

University of California Desert Research and Extension Center/Farm Smart Program

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Acknowledgements

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Executive Summary

My internship consisted of shadowing the specialists of the University of California's Desert Research and Extension Center (UC DREC) in Holtville, CA. I spend most of my time with the Farm Smart program, an educational outreach program dedicated to teaching K-12 students all concepts related to agriculture in the Imperial Valley. There are four major programs Farm Smart conducts: the Dairy program's "Alfalfa is Ice Cream in the Making", the Fall Festival, the Vegetable program's "Veggie Ventures", and the Insect program's "The Good, the Bad, the Ugly, and the Beautiful". Elementary schools would schedule a day with Farm Smart and visit the center. The program would be about 3 hours long, beginning with hands-on activities and ending with a tractor ride to one of the gardens in which the students would then harvest and take home vegetables. Farm Smart also collaborates with the University of California's Cooperative Extension Center in educational outreach events, specifically the CalFresh and 4-H programs. The center also hosts agricultural researchers from various states within the U.S and lends the land to help researchers continue their studies.

Project Objectives

At the start of the internship, I sat down with my advisors and discussed a plan for this internship in to maximize my experience. It was decided that half of my time would be spent assisting the Farm Smart program and the other half would be spent on a research project. The research project would highlight what I wished to learn from this internship. I wanted to gain experience in K-12 education and curriculum development as well as learning about the center's agricultural research and studies. Therefore, my research project would be on developing and implementing a curriculum plan on the topic of my choosing. As time passed and I was becoming more confident with my position, more responsibilities were delegated to me.

Project Approach

There were a couple of things I did that helped me complete my tasks. I kept a journal and wrote a daily log. This was not required of me, but I found that keeping a journal helps with retaining all the information I learned throughout the course of the internship. I also used my journal keep track of my hours and stay organized. I also asked questions if I had any doubts or needed clarification. I felt confident in asking questions because my advisors provided a comfortable and encouraging work environment. I was initially nervous and doubted that I would meet their expectations due to my lack of knowledge in agriculture. I was afraid that I would not be able to complete my tasks, but my advisors were encouraging and reassuring. They granted me creative liberty and space when approaching and completing my tasks. I doubt I would have been able to achieve my goals if it weren't for their support.

Project Outcomes

As stated before, I spent most of my time working with the Farm Smart program. The first two months consisted of learning and helping my advisors with carrying out the activities of our daily program. Almost every day there was an elementary school who would visit us and learn from the program. Once the program ended, I would return to the office and input income and expenses data in the budget excel file, record the demographics of the school group, as well as record volunteer hours in a shared excel file. On days when there was no program, one of my advisors would teach me how to drive the program's tractor. I would practice driving the tractor with a large, empty wagon attached. I went through safety training and supervised practice with experience tractor drivers in order to properly drive the tractor. With enough practice, I was eventually allowed to drive the tractor with the wagon full of students and adults and take them to the vegetable gardens.

Farm Smart not only provided educational outreach for the Imperial Valley but were also constantly researching to develop and implement new programs to increase this outreach. One project that is currently under development is a water conservation garden. This garden is currently under construction. My advisors and I visited Cuyamaca College's own water conservation garden in El Cajon, California. I was able to see El Cajon's outreach program and had a tour of the garden. I noticed that the concepts that Cuyamaca College teaches is focused on the environmental issues applied to San Diego, specifically. I realized at that moment just how unique the Farm Smart program is. The concepts we teach to the students all pertain to the Imperial Valley.

My advisors encouraged me to become a mentor and role model for Farm Smart. Over the summer, I collaborated with the UC Cooperative Extension's 4-H program with their annual Sustainable You summer day camp. This camp was led by high school students, teaching 4th to 6th grade students environmental issues and sustainability in the Imperial Valley. My role in this camp was to guide high school students in preparing for their lessons and becoming camp counselors along with providing any supplies that they might need for the event. The camp was divided into five topics, one topic per day. The topics were water, food, land, energy, and air. Each day highlighted the basic concept as well as major environmental issues, shown through group activities and active discussions. I worked closely with faculty from the 4-H program, UC Extension Office and 4-H high school students in preparing for the camp's events. I drove the tractor and took the campers on a tour of the research fields, visiting our cattle feedlot and harvested vegetables from our gardens. We organized a field trip to the Sonny Bono Salton Sea National Wildlife Refuge and scheduled guest presenters to teach about the Salton Sea. I enjoyed watching the counselors conduct the lessons and implement the activities. The counselors demonstrated strong leadership and initiative in teaching the campers about sustainability. The counselors were quick to react and adapt to any schedule changes during the camp day and were actively interacting with the campers every day. These counselors recognized the fact that the campers view them as role models and thus mindfully lived up to that expectation.

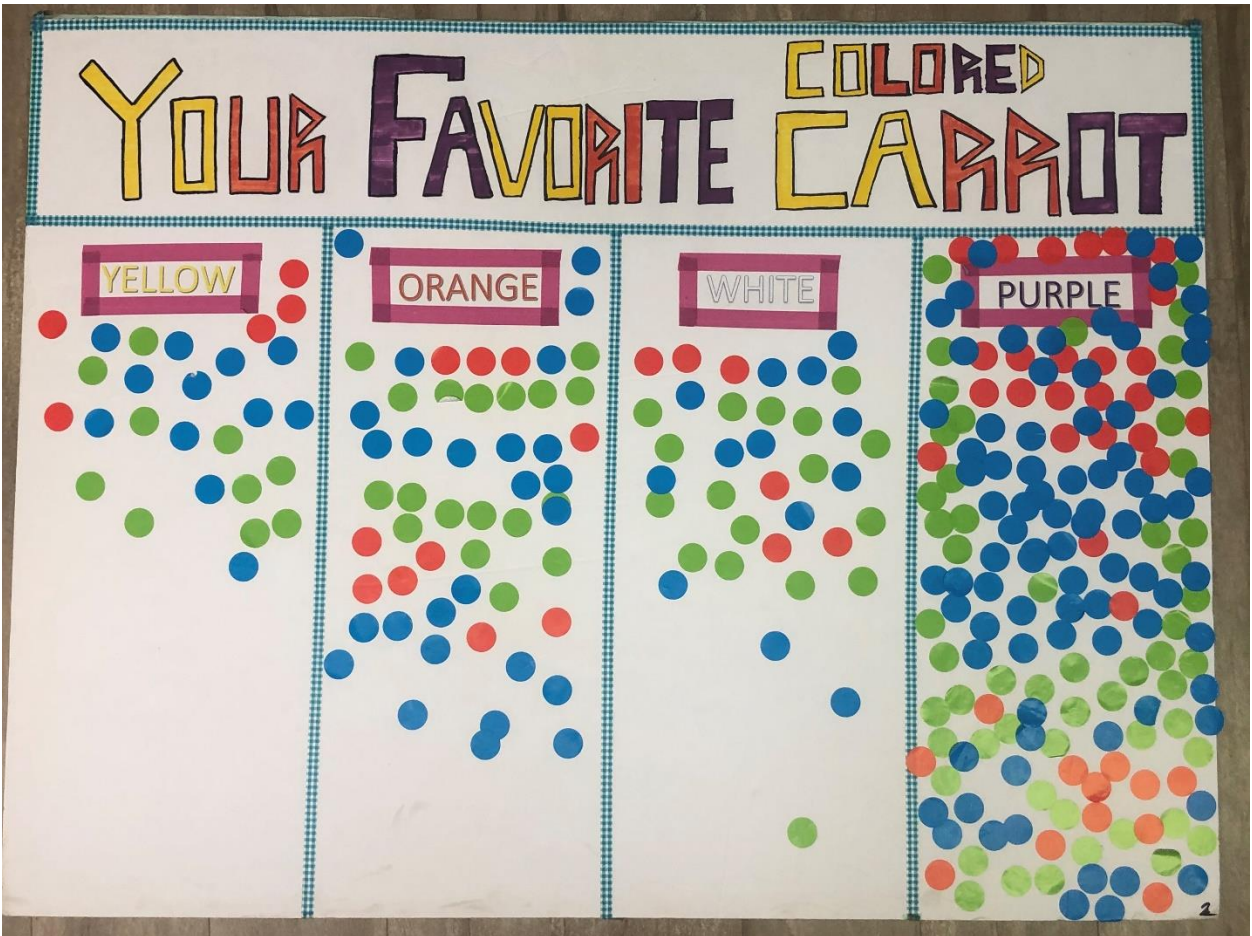
I had another opportunity to mentor when UC DREC hosted a student intern from a university in Mexicali. She was tasked to help with the Farm Smart program. I was assigned to teach her the daily activities of Farm Smart and provided an overview of the center. I served as an English and Spanish interpreter for my advisors and the intern. I enjoyed serving as a mentor and teaching others what I learned in Farm Smart. I also participated in Farm Smart's annual

