KIDS for the BAY

Report to the Alameda County Fish and Game Commission
December 15, 2021

Introduction

In the 2020 - 2021 school year, with the support of a $10,000 grant from the Alameda County Fish and Game Commission, KIDS for the BAY (KftB) delivered the Watershed Action Program (WAP) to seven classes in four elementary schools. This included 163 students and seven teachers. Partner classes and schools included:

- Three third grade classes at Manzanita Community School in Oakland, including one special education class
- One third grade class at New Highland Academy in Oakland
- One fourth/fifth grade class at R.I.S.E. Academy
- Two fourth grade classes from Lorin Eden Elementary School in Hayward.

Student participants in the WAP included an average 90% under-resourced, low-income students, 95% students of color and more than 35% English Language Learners.

During the Covid-19 pandemic in the 2020 - 2021 school year, we transitioned KftB programs online to bring hands-on learning to students in low-income, under-resourced schools. Many private schools and higher-income schools delivered in-person learning, but our partner schools could only provide distance learning for most of the school year. We delivered Zoom lessons with experiments and investigations that could be done at home. We also encouraged outdoor activities to help students connect with nature in their local watershed and take much-needed screen time breaks. Many students did not have access to basic educational supplies, so we distributed supplies to students. By effectively partnering with our teachers and families we increased our students' access to equitable, engaging learning opportunities during the pandemic.

All participants received multiple experiences including Zoom lessons, going outside to connect with nature and complete observations, nature art and local watershed trash cleanup projects, as well as online group poster-making and video-making Environmental Action Projects. Breakout rooms, Jamboard, Flipgrid and other tools helped to make Zoom lessons more interactive. Parents joined lessons and supported their children's learning at home. Teachers sincerely appreciated the programs and support provided by KftB. For our students, their KIDS for the BAY lessons were still a highlight of their school experience even during distance learning.

Program Highlights

<u>Everyone Is an Environmentalist!</u>

KIDS for the BAY (KftB) distance learning programs began with an exploration of environments and environmentalists. Students from Manzanita Community School in Oakland were quick to type their associations with the word 'environment' in the Zoom chat. Abigail volunteered to read out the list to the class, "Nature, rain, surroundings, the world, habitat, animals, natural objects, plants, diverse places, home..." Classes made lists of over twenty elements of our environment! Students also brainstormed what an environmentalist does and cares about. Marisela shared, "Environmentalists take care of the environment! They keep it clean and teach others how to keep it clean." Selassie added, "I think environmentalists care for animals and work to make sure no animals go extinct." My'kele said, "Environmentalists do science experiments!" Many students were most eager to be environmental leaders. Joseph shared, "I am already an environmentalist and so is my dad! I clean up trash in my neighborhood and my dad waters plants in our garden."

> "This KftB program helped me be an environmentalist because now I understand more about the world and how to take care of it and all the cool animals."
> Sheyna, Fifth Grade Student, Lorin Eden Elementary School, Hayward

Virtual and Neighborhood Watershed Scavenger Hunts

KftB Educator Laurel Sebastian was excited to share the colorful and interactive Virtual Watershed created by the KftB staff team with students, who couldn't wait to explore it online! In Zoom breakout groups, young scientists from RISE Academy in Oakland took turns choosing parts of the Virtual Watershed to investigate, navigated around the watershed slides and clicked each element to reveal hidden clues to learning. After choosing the Dungeness crab slide, Vincent exclaimed, "I didn't know crabs can regrow their claws! What if we could do that?" On the water cycle slide, students made movements and sounds to mimic water cycling through the parts of the watershed. When Ms. Laurel asked the class to share their discoveries, Anthony shared, "Storm drain pollution can be a problem because it could harm fish or turtles."

After the Zoom lesson, students were invited to continue their watershed exploration by doing a real watershed scavenger hunt outside at home in their own neighborhoods. When discussing what to look for, Ryder offered, "My favorite color is indigo, so maybe I'll be able to find an indigo flower outside." KftB students were very eager to go outside to complete watershed scavenger hunts in their neighborhoods. They observed animal and plant adaptations, storm drains leading to creeks and signs of pollution including litter. When the students signed in for their next KftB Zoom lesson, they were thrilled to report back on their watershed scavenger hunt discoveries. Aldo shared, "I saw two fluffy squirrels playing outside." Keisha added, "I noticed a few ladybugs on my scavenger hunt." Kaleb read out his findings, "I heard birds chirping and then saw them too. It smelled like dirt outside from all the rain!"

San Francisco Bay Estuary "Eggsperiment"

After learning that our San Francisco Bay watershed is an estuary, third grade students from Manzanita School were eager to conduct an experiment (*Eggsperiment*) to discover more about the relative density of the different types of water in an estuary. First, students explored the concept of density with a scavenger hunt for objects of relative density in their homes. After a two-minute countdown, students did a show-and-tell. Chenoah shared, "I found a heavy vase that is very dense. I think it would sink in water." Chloe added, "I found a light plastic animal toy. I think it would float in water because it is not very dense."

