

2nd Half-Year Report February 28, 2025

Prepared for: Arizona Department of Water Resources
Tucson AMA Water Management Assistance Program

The purpose of this project is to provide support for the expansion of Arizona Project WET training, materials, and festivals in the Tucson Active Management Area (AMA).

I. Introduction

The purpose of this program is to educate K-12 students about their interconnected water resources and their importance to Arizona's future in support of Tucson AMA's statutory goal of safe yield. Project goals are to work towards an understanding of:

- Surface water in terms of a watershed's components, its dynamics, and its role in the hydrologic cycle.
- The groundwater system in terms of its components, composition, and its role in the hydrologic cycle.
- The effect of snowpack on water flow in a watershed
- The movement of water through diverse substrates
- Surface water and groundwater rights in the Arizona
- Surface water management through containment and distribution
- Colorado River system allocations and uses.
- The Central Arizona Project and the Shortage Sharing Agreements on the Colorado River
- Groundwater recharge and the Arizona water bank
- Water reuse and augmentation
- Water Conservation Technology
- The Engineering Design Process

Funds granted by this contract will be used to develop and conduct curriculum components, STEM lessons, water saving and professional development for teachers. This funding will also expand existing programs within the Tucson AMA region.

II. Scope of Work (per Amendment No. 1)

Task 1: Educator One-Day Workshop

APW shall conduct a one-day workshop, potentially reaching 20 educators from the Tucson AMA. Educators will improve upon their skills in engaging students in real-world and relevant science, technology, engineering, and math learning that focuses on systems thinking and creative problem-solving. Participants will leave this workshop with practical applications for instruction regarding STEM concepts and will receive classroom implementation resources from APW.

Deliverable: The Annual report shall include a description of the workshop, including location, syllabus, marketing efforts, attendance, and survey results.

Task 2: The Groundwater System

The groundwater system is one of Arizona's most important water reserves. Increasingly, in many areas of the state, we are even managing water storage using the groundwater system. Arizona students need to understand this system as a crucial part of the water cycle to ensure that, as decision makers, we manage this resource for future prosperity.

- APW will conduct no fewer than 30 groundwater presentations for students in the Tucson AMA.
- APW will also deliver TWO (2) full-day and up to FOUR (4) half-day Water Festivals for 4th grade students within the Tucson AMA.

Deliverable: The semi-annual report will include the number of students, student assessment, and evaluation data from each teacher.

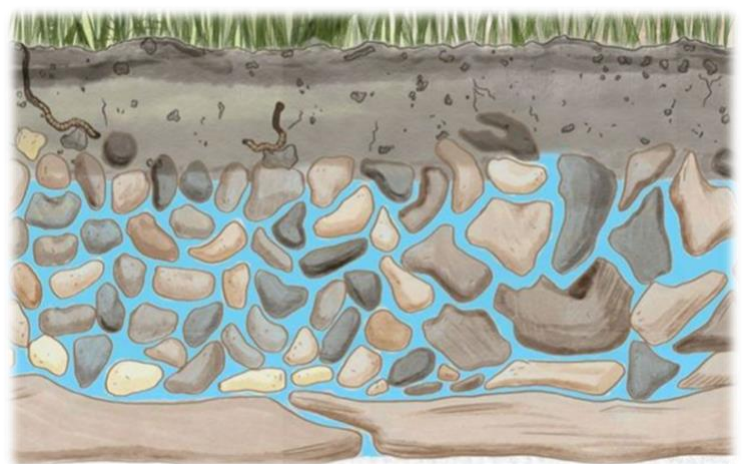
- Groundwater (**UPDATED** Appendix A)
- Arizona Water Festival (**UPDATED** Appendix B)

III. Models and Materials

A. Groundwater Flow Model purchased from CD Custom Workshop – delivered July 2024

Concepts a groundwater flow model demonstrates include:

- Flow through confined and unconfined aquifers
- Effects of pumping on said aquifers
- Cone of depression
- Effects of well pumping on water table
- Rain discharge effects on contaminant depth
- Two directional river flow
- Groundwater movement through an artesian aquifer
- Contaminant dispersion/dilution in an aquifer
- Groundwater inflow/outflow in a seepage lake
- Leakage of landfills into ground water
- Water quality stratification in the aquifer



UPDATED APPENDIX A
Groundwater Presentations

Classroom groundwater presentation uses systems thinking and the hands-on groundwater flow models, materials, and activities. Students from 3rd-12th grade are challenged to discover for themselves how the system works and why it matters to them as Tucson AMA water users. The program is designed to construct new knowledge, deconstruct misconceptions, and teach about the local groundwater system.

