Protect Our Drinking Water

Next Generation Science Standards

MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

MS-ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

ELA Standards

Reading Informational texts
RI.5.4, 5.5, 5.6, 5.7, 5.9
Writing
W.5.2, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9
Speaking and Listening
SL.1, 5.2, 5.3, 5.4, 5.5

Math Standard

Represent and Interpret Data
5.MD.B.2

This year we are competing in the Cal Water H2O Challenge. We chose to focus on protecting our drinking water. We have named ourselves the Water Guardians. We want more people to recycle their hazardous household waste. So many people do not! We have installed storm drain markers around Willows. Seven kids went with our teacher, and I am one of those 7 kids. Several kids have been interviewed by reporters. We made water filters with plastic soda bottles, cheesecloth, coffee filters, cotton, rocks, sand, and many more materials. Earlier this year we wrote an essay about water which took a long time and was very hard. I brought in a "Lifestraw." A lifestraw is a water filter that someone can suck in water from one side and come out the other side clean and it's very durable. We bought First Alert water testing kits and tested several different places with running water from Willows and we found that Willows has hard water, *and* we found that our school garden has E.coli bacteria in it's water. We went on a field trip to the wastewater plant in Willows. We made a bunch of pamphlets and handed them out to kids. We made a slideshow and presented it to several different classes. We are the Water Guardians, protecting our water so that we have enough and it's safe enough to drink.

Cal Water H2O Challenge - The Water Guardians - Mr. Buckley's Class

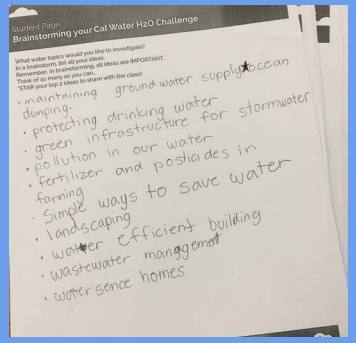
Project Development

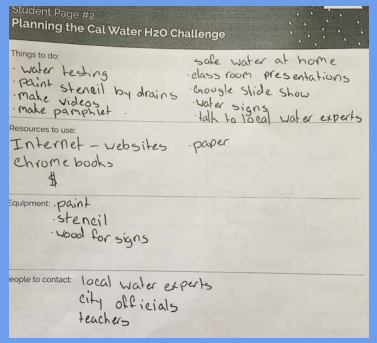
Developing Project Goals & Action Plan

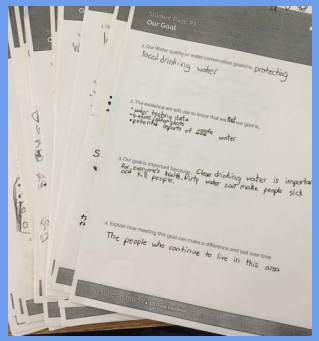
We wrote down different ideas and then we shared in small groups and as a class. It took us a while to agree on protecting our drinking water. Some students wanted to do groundwater. We finally agreed after talking for 45 minutes.

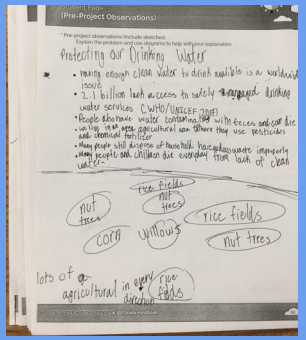
<u>Goal 1</u>: We will research and understand clean drinking water access around the world and draw connections to our local area.
<u>Goal 2</u>: We will develop an outline of ideas that take action to protect our drinking water in Willows as well as encourage others to do the same.

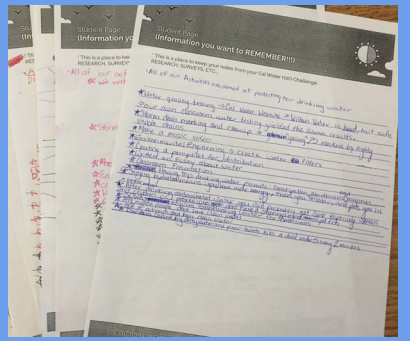
<u>Action Plan</u>: We wrote down a bunch of different activities (water testing, storm drain marking, creekside clean up, making brochures, engineering water filters, classroom presentations, etc.) and wrote that we would do them in January or February.