Read with a Farmer Day event. Farm Smart arranged local farmers to read a book to 3rd grade students in elementary schools in the Imperial Valley. I helped prepare the materials for the event and visited various school sites in Brawley and Westmorland.

I also had the opportunity to create displays for the Farm Smart program. The Farm Smart program has a partnership with the CalFresh program. Farm Smart implements some of CalFresh’s curriculum into the program’s activities. One activity we do in Farm Smart is to teach and encourage students to choose healthy food options. The lesson we conduct is “Rethink Your Drink”. We show students how much sugar is in common beverages and encourage students to drink healthier beverages. Then we provide an example of a healthy beverage but providing students samples of fruit infused water. The following is the display I created for this activity.



Another activity I conducted was a colored carrot tasting survey. A carrot researcher provided a grant to UC DREC to continue his colored carrot research. Farm Smart conducts a survey with their students. The survey consists of students trying four samples of colored carrots: orange, yellow, white, and purple carrots. We would then give a sticker to each student who sampled and ask the student to place his or her sticker on a poster board indicating which carrot was their favorite. I personally surveyed about 300 students. The following is the poster board I created and used to conduct the survey:



Throughout the months of this internship, I was asked to write about my experience with these collaborations and events. I would write a blog that my advisors would then review for approval and upload on UC DREC's blog website. I wrote about my experience with the Sustainable You camp and about opportunities I gained through this USDA internship. Through this internship, I received a USDA sponsorship to attend the 33rd Annual Conference of the Hispanic Association of Colleges and Universities, or HACU, as part of the Student Track's Adelante Institute in Chicago Illinois. A reflection of my experience can be found on this blog website.

As stated in the Project Objectives, the second half of my time was spent on a research project. The topic I chose for my research project was water conservation and water management. Since agriculture is heavily prominent in the Imperial Valley and with their only being one main source of water for our county, I wanted to spread awareness on conserving and taking care of our water. There were four major stages in my project: research, development, implementation, and analysis. In the research stage, I spent a few weeks reading and learning all I could about water in the Imperial Valley. After gathering all the information, I developed key objectives that I wanted to teach the students. My goals were to help students understand how water is managed in a community, realize how much water is available for all living beings to use, and discuss ways to conserve water. Through Farm Smart, I gained experience working with K-6th and high school students. Therefore, my target age group was 6th-8th grade students. There were three activities I chose, adapted from *Project Water Education for Teachers (WET) Curriculum and Activity Guide 2.0*. There was one major activity where everyone would participate in and two visual demonstrations. The structure of my lesson plan was adapted from

the National Agriculture in the Classroom's National Agricultural Literacy Curriculum Matrix.

The following is the detailed lesson plan I developed for my project:

OVERVIEW

Grade Levels: 5-6 grade

Estimated Time: 45 minutes

OBJECTIVES

- Students will
 - ✓ understand that the main water source for the Imperial Valley is the Colorado River and how that water is shared within the community
 - ✓ identify the 8 common water users in a community and 4 common environmental obstacles for a water source
 - ✓ compare how much water there exists on Earth versus how much water is available for use
 - ✓ provide examples of wasting water
 - ✓ discuss different ways to conserve water

MATERIALS

For all activities, water will be needed.

Activity 1: 8-4-1, One for All

- Aluminum can (can be an empty soup can, empty soda can, etc.)
- 8 pieces of string equal in length, about 5 feet in length
- Rubber bands
- About 70 feet of yarn
- 12 wooden stands
- Empty water bottles and recyclables
- Poster Board with the 8 common water users printed on it

Activity 2: A Drop in the Bucket

- 1-gallon clear container
- Clear container that can hold at least 2 cups
- Clear 1-cup measuring cup
- Clear ½-cup measuring cup
- Eyedropper

Activity 3: Money Down the Drain

- 3 water gallon jugs

- A pin, a thumbtack, a nail
- Stopwatch
- 3 clear cups

Essential Links

Video: [History of Water in Imperial Valley](#)

Vocabulary

Groundwater: freshwater found underground in the cracks and spaces in soil, sand and rock.

Municipality: a city or town that has corporate status and local government

Background Agricultural Connections

The Earth consists of 71% water and the rest being land. 97% of this water is found in the oceans and is saline or contains salt. Due to the properties of salt and how difficult it is to treat saltwater, we are unable to use this water. The other 3% of this water is freshwater and can be found elsewhere. About 2.1% of this 3% can be found trapped in glaciers and polar ice caps. It is difficult to gain access to this water due to the climate. About 0.6% of freshwater is available for us to use. This water is found on the surface (in rivers, lakes, ponds, etc.) and underground as groundwater. However, most of this 0.6% is groundwater and groundwater itself is difficult to gain access to. Therefore, surface water is our main source of water. This amount is less than 1%. In other words, the only water that is being used by all living beings on earth is found in this 1%.

Examples of saving water includes but is not limited to turning the faucet off while brushing your teeth or washing dishes, irrigating the lawn in the early morning or late evening, taking short showers, and reducing food waste.

The Imperial Valley's main water source is the Colorado River. The county shares this water source with the San Diego and Los Angeles counties, other states such as Nevada, Arizona, Utah, New Mexico, Wyoming, and Colorado. and internationally with Mexico.

The following are 8 common water users and examples of each specific to the Colorado River and the Imperial Valley.

- Navigation
 - This refers to modes of transportation such as cars, airplanes, boats, etc.
 - The Imperial Valley needs water for all ground vehicles as well as for the airplanes in the Imperial airport.
- Fish and Wildlife
 - All wildlife in the Imperial Valley needs water. There are fish in small bodies of water such as Wiest Lake in Brawley and Sunbeam Lake in Seeley. The Salton Sea, at one point, was home to the desert pupfish, an endangered species. When

birds migrate, they seek out areas with large bodies of water. In the Valley, waterfowl and shorebirds migrate to the Salton Sea and feed from the fish that is found there.