DATE	SCHOOLS	# of CLASSES	# of STUDENTS	GRADE
9/12/24	Sonoran Science Academy-Tucson K-12	4	78	6&7
9/19/24	Catalina Magnet HS	4	53	9,10,11
9/24/24	Sierra 2-8	3	63	5
9/25/24	Desert Christian	1	5	10
9/27/24	Immaculate Heart Academy	1	12	4
10/2/24	ASDB	4	11	9
10/10/24	Coyote Trail Elementary School	2	55	5
10/16/24	ASDB	5	22	6
10/18/24	Montessori Schoolhouse	1	31	6,7,8
10/22/24	Robison Elementary School	2	36	4
10/29/24	Pueblo High School	3	77	12
10/30/24	Catalina Foothills High School	3	69	11
10/31/24	Manzo Elementary School	1	19	4
11/1/24	Borton Magnet Elementary School	2	28	3
11/4/24	Sierra 2-8	3	52	7
11/6/24	Leman Academy Of Excellence-Marana	5	120	6
11/8/24	Adventure Schools	3	35	3,4,5
11/13/24	Borton Magnet Elementary School	3	29	1,2,4
11/15/24	Sonoran Science Academy East K-8	2	48	5
11/25/24	Adventure Schools	3	39	6,7,8
1/9/25	Gallego Primary Fine Arts Magnet School	3	60	3
1/10/25	Gallego Primary Fine Arts Magnet School	3	67	3
1/15/25	Sunrise Drive Elementary School	8	137	4 & 5
2/18/25	Sonoran Science Academy East K-8	6		7
3/6/25	Sonoran Science Academy-Tucson K-12	4		3 & 4
1/7/25	Dodge Traditional Magnet School	5	132	7
3/5/25	Gale Elementary School	2		4
		Total	Total	
		75*	1278	

*75 Classes represents a combined total toward a goal of 80 classes between two agencies, ADWR: GUAC Tucson AMA *and* Tucson Water.

Groundwater

NOW...

Summary:

All hydrological elements in our Arizona landscape impact available groundwater. Participants in the *Groundwater Classroom Program* explore the Arizona water cycle and unearth their watershed's surface to groundwater connection to deepen their understanding of how this intricate system works. Students recognize the human impacts on this system and are empowered to act as groundwater stewards in their communities.

Guiding Question:

What is our relationship with groundwater?
Is the relationship built to last?

Learning Objectives:

Model parts of the groundwater system within the watershed.

Understand the relationship between surface water and ground water.

Identify impacts of human activity on aquifers.

Recognize the importance of groundwater health and advocate for sustainability.

Groundwater Basics: 3rd – 5th

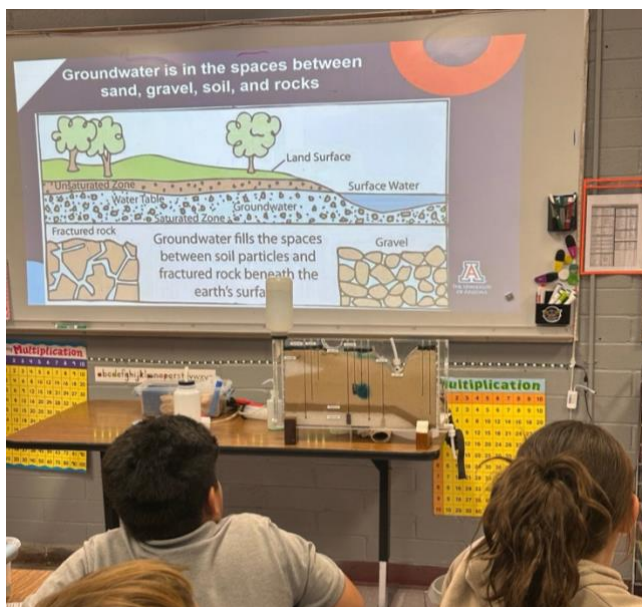
Cracking the Code of Arizona's Water Cycle

Groundwater Guardians: 6th – 8th

Defending Arizona's Aquifers from Pollution

Groundwater Connections: 9th – 12th

Mapping Arizona's Water Journey from CAP to Tap



Thank you once again for providing our students with an incredible hands-on experience. The students not only gained knowledge about the importance of water and filtration methods but also gained an understanding of the Arizona water system.

