



Changing perspective: Learning about the Delta

By Luke Price
TOKAY HIGH SCHOOL

I have always wondered what defines Northern California. Southern California has its incredible beaches, Hollywood, and the second largest city within the United States. Up in Northern California we have farms, the capital, and really big trees.

After going on the Marine Science Institute research trip to the San Francisco Bay, my perception com-

pletely changed. The most defining feature of Northern California is our water. It singlehandedly makes us the agricultural gem of the world. Northern California soil is incredibly rich thanks to minerals from the Sierras and nutrients from our marshlands. When testing water for Storm Drain Detectives, it's hard to appreciate the importance of a small little river like the Mokelumne, but as we drove west to San Francisco on the day of our field trip it all started

coming together. You could see mile after mile of verdant farmland and marshes with flocks of birds and cranes littering the landscape. Water coming all the way from the Sierra Nevadas in the east made such a sight possible. On our research boat in Redwood City, this world view expanded even more. The researchers on the boat who were assisting us with water tests on the water of the Bay brought up a sobering fact. The Delta that allows such wonders as our fertile soil

and biological diversity is on the decline. Pollution is harming our wildlife and ocean acidification is having devastating effects. Scientists are still having to deal with mistakes of the past. For example, underneath a layer of mud within the San Francisco Bay lies an ecological disaster. In the days of the 1850s Gold Rush, miners stripmined mountainsides, using mercury to separate gold from rock. The mercury ran into the Bay, killing wildlife as it went.

Now it lies in wait ready to poison the fish and waterfowl of the Bay. This made me realize that we cannot take our water for granted in Northern California, for it is more precious than all of the gold found in our hills. This trip allowed me to see that L.A. can keep its Hollywood starlets and celebrities, and San Diego its beaches. For in Northern California we have been entrusted with one of nature's greatest masterpieces, our incredible Delta.

All about our trip to the Marine Science Institute

By Heriberto Gomes
HERITAGE ELEMENTARY SCHOOL

On April 5, our class visited the Marine Science Institute. MSI was founded in 1970. In the first year discovery voyage program served about 4,000 students. Today they serve about 50,000 students and adults annually through all of its program. They take students on the boat to learn about the sea animals because if they do not teach the students and adults about the animals, they will not care.

First we boarded the bus. It took us over two hours to get to Redwood City from Lodi. When we got there we were on a little patio with picnic tables, where we ate our lunch. Then we put on life jackets and boarded the ship. One of the leaders talked to us about water safety, and then we went into our groups. My first station was the hydrology station. First we lowered the Van Dorn Bottle into the bay. Then we put the water in tubes and we examined the temperature and salinity of the water. The second station we did was called the Benthic station. At this station we lowered a big claw to the bottom of the bay and scooped up mud. We then put the mud on screens to look for shells, rocks, and creatures. At this station we also got to take an oath to protect the environment and put mud on our faces. At the third station we lowered a bottle that catches plankton into the bay. Then we went to the laboratory to see the plankton closer in a microscope.

PLEASE SEE MSI, PAGE 5

Reese Elementary plants garden that is drought-friendly

By Cassandra Oaxaca
REESE ELEMENTARY SCHOOL

Did you know we're still in a drought even after all the rain we've gotten? My class and I went on a field trip to Lodi Lake and we were talking about what you're allowed to let go in the storm drain and shouldn't go in the storm drain. As Ms. Grant was talking about this, she mentioned that people have gotten fake grass, desert yards and drought-tolerant plants. I thought this would be perfect for my school's planters, and so I pitched the idea to student council and they liked it! Once my teacher heard the word she recommended Curt Juran to help us pick some plants out because nobody had experience. Once he guided us, answered our questions, and recommended some websites to us to give us an idea, we were ready. We planted some lavender and those are supposed to need very minimal water, attract bees, and need sunlight. Coincidentally our janitor who owns a garden at our school, Mr. Oscar, asked Student Council Planting Committee to take over the garden, so that's on our to-do list. I want to say a thank you to Ms. Grant, Mr. Juran, Mrs. Martinez and Mrs. Shepherd, and the Planter Committee for helping an idea become real.



JAIRO CARRILLO/HERITAGE ELEMENTARY SCHOOL

The Mysterious Case of the Lodi Lake Lunch Thief

By Martin Ceja, Miguel Luna, & Henry Rosales
NEEDHAM ELEMENTARY SCHOOL

Hi, my name is Oscar. I am a friendly river otter who lives in the peaceful pond called Pigs Lake, just south at the end of Lodi Lake. One rainy day, I was looking around for some fish or some delicious aquatic invertebrates, otherwise known as macroinvertebrates. They are delicious and my favorite treat! Suddenly, I noticed some water beetles and scuds moving slowly into something I had never seen. It looked like an object full of colorful, crunchy leaves.

erwise known as macroinvertebrates. They are delicious and my favorite treat! Suddenly, I noticed some water beetles and scuds moving slowly into something I had never seen. It looked like an object full of colorful, crunchy leaves.

Of course I was hungry, but I decided to be patient and figure out what was happening with the mysterious leaf object. So I decided to get a closer look. It was some kind of mysterious bag with lots of leaves and rocks tied down to the bottom of Pigs Lake. I saw even more delicious bugs like mayflies, midge larvae, and dozens of scuds entering the leaf pack! My stomach growled even more, and my mouth was watering! Just when I decided it was time for me to eat my lunch, I saw a big shadow figure approaching in the distance. It was Roger, the bully beaver of Cattail Creek. No otter or other creatures dared to cross him in his territory. So, I was surprised to see him on the south end of Pigs Lake where I

live. I tried to make myself invisible so Roger wouldn't notice me. But before I knew it, he was in front of my face asking, "Hey Otter, have you seen any twigs or leaves around here? They seem to have disappeared from Cattail Creek." I wasn't planning on spilling the beans, but my eyes betrayed me when I turned to look at the mysterious leaf pack that I knew for sure was full of scrumptious bugs! Needless to say, I hadn't even open my mouth when I caught a glimpse of Roger, the bully beaver, running away with my lunch! That day I learned a lesson: Never be patient when eating a delicious treat because you never know when somebody else will snatch it from you!

Want a job keeping water clean and safe?

How to become one of the people responsible for clean drinking water

By Dylan O'Ryan
LODI HIGH SCHOOL

The majority of Americans turn on the faucet with clean water flowing. However, most of us do not consider what path the water has taken to be available to be used for our personal use. Who is responsible for treating the water? What are the qualifications that are needed for this profession? Why is there an ever-growing need for people in this profession? Water treatment operators are the sole group that is responsible for treating the water for a community. These operators run the equipment, control the processes that clean and treat the water, and monitor the plant they work at. There are four water treatment operators for the City of Lodi who keep a system running 24/7 to keep water flowing to your taps. Their paths all start at the same place: high school. The minimum requirement for a water treatment operator is a high school diploma or a GED. With that met, you can now start your path to becoming a water treatment operator. Someone straight out of high school can start a sustainable profession without any college. There are five levels to a water treatment operator: T1, T2, T3, T4 and T5. The various levels all require distinct levels of training, years of experience and education. Many water treatment operators start as an apprentice, intern or a plant laborer, and assist the more experienced operators. This position can be gained straight out of high school. This assistant job allows a person to gain experience which would be beneficial to becoming an operator. The first step in becoming a water treatment operator is starting as a T1 level operator. To become a T1 operator, you have to complete the Grade T1 operator examination. This examination is offered two times a year, once in January and another in May.

PLEASE SEE CAREERS, PAGE 4

From toilet to lightbulb: How wastewater powers the city of Lodi

By Hayley Hower
LODI HIGH SCHOOL

Driving towards Stockton from Lodi on Interstate 5, behind the City of Lodi's White Slough wastewater plant, there is a large yard of contraptions with a switchyard and seven cooling towers with fans 30 feet in diameter that reach speeds up to 147 miles per hour! These towers and pipes bring water from your house to be cleaned and sent back to you — but this time, it is given to you as electricity. Have you ever wondered how water is turned into electricity? I

took a tour of the Lodi Energy Center, which is full of equipment to clean the city's wastewater to help transform it into energy. The City of Lodi is paid \$1 million a year for 5.2 billion gallons of this cleaned wastewater. Before reusing this water that is flushed from your toilets then cleaned at White Slough, the Lodi Energy Center goes through four more steps to super-clean the water. The Lodi Energy Center pumps the water it receives from the White Slough Water Pollution Control Facility into the clarifier.



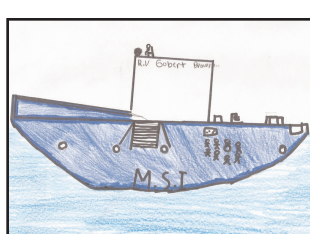
Hayley Hower and Dylan O'Ryan toured the Lodi Energy Center to learn about how Lodi's wastewater is used to generate power for the city.

COURTESY PHOTOGRAPH

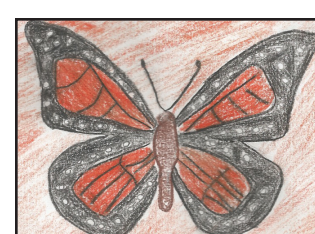
PLEASE SEE POWER, PAGE 5



All about recycling
Do you know what you can and can't recycle? Have you ever wondered what the three recycling arrows stand for? Find out more about recycling. **2**



Wild about the watershed
Students explored Lodi Lake, the Mokelumne River, the Delta and beyond through Storm Drain Detectives, the Marine Science Institute and more. **4 & 5**



Butterflies and other bugs
Through field trips and a unique set of experiments at Lodi Lake, local students learned about macroinvertebrates, entomology and other buggy topics. **6 & 7**



ANGELINA BRIANO/HERITAGE ELEMENTARY SCHOOL

Five surprising things that you can't recycle

By **Melissa Marquez**
REESE ELEMENTARY SCHOOL

According to PlanetSave.com, 87 percent of American adults recycle regularly and nearly 51 percent recycle every day. While more and more people are learning and taking action, there are still many mistakes as to what goes in the green bin or not.

Pizza boxes

Even though many people think that all boxes are recyclable, surprisingly pizza boxes aren't. Pizza boxes are made from actual cardboard; however, once the pizza is put into the box, all of the cheese and other food in the pizza is soaked into the cardboard. Once the food is soaked in the cardboard, it can't be recycled because the paper fibers will not be able to be separated from the oils during the recycling process.

Paper towels

Nowadays, paper towels are generally made from recycled paper and the paper fibers get shorter with each reuse. Paper towels are in their fourth generation. Paper towels are also usually used to clean up liquid messes, which has the same effect as pizza boxes. Being that pa-

per towels clean up messes that cannot be recycled anymore because they have absorbed the toxins from your mess.

Juice boxes

When it comes to recycling, not all boxes are the same. This is also due to the quality of the paper; but also any materials added to optimize the box for consumer use. This means that the juice boxes make it difficult to recycle because it's hard to separate the paper from the juice box.

Coffee cups

Did you know? Some estimates are putting the number of cups we dispose of at least 2.5 billion cups per year. That's an enormous amount. The problem is that the polyethylene coating inside the cups that sticks to the paper part of the cup makes it almost impossible to recycle.

Bottle caps

The reason that caps are to be taken off the bottle is because the cap is made from a different kind of plastic than the bottle, meaning that the bottle and its cap cannot be recycled together, according to PlasticsMakeItPossible.com.



MONICA ORTIZ/HERITAGE ELEMENTARY SCHOOL
Recyclables are piled on the floor at Cal-Waste.