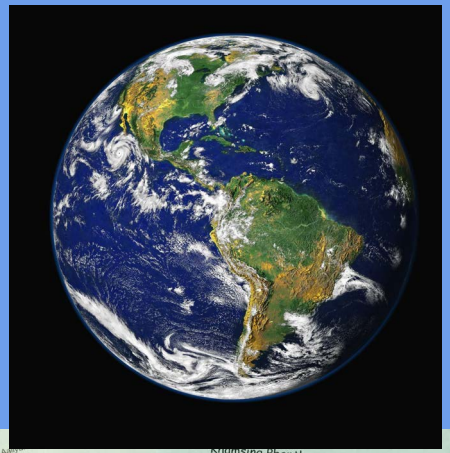


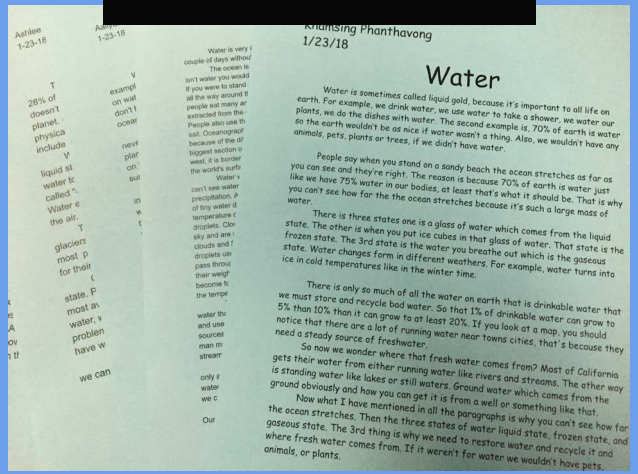






Water Essays





Khamsing Phanthavong
1/23/18

Water

Water is sometimes called liquid gold, because it's important to all life on earth. For example, we drink water, we use water to take a shower, we water our plants, we do the dishes with water. The second example is, 70% of earth is water so the earth wouldn't be as nice if water wasn't a thing. Also, we wouldn't have any animals, pets, plants or trees, if we didn't have water.

People say when you stand on a sandy beach the ocean stretches as far as you can see and they're right. The reason is because 70% of earth is water just like we have 75% water in our bodies, at least that's what it should be. That is why you can't see how far the the ocean stretches because it's such a large mass of water.

There is three states one is a glass of water which comes from the liquid state. The other is when you put ice cubes in that glass of water. That state is the frozen state. The 3rd state is the water you breathe out which is the gaseous state. Water changes form in different weathers. For example, water turns into ice in cold temperatures like in the winter time.

There is only so much of all the water on earth that is drinkable water that we must store and recycle bod water. So that 1% of drinkable water can grow to 5% than 10% than it can grow to at least 20%. If you look at a map, you should notice that there are a lot of running water near towns cities, that's because they need a steady source of freshwater.

So now we wonder where that fresh water comes from? Most of California gets their water from either running water like rivers and streams. The other way is standing water like lakes or still waters. Ground water which comes from the ground obviously and how you can get it is from a well or something like that.

Now what I have mentioned in all the paragraphs is why you can't see how far the ocean stretches. Then the three states of water liquid state, frozen state, and gaseous state. The 3rd thing is why we need to restore water and recycle it and where fresh water comes from. If it weren't for water we wouldn't have pets, animals, or plants.

We read about water around the world and water in California and wrote essays. We wrote six paragraphs and learned many facts about water. Most of Earth's water, 97.5%, is salt water found in the oceans. Fresh water is 2.5%, but less than 1% is available to humans for use.

The water cycle is when water evaporates into the air, the water vapor condenses and forms clouds, and then there is precipitation (rain and snow) when water is too heavy to stay in the air.

Water changes form as the seasons change. For example, water freezes in winter, melts in spring, evaporates in summer, and condenses in the fall.

