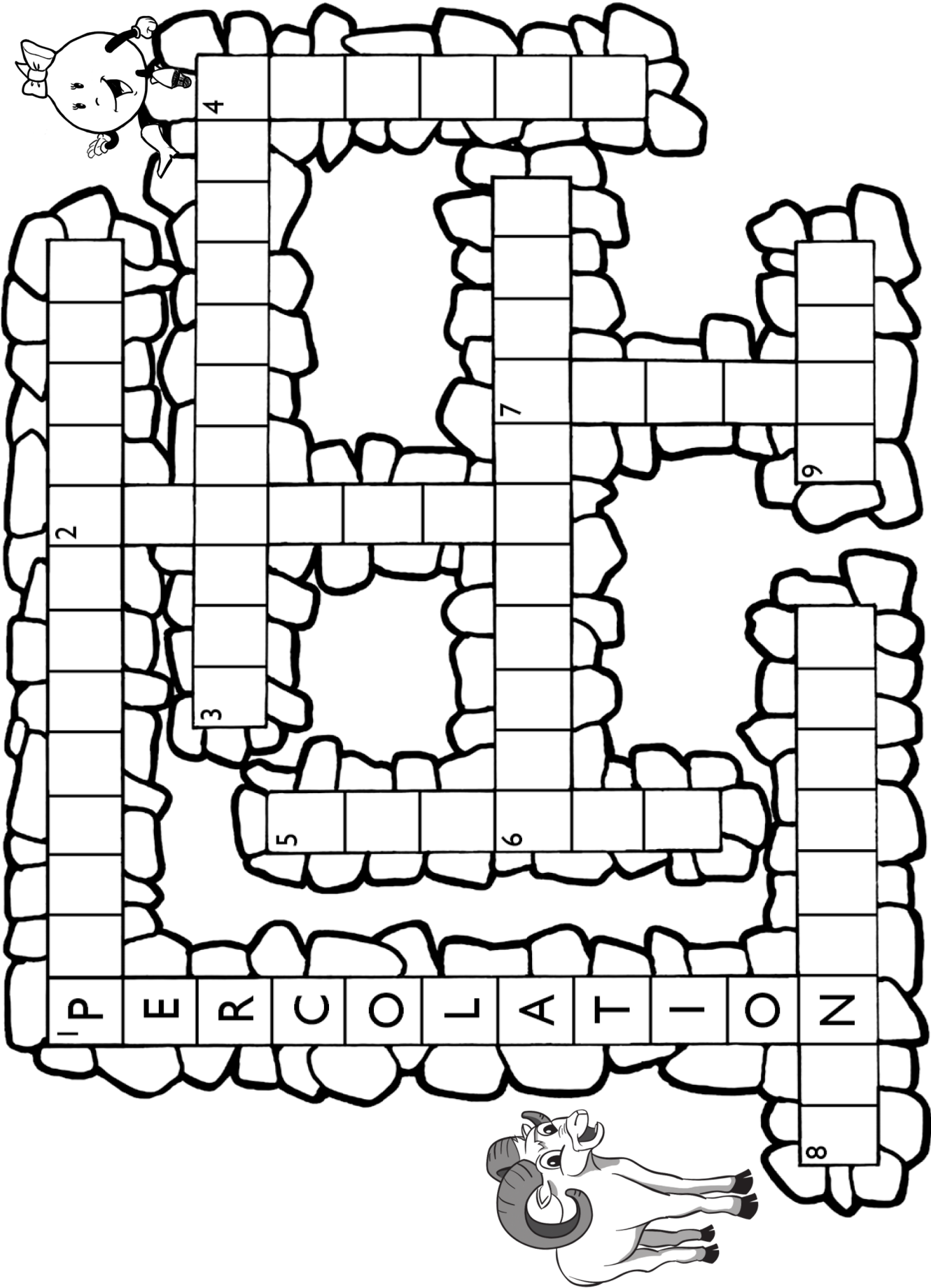


well

Water Cycle Crossword Clues



Water Cycle Crossword Puzzle



Activity 3: Can You Imagine...Life Without Water?