Recycling word search

A U H E R R M J A M N C C J V
O D E N R C E X S P O A J Z H
E R V V R E N P R B R M A N Q
S R Y I O O P O A D E C N R X
A T G R R W S A B P I U E X Z
G C R O W C A O P T S U M Y B
V L U N O S A Q S V S W S M A
S L X M V R S A T E L E E U L
E O H E D N L S S A L G B N I
H X R N Y P R O C E S S H I N
L C N T G N I L C Y C E R M G
J X R C I X V U Q A M A Q U I
X X S Y N N R Q W H D F L L V
X Y I B V O G M W U V O F A M
W J I U J W F E H D N I W Q L

- | | | |
|-------------|---------|-----------|
| ALUMINUM | BALING | CARDBOARD |
| ENVIRONMENT | GLASS | NEWSPAPER |
| PAPER | PLASTIC | PROCESS |
| RECYCLING | REUSE | SORTING |

— By Julio Cortez, Heritage Elementary School

Plastic water bottles by the numbers

By **Alondra Cazares**
HERITAGE ELEMENTARY SCHOOL

- 50 billion plastic water bottles are used each year.
- Americans consume 8.6 billion gallons of bottled water.
- Plastic water bottles can take between 400 and 1,000 years to decompose.
- It requires 3 times the amount of water to produce a plastic bottle than it does to fill it.
- Bottled water costs over 1,000 times more to drink than tap water.

What happens to trash?

By **Shaila Flores**
HERITAGE ELEMENTARY SCHOOL

What happens to the trash? Where does it go? When you drop some trash on the floor it gets recycled, or some of it gets recovered and some of the trash gets burned. The trash gets associated in the trash landfills. If you want to be in a good, clean place, you should help the community. When you drop trash think of this: All the trash you throw on the floor gets polluted, and sometimes the trash you throw goes to the water and fish think it's food so they eat it and they get sick and some fish die. Some people throw out plastic, papers, cans, water bottles and more. If you love animals, you should not pollute, because if there is pollution fish die.

What Reese and Heritage Elementary students learned at Cal-Waste

By **Carlee McCabe**
REESE ELEMENTARY SCHOOL

The trip to Cal-Waste was amazing. Our sixth-grade class and the fifth-graders from Heritage School were able to see and learn what the workers at Cal-Waste do with all the recycling.

The three arrows on the recycling sign mean 1. Reduce, 2. Reuse, 3. Recycle.

Reduce means that you save energy and money simply by making smarter choices. Reuse means to use something that had been already used. An example is that somebody reused some old used tools and made a sculpture out of it. Recycle means to convert (waste) into reusable material.

All of us got to go look around with our guide and see how recycling works. We also got to see a huge pile of recycling that was as tall as about a two-story house. Did you know they have to move all that recycling off the floor every 7 hours? That's crazy!

After that, we got to look inside this room that showed a wall of what and what not to

recycle. What surprised me and a few of my classmates was that you can't recycle pizza boxes because of all the grease that soaks into the box.

As a community we need to be more careful and recycle what needs to be recycled and throw away what needs to be thrown away.

How recycling works

By **Marco Garcia**
HERITAGE ELEMENTARY SCHOOL

There are many steps for recycling recyclable things like plastic, glass, cardboard, etc. Some steps that I'm going to talk about in this article today are the steps that Cal-Waste uses every day.

The first step for recycling is that Cal-Waste sends their recycling trucks out into different neighborhoods and they go around collecting all of the RECYCLE ONLY bins. After that, when the truck is finished collecting all the RECYCLE ONLY bins, the recycling truck goes to the Cal-Waste recycling center and drops everything they collected into a big pile.



JAVIER SOTO AND GERMAN CAMARGO/
HERITAGE ELEMENTARY SCHOOL

Next, a loader car brings all of the recyclable stuff that the recycling truck has dumped in a pile on the floor. Additionally, a machine carries all the stuff that the loader car put in a pile.

After that, employees of Cal-Waste sort out stuff that won't be recycled like plastic bags. The employees must work while wearing gloves because they might get stabbed in the hand with a needle with bad chemicals. If they do get stabbed by a needle, and they might get sick and would not

be able to work. Also the people responsible for the sorting have to be very careful because if a plastic bag goes through the machine, the machine will break.

All the recyclable stuff gets sorted out to the next station. The employees and machines separate out plastic, paper and cardboard. The recyclables are then packed into large blocks.

Most of the recyclable plastic at Cal-Waste is shipped to China, where it will be recycled and turned into other products.

Why should students join the Earthkeepers?

By **Naomy Salazar Lara**
HERITAGE ELEMENTARY SCHOOL

Earthkeepers is a club at Heritage School that meets once a week to clean up our campus. The club is run by Ms. Jacinto, and has students who do the work. For this interview, I spoke to Araceli Villanueva, a fifth-grade Earthkeeper.

Q: Why did you join Earthkeepers?

A: I joined Earthkeepers because I want to help keep the Earth clean.

Q: What makes Earthkeepers special?

A: Earthkeepers is special because I want to live in a healthy world.

Q: Why is it good to keep our campus clean?

A: It is good to keep our school clean because something can be dangerous and somebody could get hurt.

Q: Do you like Earthkeepers?

A: Yes, definitely!

Q: How do you clean the campus?

A: We use buckets and grabbers to collect the trash.

Q: Who motivated you to join Earthkeepers?

A: My teacher, Ms. Jacinto motivated me to join Earthkeepers.

Q: What is the hardest part about being an Earthkeeper?

A: Nothing, everything is easy and fun.

Q: Do you only clean our campus?

A: No, we'll go outside and clean the storm drain also.

Q: Do you use reusable bags?

A: Yes, of course!

Q: Do you recycle?

A: Of course!

Q: Do you chat with friends while you're working on Earthkeepers?

A: Yes, while I'm cleaning.

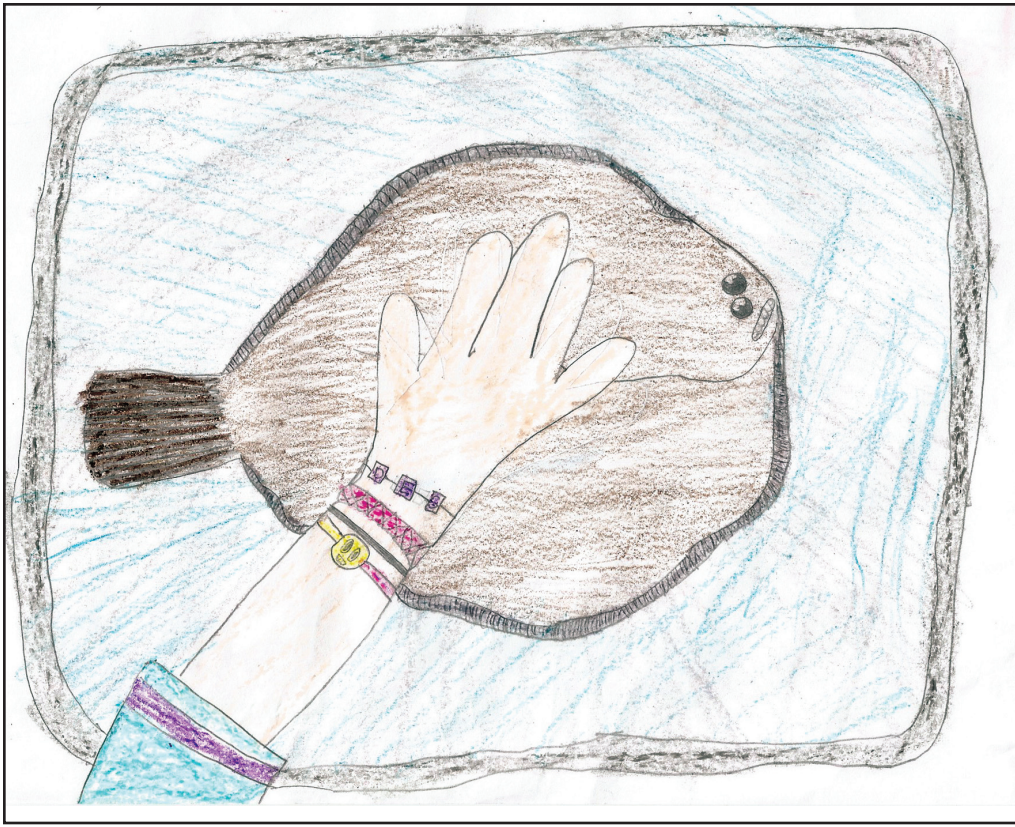
Q: What is your favorite part about Earthkeepers?

A: My favorite part about Earthkeepers is cleaning the school.

The students of Heritage, Needham, Reese and Lockeford elementary schools, Tokay and Lodi high schools, and Benjamin Holt Preparatory Academy would like to thank the following sponsors for their support:



AMAZING PLANTS AND ANIMALS



DESTINY MUNOZ/HERITAGE ELEMENTARY SCHOOL

During a trip on the Marine Science Institute's research vessel, students were able to study California halibut and other fish up close.

Have you heard of the flatfish?

By Raul Peralta and Kelvin Aguilar
HERITAGE ELEMENTARY SCHOOL

Flatfish swim sideways and they hide on the ocean floor. They can also camouflage on the ocean floor to hide from predators and other fish.

These fish are fascinating creatures because they have both eyes on one side of their body. When they are on the floor, they can look up to see their surroundings and other fish near them.

When you find a flatfish, they can be found in a group. Flatfish can live in brackish water and freshwater. Flatfish are about two feet long when they are adults.

Facts about California halibut

By Destiny Munoz
HERITAGE ELEMENTARY SCHOOL

1. The California halibut is also called the flatfish.
2. A California halibut can weigh up to 390 pounds.
3. A female halibut can live up to 42 years.
4. California halibut have diamond shaped bodies.
5. Halibuts use their flat shape to camouflage themselves on the ocean floor.

Eagle Scout Project: Building wood duck boxes at Lodi Lake

By William Jones
BOY SCOUTS TROOP 199

An Eagle Project is the opportunity for a Boy Scout to demonstrate leadership of others while performing a project for the benefit of his community.

For my Eagle Project I chose to install and monitor nine wood duck boxes in the Lodi Lake Nature Area. Lodi Lake donated some boxes that were in storage from another Eagle Project.

The reason I chose this for my Eagle Project is my love of interacting and working with wildlife. Wildlife needs to be protected and managed for future generation to enjoy.

As of May 7, we have had one-box produce 12 ducklings.

Destruction of riparian forests—the birds' primary breeding and wintering habitat — and uncontrolled harvest were the two major factors that contributed to the species' decline. By the late 1800s to early 1900s, extinction of the wood duck seemed imminent, according to Ducks Unlimited.

Federal and state hunting regulations, habitat restoration and the nesting box pro-



COURTESY PHOTOGRAPH

For his Eagle Project, William Jones installed and monitored nine wood duck boxes in the Lodi Lake Nature Area.

gram have brought the numbers of wood ducks up. By the 1940s, their numbers had increased enough so that there was no longer a fear of

extinction.

Today, it is estimated that wood duck nest boxes produce 100,000 ducklings annually in North America.

Plants and plankton: They're more important than you might think

By Anthony Diaz Santamaria
HERITAGE ELEMENTARY SCHOOL

When you're about to litter, think again what you're about to do. When we litter, the waste ends up in the ocean, which will kill millions of plankton, and possibly plants.

You may not realize how important plankton and plants are. Below is some information on the ways in which both plankton and plants help humans. So if you're grateful for what you have, you won't litter.

Plants

- There are many ways in which plants help humans and animals.

- The most helpful thing plants do is they make oxygen. Without plants we wouldn't have oxygen. Without oxygen, people would die.

- Plants also give us food. If there weren't plants what would herbivores eat? This would mean that many animals would die.

- Plants help us by providing resources to make medicine. Everybody gets sick at some point. So everybody will need medicine.

- Even though humans pollute the air, plants help and filter the air from pollution.