Thanks & Regards,

Rashmitha Pallath



UPDATED APPENDIX B

March 1, 2024, Sahuarita Water Festival

Sahuarita

Water Festival

March 2024




Statewide
Arizona Project Wet's mission is to meet the needs of our community by using relevant, research-based educational strategies and techniques in helping people develop knowledge and skills that equip them to act for water stewardship.

194,856 Students	7,404 Teachers
<i>Since 2000</i>	
11,087 Parents	9,436 Volunteers

*"I've worked at the Festival for several years now and I believe the lessons make the students think about water in a more holistic way. They see water sources, sources of pollution, and conservation methods."
- Community Volunteer*

Community

Our programs are made possible through the generous support of sponsors, municipalities, and dedicated community members who collaborate to enrich the Sahuarita School District. We deeply appreciate your commitment to APW's programming!




Volunteer Survey Statements	Agree/Strongly Agree
After participation in this program, children will better understand Arizona's interconnected water resources.	99%
After participation in the program, volunteers and other adults are more aware of water science and how their decisions affect our water supply.	99%
I believe the Water Festival program is important for student learning, both academically and as citizens.	100%
I believe Arizona Water Festivals have a positive impact on the community.	99%


Outcomes

The 11th annual Sahuarita Water Festival welcomed 464 students from 7 different schools, led by 22 teachers. Participants engaged in comprehensive learning about Water Conservation!

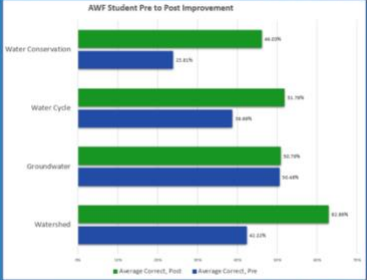
Participating Schools



*"The Water Festival has brought a lot of information and has impacted the children and myself very positively. They were excited about the activities they participated in and have a new perspective on water conservation."
- 4th Grade Teacher*



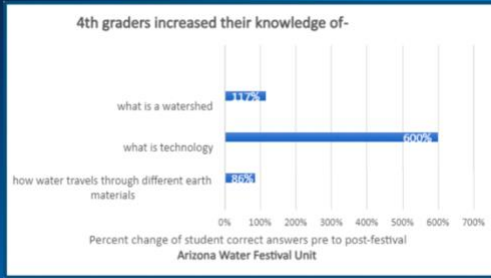
AWF Student Pre to Post Improvement



Topic	Average Correct, Post	Average Correct, Pre
Water Conservation	86.25%	72.00%
Water Cycle	81.25%	68.00%
Groundwater	80.00%	64.00%
Watershed	81.25%	64.00%



March 1, 2024, Sahuarita Water Festival continued



Gratitude

From securing festival venues to developing our curriculum, each event demands meticulous planning and effort. The success of Water Festivals is a testament to the dedication of our team and our partners statewide!

"I felt the program was well thought out and the students enjoyed the hands-on experience."
- Community Volunteer

464 Students	22 Teachers
At this event	
28 Parents	39 Volunteers

Teacher Survey Statements

Agree/Strongly Agree

The Water Festival Program is very valuable/valuable in terms of student learning.	97%
The program increased my understanding of water science and conservation.	91%
The program increased my students' understanding of water science and conservation.	95%
My students are more likely to engage in water conserving habits as a result of participating in the Water Festival program.	84%
My students can describe what a watershed is and name some of the components of a watershed.	92%
My students can identify multiple ways to save water in their homes.	96%

Moving Forward

APW eagerly anticipates continuing the Water Festival program in your community. Please don't hesitate to contact our Festival Coordinators with any inquiries about scheduling your next event:

Phoenix Office: Jordan Christiansen - christiansenj@arizona.edu

Tucson Office: Sophie Markowitz - sophiem@arizona.edu

APW Director: Lisa Townsend - lisatownsend@arizona.edu



Thank you dedicated Sponsors & Partners!