Activity Overview

In this activity, students learn to recognize water as a natural resource, make drawings of ways we use water, and explore water's role in our lives. Students gain a deeper understanding of water, the many ways we use it, and how essential it is for all life.

Arizona Department of Education Academic Standards

Please refer to the Arizona Department of Education Academic Standards section for the ADE standards addressed by this lesson.

Learning Outcomes

Students will be able to:

- List and describe ways that water is used.
- Define the term "natural resource."
- Explain the importance of water as a natural resource.
- Describe how a scarcity of water could affect our daily lives.

Materials

- Paper
- Crayons and/or colored pencils

Instructions: (estimated time 60 minutes)

1. Ask the class to brainstorm ways that we use water. List students' ideas on the board. Use prompting questions as needed to ensure that the list includes ways that students use water in their own lives (drinking, washing, cooking, cleaning, watering plants, etc.) and ways that society as a whole uses water (to grow food, to make electricity, in manufacturing processes, to carry wastes away from our homes, etc.).

2. Still writing on the board, ask if students know what a **resource** is. Define resource as a source or supply from which we can draw in time of need. Define **natural resources** as materials we use from the natural environment. These include air, water, soil, trees, and wildlife.

3. Be sure students all have paper and crayons or colored pencils. Ask everyone to sit quietly and close their eyes as you read this short guided visualization:

"Imagine a glass of water sitting in front of you. What does the water look like? Imagine that you are very thirsty. Pretend you take a sip. What does it taste like? Imagine putting your finger in the water. What does it feel like? Now imagine that this glass of water grows until it becomes a pool big enough for you. Imagine yourself floating on the water, starting up at the sky. What does it feel like to float? Now think about your favorite place with water or your favorite way to use water. Imagine that you are in that favorite place or that you are doing that favorite thing.... Now quietly open your eyes and draw your favorite place with water or favorite way to use water."

4. Remind students of all the ways we use water and that water is an important natural resource. Invite students to turn over their paper and make a second drawing, this time of a way of using water that they think is important to everyone.
5. When students have finished, ask volunteers to share and explain their drawings. Use this to generate discussion about the importance of water. Can you imagine life without water? Discuss how a scarcity of water would affect our daily lives. Affirm that water is essential to every living thing!
6. Ask students what questions they have about water. Discuss as you wish. List selected questions on the board and state that a special presenter named Dr. Faucet will visit soon and help the class learn more about water.

Follow-Up/Extension Ideas

The **Conservation Kids** program sparks student interest in further explorations pertaining to water and can be used as a take-off point for related units of study that also address concepts in the Arizona Department of Education Academic Standards. Teachers may wish to consider pursuing one or more of the extension ideas outlined below. These ideas can also be expanded to embrace additional standards in other subject areas.

Writing about Water

Students at all grade levels can write about their new understandings about water. They can begin with any of a variety of prewriting exercises (brainstorming, webbing, discussing the purpose and audience of their writing, organizing or outlining their ideas) and then develop a written piece appropriate to their grade level. This would address a variety of ADE Writing Standards for Grades 1-3.

Properties of Objects and Materials

For first and second graders, continue to explore water by comparing its properties with those of other materials. First graders can benefit from practice in classifying objects by simple physical properties (shape, texture, size, color, weight) or as solids, liquids, or gases. Second graders can go further by measuring these types of properties and by devising simple demonstrations of how water can exist as a solid, liquid, or gas and by exploring how states of matter are related to shape. These activities would address ADE Science Standards SC01-S5C1-01; SC01-S5C1-02; SC02-S5C1-01; SC02-S5C1-02; SC02-S5C1-03; SC02-S5C1-04.

Water and Weather

For first and second graders, consider following Dr. Faucet's presentation with lessons about weather. First graders might simply identify characteristics of weather, including precipitation, and analyze how weather affects their daily lives. Second graders might actually measure and record weather conditions, learn to identify clouds, and analyze relationships between clouds and precipitation. These activities could address several ADE Science Standards, including SC01-S6C3-01; SC01-S6C3-02; SC02-S6C3-01; SC02-S6C3-02; SC02-S6C3-03; SC02-S6C3-04.