- Agriculture
 - The Imperial Valley is known for agriculture. It is a large part of the Valley's economy. Some crops that is grown includes but is not limited to alfalfa, sugar beets, lettuce, broccoli, cauliflower, cabbage, and cantaloupes. Water is a necessity for cultivating crops.
- Business/Industry
 - This refers to companies that produces consumer products.
 - The One World Beef plant in Brawley used water to process and harvest beef. Central Coast Cooling, a cold storage facility, uses ice in order to keep the produce in cold storage. The Spreckels Sugar Company in Brawley uses water to keep the factory running and produce sugar from sugar beets.
- Earth Systems
 - All living beings on Earth depend on the water cycle to gain access to water, specifically from precipitation. This includes the Imperial Valley.
- Energy
 - Hydropower Energy: There are 8 hydropower plants placed throughout the All-American Canal. We have black start systems in the Imperial Valley. This means that if the power went out, we can get power generated from these hydropower plants.
 - Geothermal Energy: Hot water is pumped from deep underneath the Earth's surface which is then converted to steam once it reaches the surface. This steam is then taken to a cooling tower which is then converted into energy. The Imperial Valley is a large producer of geothermal energy. Calipatria has a geothermal plant with pipes lining throughout the Valley that carries steam to the plant. The Imperial Valley has a combined capacity of approximately 345 net watts. One megawatt is 1 million watts. That is, the capacity is 345 million watts. (About 10,000 watts is used to power one classroom. That means the energy produced can power about 34,000 classrooms!)
- Municipal
 - This refers to individual needs and community facility needs. Individuals uses water for their daily needs such as drinking, cooking, and cleaning. Community facilities such as hospitals, churches, offices, and stores need a plumbing and running water system.
- Recreation
 - Some recreational activities need water as well. Community and home pools is one example. There are also small businesses that rent inflatable water bounce

houses for parties. Customers must use their own water for this recreational activity.

- The Aquatic Center in El Centro, which opened on October 26th, uses approximately 540,000 gallons of water for all the pools.
- Boating and using jet skis along the river and lakes are also recreational activities. Both activities lead to water pollution.

The following are 4 common environmental challenges the Imperial Valley faces when obtaining water from the Colorado River.

- Flood
 - Certain areas of the Imperial Valley are prone to flooding. This is an issue because the roads in those areas are inaccessible during the flooding.
- Drought
 - California is currently experiencing a drought. Due to this, restrictions have been placed in the state to limit water use. The Imperial Valley accommodates to these restrictions.
- Endangered Species
 - Habitat destruction and displacement is the number one cause for the decrease in biodiversity. Precautionary measures need to be taken when constructing and maintaining the canals in the Imperial Valley to ensure the safety of the species' habitat.
 - Canals are a mode of transporting water from the Colorado River. The burrowing owls is an endangered species whose preferred habitat is in burrows alongside canals. The Imperial Irrigation District (IID) take this species into heavy consideration and adapt to this detail. The IID take precautionary steps in order to not disturb the burrowing owl's habitat.
- Pollution
 - The water the Imperial Valley receives is from the end of the Colorado River. The water quality differs greatly compared to the beginning of the Colorado River. We experience pollution from the border of Mexico, agricultural runoff, and any pollution occurring upstream.
 - On a more local level, there have been individuals who do illegal dumping in canals such as dumping a fish tank without considering the consequences of introducing nonnative species.

Interest Approach – Engagement

1. Before the beginning of this lesson, have the students watch the *History of Water in Imperial Valley* video

2. Ask students to name a couple of the essentials of living beings. Responses may include shelter, food, and water. Inform students that water will be the topic of this discussion.

3. Then ask students to list common uses of water. Response may include water being used for agriculture, plants, animals, water processes, and domestic use.

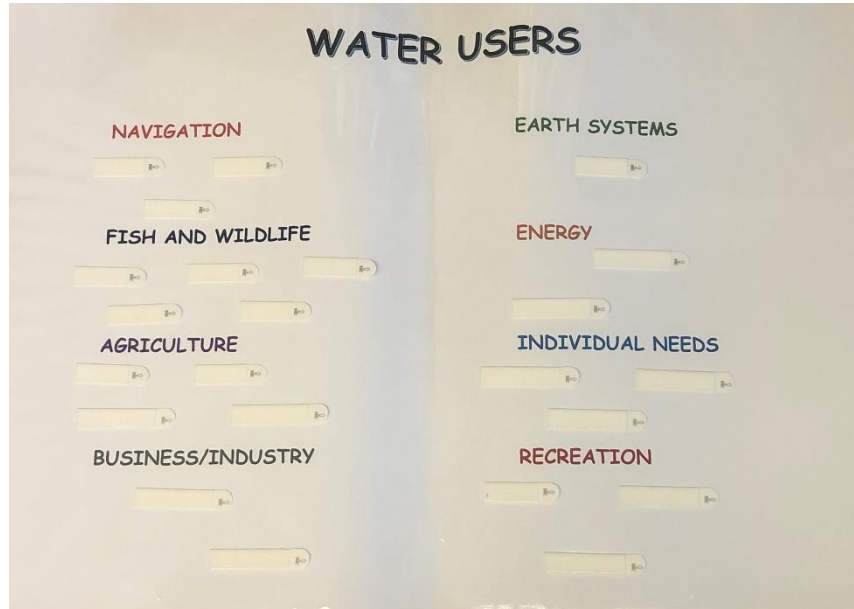
4. After students are finished listing the different uses of water, inform students the 8 common water users. This will lead to the first activity.

Procedure

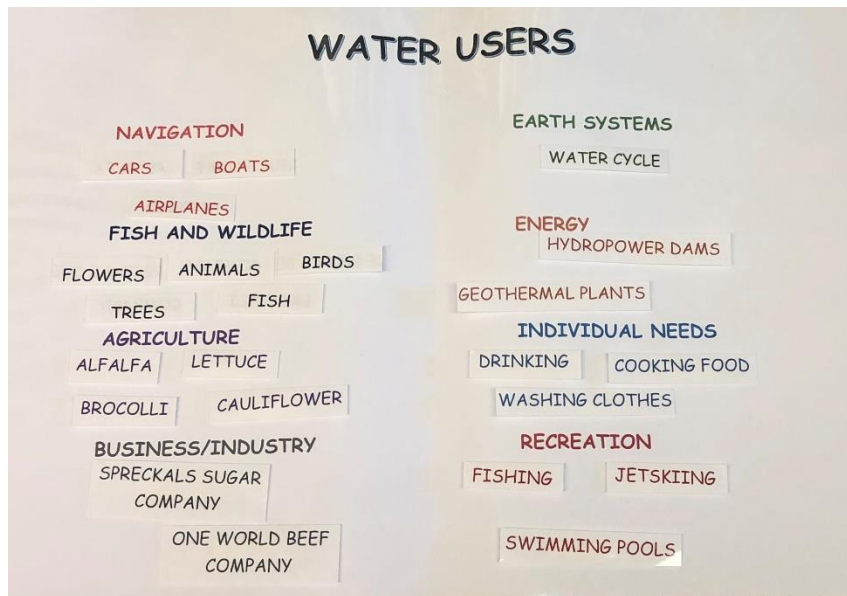
Activity 1: 8-4-1, One for All

Conduct this activity with the students to help them identify the 8 common water users in a community and 4 common environmental obstacles for a water source. Refer to *Background Agricultural Connections* for the details of each water user and environmental obstacles for a water source.