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FREEPORT-McMoRAN
SIERRITA OPERATIONS

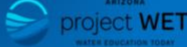


April 25, 2024, Tucson-Amphitheater USD

Amphitheater

Water Festival
April 2024

 THE UNIVERSITY OF ARIZONA
Cooperative Extension

 ARIZONA
project WET
WATER EDUCATION TODAY

Statewide

Arizona Project Wet's mission is to meet the needs of our community by using relevant, research-based educational strategies and techniques in helping people develop knowledge and skills that equip them to act for water stewardship.

194,856
Students

7,404
Teachers

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Volunteers

"I've worked at the Festival for several years now and I believe the lessons make the students think about water in a more wholistic way. They see water sources, sources of pollution, and conservation methods."
- Community Volunteer

Community

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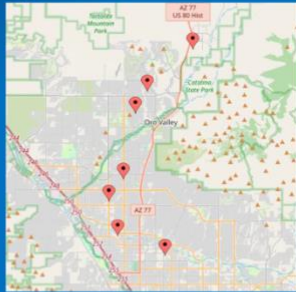


Volunteer Survey Statements	Agree/Strongly Agree
After participation in this program, children will better understand Arizona's interconnected water resources.	99%
After participation in the program, volunteers and other adults are more aware of water science and how their decisions affect our water supply.	99%
I believe the Water Festival program is important for student learning, both academically and as citizens.	100%
I believe Arizona Water Festivals have a positive impact on the community.	99%


Outcomes

The 15th annual Amphi Water Festival welcomed 412 students from 7 different schools, led by 15 teachers. Participants engaged in comprehensive learning about Water Conservation!

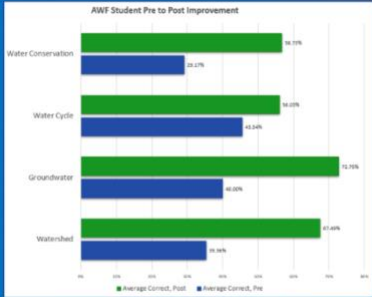
Participating Schools



"The Water Festival has brought a lot of information and has impacted the children and myself very positively. They were excited about the activities they participated in and have a new perspective on water conservation."
- 4th Grade Teacher



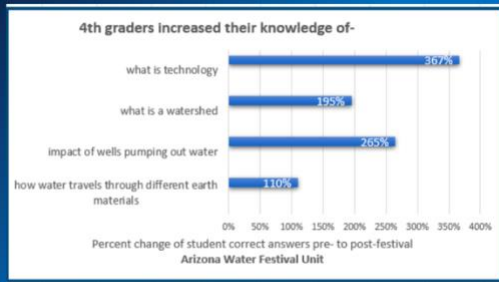
AWF Student Pre to Post Improvement



Topic	Average Correct, Post	Average Correct, Pre
Water Conservation	86.51%	58.21%
Water Cycle	84.05%	63.24%
Groundwater	83.76%	64.03%
Watershed	81.04%	61.8%



April 25, 2024, Tucson-Amphitheater USD continued



Gratitude

From securing festival venues to developing our curriculum, each event demands meticulous planning and effort. The success of Water Festivals is a testament to the dedication of our team and our partners statewide!

*"I felt the program was well thought out and the students enjoyed the hands-on experience."
- Community Volunteer*

412 Students	15 Teachers
<i>At this event</i>	
48 Parents	20 Volunteers

Teacher Survey Statements

Teacher Survey Statements	Agree/Strongly Agree
The Water Festival Program is very valuable/valuable in terms of student learning.	88%
The program increased my understanding of water science and conservation.	88%
The program increased my students' understanding of water science and conservation.	88%
My students are more likely to engage in water conserving habits as a result of participating in the Water Festival program.	75%
My students can describe what a watershed is and name some of the components of a watershed.	88%
My students can identify multiple ways to save water in their homes.	88%

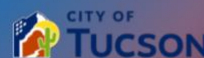
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APW Director: Lisa Townsend - lisaatownsend@arizona.edu



Thank you dedicated Sponsors & Partners!



November 12, 2025, [Marana](#)

Schools	# of CLASSES	# of STUDENTS	# of Volunteers
Twin Peaks K-8	4	270	9 adults, 22 HS
Coyote Trail Elementary School	3		
Gladden Farms Elementary School	4		

Upcoming Arizona Water Festivals:

February 28, 2025, [Sahuarita](#)

March 11, 2025, [Tucson-Amphi](#)

March 20, 2025, [Tucson-TUSD](#)