Experiments with Plants and Water

Third grade classes might plan and conduct simple experiments in which plants are given adequate water, too much water, and not enough water. Experiments along these lines can involve using appropriate measurement tools and recording and analyzing data. Students could learn about the functions of different plant structures and the fact that water is found throughout a plant. Such explorations could address several ADE Science Standards related to science as inquiry, including SC03-S1C2-01; SC03-S1C2-02; SC03-S1C2-03; SC03-S1C2-04; SC03-S1C2-05; SC03-S1C3-01; SC03-S1C3-02; SC03-S1C3-03; other inquiry process standards, and science content standard SC03-S4C1-01.

Water Interactions

Third graders can expand their explorations of water to discuss how the amount of water in the environment affects human populations. Water availability affects human communities in general ways on an ongoing basis. Additionally, extreme events like droughts and floods affect us in other ways. In turn, human activities can affect the environment and the likelihood of drought, floods, and more. Finally, water is one of several environmental factors that affect other living organisms, including their ability to live in a given geographic area. Exploring these topics would address ADE Science Standards SC03-S3C1-01; SC03-S3C1-02; SC03-S4C3-05.

Teacher Background Information

Oro Valley's inhabitants continue to live in a delicate balance with water. Here in the Sonoran Desert, we receive only 12 inches (30.5 cm) of rain each year and have no perennial (continuously flowing) rivers nearby. Our town's population has grown from 1,200 in 1974 to over 41,000 in 2012. In addition to our extraordinary population growth, lifestyle amenities such as swimming pools, outdoor landscaping, and daily showers have resulted in a rapid depletion of our groundwater. In 1875, residents could dig just 25 feet (7.5 m) underground to access water, and the local Santa Cruz River flowed perennially. Today the river is dry and we must drill 250-300 feet (75-90 m) down in order to pump up groundwater.

By the 1990's, the water table was dropping in some areas at a rate of five feet or greater per year, so Oro Valley began to accept water from a second major source, the Colorado River. In 2012, Oro Valley began using groundwater blended with river water that was pumped 336 miles (541 km) from Lake Havasu via the Central Arizona Project canal. This Colorado River water is recharged into large basins west of the Tucson Mountains, where it percolates down to the water table before it is pumped up and into Tucson and ultimately Oro Valley. Currently, Oro Valley gets nearly 15% of its drinking water from the Colorado River.

A third source of water in the Oro Valley area is reclaimed water. After our water is used, it travels in pipes to the Water Reclamation Treatment Plant where the wastewater, or effluent, goes through a process that mechanically and chemically cleans it. This reclaimed water is treated to a standard that can be used for landscaping at parks, schoolyards, and golf courses. Some places are already recycling their water for drinking (for example: Disneyland, International Space Station, and Orange County Water District in California).

Even though we now have three sources of water, the practice of conserving water in Oro Valley is as important as ever. The Colorado River is not a limitless supply of water, and the Southwest is one of the fastest growing regions in the country. Oro Valley Water Utility's outreach programs promote a water-conscious culture by fostering a deeper understanding of our relationship with water in the desert. The **Conservation Kids** program seeks to provide students with a fun learning experience that will raise their appreciation of water and generate enthusiasm for water-saving practices.

Arizona Department Of Education Academic Standards

The *Conservation Kids* program addresses the following Academic Standards. (Complete versions of the Academic Standards are available at <http://www.azed.gov/standards-practices/>.)

SCIENCE STANDARDS	ACTIVITY #1	ACTIVITY #2	ACTIVITY #3	PRESENTATION	POST-VISIT BOOKLET
SC01-S1C1-01 Compare common objects using multiple senses.	✓				
SC01-S1C1-02 Ask questions based on experiences with objects, organisms, and events in the environment.	✓		✓		
SC01-S5C1-02 Classify materials as solids or liquids.	✓			✓	
SC01-S6C1-01 Describe the following basic earth materials: rocks, soil, water.	✓		✓	✓	
SC01-S6C1-03 Identify common uses (e.g., construction, decoration) of basic earth materials (i.e., rocks, water, soil).			✓	✓	✓
SC01-S6C1-04 Identify the following as being natural resources: air, water, soil, trees, wildlife.			✓	✓	
SC01-S6C1-05 Identify ways to conserve natural resources (e.g., reduce, reuse, recycle, find alternatives).			✓	✓	✓
SC02-S1C1-01 Formulate relevant questions about the properties of objects, organisms, and events in the environment.			✓		
SC02-S5C1-02 Classify materials as solids, liquids, or gases.	✓			✓	