1. Prep:
 - a. This activity is an obstacle course. The obstacles will need to be prepared beforehand. There are four obstacles, each represents a real-life obstacle of a river source. The four obstacles are the following.
 - i. Floods: The flood will be represented by a rope that the group must travel over.
 - ii. Drought: Drought will be represented by a rope that the group must travel under.
 - iii. Endangered Species: The endangered species will be represented by a zigzag path formed by 4-6 chairs in which the students must pass through.
 - iv. Pollution: Pollution will be represented by a rope with a curtain of water bottles tied together attached. The group must travel under this rope.
 - b. The part of the lesson also requires a poster board. Create a poster board that lists the 8 common water users. Then create slips of paper that each contain an example of each category. The poster board should look something like the following:



- Before beginning the obstacle course, discuss with the students the 8 common water users. The categories are Navigation, Fish and Wildlife, Agriculture, Business/Industry, Earth Systems, Energy, Municipal, and Recreation. Pass out a slip of paper than contains an example to each student. Then, in small groups, have the students place their example on the poster board in the category they believe the example falls under. Once this is done, briefly review the answers. The poster board should now look like the following:



- After discussing the 8 common water users, ask students where the Imperial Valley gets their water. The answer is the Colorado River. Explain to students that many communities can share this one river, but that community can face environmental

challenges when receiving that water. Explain to students that they would now do a simulation, representing this issue.

4. Explain to the students that they will be formed in groups of 8 and must go through an obstacle course. Each group will share a rubber band with 8 strings attached and use the rubber band to pick up a cup of water and carry it through the course.
 - a. The course itself represents the Imperial Valley's main source of water, the Colorado River. Each group will represent a community in the Imperial Valley. Each member of the group will represent one of the 8 water users. Each obstacle will represent one specific struggle a community is facing.
 - b. Do not explain what the obstacles represent until each group encounters the obstacle. Instead, tell students to pay close attention to what the obstacle represents and how it could affect the water source.
 - c. If one groups drops the cup of water, everyone must start over from the beginning of the obstacle course.

The obstacle course should look like this the following:



The following is a picture of one group using the rubber band to pick up the cup of water:



5. Once the students complete the obstacle course, begin a discussion of their observations. The following are questions that can be asked to stimulate discussion:
 - a. What were the 4 environmental obstacles?
 - b. How was the group able to successfully pass through the obstacle? (Ideal answers include but is not limited to teamwork and communication.)
 - c. What is the significance of redoing the obstacle course from the beginning if the cup of water was dropped?
 - d. Was the same amount of water conserved throughout the course? Is the amount of water from the first obstacle the same amount at the last obstacle?
6. Finally, review the following key points:
 - a. Teamwork and communication are important when managing and distributing water in a community.

- b. We, as individuals, are not the only ones who use water. Remind them of the 8 water users that were discussed.
- c. The Colorado River is the main source of the Imperial Valley.

Activity 2: A Drop in a Bucket

Conduct this activity with the students to help them understand how much water is in the world and how much of that water is available for us to use.

1. Prep: Not much prep is required for this activity. Have the empty containers ready for use before the activity starts.
2. Start with a 1-gallon bucket filled with water. Inform the students that this bucket represents all the water on Earth. Ask the students to name some of the places where water is found. Responses may include oceans, lakes, rivers, clouds, glaciers, underground as groundwater, and in plants and animals.
3. Pour 2 cups from the bucket into the container that can hold 2 cups. Then, ask the students if they can guess what the water in the container represents.
 - a. The 2 cups of water represent all the fresh water in the world which is about 3% in total. The rest of the water is saltwater and cannot be used. Ask students why we cannot use saltwater in the same way that fresh water is used. Responses may include drinking saltwater would make people sick, watering fields will stunt plants' growth, etc.
4. Take $\frac{1}{2}$ of a cup from the 2-cup container. Ask the students what the rest of the $1\frac{1}{2}$ cups would represent.
 - a. This $1\frac{1}{2}$ cups represents the polar ice caps and glaciers, which is about 2.1% of all the freshwater on earth. This is water that is not available for us to use due to the water being in its frozen state.
 - b. Set aside the $1\frac{1}{2}$ cups of water, explaining to the students that we cannot use this water.
5. Ask the students what the $\frac{1}{2}$ cup of water represents.
 - a. This $\frac{1}{2}$ cup of water represents the freshwater that is available for us to use, which is about 0.6% of all freshwater.
 - b. Ask students where this freshwater is located. Responses may include bodies of surface water such as lakes, rivers, and ponds. Explain that most of this freshwater is in fact found underground in the form of groundwater. Explain to the students that ground water is incredibly difficult to gain access to.
6. Explain to students that some water must be taken out of the $\frac{1}{2}$ cup. This water will represent all the surface water on Earth. Ask the students to guess how much water will be taken out of the $\frac{1}{2}$ cup.

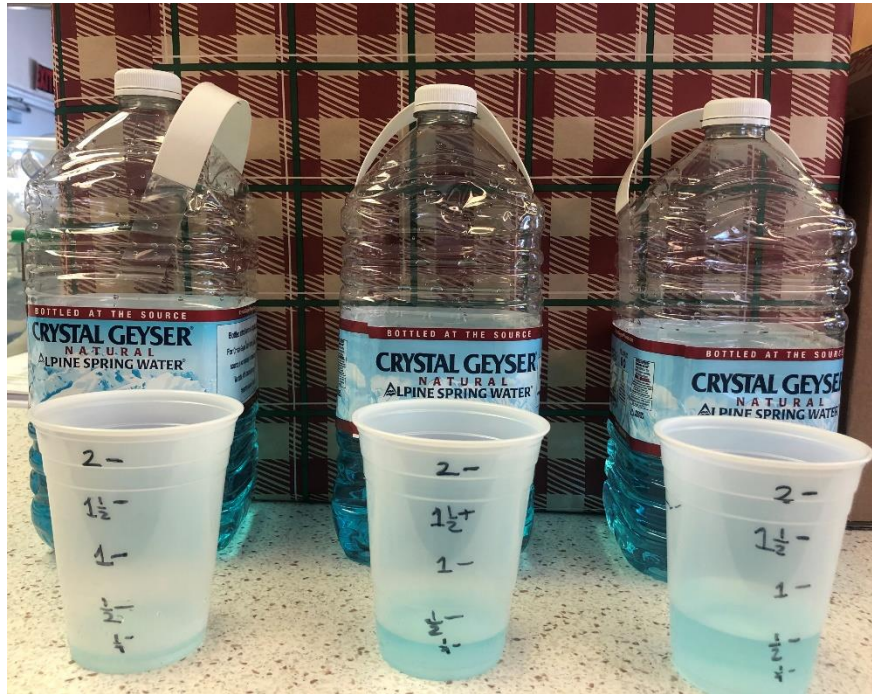
7. After the students are finished guessing, take the eyedropper out. Use the eyedropper to take some water out of the $\frac{1}{2}$ cup. Then, place one drop on your hand.

Explain to students that out of all the water in the world, less than 1%, or one drop, is freshwater available for us to use. Emphasize how important it is to conserve and protect the limited amount of water that is available for everyone.

Activity 3: Money Down the Drain

Conduct this activity with the students to help them visualize the effects of wasting water through a common example of wasting water.

