FASCINATING FOSSILS & MORE MSI

The secret to making fossils stronger

Elle Paunon
JOE SERNA JR. CHARTER SCHOOL

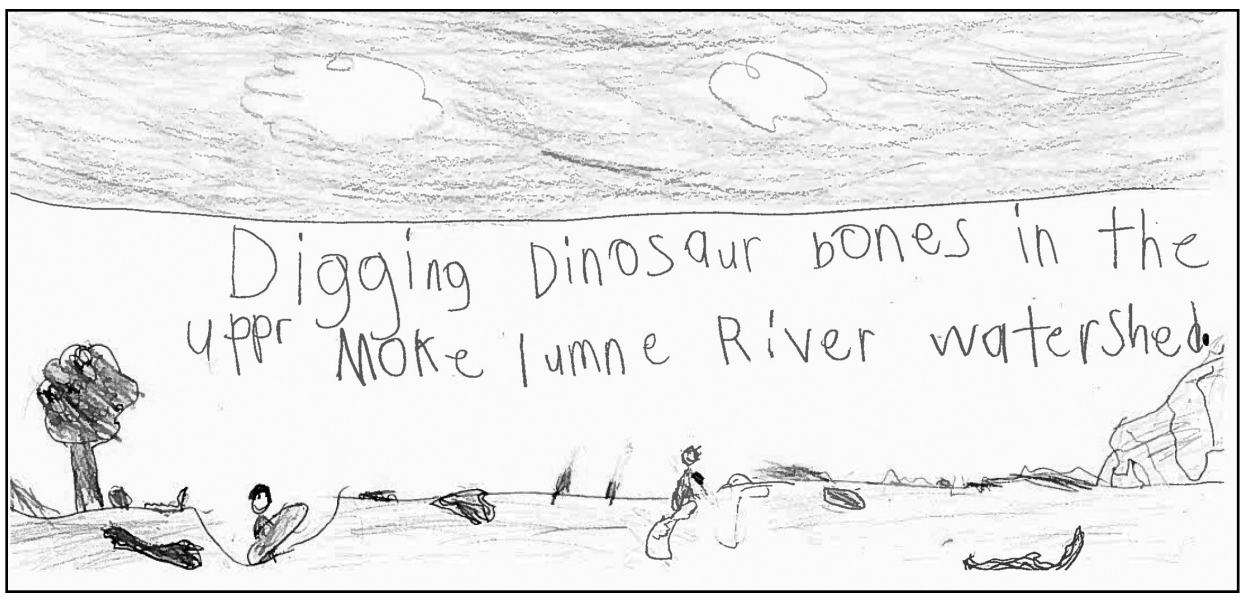
Did you know that fossils were found near our watershed? Well, a ranger, Greg Francek, was walking and doing his usual routine, but then something caught his eye. It was the foot bone of a camel! He then took it back to his lab and examined it further. Then, he used a special substance called butvar to strengthen the fossil.

To start off, when my classmates and I interviewed the ranger who found the fossils, Greg. We asked him what he uses to strengthen the fossils. It turns out that he actually uses a type of special liquid called butvar. I know what you're thinking: "What even is that?" or "He doesn't superglue them?" Well, no, he does not superglue them, but he does use a very similar substance.

Butvar is a thermoplastic, polyvinyl butyral, resin. I actually had no idea what that meant, but what he said in the interview cleared it up. Greg stated that butvar was a mix of tiny plastic balls that melted when mixed with another substance called acetone, and yes, acetone is what some people use to remove nail polish from their fingernails. When the acetone and plastic balls mix, it basically becomes a tough, transparent thermoplastic. If you don't know what thermoplastic is, it's basically a type of plastic that can be shaped, reheated, or cooled multiple times. Pretty interesting, right?

It's very bizarre to think that camels existed right by our watershed such a long time ago, and it's amazing that we were able to discover these fossils after such a long time! And guess what? Scientists can help preserve these fossils using butvar!

Thanks to Greg Francek, we were able to discover a piece of history that none of us would've ever expected coming.



AXEL CABRERA GUTIERREZ/BECKMAN ELEMENTARY SCHOOL

The discovery of prehistoric fossils in the watershed

Joel Villanueva
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Have you ever been to a lake or river? Well, ranger Greg Francek from EBMUD was looking around the Mokelumne River and saw something weird.

Well, that something weird was a mammoth bone sticking out of the ground. That mammoth bone weighed about 300 pounds. It was a whole skull and tusk together. It took 150 hours plus.