SCIENCE STANDARDS (Continued)	ACTIVITY #1	ACTIVITY #2	ACTIVITY #3	PRESENTATION	POST-VISIT BOOKLET
SC02-S5C1-03 Demonstrate that water can exist as a gas-vapor; liquid-water; and solid-ice.				✓	
SC03-S1C1-01 Formulate relevant questions about the properties of objects, organisms, and events of the environment using observations and prior knowledge.			✓		
SOCIAL STUDIES STANDARDS					
SS01-S1C1-03 Use primary source materials (e.g., photos, artifacts, maps) to study people and events from the past.				✓	
SS01-S3C4-01 Identify examples of responsible citizenship in the school setting and in stories about the past and present.				✓	✓
SS01-S3C4-03 Discuss the importance of students contributing to a community (e.g., helping others, working together, cleaning up the playground.)				✓	✓
SS01-S4C1-04 Recognize characteristics of human and physical features: a. physical (i.e., ocean, continent, <u>river</u> , lake, mountains, islands); b. human (i.e., equator, North and South Poles)		✓		✓	
SS01-S4C2-02 Discuss physical features (e.g., mountains, <u>rivers</u> , <u>deserts</u>) in the world.		✓		✓	
SS01-S4C2-04 Discuss the ways places change over time.				✓	
SS01-S4C3 Correlates with SC01-S6C1.	✓		✓	✓	✓

SOCIAL STUDIES STANDARDS (Continued)	ACTIVITY #1	ACTIVITY #2	ACTIVITY #3	PRESENTATION	POST-VISIT BOOKLET
SS01-S4C5-01 Identify ways (e.g., clothing, housing, crops) humans adapt to their environment.				✓	
SS01-S4C5-02 Identify resources that are renewable, recyclable, and non-renewable.				✓	✓
SS01-S5C1-02 Recognize that people need to make choices because of limited resources.			✓	✓	
SS02-S1C1-04 Use primary source materials (e.g., photos, artifacts, interviews, documents, maps) and secondary source materials (e.g., encyclopedias, biographies) to study people and events from the past.				✓	
SS02-S3C4-01 Discuss examples of responsible citizenship in the school setting and in stories about the past and present.				✓	
SS02-S3C4-03 Describe the importance of students contributing to a community (e.g., helping others, working together, service projects).				✓	
SS02-S4C1-05 Recognize characteristics of human and physical features: a. physical (i.e., ocean, continent, <u>river</u> , lake, mountain range, coast, sea, <u>desert</u>); b. human (i.e., equator, Northern and Southern Hemispheres, North and South Poles).		✓		✓	
SS02-S4C1-06 Locate physical and human features using maps, illustrations, images, or globes: a. physical (i.e., ocean, continent, <u>river</u> , lake, mountain range, coast, sea, <u>desert</u>); b. human (i.e., equator Northern and Southern Hemispheres, North and South Poles, city, state, country).				✓	
SS02-S4C2-03 Discuss physical features (e.g., mountains, <u>rivers</u> , <u>deserts</u>) in the world.				✓	
SS02-S4C2-04 Discuss the ways places change over time.				✓	