1. Prep: Use a pin to create a hole on the cap one of the empty one-gallon water jug. Do the same with the thumbtack and nail to the other two water jugs. Each container should have a hole, each with a different size, on each cap. Fill each container with some water. Ideally, water should drip from each water jug, not stream. Place tape on each hole and fill each jug with water before starting the activity.
2. Ask students where someone can get a cup of water in that instant. The answer is the faucet or sink. Explain to the students there are faucet systems in almost every single building, in our classrooms, in our homes, etc. These systems are designed for us to gain immediate access to water.
3. Next, ask for four volunteers to help with the demonstration. Three students will each hold one water jug, and have it hover over a clear cup. The fourth student will use the stopwatch. The three students will then flip the water jug and let the water run from each water jug while the student with the stopwatch times the action for one minute. At the end of the minute, everyone will compare each of the cups that contains the water captured from the containers.
 - a. Students should note that the bigger the hole size of each container, the faster the rate of the water is being released. In other words, the larger the leak, the faster water is wasted.
 - b. Ask students how much water will be released by the end of an hour? What about at the end of the day? Provide a hint by asking what can be done in order to make this calculation (which is multiplying the amount of water captured in one minute by 60 since there are 60 minutes in one hour).
 - c. The following is an example of the result of this activity:



4. Remind students that just how water is easily accessible to us through the faucet system, something as simple as a faucet leak can lead us to waste water in tremendous amounts over time.

Concept Elaboration and Evaluation

After conducting these activities, review and summarize the following key concepts:

- Despite the Earth consisting of 70% water, less than 1% of water is available for all living beings to use.
- Just how water is easily available to us, water can easily be wasted by us.
- Ask students to name and describe the 8 types of water users.
- The Colorado River is the Imperial Valley's main source of water. This one source of water faces many environmental challenges before it is eventually distributed to the numerous types of water users within a community.
- Finally, ask the students, "What can we do to conserve water?"

Sources/Credits

The activities of this lesson are adapted from the *Project WET Curriculum and Activity Guide 2.0*.

The structure of this lesson plan is adapted from National Agriculture in the Classroom's National Agricultural Literacy Curriculum Matrix.

- For further information visit <https://www.agclassroom.org/teacher/matrix/index.cfm>

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Farm Smart Program

In addition to this lesson plan, I created a test for students to take before and after the presentation. I used this pre-test and post-test to gather data and measure the amount of information retained after my presentation. The following is the set of questions I created for the test:

PRE/POST TEST

1. True or False: Only 1% of water on Earth is available for every living being to use.
2. True or False: Leaving the faucet running while brushing your teeth is one way to save water.
3. What is the main source of water for the Imperial Valley?
 - a. Pacific Ocean
 - b. Colorado River
 - c. Chicago Lake
 - d. Lake Michigan
4. Most of the water on Earth is found where?
 - a. Oceans
 - b. Lakes
 - c. Glaciers/Ice caps
 - d. Underground/groundwater
5. Most of the freshwater is found where?
 - a. Oceans
 - b. Lakes
 - c. Glaciers/Ice caps
 - d. Underground/groundwater
6. What are the three forms of water?

1. _____ 2. _____ 3. _____

7. True or False: Communities must work together to obtain the water they need.

WORD BANK

Flood	Earth Systems	Energy
Recreation	Business/Industry	Drought
Agriculture	Endangered Species	Navigation
Fish and Wildlife	Pollution	Individual Needs

Choose from the Word Bank

List the 8 types of water users.

.

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

Choose from the Work Bank

List all 4 examples of natural obstacles for a river water source.

1. _____
2. _____
3. _____
4. _____

The following is my observations and analysis of the presentations. I conducted one trial presentation with a group of high school freshman students. This served as a test run in order to determine how I can improve the activities and my public speaking skills. It served as a valuable lesson for me and I made great improvements to my project. After revising my project, my advisors arranged for two presentations at local elementary schools. One presentation was with Meadows Elementary Union School in El Centro with a group of 7th and 8th grade students. The second presentation was held in Phil Swing Elementary School in Brawley, my hometown, to a class of 6th grade students.

Once the presentation was done, I collected the tests from the students. I then graded the tests and organized them in a frequency table based on the number of students who answered the questions correctly. I then used a statistics programming software called R programming to create the bar graphs of the data. I learned how to work with R programming this fall semesters in one of my math courses. I found it faster to input the code and create the visuals I needed for project. Due to the complexity of the test, I split the grades into two data sets. One data set consists of the number of students who answered the first 7 questions of the test correctly. The other data set consists of the test results of the word bank in which I calculated how many students selected a certain amount of correct choices. The bar graphs show a visual comparison of the pre-test and post-test results. One thing to note is that there were less post-tests due to students needing to leave early for different reasons. The following are the tables and graphs I created using R programming.

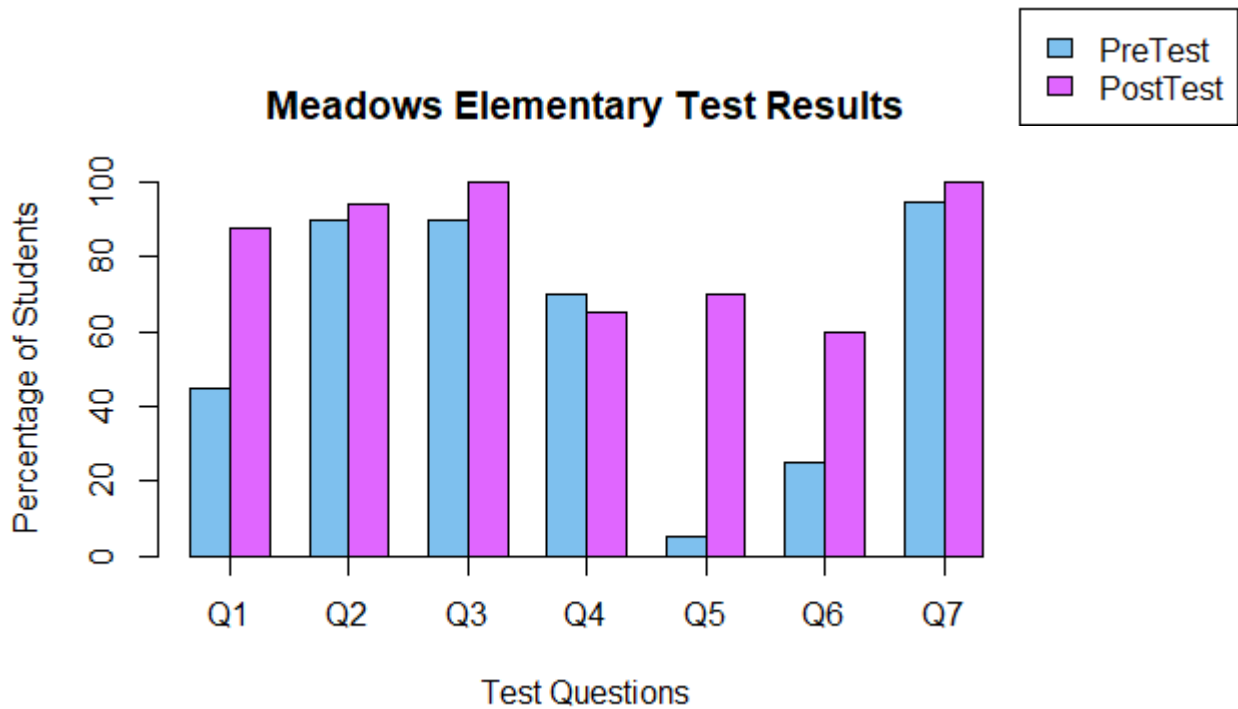
Meadows Elementary School Results

1. Table: First 7 Questions of the Test

Number of Students Who Answered the Question Correctly

Question	Frequency		Relative Frequency (%)	
	PreTest (out of 20)	PostTest (out of 17)	PreTest (out of 20)	PostTest (out of 17)
Q1	9	15	45	88
Q2	18	16	90	94
Q3	18	17	90	100
Q4	14	11	70	65
Q5	1	12	5	70
Q6	5	10	25	60
Q7	19	17	95	100