Then again he was searching through and found a camel bone. There were more bones found near Valley Springs.

To this day there are still more bones being found in the Mokelumne River watershed.

FOSSILS

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recording your findings. Like Mr. Francek said, "Always look left, right, up, and down."

We were curious about how long it takes for a naturalist to excavate a fossil. We found out that it can be as fast and easy as bending over and picking it up, or it can take as long as multiple weeks if it's a larger specimen. He proceeded to give us an example. One time it took him 130 hours; that's about two weeks of work.

What do naturalists do when they find a fossil? They first take a closer look at the fossils and determine if it is in fact a fossil. Then they will check their surroundings and take pictures. In the pictures they will make sure to include a compass, a pencil, a ruler, and sometimes their field journal. They also use a GPS to know exactly where the fossil is located. The reason for these items is to know the direction, the size (compared to the pencil and ruler) and the field journal to write down observations.

Overall, the interview was a good opportunity to find out things that we never thought about learning. It was interesting to hear what he had to say throughout the interview. We learned a lot of new interesting things. Did any of your questions get answered? Once again, thank you, Mr. Greg Francek, for allowing us to interview you and joining us!

How bees help us, and how to help them

Santiago Eslava Juarez
HERITAGE ELEMENTARY SCHOOL

Facts about bees

Typically bees fly about 12 1/2 miles per hour, but they can fly much faster.

Most bees have short thick bodies covered with hair.

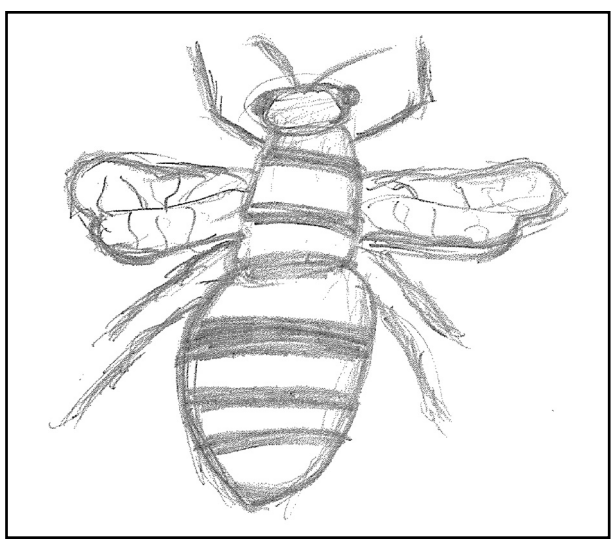
Bees have six legs that are attached to the three parts of their body.

How do bees help us?

There are around 4,000 bee species that are native to the United States, and around 20,000 bee species worldwide. People enjoy eating the honey that bees make. People also value the role that bees play in pollinating plants. Unfortunately, the use of pesticides and expansion of cities are two of the factors that have led to a decline in bee populations. This not only affects humans but also affects ecosystems worldwide.

How can people help bees?

People can help bees by learning how to keep hives. People who keep hives can enjoy the honey and help bee populations.



SANTIAGO ESLAVA JUAREZ/ HERITAGE ELEMENTARY SCHOOL

Stingrays vs. bat rays: How to tell them apart

Erica Tapia Garcia
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On our MSI trip back in October, we were able to see and feel a bat ray. It was a wonderful experience, and I am very grateful to have had that opportunity. Many people tend to mix up stingrays and bat rays with one another, but they are very different in many ways. There are ways to tell the difference between them, whether it's by the way they look, move, or even the way they eat. Today I will talk about those differences.

The first way that you can tell them apart is by their appearance. Like bat rays, stingrays can have a diamond-shaped body, however, the bat rays' pectoral fins are pointed at the ends, while the stingrays' pectoral fins are rounded. Unlike bat rays, stingrays can also have a disc-shaped body. Stingrays normally have shorter tails than bat rays too. The snout of a bat ray can look almost like the beak of a bird, it sticks out and comes to a point where it is very noticeable. Stingrays have more of a flattened triangle snout with not much of a noticeable point to it.

Aside from telling them apart by their appearance you can also tell them apart by their movements. Bat rays move in a graceful way by moving their pectoral fins up and down. Stingrays, on the other hand, move in a more wavy motion helping them move in the water. Bat rays dig into the sand to expose buried prey, and stingrays skim the ocean floor looking for food and sucking the prey into their mouth before fully digesting them.