SOCIAL STUDIES STANDARDS (Continued)	ACTIVITY #1	ACTIVITY #2	ACTIVITY #3	PRESENTATION	POST-VISIT BOOKLET
SS02-S4C5-01 Identify ways (e.g., agriculture, structures, roads) in which humans depend upon, adapt to, and impact the earth.				✓	
SS02-S4C5-02 Recognize ways of protecting natural resources.				✓	✓
SS02-S5C1-01 Discuss how scarcity requires people to make choices due to their unlimited needs and wants with limited resources.			✓	✓	
SS03-S1C1-03 Use primary source materials (e.g., photos, artifacts, interviews, documents, maps) and secondary source materials (e.g., encyclopedias, biographies) to study people and events from the past.				✓	
SS03-S3C4-02 Describe the importance of students contributing to a community (e.g., service projects, cooperating, volunteering).				✓	
SS03-S4C1-06 Recognize characteristics of human and physical features: a. physical (i.e., ocean continent, <u>river</u> , lake, mountain range, coast, sea, <u>desert</u> , gulf, bay, strait, plain, valley, volcano, peninsula); b. human (i.e., equator, Northern and Southern Hemispheres, North and South Poles, city).		✓		✓	
SS03-S4C1-07 Locate physical and human features using maps, illustrations, images, or globes: a. physical (i.e., seven continents, four oceans, <u>river</u> , lake, mountain range, coast, sea, <u>desert</u> , gulf, bay, strait, peninsula); b. human (i.e., equator, Northern and Southern Hemispheres, North and South Poles, city, state, country, roads, railroads).				✓	
SS03-S4C2-02 Describe how physical and human characteristics of places change from past to present.				✓	
SS03-S4C5-01 Identify ways (e.g., farming, building structures and dams, creating transportation routes, overgrazing, mining, logging) in which humans depend upon, adapt to, and impact the earth.				✓	
SS03-S4C5-02 Describe ways of protecting natural resources.				✓	✓

SOCIAL STUDIES STANDARDS (Continued)	ACTIVITY #1	ACTIVITY #2	ACTIVITY #3	PRESENTATION	POST-VISIT BOOKLET
SS03-S4C5-03 Identify resources that are renewable, recyclable, and non-renewable.				✓	✓
SS03-S5C1-01 Identify how scarcity requires people to make choices due to their unlimited wants and needs.			✓	✓	
READING STANDARDS (Informational Text)					
1.RI.6 Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.		✓			✓
1.RI.7 Use the illustrations and details in a text to describe its key ideas.		✓			✓
1.RI.10 With prompting and support, read informational texts appropriately complex for grade 1.					✓
2.RI.6 Identify the main purpose of a text, including what the author wants to answer, explain, or describe.		✓			✓
2.RI.7 Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.		✓			✓
2.RI.10 By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 2–3 text complexity band proficiently, with scaffolding as needed at the high end of the range.					✓
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, read and comprehend informational texts, including history/social studies, science, and technical texts, at the high end of the grades 2–3 text complexity band independently and proficiently.					✓

SPEAKING AND LISTENING STANDARDS	ACTIVITY #1	ACTIVITY #2	ACTIVITY #3	PRESENTATION	POST-VISIT BOOKLET
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.	✓	✓	✓	✓	
1.SL.2 Ask and answer questions about key details in 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 gather additional information or clarify something that is not understood.	✓	✓	✓	✓	
1.SL.4 Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.	✓		✓	✓	
1.SL.5 Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.			✓		
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.	✓	✓	✓	✓	
2.SL.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.	✓	✓	✓	✓	
2.SL.3 Ask and answer questions about what a speaker says in order to clarify comprehension, gather additional information, or deepen understanding of a topic or issue.	✓	✓	✓	✓	
2.SL.4 Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.	✓		✓	✓	
2.SL.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings.			✓		
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.	✓	✓	✓	✓	

SPEAKING AND LISTENING STANDARDS (Cont.)	ACTIVITY #1	ACTIVITY #2	ACTIVITY #3	PRESENTATION	POST-VISIT BOOKLET
3.SL.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	✓	✓	✓	✓	
3.SL.3 Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.	✓	✓	✓	✓	
3.SL.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.	✓		✓	✓	
3.SL.5 Create engaging audio recordings of stories or poems that demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.			✓		
LANGUAGE STANDARDS					
1.L.5 With guidance and support from adults, demonstrate understanding of word relationships and nuances in word meanings.	✓	✓	✓	✓	✓
2.L.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.	✓	✓	✓	✓	
2.L.5 Demonstrate understanding of word relationships and nuances in word meanings.	✓	✓	✓	✓	✓
3.L.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.	✓	✓	✓	✓	
3.L.5 Demonstrate understanding of word relationships and nuances in word meanings.	✓	✓	✓	✓	✓
VISUAL ARTS STANDARDS					
VA-S1C1, S1C2, S1C3, S1C4, S1C5 Create: Student will create artworks to communicate ideas, meanings, and/or purposes.			✓		