California has a system of dams that store water. There have been many years of drought. Some people want more dams. Some people think we should take the salt out of ocean water and use that for many people in California. Everyone agrees that we need to save our water and protect our water from becoming contaminated.

Drinking Water Research Around the World and Locally

Since we started competing in the Cal H2O Challenge, we have researched and found many statistics of how many people die from not clean enough or enough water. We found out that millions of people have died from not enough clean water. We also found that about 30% of all schools in the world don't have clean water. Also, we found that about 15 people die per minute from not enough clean water. We learned that many people and children only have dirty water to drink. That is why many people and children are dying. We looked at statistics from UNICEF and WHO.

In Willows, our water comes from groundwater. We live in a farming area. The fields and orchards are sprayed with pesticides and there are a lot fertilizers used. We need to keep our water clean.

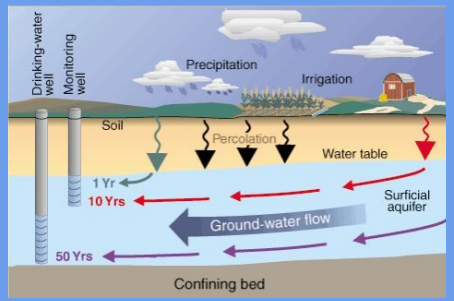
A truck delivers water to thirsty people.

Some people have to walk miles each day for water.

Kids carry water on their donkey.

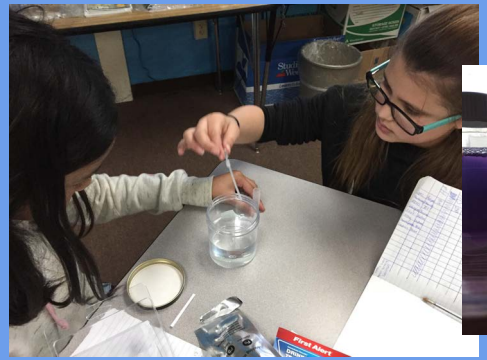
Many people and kids only have dirty water to drink.

Water Expert Presentation

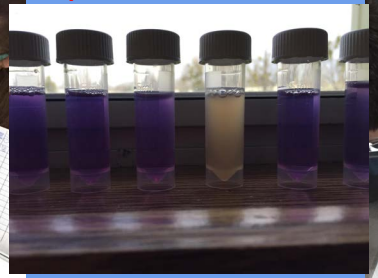


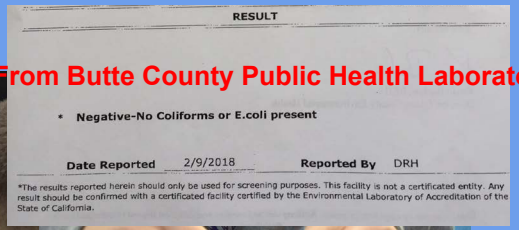
Sharla Stockton, a local water expert from Glenn County Groundwater Authority, came into our classroom. Ms. Stockton talked to us about our water and rocks. She talked about tight rocks and loose rocks. The loose rocks mean the water can go through faster and the tight one means it is harder to get through. She talked about porosity which means a bunch of holes where water can go through. She talked about an area where water can fill these spaces called saturated zone. From Ms. Stockton, we learned that the City of Willows gets its water supply from groundwater. That's why our water is hard water. Minerals are pumped up through wells with the water. We learned there are many contaminants that can enter our water by going down into the soil and getting into the aquifer, where the groundwater is stored.

Water Quality Testing in the Classroom!