2. Graph



3. Interpretation

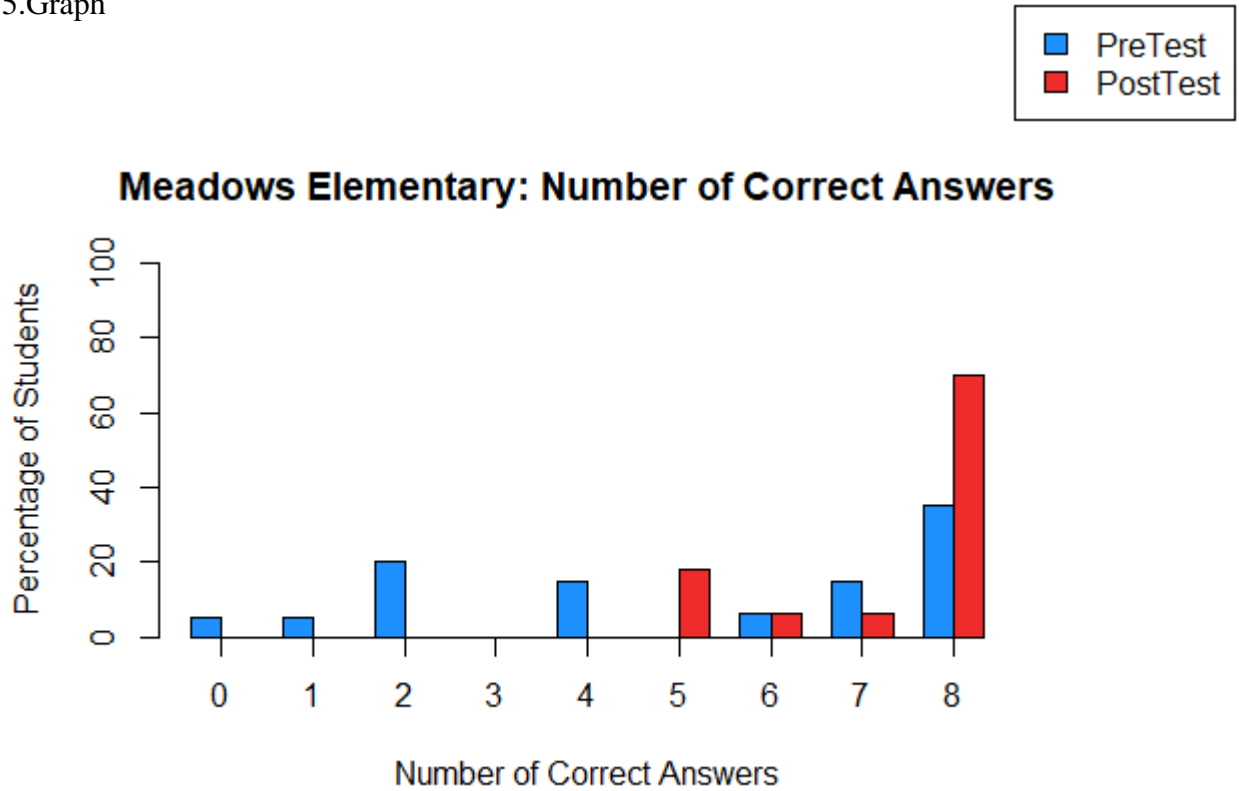
Based on the pre-test, this group of 7th and 8th grade students clearly had some prior knowledge on water in the Imperial Valley. However, most of the students did not answer Question 5 correctly which refers to where most of freshwater is found on Earth. They were not aware that most of the freshwater is found in the glaciers and ice caps. I can tell that they were able to retain this detail after the presentation because there was a significance increase in the number of students who answered this correctly.

4. Table: Word Bank Test Results

Number of Students Who Selected a Certain Number of Correct Answers
in the 8 Water Users Category

Number of Correct Answers	Frequency		Relative Frequency (%)	
	PreTest (out of 20)	PostTest (out of 17)	PreTest (out of 20)	PostTest (out of 17)
0	1	0	5	0
1	1	0	5	0
2	4	0	20	0
3	0	0	0	0
4	3	0	15	0
5	0	3	0	18
6	1	1	5	6
7	3	1	15	6
8	7	12	35	70
Total	20	17	100	100

5.Graph



6.Interpretation

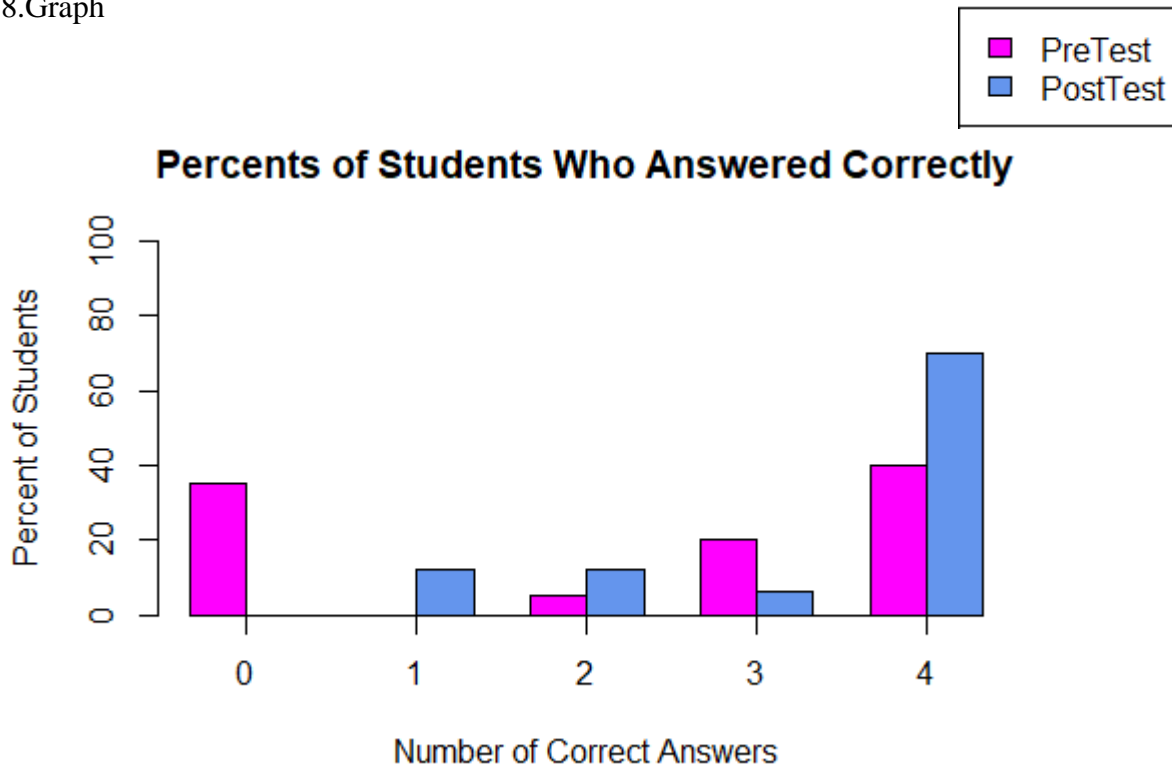
In the pre-test, there were mixed results. The majority of the students had either all of them correct or had between 0-4 correct answers out of 8 in total. The students did significantly better in the post-test, with 70% of the students having all 8 correct answers.