Plankton

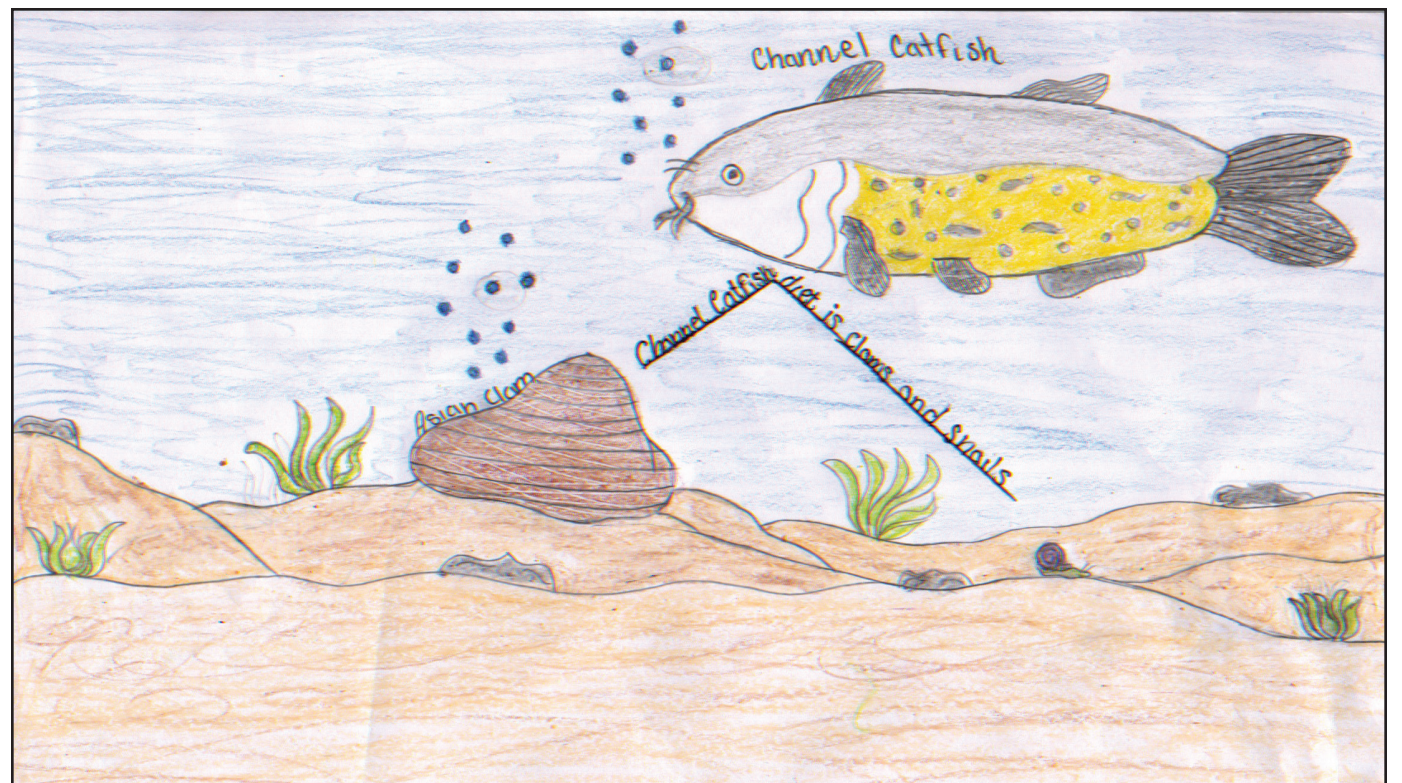
- There are many ways in which plankton (yes, tiny plankton) help humans and animals.

- Many people like to eat fish. Not just because it's good, because it gives protein. But where does the fish get protein? From plankton. Plankton provides nutrition to fish and other ocean animals we eat.

- Plants aren't the only thing that gives oxygen. Plankton also make oxygen. In fact plankton make a quarter of oxygen in the atmosphere.

- Plankton are also good for humans to consume. Eating plankton can offer pain relief and promote healthy blood sugar. Plankton is also considered "brain food" for humans.

- Just like plants, plankton are used to make medicine.



PAULINA LOPEZ/HERITAGE ELEMENTARY SCHOOL

Fast facts about turtles

By Kai Wall
REESE ELEMENTARY SCHOOL

- Turtles have been on Earth for more than 200 million years.

- Turtles live on EVERY continent except Antarctica.

- Turtles will live in almost every climate that's warm enough to complete their breeding cycle.

- Turtles are in the reptile family.

- Turtles evolved before some reptiles, including birds, crocodiles, lizards, and even snakes.

- A turtle's shell is made up of 60 different bones con-

nected to each other.

- The top part of the turtle's shell is called a carapace, and the bottom part is called a plastron.

- Turtles range in size from the 4-inch bog turtle to the 1,500-pound leathery turtle.

- North America contains a large variety of turtle species, but in Europe they only contain two species of turtles.

- Turtles lay their eggs on the land and go back into the sea, leaving the babies.

- Turtles have a good sense of smell and good eyesight.



RODRIGO ACOSTA/NEEDHAM ELEMENTARY SCHOOL

Drought-efficient plants and why it's important to use them

By Amelia Dietz
REESE ELEMENTARY SCHOOL

The drought was a really big thing in Lodi for a while, and that just barely ended not too long ago. During that time, many people near our area were doing their best to save water. During that time, many people near our area were doing their best to save water.

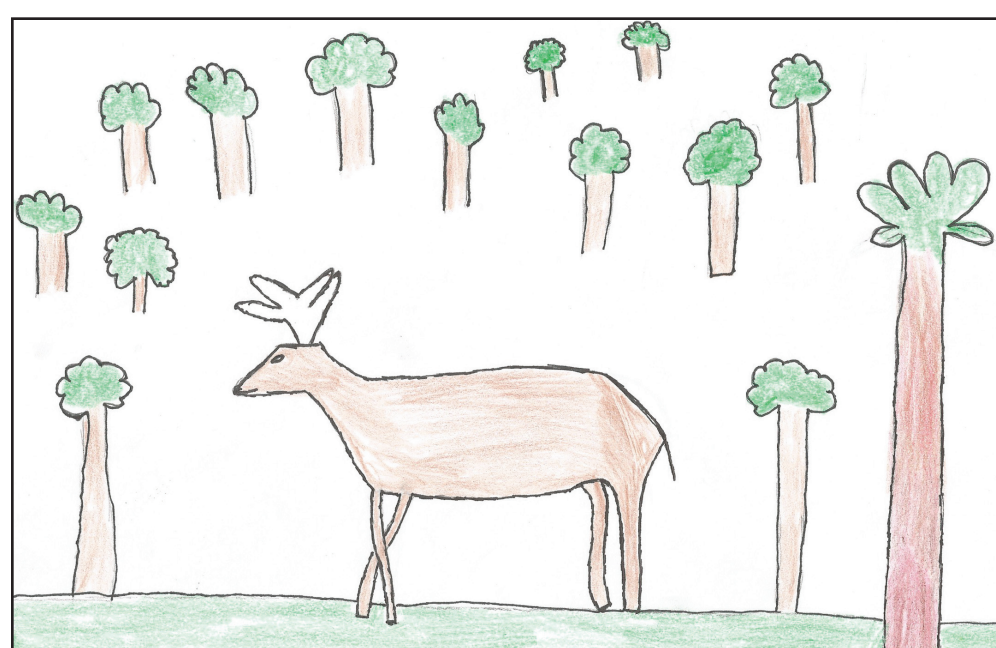
One way to do that is to plant drought-efficient plants. One of these kinds of plants is called a California lilac. It is a blue/purple plant that is mostly known to be a tree or a shrub. These would look beautiful in any garden.

Another example is the Geraldton waxflower. This

plant is also known as a shrub or bush and blooms flowers that have a waxy kind of feel.

These plants should not just be used while in the middle of a drought. It is always a really good idea to try to conserve water all of the time. These plants work by keeping the water inside of them just like a cactus does, so every time you water them, the water doesn't just go down into the ground, it gets sucked up into the plant and saved for later.

Drought-efficient plants are good for the environment no matter what time of the year it is or whether or not you're in a drought.



JESUS RAMIREZ/HERITAGE ELEMENTARY SCHOOL

All about vultures

By Samra Saeed
HERITAGE ELEMENTARY SCHOOL

Vultures can be found in our area. They are scavengers that will eat dead creatures. Vultures might also attack newborn baby birds. They also have a sharp, pointed beak so they can cut off the meat easily.

All vultures have a wide wingspan, which lets them fly for hours to hunt for food. Most vultures can live 11 to 47 years. Some vultures can be as tall as adult humans.

Eagles and some owls are predators of vultures.

WILD ABOUT WATER

What do Storm Drain Detectives do?

By **Kennedi Carson**
REESE ELEMENTARY SCHOOL

Have you ever wondered how clean or dirty the Mokelumne River is? Well, if you have, you can participate in an afterschool activity that happens once a month at Lodi lake called Storm Drain Detectives.

During Storm Drain Detectives we measure pH (potential of hydrogen), EC (electrical conductivity), DO (dissolved oxygen), turbidity, and other interesting things.

So, what does pH show in water? Basically, the pH value shows whether water is hard or soft.

According to www.freedrinkingwater.com, "The pH of pure water is 7. Typically, water with a pH lower than 7 is considered acidic, and with a pH greater than 7 is considered basic. The normal range for pH in surface water systems is 6.5 to 8.5, and the pH range for groundwater systems is between 6 to 8.5. Alkalinity is a measure of the capacity of the water to resist a change in pH that would tend to make the water more acidic."

The measurement of alkalinity and pH is needed to determine the acid level of the water.

The electrical conductivity of water estimates the total amount of solids dissolved in water — TDS, which stands for Total Dissolved Solids. TDS is measured in ppm (parts per million) or in mg/l.

The electrical conductivity of the water depends on the water temperature: the higher the temperature, the higher the electrical conductivity would be. The electrical conductivity of water increases by 2 to 3 percent for an increase of 1 degree Cel-



KENNEDI CARSON/REESE ELEMENTARY SCHOOL

Left: This is the turbidity reader. We use it to test the turbidity level in the water. In the glass vile is an example of perfectly clean, non-turbid water. Center: This is the DO meter. We use it to measure the dissolved oxygen in the water. Right: This is the pH meter. We use it to measure whether the water is hard or soft

sus of water temperature. Many EC meters nowadays automatically standardize the readings to 25 degrees Celsius.

While the electrical conductivity is a good indicator of total salinity, it still does not provide any information about the ion composition in the water. The same electrical conductivity values can be measured in low quality water (e.g. water rich with sodium, boron and fluorides) as well as in high quality irrigation water (e.g. adequately fertilized water with appropriate nutrient concentrations and ratios).

With the DO meter we measure the dissolved oxygen in the water.

According to www.state.ky.us, "Dissolved oxygen is the level of gaseous oxygen (O₂) dis-

solved in the water. Oxygen gets into the water directly from absorption from the atmosphere, by rapid movement, or as a waste product of plant photosynthesis. Water temperature and the volume of moving water can affect dissolved oxygen levels. Oxygen dissolves easier in cooler water than warmer water. Adequate dissolved oxygen is important for good water quality and necessary to all forms of life. Dissolved oxygen levels that drop below 5.0 mg/L cause stress to aquatic life. Lower concentrations cause greater stress. Oxygen levels that go below 1-2 mg/L for a few hours may result in large fish kills."

Turbidity is the cloudiness or haziness of a fluid caused by large numbers of individual particles that are

generally invisible to the naked eye, similar to smoke in air. The measurement of turbidity is a key test of water quality. Fluids can contain suspended solid matter consisting of particles of many different sizes. Some particles may be large enough and heavy enough to settle rapidly to the bottom of the container if a liquid sample is left to stand (the settleable solids), but very small particles will settle very slowly or not at all if the sample is regularly agitated or the particles are colloidal. These small solid particles cause the liquid to appear turbid.

Those are a few things I have learned from Storm Drain Detectives. I hope from reading the article that you will consider participating in SDD.

POWER

CONTINUED FROM PAGE 1

At this point the water has more than 40 parts per million of silica. Silica in solid form is glass. It is naturally a mineral, but going through the treatment process it is reduced to make the water more pure. The water is mixed with a chemical solution, which drops out the silica in the water. The silica is reduced to less than 15 parts per million.

After the clarification process, the water is pumped into a giant warehouse-like structure to start the ultrafiltration process. In this process, water flows through membrane filters to remove solids that have formed in the processing of clarifying the water. This type of ultrafiltration is essential for the next step in of purifying the water.