The yellow vile is the positive test for E.coli

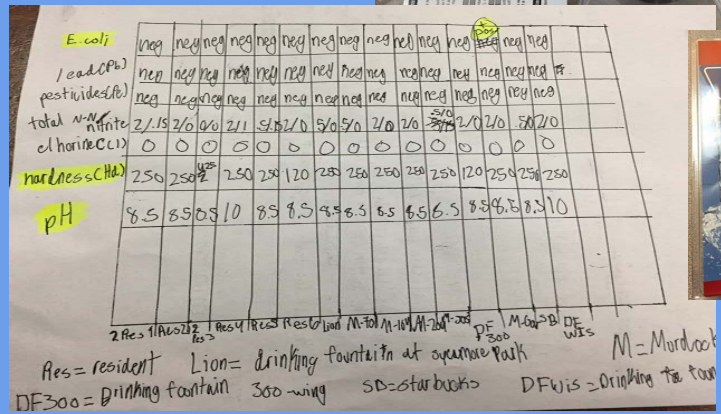


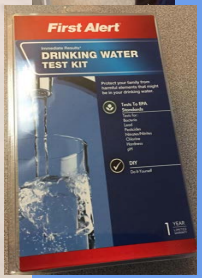


From Butte County Public Health Laboratory

We bought 15 water testing kits, and we got water samples from homes, our school, the middle school, Walmart, Starbucks, and a local park. We worked in groups and tested the water and we figured out that our school garden's water has bacteria in it! All of the other tests were negative. The school district was concerned. The garden was shut down and the superintendent ordered more sensitive testing from the Butte County Public Health Laboratory and ordered signs stating that the garden water was not for drinking. The result from the school district's testing is that the water is safe to use, but we do not want anyone to drink it because it is not filtered.

We also figured out that Willows has hard water. Hard water is not dangerous to humankind. It is harmful to anything metal, like pipes. Hard water can wear them down quicker, and clog them.





Engineering Water Filters in the Classroom!

Mr. Buckley looked online for an engineering water filter activity. Then Mr. Buckley gave us all of the materials that we needed - cotton balls, coffee filters, rubber bands, paper clips, cotton batting, clay, sponge, pebbles, sand, and pantyhose (yes, pantyhose!). Within our groups we had to create our own filters. When we were done, we poured dirty water (soil, oil, beans, baking soda, and food dye) through the filter and watched it drip out cleaner. Most groups redesigned their filters one or two times. The filters worked well, but it was hard to remove all the dye. The dye represented chemicals. This was interesting because, in real life, it is very difficult to remove all traces of chemicals in water. We had to keep pouring the same water through the filters to get the dye to disappear. It was cool to think like an environmental engineer.

Click Below to watch video!

https://youtu.be/PRg1-rsQ4Ko

Protecting Our Drinking Water Brochures

Click Below to watch video!

https://youtu.be/i4_7WrCi_eg

Mr. Buckley and I found an app called "Adobe Spark" and my team and I figured out how to make a brochure. We created one side of the brochure at a time. The app was slow but worked well. We finally had success with the app and made a creative brochure. We handed out the brochures at our 16 classroom presentations so they could take them home to their families. We also left a stack at the Willows Public Library, the Murdock Elementary (our school) front desk, the Glenn County Office of Education, and the Willows Unified District Office front desk.

Recycling Hazardous Household Waste

Most people that we know do not properly dispose of hazardous household waste. It is very important that we recycle hazardous household waste, because it can get in our water and pollute it. If all of our water was polluted then we would have nothing to drink, which means we would all die. If you pollute our water than animals will die, so don't just think about humans, think about all the other animals and plants that will die too. Without water nothing can survive, so instead of polluting it, we should protect it.

When we are giving our classroom presentations, recycling hazardous household waste is something that we talk a lot about. The brochure that we made focuses on properly recycling hazardous household waste at the local landfill.

We Installed Storm Drain Markers Around Willows!

There is another way to stop pollution, by marking storm drains, so people know not to throw trash down there anymore. This means garbage doesn't get flushed down into waterways. We called the City of Willows and they gave us permission mark the storm drains around Willows. A group of 7 students and our teacher glued 25 storm drain markers around Willows. One is in front of our school.

Wastewater Treatment Facility Field Trip

Our class visited the Willows Wastewater Treatment Facility to learn how cities clean the water that comes from toilets, sinks, washing machines, etc. We saw how the guys at the treatment plant remove things from the water so that it can go back into nature. Travis, our tour guide, said that cities don't reuse water from treatment plants, but someday they might allow it. Being at the wastewater plant made us think of our water filter engineering. The wastewater plant is a giant filtering facility. It takes disgusting water and makes it clean. They filter water using different methods and they constantly test the water so they get the right results - clean water!