Students then gathered a simple list of supplies for their Eggsperiment: two cups of water, salt, two eggs, and a spoon. Ms. Sienna guided students in the set up of the experiment and asked students to type their predictions in the Zoom chat along the way. Jairon observed, "My egg sank in the freshwater, just like I thought it would! I think it sank because the egg is denser than the freshwater." Student scientists then dissolved salt in their second cups of water to make an ocean-like environment before adding their second egg. With her video spotlighted for the class, Jasmine shared, "My egg floated a little differently than Ms. Sienna's. My egg in salt water floated in the middle of the cup while Ms. Sienna's floated at the very top or surface of her salt water. Next time I think I will add more salt to my water so my egg can float at the top too!"

Connecting the Eggsperiment back to the San Francisco Bay estuary environment, Ms. Sienna demonstrated what happens when saltwater and freshwater mix in the bay. After students made their predictions, she added both types of water into the divided corners of a plastic bag. Next, she slowly lifted the bag as the class watched the dark blue saltwater sink below the freshwater. Simon concluded, "The saltwater sinks below the freshwater in the bay." Students also observed the swirling null zone where the two types of water meet and mix together, and waved their arms together to mimic the water

in an estuary. Ms. Sienna uploaded the Estuary in a Bag Experiment for students to try at home. Romariay exclaimed, “Yay, more experiments! I really liked doing the eggsperiment today. It was so fun!”

Pollution and Stormdrains

Students from Lorin Eden Elementary School in Hayward were ready to investigate how pollution travels into and around our watershed. To begin, the class observed a video of pollution entering the KftB clay watershed model. Amari shared, “I noticed the pollution moved out to the Pacific Ocean where the octopus is.” Derik added, “The tides and wind moved the polluted water.” Next, the students examined a colorful diagram of a polluted city and took turns pointing out sources and pathways of litter in the environment. Sophia noted, “People added too much trash to the trash cans and now it’s getting pushed into the creek from the wind.” Donte shared, “It looks like someone is littering from their car.”

After exploring types of pollution, Ms. Laurel shared photos of storm drains and the sanitary sewer system. Students from Lorin Eden Elementary worked together to identify their similarities and differences. Saiya said, “Storm drains help us because they help water get off the street and into creeks, but they can move pollution too.” Rahmaan pointed out the water treatment plant in the diagram and shared, “Only the sewer system water gets cleaned!” Aliza added, “Grease is a type of sewer pollution. I think because it could clog the sewer pipes.” Kaeden concluded, “Water in both systems eventually goes into the bay.”

After considering the common pathways of pollution from neighborhoods to the bay, students had a chance to make their own Madlib stories about pollution on the move. One group’s story was about an abandoned fishing net that floated into the San Francisco Bay and up to the Sacramento River before being thrown away by a brave Dungeness crab. Another group wrote about plastic pollution that washed into the bay and was eaten by a turtle. The class concluded that there are many pathways for pollution, but we can try to make every story a happy ending by reducing and cleaning up pollution.

Student scientists from Manzanita School shared their experiences searching for storm drains at home. Isabelle shared, “I noticed lots of trash by the storm drains on my street. I’m going to tell my neighbors to stop littering!” Isabelle and her peers were excited to hear that they would have the opportunity to be teachers and leaders and educate others about what happens when they litter and the harm it can cause. In breakout groups, students examined photographs showing various ways pollution can harm animals. Adrian observed, “The plastic around the turtle's shell looks like it's squeezing it. That's bad because it probably can't breathe.” Khloe suggested, “A way to make sure this doesn't happen is to recycle and cut six-pack rings and put them in the trash so they don’t get into the ocean.”

After watching a video about the impacts of microplastics on the environment, Ms. Sienna asked the class, “Why are microplastics such a serious problem?” Kamil responded, “Microplastics are extra dangerous because they are small and there are so many of them.” Class teacher Mr. Wallace added, “Big pieces of plastic, like water bottles on the ground, are easy to see and pick up, but microsplastics are harder to see and remove.” Khloe shared, “Fish who are trying to eat something confuse them for little food like plankton. And then we eat those fish!”

The students were saddened by the images of animals hurt by plastic trash, and they were very motivated to take action to reduce stormwater pollution. When Ms. Sienna asked the students to brainstorm ways we can help stop pollution today, Khloe suggested, “We can clean up the litter we find on the ground and protect animals from the microplastics that go through the storm drains. We should do it soon because it’s been really rainy lately.” Students took turns reading and explaining rules for how to do a cleanup safely at home during the Covid-19 pandemic. The class set a goal of 1,000 total pieces collected for the whole class, and they far exceeded that goal in their trash cleanup projects at home!