The third process, which is done twice, is called reverse osmosis. Water is passed through a semipermeable membrane, which means it'll only let certain things through the wall and not let them go back the other way. This is to remove even more impurities from the water. More chemicals are added to adjust the pH of the water and prevent damage to the membranes, or walls of the machine.

The last step is called electrode ionization, which is the last attempt to make the water as clean as possible. This final step removes dissolved impurities from the water, making the water less than 10 parts per billion silica.

This demineralized water is now ready to be fed into the steam system to start the process of producing electricity.

Now here comes the fun part. The water is pumped into what they call a huge heat recovery steam generator, which contains hun-

Learn more about energy efficiency

· **Kids Can Save Energy!**
www.energystar.gov/index.cfm?c=kids.kids_index

· **Bill Nye, the Science Guy:** homeenergysaver.ning.com/video/video/show?id=6551471%3AVideo%3A12013

· **Room to Room Energy Saving Ideas:** www.energystar.gov/index.cfm?fuseaction=popuptool.atHome

For more information, visit City of Lodi Electric online at www.lodielectric.com, on Facebook at www.facebook.com/lodielectric or call toll free at 855-516-2105.

dreds of tubes to help control the turning of water into steam. Hot gas from a combustion turbine passes across the outside of the tubes as the water flows through it, creating a tunnel. The heat from the gas is transferred to the water that's in the tubes.

As the water flows, it gets hotter and hotter until it evaporates into steam. The steam then travels through pipes over to a steam turbine generator. The steam turbine generator converts the thermal energy (heat) in the steam to mechanical energy to produce electricity.

The steam turbine generator can produce 105 megawatts of power. The Lodi Energy Center produces about 300 megawatts of energy from this process, equivalent to what 300,000 homes use.

The journey is long for our toilet water, but through science and technology and careful measurements, toilet to light bulb is seemly a modern means of creating energy.

CAREERS

CONTINUED FROM PAGE 1

With this T1 accreditation, one can become an entry level water treatment operator.

The next level is T2. This level can be gained after a T1 level, or you can bypass the T1 level by taking a 36-hour course of specialized training that covers the fundamentals of drinking water treatment. To treat the water, you have to obtain certification.

Each operator level comes with various levels of responsibility and expertise. T1 and T2 operators can work at smaller treatment plants or at wineries.

The next level is T3. This level allows you to work at the Lodi Treatment Plant. This level's minimum requirements are the T3 examination, along with one year of working as a T2 operator, and an additional

Why is the City of Lodi's water treatment method so special?

When the water treatment plant was put online in 2012, the plant was able to keep the amount of water the same throughout the severe drought. This allowed for a sustainable situation in the Lodi area. This separated Lodi from other California communities because the city could allow the ground table to recover even through the drought.

year as a treatment operator. Another requirement is that you must take two 36-hour courses related to water treatment.

With a T3 certification, an operator can work at any treatment plant in California (T1 to a T5 level facility).

Each treatment plant must designate a Chief Plant Operator. The Chief Plant Operator is the person directly responsible for the daily operation. To supervise the operation of the Lodi treatment plant, the operator must hold a T4 certification.

The requirements for T4 is to pass the T4 exam, one year as a T3 operator, three additional years of operating experience, and you must take three 36-hour courses in water treatment.

The final level is T5, which requires four 36-hour courses, two years as shift operator or chief operator, and three additional years of operating experience.

Water treatment operators are constantly working to advance and learn more about their field.

Andrew Richle, the water plant superintendent at the Lodi water treatment plant, and his colleagues see a problem in gaining the experience needed to advance to the higher

levels of an operator.

There is a need for more workers who are trustworthy to run the plants, Richle said, but there is a "level of competence" issue. Richle wants more programs to make advancements; however, he needs competent workers for the positions.

Richle is trying to create programs and apprenticeships for the City of Lodi water treatment facility that would speed up the advancement rate. There are many operators at high operational statuses that are getting close to retirement, he said.

Richle and his colleagues have the drive to make a change in the water treatment industry. However, there are obstacles that they face in creating apprenticeships and internships in Lodi.

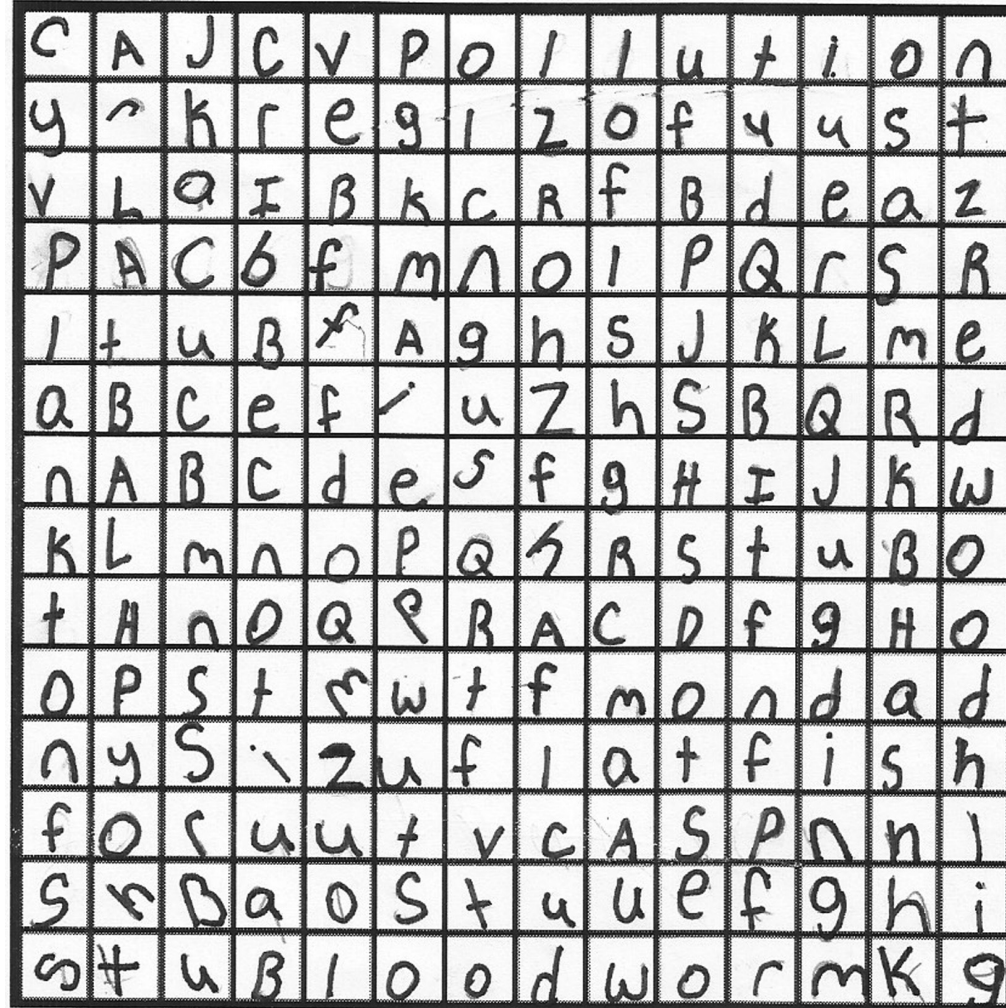
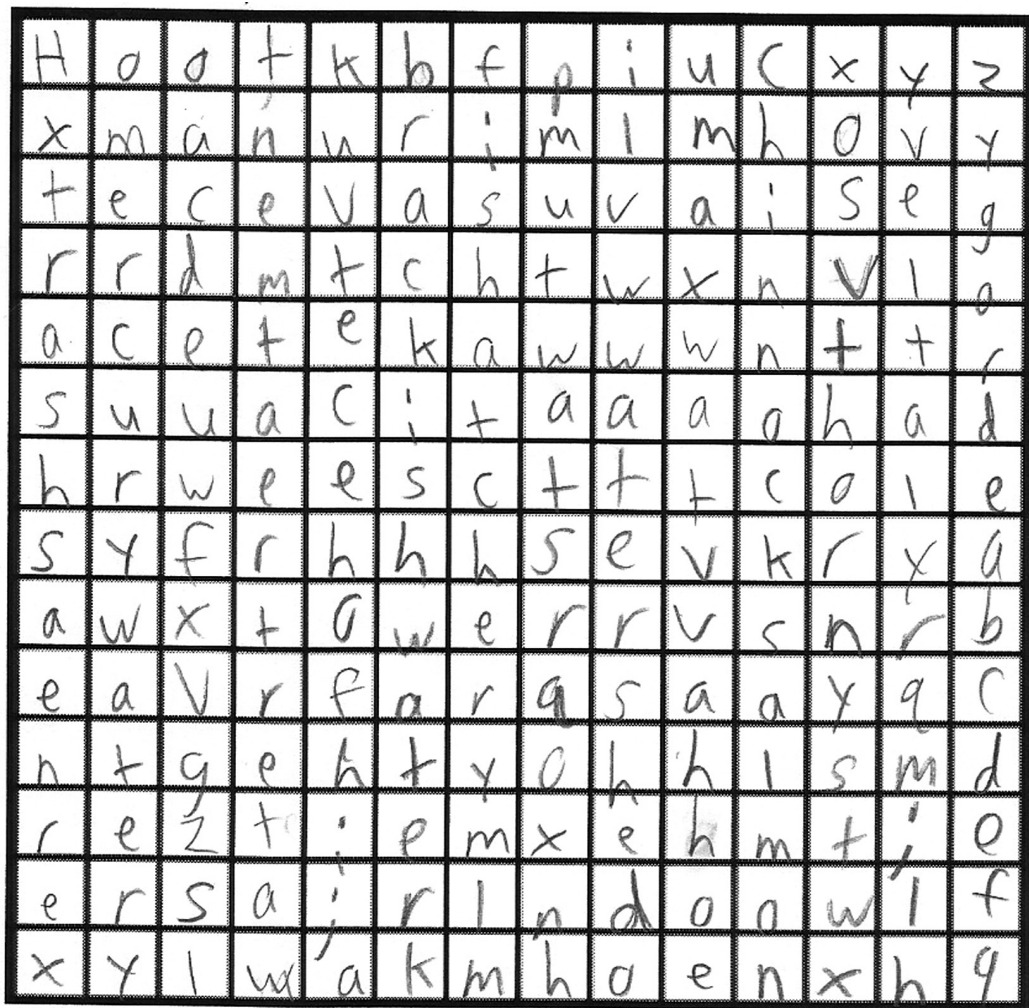
For these programs to start, the funding has to be available. In addition, they must be approved by upper management along with city council.

Lodi's water treatment is special in California because they have been able to maintain a stable groundwater table reading. They were able to achieve this by using surface water from rivers and Lodi Lake to compensate for the lack of water in the ground.

Water treatment is important to everyday life, and it is important to know who treats something we use every day. It's possible that someone straight out of high school can embark on a lifelong profession that is sustainable and important to everyday of life.

If you have any questions about water treatment operators, the California Water Boards (www.surcb.ca.gov) and the Sacramento State Water Programs (www.owp.csus.edu/courses/catalog.php) have information about accreditation for operators and frequently asked questions.

Water creature word searches



TRASH
MERCURY WATER
PLANT

CHINNOCK SALMON
WATERSHED
FISH HATCHERY

— By Alexander Bazaldua, Heritage Elementary School

CRABFISH
BLOODWORM
REDWOOD

PLANKTON
SHRIMP
FLATFISH

FISH

— By Christian Villafuerte, Heritage Elementary School

WILD ABOUT WATER

The drought and Lodi: Conservation efforts behind the scenes

By Christian Raught

BENJAMIN HOLT PREPARATORY ACADEMY

Lodi has been the host of several showers in the past month or so. This is good news for the drought status, especially with the recent lifting of water restrictions originally set in place since 2014.

Yet even as the drought state of emergency is lifted, there is still much to be said about the water habits developed during the drought.