7. Table: Word Bank Test Results

Number of Students Who Selected a Certain Number of Correct Answers
in the 4 Environmental Obstacles Category

Number of Correct Answers	Frequency		Relative Frequency (%)	
	PreTest (out of 20)	PostTest (out of 17)	PreTest (out of 20)	PostTest (out of 17)
0	7	0	35	0
1	0	2	0	12
2	1	2	5	12
3	4	1	20	6
4	8	12	40	70
Total	20	17	100	100

8. Graph



9. Interpretation

There were mixed results in the pre-test. 35% of the students had 0 out of 4 correct responses and 40% had 4 out of 4. This group scored on opposite sides of the range. However, the post-test results were very different. 70% of the students had all 4 correct answers while 30% of the students had between 1-3 correct answers.

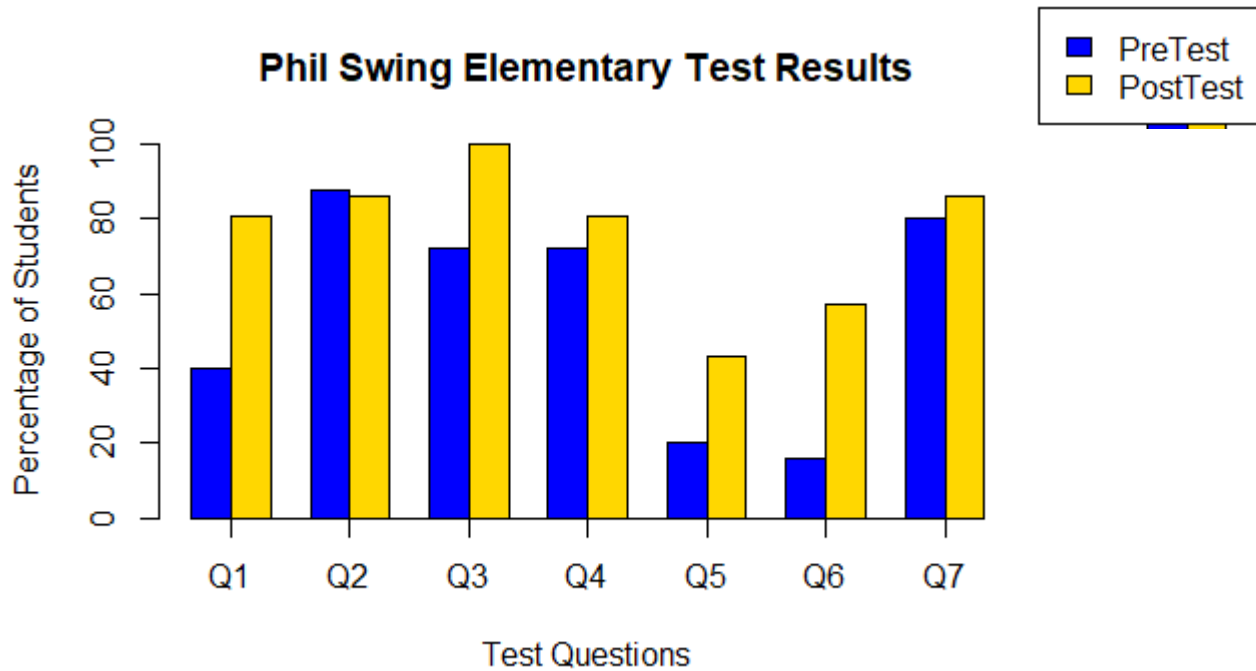
Phil Swing Elementary School Results

1. Table: First 7 Questions of the Test

Number of Students Who Answered the Question Correctly

Question	Frequency		Relative Frequency (%)	
	PreTest (out of 25)	PostTest (out of 21)	PreTest (out of 25)	PostTest (out of 21)
Q1	10	17	40	81
Q2	22	18	88	86
Q3	18	21	72	100
Q4	18	17	72	81
Q5	5	9	20	43
Q6	4	12	16	57
Q7	20	18	80	86

2. Graph



3. Interpretation

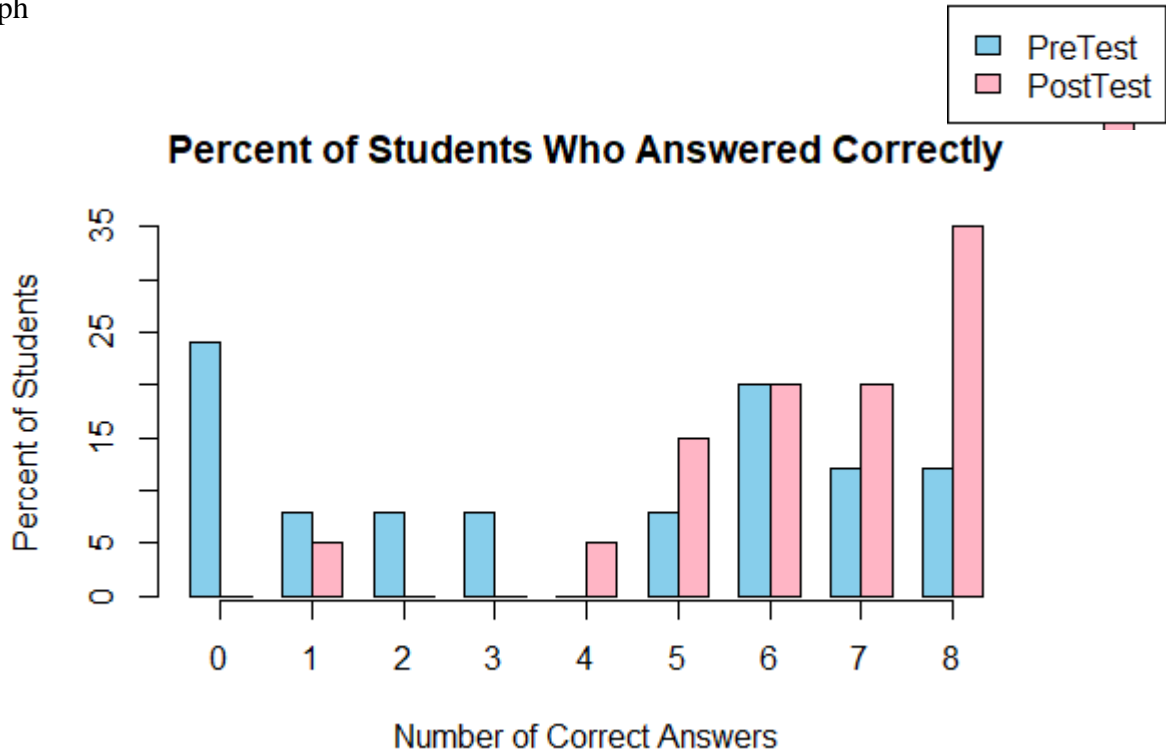
This group of 6th grades also had some prior knowledge about water in the Imperial Valley, but it was less compared to the 7th and 8th grade group. Most of the students in this group also seemed to not be aware that most of the freshwater is found in glaciers and ice caps. This is because only 20% of the students answered Question 5 correctly. The 6th grade group did slightly better in the post-test. In almost all of the questions answered, there was a percent increase. This means that the students did retain the information learned during the presentation.