Apart from their looks and movements, you can also tell the two apart by their habitat or the things they eat. Bat rays live in muddy or sandy places as well as estuaries, and bays along Oregon and California coasts. Stingrays are found in the shallow coastal waters in seas usually buried, they can also be found in freshwater. Bat rays eat small fish, mollusks, and crustaceans, while stingrays eat worms, clams, and shrimp.

In conclusion, even though a lot of people mix up bat rays and stingrays, there are many differences to tell them apart. From their appearance, to how they act, and even where they live or what they eat. I hope you learned how to tell them apart after reading this.

SAMANTHA SANTOS/HERITAGE ELEMENTARY SCHOOL

Gold Rush left mercury in San Francisco Bay

Andy Quintana
JOE SERNA JR. CHARTER SCHOOL

I had the chance to go on a study trip with the Marine Science Institute. One thing we learned about was mercury in the bay. Mercury is a very heavy metal that is toxic to animals and humans when ingested.

The mercury got in the bay because of the Gold Rush in 1849. Miners would use mercury to clump up the gold to make it easier to find. They would do this by using a method called hydraulic mining.

The miners would have a big machine. They used the machines to put mercury inside the dirt and soil to clump up the gold. The mercury and gold would combine to make an amalgam. They would heat it up to evaporate the mercury.

Some of the mercury would stay in the soil. That mercury would end up in rivers and streams that led to the San Francisco Bay.

Facts about zooplankton

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Have you ever wondered how many types of zooplankton there are?

There are so many different species in the world than there are parrots in the world, and maybe there are lots yet to be discovered.

Zooplankton is separated into two types. One type of plankton is the meroplankton and the other type is the holoplankton. Meroplankton is the larvae type of zooplankton that don't stay small for long and grow into fish, crabs and other animals, while holoplankton on the hand is clear plankton that stays small and is a drifter for the rest of their life. A drifter is plankton that moves in the water's direction.

Zooplankton is not phytoplankton which are just photosynthetic organisms. They are different because zooplankton means the animal type of plankton.

An example of a zooplankton is a moon jellyfish. Moon jellyfish are plankton because they are drifters, which means that they follow the direction of the water.

Zooplankton can also reproduce quickly. They are also the prey for many predators such as small fish like sardines, carnivorous copepods, and chaetognaths.

In conclusion, zooplankton are really interesting and they are such cool animals. They also help so many animals within their food chain and we've found out many interesting things about them.

What is a Van Doorn bottle?

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JOE SERNA JR. CHARTER SCHOOL

Have you ever heard of a bottle that can collect water samples? It's called a Van Doorn bottle! Its scientific name is oceanographic bottle. Another name people use for the Van Doorn bottle is the Nansen bottle.

The Van Doorn bottle allows samples to be taken at different water depths. It is designed/modeled horizontally because it makes it easier to collect water samples. It makes it easier to collect the water samples because when it is lowered into the water, the water goes straight into the Van Doorn bottle. There is a rope attached to the Van Doorn bottle so it can be lowered into the water without losing the bottle. To close the bottle you need to drop a metal thing (which is also attached to the rope) down onto the Van Doorn bottle.

Now let us tell you about our experience while using the Van Doorn bottle. It was confusing and awesome. It was confusing because our instructor had us figure out how to use it instead of her just showing us. There were a lot of steps to figure it out but in the end, we ended up figuring it out. Our instructor also let us help collect water samples after we figured out how to use it. Overall, it was an amazing experience being able to go on the MSI trip and be able to use it.

The person who designed a water sampling bottle was Fridtjof Nansen in 1894, and Shale Niskin improved it more in 1966. It's a big year gap because it took time to improve the Van Doorn bottle and they didn't have the right products or materials to improve it.

How climate change will affect the Bay

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What do you think life around San Francisco Bay will look like in the upcoming decades? There are many ways that global warming can and will affect our beloved bay, as climate change is sure to have some sort of effect on it. One example is the major shift in species that are found in that environment.

With the rising heat, certain animals like leopard sharks are noted to do badly in temperatures above 70 degrees Fahrenheit. According to Surfforecast.com, the current temperate of San Francisco Bay is 67 degrees Fahrenheit. With global warming, the bay is only going to grow hotter and hotter. This will certainly cause the leopard shark to either move away from the bay to an ecosystem likely not as suitable, or for them to die due to the warm waters.

As a consequence of climate change, we could lose the creatures we so dearly admire. Global warming won't just affect the leopard shark, but surely many other animals currently inhabiting the bay. And in the near future, we would lose — and gain — many sea animals.