Lodians such as myself may have

felt as if the drought had little to no real effect on our city, aside from the mandatory conservation restrictions.

As it turns out, the Lodi Surface Water Plant has been hard at work making this happen. As our primary source of water, it takes in much of our surface water and processes it until it is ready to be sent out to homes.

It is rated to produce 10 million gallons per day, chief water plant operator Andrew Richle said, yet this thirsty town can use up to 20

million. How does it manage to keep up?

The answer is quite simple, and yet ingenious; the plant uses a combination of processing and water from the Mokelumne River and 28 wells scattered across town. This works to create a system that can work through pretty much anything, including our recent drought.

As the drought progressed, the biggest difference in operation of the plant was the activation of more wells, Richle said. This used

up plenty of water from the wells, but the Mokelumne River helped keep them up until the drought eventually eased off this year.

This is not to say that keeping an eye on our water usage is no longer needed, though. As was the case with me, it is very possible there are many who are unaware of the lengths that the city has gone to conserve.

The efforts of our water policy enforcement teams have greatly helped in reducing water usage. They catch people who are perhaps

overwatering on an off day, watering with an open hose, or spraying down their driveways.

Rather than a punishment, they will stop and give them means of information, a pamphlet of the various water restrictions in place, compliance engineer Kat Garcia said. Aside from this, water information is not necessarily put out in anyone's faces.

With all this to consider, watching the next water year unfold should prove as interesting as ever.

What still affects us today from the Gold Rush

By Alejandro Osorio

HERITAGE ELEMENTARY SCHOOL

There are many effects on us from the California Gold Rush. Do you know any of them? YOU DON'T?!

Well, you're going to find out a few of them. One effect is from a toxic chemical

called mercury. Fish absorb mercury and we human beings eat fish, right?

Well, if you eat fish that are contaminated with mercury it can damage your nervous system, and you might also start to hallucinate.

If you do not want mercury

in you, I suggest that you search on the internet for which fish are contaminated with mercury.

There is another toxic chemical that affects us today. It is mercury's cousin methylmercury. If methylmercury contaminates your body it damages

your body and it could harm unborn babies. I hope you will think wisely before eating a fish.

Editor's note: During the Gold Rush, mercury was used to process the gold and was washed downstream to the Delta and San Francisco Bay, where it can still be found.

Camanche Dam fast facts

- Construction began in 1963 and was completed in 1964.
- Capacity of Camanche Dam is 431,000 acre-feet.
- Purpose for building was to provide flood control.
- Camanche Dam is 171 feet high and 2,400 feet long.
- Camanche is still being used.
- Camanche Dam is located in San Joaquin County.
- The town of Camanche disappeared under its reservoir.
- East Bay Municipal Utility District is the owner of Camanche Dam.
- Camanche Dam's surface area is 7,770 acres.
- Camanche is an earthfill dam.
- Camanche Dam impounds the Mokelumne River.
- Camanche Dam has the world's largest artificial salmon spawning.

— By Christian Martinez, Heritage Elementary School

Salt Springs Dam fast facts

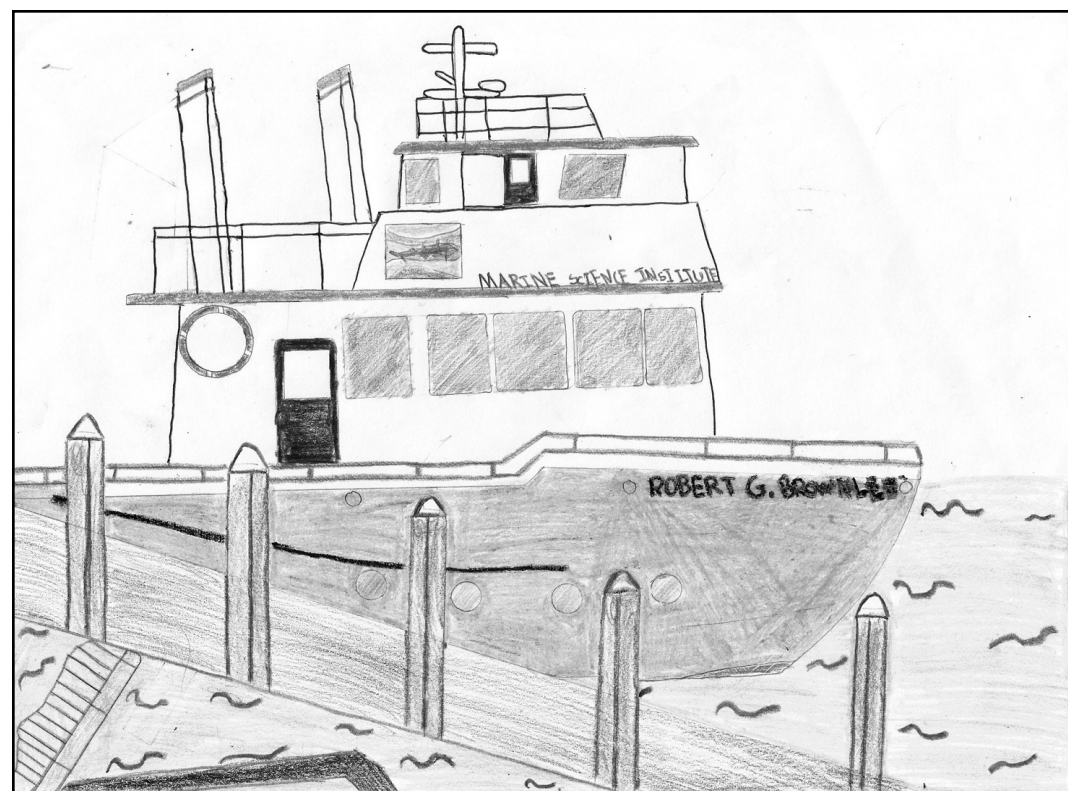
- Height: 332 feet tall
- Completed: 1931
- Membrane was completed: 2005
- Surface elevation: 3,900 feet
- Owned by: Pacific Gas and Electric
- Purpose: Hydroelectricity production
- Location: Amador, California
- Settlements: Tamarack

— By Monica Ortiz, Heritage Elementary School

Pardee Dam fast facts

- Height: 345 feet tall
- Completed: in 1929
- Water is used for drinking water in the San Francisco Bay Area
- Length: 1,337 feet long
- Surface area: 2,134 acre-feet
- Owned by: East Bay Municipal Utility District (EBMUD)
- Location: The foothills of the Sierra Nevada

— By Araceli Arong, Heritage Elementary School



MSI

CONTINUED FROM PAGE 1

The last station was the ichthyology station. We put a large net in the water to catch fish. We all worked together to pull the net back onto the boat. Once the fish were on the boat, we got to touch and examine them and determine which species they were.

One of the fish we caught was called a midshipman. This is a rare fish to catch in the San Francisco Bay. When we were done, we returned the fish to the water. Then we even got to see a seal!

ART BY HERIBERTO GOMES/HERITAGE ELEMENTARY SCHOOL

What the White Slough Wastewater Treatment Facility does with our water

It takes 7 to 9 hours for the water to get from our homes to the White Slough treatment plant. White Slough is about 7 miles away from the center of Lodi.

Once the water gets to White Slough, they begin to clean it so it won't be nasty or disgusting. If they don't clean the water, people can get sick from diseases that spread through the water.

If people put things in the toilet that don't belong, it becomes harder for the people that are working at White Slough to clean the water.

Once the water is fully cleaned, it is sold to different companies, or released into the Delta.

— By Paola Cardoso, Heritage Elementary School

Dealing with a clogged pipe: When to call a plumber or the city

Have you ever wondered where your water goes after you flush your toilet, take a shower, or wash your hands? Well, after your water goes down the drain it goes to White Slough Wastewater Treatment Plant. This process takes about six to seven hours to reach the plant from Lodi.

At this place, they do five steps to make the water clean again. The first step they do is the primary treatment, next is secondary treatment, then secondary clarifier, third aeration treatment, and lastly the disinfection step. The last step they use is the ultraviolet process or UV process; this process makes the water clear and much cleaner.

But before your water gets to the treatment plant, some things may happen.

Has your toilet, shower, tub or sink ever plugged up? If so, then your lateral or main is clogged. The lateral is your responsibility and the main is the city's responsibility.

Everyone knows how to unclog a toilet, but if you try unclogging your toilet and you can't unclog it, then call the city. If anything clogs up and you can't unclog, then call the city right away. Do not call a plumber because they will just ask you for money to fix it.

If you call the city and the main is clogged then the city will fix it without asking for money, if the lateral is clogged they will tell you that it is your responsibility and you will have to fix it. That's when you call a plumber to get it fixed.

So if you ever have wondered where your water goes after you flush the toilet or wondered what to do when you can't unclog something then this is the right section for you.

— By Anthony Werder, Reese Elementary School

Facts about Lodi's Surface Water Treatment Facility

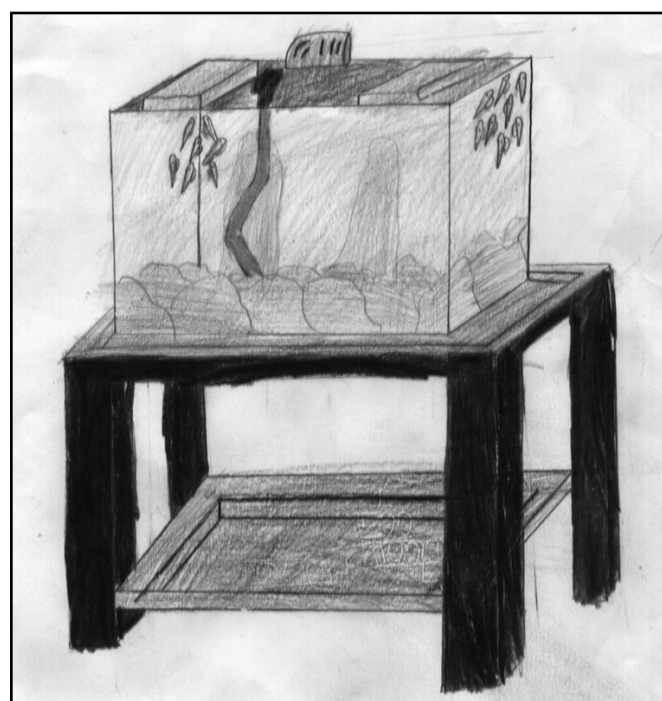
The most important information I learned at the Surface Water Treatment Facility is that the different colored pipes are carrying different types of water. The green pipes carry untreated water and the blue pipes are for treated water. The purple pipes carry water that has been treated, but that is not drinkable.

Also, I learned that initial treatment capacity is 50 million gallons of potable water a day.

There are four types of filters at the treatment facility. The types of filters are slow sand filter, rapid sand filter, pressure filter and diatomite filter.

— By Azael Gonzalez Santos, Heritage Elementary School

Salmon in the classroom: Our watershed experiment



By Alexis Mendoza

HERITAGE ELEMENTARY SCHOOL

On January 13, we started to raise our very own salmon in a fish tank in our classroom. Our teacher is Ms. Jacinto, and we are a fifth-grade class. The salmon were brought to us as eggs.

The temperature of the water in the tank had to be kept between 50 and 60 degrees Fahrenheit. At first it was really hard to keep the water temperature that low.

We kept the chinook salmon until they were fry. We released the salmon on February 23, after their yolk sacs were gone.

When we released the salmon fry, they swam away slowly. They looked really tiny compared to the river!

Quick tips for conserving water and energy

By Amelia Ellison

LODI HIGH SCHOOL

Water

- Keep showers 5 minutes or less (it saves 1,000 gallons of water per month).
- Turn off the water while lathering your hands with soap.
- Turn off the water while brushing your teeth.
- Instead of using the garbage disposal for fruit and vegetable waste, compost it.
- Wash your car on the lawn or get it washed at a commercial car wash.

Energy

- Turn off lights that are not being used.
- Run dishwashers only when they are full.
- Switch to energy efficient light bulbs.
- Keep windows and doors shut when running the air conditioning or heat.
- Use ceiling fans instead of AC.