4. Table: Word Bank Test Results

Number of Students Who Selected a Certain Number of Correct Answers
in the 8 Water Users Category

Number of Correct Answers	Frequency		Relative Frequency (%)	
	PreTest (out of 25)	PostTest (out of 20)	PreTest (out of 25)	PostTest (out of 20)
0	6	0	24	0
1	2	1	8	5
2	2	0	8	0
3	2	0	8	0
4	0	1	0	5
5	2	3	8	15
6	5	4	20	20
7	3	4	12	20
8	3	7	12	35
Total	25	20	100	100

5. Graph



6. Interpretation

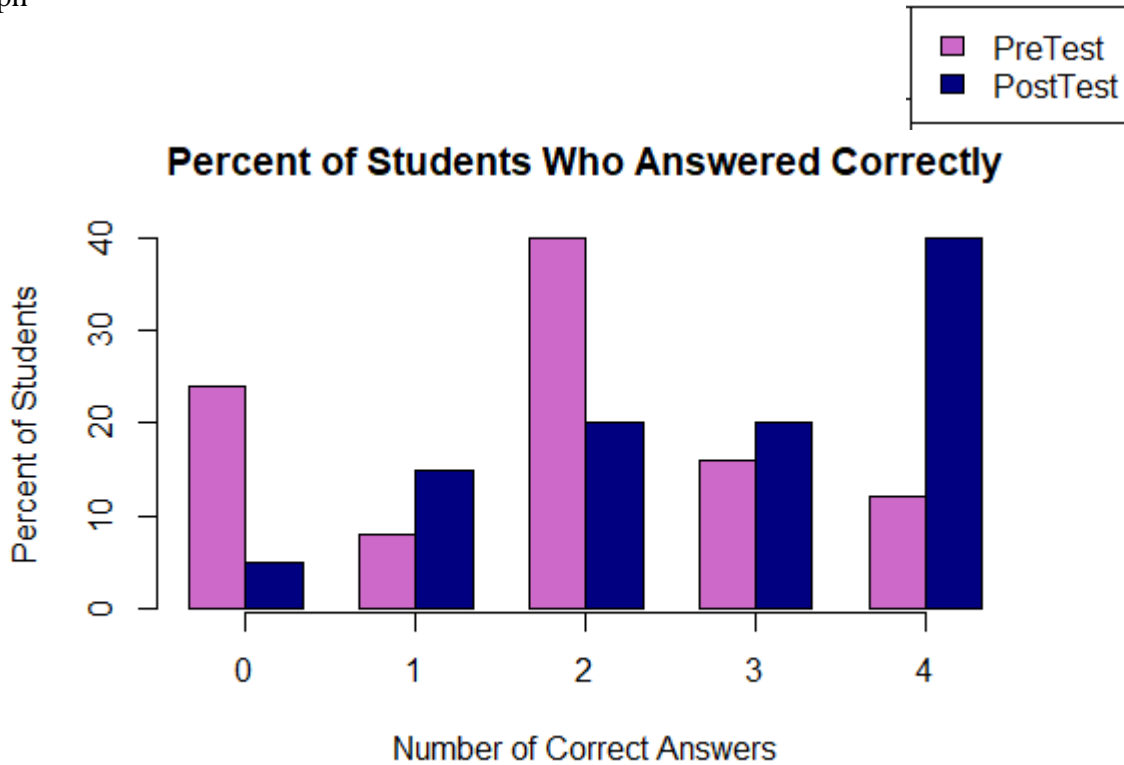
Although the pre-test shows mixed results, most of the students had 0 correct answers with a total of 24% of the group. I was happy to see that in the post-test, 35% of the students had all 8 answers choices correct and 55% had more than half of the answer choices correct.

7. Table: Word Bank Test Results

Number of Students Who Selected a Certain Number of Correct Answers
in the 4 Environmental Obstacles Category

Number of Correct Answers	Frequency		Relative Frequency (%)	
	PreTest (out of 25)	PostTest (out of 21)	PreTest (out of 25)	PostTest (out of 21)
0	6	1	24	5
1	2	3	8	15
2	10	4	40	20
3	4	4	16	20
4	3	8	12	40
Total	25	20	100	100

8. Graph



9. Interpretation

40% of the students had half of answers choices correct in the pre-test. 28% of students had between 3-4 answers correct while 32% had less than 2 answers correct. In the post-test, 40% of the students had all 4 answer choices correct, 40% had between 2-3 answers correct, 20% of students had less than 2 answers correct. This means that there was a 80% passing rate in the post-test, compared to the pre-test whose passing rate was 28%.

This concludes the analysis of the data collected in my research project.

Conclusion

I enjoyed every task that I was assigned to do. Not only was I receiving a mentorship with my advisors, but my advisors encouraged me to become a mentor to youth in the Imperial Valley. This was a new role for me. I was provided the opportunity to share what I have learned and use my skills I brought in as an applicant and teach students about water conservation. My goal was to bring awareness and teach students about water conservation and management in the Imperial Valley. Based on the interactions I witnessed during the presentations and the analysis of the pre and post-tests, I can say that I did achieve my goal.

I started this internship without knowing much about agriculture, but I kept a positive attitude and an open mind. I can say without a doubt that I received so much more than what I was expecting out of this internship. This internship had a large, positive impact in me. I further developed my leadership skills, become more innovative and creative, and was encouraged to share my experience, serving as a positive role model in my community.

As I prepare myself for graduation and to receive my bachelor's degree, I ponder over what I would do after I finish college. My original goal when I started college was to pursue a mathematics degree and apply it in education. I wanted to become a teacher. However, with UDSA, I realized that I could do much more in education than serving as a teacher. Teaching is not the only career option for me now. I developed a connection with agriculture, and I wish to pursue a STEM career in agriculture. I would like to continue working with USDA and keep serving my community. I am grateful to have received this opportunity and have a wonderful experience with UC DREC/Farm Smart program.

Appendices

For further information about UC Desert Research Center and Farm Smart program, visit

<http://drec.ucanr.edu/>.

To read about the blog posts I wrote, visit <https://ucanr.edu/blogs/debblog/index.cfm> .

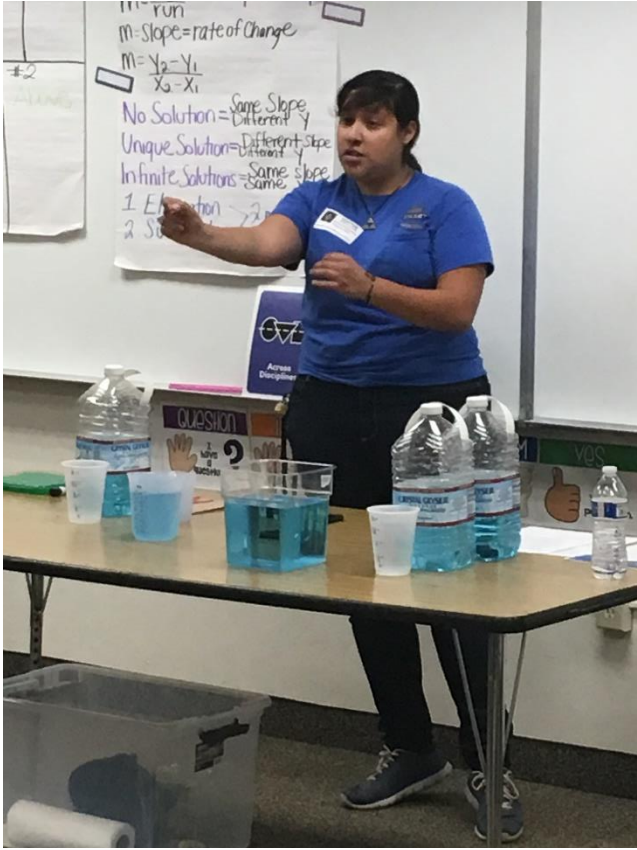
The Farm Smart program also uses social media platforms, specifically Facebook and Twitter

@UC Farm Smart.

The following are pictures taken during the presentations

7th and 8th grade presentation





6th grade presentation