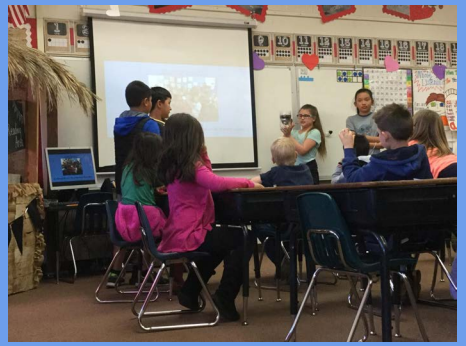
Click Below to watch video!

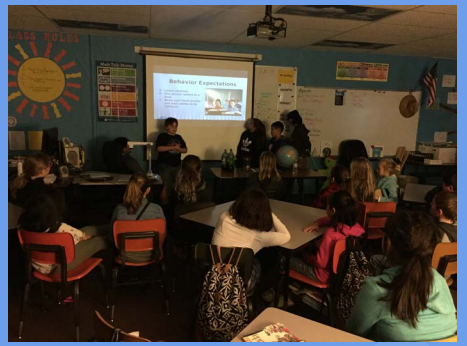
https://youtu.be/iYY6JwAYjXw

Classroom Presentations

"The kids did a fantastic job presenting, and were so kind to one another. They had clearly worked hard on their presentation, were comfortable in front of my class, supportive of one another, and enthusiastic about the subject. It was truly a pleasure to have them visit our room. Thank you for sharing!" -Kristen Schlund, 2nd Grade Teacher

"I was impressed with the entire presentation; it really engaged my students! First, you were well organized and well prepared. Each of you had a role to play, and each was ready for their "lines." It was like watching a well-put-together play--no down time. You made good eye-contact and spoke clearly and loudly enough for the class to hear. Next, your visual presentation was attractive and relevant. Each slide had a purpose and the slides furthered my students' understanding of what was being discussed. The demonstration model being set out first, left students knowing that something exciting would happen along the way!" -Sharon Busler, 1st Grade Teacher





We did our own classroom presentations. We went around to other classes and talked to them about protecting our drinking water. We used a slideshow with 31 slides for our presentation. We showed one of the water filters that we made and showed them how it works. We showed them the lifestraw. We gave brochures to the students and told them to share with their parents. We went to 16 different classes at our school. Each presentation was 15-20 minutes about protecting our drinking water.

Protecting Drinking Water in Nature

A Lifestraw is a water filter that is perfect for camping and you can drink out of rivers, lakes, and most water sources, even possibly a toilet. Also it removes about 99.999999% of all water borne bacteria and is very durable, *and* it can filter around 1,000 gallons of water. Also, the company that owns lifestraws, give them to Africans that don't have clean water. This is how people can protect themselves and their water from contaminants while in nature. We encouraged other students to use a lifestraw when camping or hunting. A few students said they had one.

Task Forces

Portfolio Slideshow Tech Support

Classroom Presentation Crews A and B

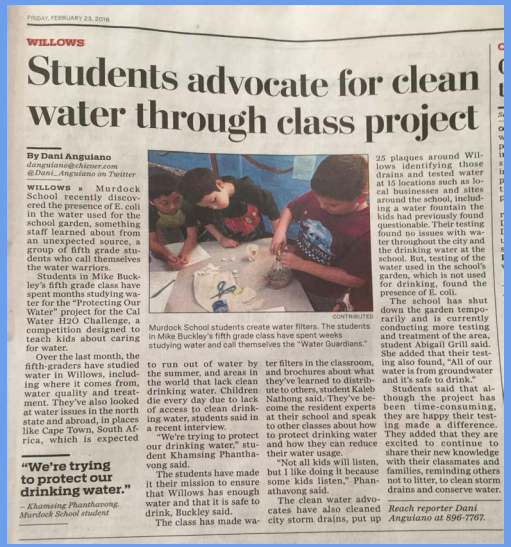
Brochure Design and Production

Storm Drain Marker Installation

Public Outreach

We shared our water quality test results with the school, and we reached out to other students and teachers by doing 16 class presentations.