Adults and Students!

Visit www.mywaterpledge.com to take a pledge to conserve water. Visit the website for information about prizes, student pledges and more.

Found: Crayfish

By Jasmine Delacruz

NEEDHAM ELEMENTARY SCHOOL

A crayfish can live on water and rocky areas such as freshwater places.

Characteristics

It has eight pointy legs, four pointy and skinny legs. It seems like a lobster.

Feeds on

Crayfish eat little fish and worms. Crayfish can eat little fish that are not alive.

The crayfish is a special insect, because it's a beautiful and most interesting insect.

Editor's note: For more about macroinvertebrates like crayfish, see Page 7.

JUMBLE

THAT SCRAMBLED WORD GAME

By Usman Khan and Alexis Mendoza

Unscramble these three jumbles, one letter to each square, to form three ordinary words.

osrvcene

astwheder

yeglrinc

□ ○ □ □ □ □ □ □ □ □

○ ○ ○ □ □ □ □ □ □ ○

□ □ □ □ □ □ □ □ □ □

○ ○ ○ ○ ○ ○ ○ ○

○ ○ ○ □ □ □ □ □ □ □

Earthkeepers are...

INTRIGUING INSECTS

Career spotlight: Why be an entomologist?

By Alondra Rodriguez and Jairo Carrillo
NEEDHAM ELEMENTARY SCHOOL

If you're fascinated by bugs, then there is a career for you in entomology! An entomologist is a scientist who studies insects. You might be wondering what jobs can possibly pay you to study bugs. Actually, there are many important jobs out there that need experts in bugs. When we visited the Bohart Mu-

seum of Entomology in UC Davis, we learned that there are jobs all over the world in entomology. We saw pictures of entomologists from UC Davis working in the Bahamas and in Africa. These scientists are studying insects to protect people from illnesses. Other entomologists help study insects to make our foods safer to eat. Also, we met a real life entomologist at Lodi Lake when we did our Leaf Pack activities. His name is

Mr. Kess Benn and he told us he was crazy about bugs since he was a little boy. One of his jobs is to study insects in rivers, lakes, and ponds to check if the water is good quality. He works with a biologist named Erin Gleason who also studies insects in her career. Other important jobs entomologists do are classification of insects, their life cycles, biodiversity, physiology, behavior, ecology, population control, and much more. Another reason a person might be

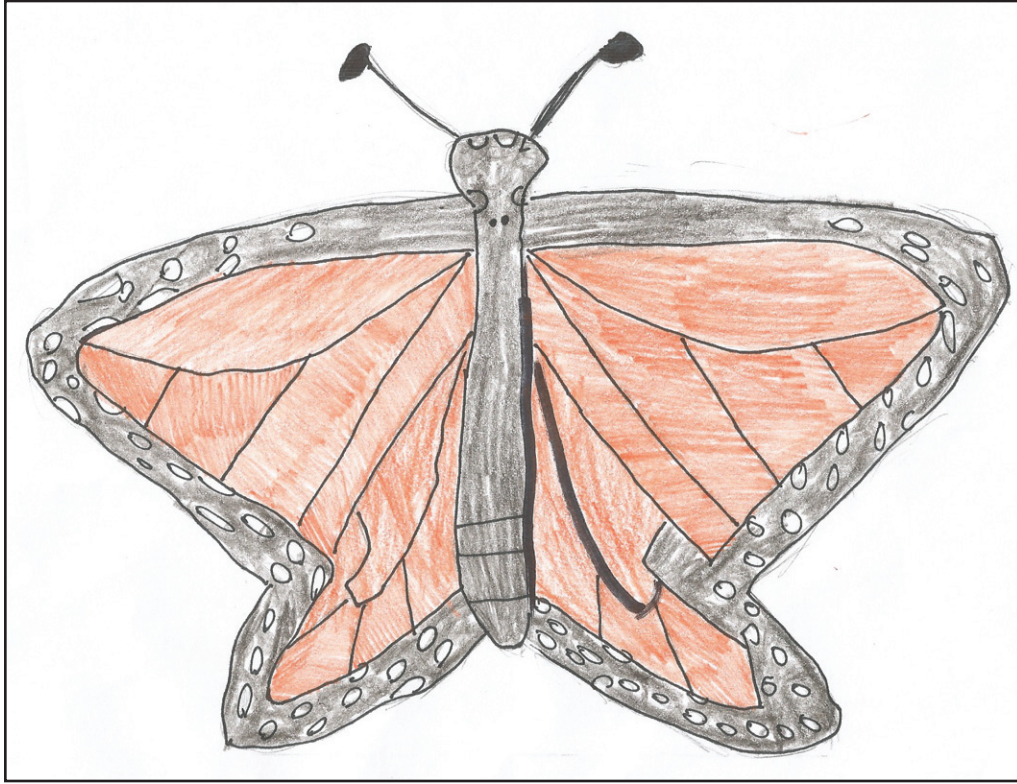
interested in becoming an entomologist is if you enjoy nature and studying animals. Some entomologists have fun discovering new insects. For example, at the Bohart Museum we learned that a new insect was discovered. The entomologists who made the discovery got to name the new insect after our new president. They named it "Neopalpa Donaldtrumpi." The picture we saw of the insect had yellow and orange on its head.

As you can see, the life of an entomologist sounds like an amazing idea for those who love studying animals and nature. A final fact we learned about this career is that an entomologist can make good money. A starting entomologist can make \$40,000 and go up to \$89,000 or even \$289,000, if they get hired in a university. So, if you are crazy about bugs and would love to travel, being an entomologist would be a perfect career for you.

Six fast facts about monarch butterflies

By Tim Flores and Adam Shergill
REESE ELEMENTARY SCHOOL

1. The monarch butterfly is a milkweed butterfly.
2. The monarch butterfly is the most familiar North American butterfly.
3. The monarch butterfly has an orange and black wing pattern.
4. The monarch's wingspan is 8.9 to 10.2 centimeters.
5. The monarch butterfly is all black besides its wings.
6. The monarch butterfly is a large butterfly.



All about the Bohart Museum of Entomology

By Andres Cortez
NEEDHAM ELEMENTARY SCHOOL

The Bohart Museum of Entomology is a museum that has millions of insects to see. It is located in the UC Davis university. The Bohart Museum was founded in 1946. It was named after Dr. Richard M. Bohart. He taught general entomology at UC Davis, which means he was an expert on the study of insects. The Bohart Museum has the largest collection in North America. They have more than 7 million specimens or types of insects! The Bohart Museum has been collecting insects since 1946. It officially became a museum in 1983 where you can look at insects and get tours.

If you want to have a birthday party with a theme about bugs because you love them so much, you can reserve a tour at the Bohart Museum. This is possible. A 12-year-old boy from Mesa, Arizona loved bugs and was very interested in them. His name is Ty Elowe. UC Davis made it possible for this boy to have his birthday celebration there. His mother told the museum his son wants to be an entomologist and is very interested in insects. Ty Elowe was able to get a complete tour of the Bohart and he even got to pet a hissing cockroach, a walking stick, and even a tarantula! On my tour, I also got to pet the Madagascar hissing cockroach!

Every year they get 40,000 specimens or insects! They get insects from all over the world, for example Central and South America, Africa, Madagascar, Australia, and the Middle East. They have 150,000 moths! They have the world's largest collection of butterflies! Also world's largest collection of water bears insects! They have 4,500 swallowtail butterflies.

Finally, the collection of insects at the Bohart Museum are the following. 30 percent are bees, wasps and ants. 20 percent are beetles. 18 percent are moths and butterflies. 15 percent are tree bugs. 12 percent are flies. 3 percent are mantids, lice and cockroaches. 1 percent are tardigrads, spiders, millipedes and centipedes. Here is a graph that shows what you can find at the Bohart Museum.



MIGUEL LUNA/NEEDHAM ELEMENTARY SCHOOL

Our visit to the Bohart: So many butterflies!

By Brooke Graef
NEEDHAM ELEMENTARY SCHOOL

This year on March 9, 2017 our fifth grade class visited the Bohart Museum of Entomology to wrap up our studies about macroinvertebrates and the Leaf Pack investigations. Did you know that UC Davis is more than a top university in our state where you can become a scientist, biologist, or even an entomologist, it is also where the Bohart Museum of Entomology is located? To our delight, we discovered a bigger world of insects beyond macroinvertebrates at the Bohart! On our visit, I learned that the Bohart Museum has the biggest collection of insects that you could ever see! The Bohart is home to a collection of about 8 million specimens or types of insects, including my favorite, the monarch butterflies. If you have a chance you should visit the Bohart Museum with your family.



Marlene Lujan of Needham Elementary School holds a bug during a trip to the Bohart Museum.

At the Bohart Museum you could see, hold, and photograph butterflies from around the world. Also, I learned a world of facts about insects and invertebrates. You would need weeks to go through their collection. On our visit I spent most of my time looking, holding and photographing a few of their butterflies. I had never seen or heard about some of the butterflies I saw that day.

At the Bohart, there are dozens of wooden walls that slide open and have hundreds of drawers where the specimens of insects are stored! We saw a lot of butterflies and they all were unique and special. A few things that I learned were that butterflies lay their eggs on a leaf, but

leave a special kind of glue that holds the egg to the leaf. I learned that your family can plant milkweed flowers in your backyard and you might have some colorful monarch butterflies stop by on their migration flight south. I learned that many monarch butterflies migrate to Pacific Grove in Monterey, California. I hope to visit Pacific Grove one day. Furthermore, I learned that butterflies are very intelligent insects and have a few extra abilities, too. An example is of course the monarch butterflies. They are the only ones that eat milkweed, which is poisonous to other insects. The milkweed helps them to protect themselves. A fascinating fact is that their bright colors can not be seen by other animals! This also helps them stay safe and away from predators. So, if you have a chance stop by the beautiful campus in UC Davis to visit the Bohart Museum. You will have a chance to see the aquatic insects or the macroinvertebrates we found in our Leaf Pack investigation. If you are up to the challenge, you might even be interested in holding a Madagascar hissing cockroach, a walking stick, and even a tarantula in the Bohart's petting zoo. (Some people passed on holding the hissing cockroach, but I tried it.) If you visit the Bohart with your family, the tours are free!



OMAR TORRES/HERITAGE ELEMENTARY SCHOOL

INTRIGUING INSECTS

Science investigation: What we learned from leaf packs

By Efrén Diego and Brian Navarrete
NEEDHAM ELEMENTARY SCHOOL

Part One

This year our class participated in some very fun science activities called the Leaf Pack Investigation.

On October 27, 2016, our fifth-grade class made our first trip to Lodi Lake to begin our leaf pack activities. Before we even went to Lodi Lake we had to put together some leaf packs in our classroom.

A leaf pack is a small mesh bag that we filled with rocks and leaves. The leaf pack is designed to collect macroinvertebrates or bugs so we can study them.

To make some, we first collected lots of dry leaves. During recess we went around the school collecting dry leaves for our project. We used the dry leaves and small rocks to put together eight leaf packs. We worked in small groups to put them together. Each group had to make sure that the leaf packs were about the same size and weight. We used a hand scale to weigh our leaf packs.

On October 27, our class was finally ready for part one of the leaf pack activities in Lodi Lake. Our teacher separated our class into two groups, Team A and Team B. We went through the nature trail and we saw deer, squirrels, frogs, turtles, blue jays, and redwood trees. Along the way, our guides Mr. Norman and Mr. Larry were teaching us about the animals and plants.

Each team had four leaf packs to place in different places along the trail.

Before each leaf pack was placed, we had to do teamwork to measure the air temperature and the water temperature then record it on a sheet. We also recorded the time and brainstormed words to describe the location, water color and plants.

The first leaf pack we placed was at the Lake Boathouse by the dock. For that one, our guide Norman helped to drop the leaf pack into the water because it was slippery. The second leaf pack was placed by the River-Pump area. We placed the third leaf pack by the path of Cattail Creek. The fourth and last leaf pack was placed at Pig's Lake by the fence at the end of the trail.

Along the way, Mrs. Grant, Mr. Larry, and grandpa nature, Mr. Norman, were teaching us about water, the plants and animals in Lodi Lake. That was the best day ever because it was cloudy and rainy.

Part Two

On November 21, 2016, we went back to Lodi Lake to do part two of our Leaf Pack activities.

First the bus dropped us off at the Water Treatment plant. It was fun to learn about how

water gets treated before it gets sent to our houses. An interesting fact we learned is that the treatment plant could pump up to 10 million gallons of water a day!

Afterwards we walked to Lodi Lake to finally see what we could find in our leaf packs! We had a surprise waiting for us. Our leaf packs were already taken out ready for us to study them. All survived, except for one. It was found ripped apart, it was the one we placed at Pigs Lake. (This is still a mystery to this day. We wrote many stories about this mystery.)

Another surprise was we had three experts from the U.S. Fish and Wildlife Service to help us study our leaf packs! Their names are Kess Benn, Donnie Ratliff and Erin Gleason.

Ms. Ruiz divided us into groups of 4 or 5 and each group went to a picnic table. On the table, we had a tub with magnifying glasses, sifters, brushes, petri dishes and clipboards to record our findings. There was also a bucket with a leaf pack and another bucket with clean water.

First we had dipped our leaf pack in clean water, then we spent a lot of time sifting and draining through the leaf pack water to see what we could find. Nobody believed that we would find anything. Then I started hearing other groups screaming and yelling. They had found macroinvertebrates!

Soon our group found our first. It was a water dragonfly. Then we found some aquatic earthworms, and lots of scuds. Our table team worked together to record and study the macroinvertebrates. Then we went up to a big chart and Mrs. Transon helped to record our findings.

Later on Kess, Donnie and Erin showed us some real stoneflies they brought for us to study under a microscope. It was fun to touch the stonefly macroinvertebrate. Donnie told us we didn't find any in our leaf packs because stoneflies live in rivers in higher places like mountains.

Later on we gathered in a circle to hear Donnie, Kess, and Erin teach us more about the macroinvertebrates we found. Donnie told us that it was a good thing we found many different kinds of macroinvertebrates or bugs, because the more different bugs, the better the health of the water. We learned that this is called diversity and that diversity in bugs is a good thing because it shows that the water is fresh.

Then he pointed to the big chart with all the macroinvertebrates our class found. Donnie said that our findings show that the water in Lodi Lake is fresh.

It was a great day of learning and fun. Who could have imagined that studying bugs was so interesting and fun!

What are benthic macroinvertebrates?

By Henry Rosales and Rodrigo Acosta
NEEDHAM ELEMENTARY SCHOOL

Specialized vocabulary for Leaf Pack Investigation

- Benthic: describes something that lives on the bottom areas
- Freshwater: streams, rivers, lakes, ponds are freshwater sources
- Outfall: where a river, drain or sewer flows into the sea, a lake or stream
- Macro: big or somewhat large
- Invertebrate: animals without vertebrae or a backbone

Characteristics of benthic, freshwater macroinvertebrates

- Live under fresh water sources like

the bottoms of lakes, rivers, streams and ponds.

- They are bugs without backbones.
- Love to munch or eat leaves.
- Can be seen by your eyes without microscope.
- Some macroinvertebrates have a COMPLETE life cycle, some have an INCOMPLETE!

Where can benthic macroinvertebrates be found?

Benthic macroinvertebrates can be found in bottom of freshwater sources like lakes, rivers, streams and even ponds. Also, they can be found near an outfall.

In Lodi Lake, we found macroinvertebrates in the leaf packs we placed by the lake boathouse, the river pump

area, and at the slough west of Cattail Creek path. We also placed a leaf pack by the Pigs Lake north end by the fence at Lodi Lake, but we did not find the leaf pack to study the bugs in it. I think maybe a beaver or some fish got to it.

Examples of benthic or freshwater macroinvertebrates

- Stonefly
- True bug
- Mayfly
- Water beetle
- True flies
- Midge larvae
- Caddisfly
- Dragonfly
- Saw bug
- Scud



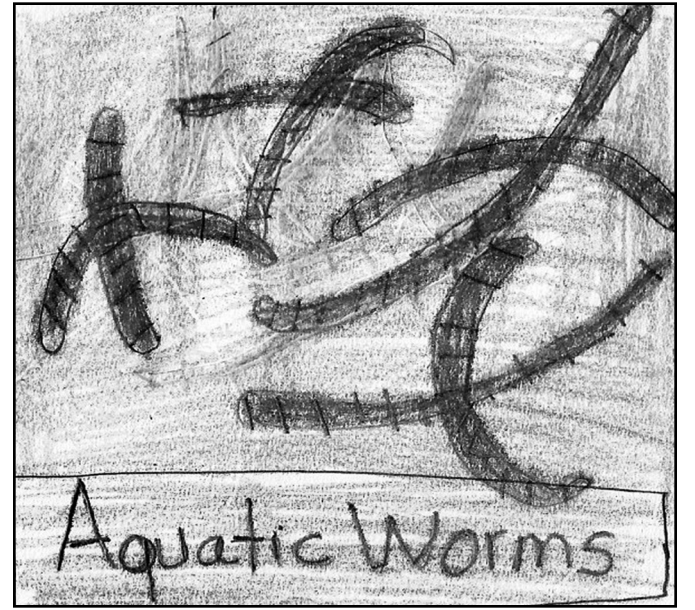
Bugs, Bugs, Bugs: Madagascar hissing cockroach

By Samantha Salcedo and Luz Maria
NEEDHAM ELEMENTARY SCHOOL

The hissing cockroach hisses because it is characterized by their hissing sound.

The hissing cockroach defends itself with his legs and uses its hissing sound.

The hissing cockroach eats fruits that fall off the trees.



Fast facts about aquatic worms

By Alexandra Rios
NEEDHAM ELEMENTARY SCHOOL

Found: Polluted or oxygen-poor water.

Food: Scavenger — eats decaying matter and sewage.

Characteristics: Segmented body builds a vertical tube from which one end protrudes. It has no shell, no legs, it is flat and has a red color, and no wings.

It is special: Because it can survive in low oxygen levels fatal to most invertebrates.

Have you ever wanted to learn more about worms?

By Camden Locke
REESE ELEMENTARY SCHOOL

What is a worm? A small snake? An insect?

No, a worm is actually an invertebrate, a creature with no backbone. A worm is a cylinder-like creature that is very slippery. They also have no limbs, but they do much more than just slither around all day. They actually make tunnels where water can flow to get to your plants.

Did you know that one million worms weigh only 1 pound? So I would recommend putting one of these little guys in your garden!

Earthworms are around 30 to 70 millimeters long and 3 to 5 millimeters wide. They are found in a wide range of soils, but usually are in wet and highly organic soil. They can be green, yellow, pink and grey.

They only live from 447 days to 587 days. When they are disturbed, they curl up into a ball.

Did you know that there are over 6,000 species of earthworms worldwide? And since earthworms do not have a respiratory system, the system where you breathe and send blood to all of the parts of your body. They must use their skin to breathe. They must stay moist and slimy so that oxygen can be diffused through the skin.

So worms are not really tiny snakes destroying your garden, they are very interesting creatures with a very interesting everyday life.

Monarch butterflies poem

By Alondra Rodriguez
NEEDHAM ELEMENTARY SCHOOL

When a caterpillar comes out of its egg,

It has more than six legs.

Danaus plexippus is its real name,
It's not you we have to blame

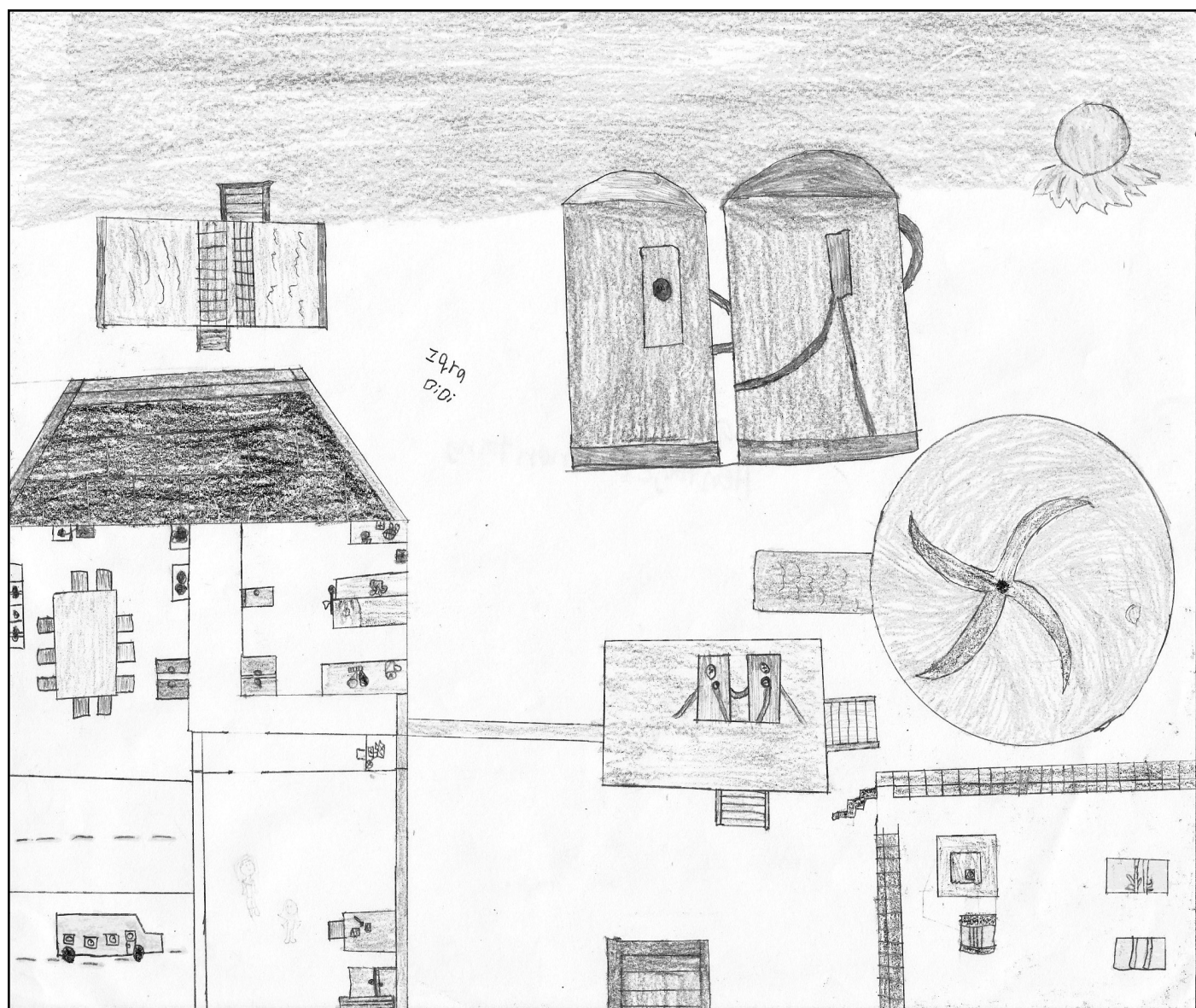
Orange, black and white
Good thing they do not bite

They only see black and white
But they are really beautiful and bright.

Crayfish, mayfly poem

By Jacob Luis
NEEDHAM ELEMENTARY SCHOOL

Crayfish
Scavenger omnivore
burrowing crawling eating
claws sharp <> predator, herbivore
crawling flying scavenging
3 tails, 2 sets of wings
Mayfly



IQRA BIBI/HERITAGE ELEMENTARY SCHOOL

Why you should clean up trash

By Emely Lagunas
HERITAGE ELEMENTARY SCHOOL

Earthkeepers is a club at Heritage School that meets once a week to clean up our campus.

My interview is with Yesenia Maldonado, a fifth-grade Earthkeeper.

Q: Why did you join Earthkeepers?