We also spread the word about our project by meeting with a reporter from the Chico Enterprise-Record/Oroville Mercury-Register for a newspaper story. That article came out on February 23. The Glenn County Gazzette, the local education paper, also wrote a story about our project that will come out in early March.



FRIDAY, FEBRUARY 23, 2018

WILLOWS

Students advocate for clean water through class project

By Dani Anguiano
danguiano@chicoer.com
@Dani_Anguiano on Twitter

WILLOWS » Murdock School recently discovered the presence of E. coli in the water used for the school garden, something staff learned about from an unexpected source, a group of fifth grade students who call themselves the water warriors.

Students in Mike Buckley's fifth grade class have spent months studying water for the "Protecting Our Water" project for the Cal Water H2O Challenge, a competition designed to teach kids about caring for water.

Over the last month, the fifth-graders have studied water in Willows, including where it comes from, water quality and treatment. They've also looked at water issues in the north state and abroad, in places like Cape Town, South Africa, which is expected to run out of water by the summer, and areas in the world that lack clean drinking water. Children die every day due to lack of access to clean drinking water, students said in a recent interview.

"We're trying to protect our drinking water," student Khamsing Phanthavong said.

The students have made it their mission to ensure that Willows has enough water and that it is safe to drink, Buckley said.

The class has made water filters in the classroom, and brochures about what they've learned to distribute to others, student Kaleb Nathong said. They've become the resident experts at their school and speak to other classes about how to protect drinking water and how they can reduce their water usage.

"Not all kids will listen, but I like doing it because some kids listen," Phanthavong said.

The clean water advocates have also cleaned city storm drains, put up 25 plaques around Willows identifying those drains and tested water at 15 locations such as local businesses and sites around the school, including a water fountain the kids had previously found questionable. Their testing found no issues with water throughout the city and the drinking water at the school. But, testing of the water used in the school's garden, which is not used for drinking, found the presence of E. coli.

The school has shut down the garden temporarily and is currently conducting more testing and treatment of the area, student Abigail Grill said. She added that their testing also found, "All of our water is from groundwater and it's safe to drink."

Students said that although the project has been time-consuming, they are happy their testing made a difference. They added that they are excited to continue to share their new knowledge with their classmates and families, reminding others not to litter, to clean storm drains and conserve water.

Reach reporter Dani Anguiano at 896-7767.

"We're trying to protect our drinking water."
– Khamsing Phanthavong, Murdock School student

Murdock School students create water filters. The students in Mike Buckley's fifth grade class have spent weeks studying water and call themselves the "Water Guardians."

CONTRIBUTED

What can people do to help protect our drinking water?

1. Properly dispose of hazardous household waste at the Glenn County Landfill.
2. Don't litter; pick up litter by storm drains, along creeks, and everywhere else.
3. Don't pour anything hazardous down the drain or on the ground.
4. Install storm drain markers by drains around the city.
5. Pay attention to water quality testing statistics and conduct additional testing on your own.
6. Report suspicious activity, like dumping, that could threaten the water quality.

The Takeaways: What did we learn?

1. There are many people and children around the world who do not have access to safe drinking water.
2. Willows gets its water from groundwater.
3. The water in Willows is hard water, which is not harmful to humans but can leave a residue, ruin appliances, and clog pipes.
4. Water should not be taken for granted.
5. We should protect our water source - recycle hazardous household waste, pick up litter, report water contamination, talk to friends and neighbors.
6. Our school garden tested positive for bacteria. The school district paid for more testing which came out as negative from the Butte County Public Health Laboratory.
7. Environmental engineers design filters to remove contaminants from drinking water - the Lifestraw and wastewater treatment facility.
8. It can be difficult to filter all chemicals from water.
9. According to Cal Water and our classroom water quality testing, the water in Willows is safe to drink.
10. We want to keep our water clean for us and for the future people of Willows.