A: To be part of cleaning the world.

Q: Do you like being part of Earthkeepers?

A: I like being part of Earthkeepers because I am not just helping myself, I am helping everyone.

Q: What's your favorite part of Earthkeepers?

A: I like being part of Earthkeepers because I don't have to do it by myself, but I can get help from others.

Q: Why should we keep our school campus clean?

A: It's good to keep are campus clean because it will be smelly.

Q: Do you chat with your friends while you work or do you do your job silently?

A: Sometimes I talk with my friends while I'm working, but other times I work quietly.

Q: Are efforts to protect the environment worth it?

A: Yes, because you're putting a lot of effort and that means that you are trying.

Q: What's the hardest part of being an Earthkeeper?

A: The hardest part is picking up all the trash around us.

Q: Who motivated you to become an Earthkeeper?

A: Ms. Jacinto and my older brother motivated me to join Earthkeepers.

Q: Do you recycle at school and at home?

A: Yes, I recycle at school and at home.

COOL CRANES AND OTHER BIRDS

Sandhill Crane Festival celebrates birds that migrate to the Delta

By Maritza Torres
HERITAGE ELEMENTARY SCHOOL

Ken Nieland is the president of the Sandhill Crane Festival Steering Committee. The Sandhill Crane Festival is held in Lodi each November.

Q: What is the Sandhill Crane Festival?

A: It is an event held every year in November, where people can go in Lodi to learn about Sandhill cranes.

Q: Who started the crane festival?

A: An organization named the Chamber of Commerce. Twenty-one years ago, the Chamber of Commerce had the idea to have people come to Lodi to come and see the cranes.

Q: What was the purpose of starting the crane festival?

A: The purpose was to attract people to Lodi, and help people learn more about cranes.

Q: How long has the crane festival been going on?

A: It has been going on for 21 years.

Q: How many years have you worked with the crane festival?

A: I have been there since the start.

Q: What do you do, or what is your job title with the crane festival?

A: I am the president of a club. I am also the chairman for meetings.

Q: What qualified you to work with the crane festival?

A: I used to work at the zoo, so they called me thinking I knew something about birds — which I did.

Q: How long does it take to prepare for the festival each year?

A: It takes one year to prepare for the festival. There are

different committees that work on different parts of the festival. The committees meet once a month.

Q: About how many cranes come each year? What is the largest amount of cranes that have come?

A: From November 2007 to February 2008, there were anywhere from 6,421 to 27,213 cranes counted. There are an estimated 50,000 cranes that winter throughout California.

Q: Do you get more lesser or greater Sandhill cranes?

A: We get more lesser Sandhill cranes, because greater Sandhill cranes are endangered in California. Four-fifths of the cranes that winter in the Delta are lesser Sandhill cranes.

Q: Do greater and lesser Sandhill cranes come at the same time?

A: No, because greater Sandhill cranes come a little bit earlier and stay later, too.

Q: Do any of the Sandhill cranes that land get hurt?

A: I have never seen one, but they could get stuck in power lines.

Q: Do Sandhill cranes fight with one another?

A: I haven't seen them fight, but they might fight over a tasty frog!

Q: What color are the eggs of the two types of Sandhill cranes?

A: The eggs are off-white with spots on them.

Q: Why do cranes dance?

A: It is their way to communicate.

Q: Have you ever named a Sandhill crane?

A: I haven't, but a lady named one and wrote a book about 'Sandy, the Sandhill crane,' and if I remember correctly it was an orphan.

Facts worth knowing about Sandhill cranes

By Arely Leanos Ayala
HERITAGE ELEMENTARY SCHOOL

- Sandhill cranes' scientific name is *Antigone canadensis*.
- Sandhill cranes can live for 20 years or more.
- Baby cranes eat grain, snails, crustaceans, frogs, fish and insects.
- Sandhill cranes are omnivorous, which means that they eat plants and animals.
- Sandhill cranes can weigh 3 to 6.5

- kilograms, or 6.5 to 14 pounds.
- Sandhill cranes height is 80 centimeters to 1.2 meter, or 3 to 5 feet.
- Siberian cranes can migrate nearly 10,000 miles round trip.
- Sandhill cranes can usually fly at an altitude of 3,000 to 5,000 feet.
- A female Sandhill crane usually lays two eggs.
- Sandhill cranes can be good dancers to draw attention.
- Sandhill cranes can make a loud call to other cranes.

- Sandhill cranes can swim.
- Sandhill cranes stand in one leg when they are roosting, and tuck one leg up into their body to keep it warm.
- Sandhill cranes sleep standing in water, on the ground.
- Sandhill cranes spend winters in the south.
- Sandhill cranes spend most of their lives in freshwater wetlands, including marshes, wet grasslands and river basins.



JULIAN JUAREZ/HERITAGE ELEMENTARY SCHOOL



ARELY LEANOS/HERITAGE ELEMENTARY SCHOOL

Learn more about Lodi's wintertime visitors, the stunning Sandhill cranes

By Ms. Jacinto's Class
HERITAGE ELEMENTARY SCHOOL

Liz Tobeck is a member of the Sandhill Crane Festival Steering Committee and helps to organize the festival each year.

Q: What was the purpose of starting the Sandhill Crane Festival?

A: To bring people an awareness of cranes, and to get people outdoors, but mainly to bring awareness.

Q: How many years have you worked with the crane festival?

A: I have worked with the crane festival for 17 years.

Q: What do you do, or what is your job title with the crane festival?

A: I am in charge of the exhibitor hall, and am on the steering committee. I also find out which of the previous years' exhibitors can and cannot attend. I send out email invitations to all the vendors, asking them to respond by June 1. Some exhibitors sell things such as binoculars, books or jewelry. Some might not sell anything, such as the Sierra Club or the Audobon Society.

Q: What qualified you to work with the crane festival?

A: My organizational skills, and my interest in the outdoors.

Q: What is one thing that you find interesting about the crane festival?

A: Of course it's the birds! And developing more of an awareness of the environment. For example, learning about what is happening with farming, and this year the flooding, that affects the cranes' habitat.

Q: Do any of the cranes that land get hurt?

A: Well, it depends on where they land! This is because they could land where coyotes are.

Q: Have you ever named a Sandhill crane?

A: I haven't, but I think they might have named one in Alaska because they roam freely over there in people's yards, and to some people they might seem like pets to them.

Q: Do people have Sandhill cranes as pets?

A: Well, not really, but in Alaska people might see them as pets.

Q: What is the lifespan of cranes?

A: I don't remember, but I do know that the bigger the bird, the longer its life is.

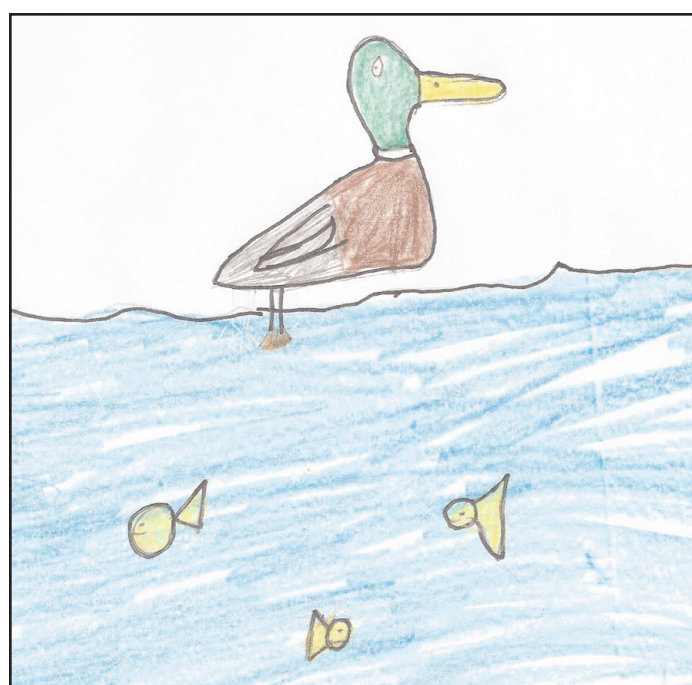
Q: Do people eat Sandhill cranes?

A: Sadly, yes, in North and South Dakota they do. In California it's illegal to hunt Sandhill cranes, but in North and South Dakota they do hunt them, and eat them.

Fast facts about geese

By Riley Mulkins
REESE ELEMENTARY SCHOOL

- Some geese migrate every year. Others stay in the same place year-round.
- Geese eat seeds, nuts, grass, plants and berries. They love blueberries.
- Geese can live almost anywhere. They like fields, parks and grassy areas near water.
- Geese fly in a "V" formation. If one goose is injured, other geese will stay with it until it dies or can rejoin the flock.
- Geese are sometimes raised like chickens for their meat or eggs.
- Male geese protect the nest while the female geese sit on the eggs.



Mallard ducks and where they live

By Ben Mitchell
REESE ELEMENTARY SCHOOL

Mallard duck (also known as wild duck) is the largest and the most abundant duck in the world. Mallard ducks inhabit mainly Northern Hemisphere and it can be found in North America, Europe and Asia. Mallard ducks inhabit wetlands, marshes, ponds, lakes, rivers and flooded areas. The animal is threatened by recreational hunting, pollution of the water, lead and mercury poisoning and habitat destruction. Luckily, the number of mallard ducks in the wild is still large and they are not listed as an endangered species.

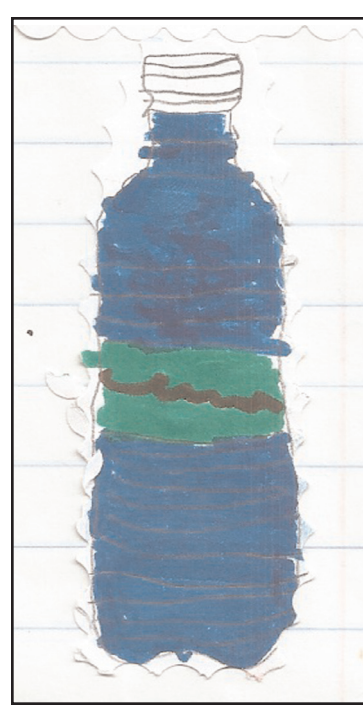
Sandhill Crane Poem

The dancing cranes
Love the rain
They land so elegant
With their intelligence
Their necks and legs are long
They're really really strong
Covered with mud
That the cranes had dug
Sleep in water
Without the hurt
of a raccoon named Burt
— By Yesenia Maldonado,
Heritage Elementary School

Five facts about your trash

By Jesus Morales, Ivan Flores and Ricardo Gomez
HERITAGE ELEMENTARY SCHOOL

1. A diaper takes about 250 to 500 years to decompose.
2. A soda can could take 500 years to decompose.
3. A glass bottle takes 1 million years to decompose.
4. A paper takes one month to decompose.
5. A plastic bottle never decomposes and goes in to smaller pieces.



Everyone should learn about Cal-Waste

By Adrianna Fleming
REESE ELEMENTARY SCHOOL

I think everyone should learn about Cal-Waste. Cal-Waste is a recycling company. It is not the recycling that picks up your recycling at home, but it picks up school recycling.

It is a family-owned business. Cal-Waste is open five to six days a week. Cal-Waste is located in the city of Galt, if you want to go there and get more information.

There are 152 people working in the Galt Cal-Waste. There are three Cal-Waste Recoveries in the U.S.

Some things you can't recycle that most people think you can are paper towels, pizza boxes, plastic bags, plastic egg cartons, food wrappers and any rope or long string.

You cannot recycle paper towels because they have been recycled about five times already and they cannot do anything else with them. You cannot recycle pizza boxes because the cardboard got all greasy from the pizza, but you can recycle normal cardboard.

You do not have to take the lids or labels off of glass. When you recycle water bottles, the caps have to be not on at all or tightly screwed on.

Did you know a single aluminum can takes 200 to 500 years to fully degrade in a landfill?

If they find a needle or chemical they have to shut down all of Cal-Waste and look through every little bit. So if you want more info, you can go to Cal-Waste.