Neighborhood Trash Cleanup Projects

After scouring their neighborhoods and local parks for trash over spring break, Ms. Sally's class from Lorin Eden Elementary collected 114 pieces of litter before the seventh lesson, and Mr. Rall's class collected 290. Caiden shared his findings: "I picked up 20 pieces of litter from the road and sidewalk. I mostly noticed water bottles and candy wrappers." Both classes were so excited about sharing the stories of their litter cleanups, and many students asked if they could keep doing cleanups! Ms. Laurel happily agreed, and by the end of the program the classes collected a total of 525 pieces (11 gallons) of litter! The students were immensely proud of their collective impact, even though they each cleaned up individually. Angelick shared, "I feel proud for helping the Earth."

Student Environmental Leaders

Students made educational posters and taught their families how to sort trash at home to reduce pollution, following city guidelines. They also learned how to practice the Five Rs (Reduce, Reuse, Recycle, Rot, Refuse) to reduce waste at the source. Many classes of students created inspiring videos and posters about protecting the watershed environments we all share. They invited their families, other classes of students, teachers and school principals to join their special online video and 'poster gallery' presentation events, which were attended by more than 100 participants for every event! Students increased their knowledge and understanding of watershed environmental stewardship, and became leaders teaching others.

> "Our virtual event was AWESOME! We had so much fun creating the skits, making posters, designing student T-shirts and doing digital art projects. Our KftB Educator, Ms. Sienna combined all of these pieces into a fantastic video. We had a virtual assembly event, and we had over 150 attendees!"
> Tracy Dordell, Third Grade Teacher, New Highland Academy, Oakland

For their final lesson, students in Ms. Anderson's class from Manzanita School were so proud to share their inspiring videos and posters with the guests who attended their educational Virtual Assembly! After viewing the video compilation of student clips and posters, the guests and students complimented each other and pondered the question, "How will you help take care of the environment?" School principal Amy Jones, shared, "I'm so proud of you young environmentalists! You have so much power to make change in our world!" Teacher Ms. Anderson shared, "I'm impressed with how brave you all were and that each of you chose a meaningful way to teach others, by making posters, sharing your inspiring words, or making videos!"

Virtual Creek Field Trip

In their virtual creek field trip, Zoom lesson, students from Lorin Eden Elementary enjoyed a moment of quiet listening as Ms. Laurel played creek sounds. Saiya shared, "I heard a bunch of birds chirping." Skyler added, "I think I heard a hummingbird." Rolando said, "I heard the creek flowing." Ms. Laurel had the class wiggle their arms to mimic freshwater flowing downhill and added, "Yes, this water is flowing all the way down to the San Francisco Bay."

Ms. Laurel challenged the students to think of adaptations plants might have to survive hot and dry California summers. Kalea said, "Well, they need roots to find water." Isabella added, "They would need *deep roots* to find the water." The students then marveled at pictures of native California grass root systems, which often extended five times as deep as the above-ground plant. Ms. Laurel also explained how California buckeye trees and many wildflowers grow and flower all winter and spring and then become dormant in the summer and fall.

Moving through the food web, the students brainstormed animals that eat plants. In the chat, the class quickly created a list of over 20 animals, including lots of insects. They were amazed to learn that creeks are often filled with invertebrate larvae of familiar insects like dragonflies. The students played a quick game to guess which larvae picture matched which adult insect. Caiden explained, “I guessed number three was a mayfly nymph because it has three long tail parts like the adult.” Natalie added, “And that fat nymph looks a bit like the dragonfly adult.” The class discussed how these sensitive invertebrates are a good indicator of creek health, and that lots of fish and birds depend on these insects for food.

The field trip ended with every student’s favorite game of trying to match creek bird calls to their makers. After listening to a wood duck call, Jasi said, “It sounds like a rubber ducky or dog toy.” Ms. Laurel responded, “I agree! So next time you hear a rubber ducky near a pond or creek, you’ll know it’s a wood duck!” After learning about acorn woodpeckers’ obsession with stashing acorns, Caiden noted, “They probably have to worry about squirrels stealing their acorns.” “Good point, Caiden. They have to press the acorns tightly into cracks in trees to make them hard for squirrels to get,” responded Ms. Laurel. After investigating six birds, their adaptations and behaviors, and their bird calls, Rahman explained, “The birds need their unique calls to communicate and find the same kind of birds.”

Professional Development for Partner Teachers

KftB partner teachers increased their confidence and skills in teaching environmental education, and in using various technology platforms to enhance their students’ learning. They really appreciated the support that they received from KIDS for the BAY during the challenges of distance learning. Some quotations from teacher participants are shared below:

> “I feel really fortunate that I've been able to watch KftB Educator Ms. Sienna teach environmental science for the past two years - in person and virtually. She is a strong instructional role model and motivated me to really focus more on my teaching in science. Since starting this KftB program, I'm teaching more science than ever before and now I have a lot of confidence and enjoyment in teaching environmental science.”
> Elizabeth Noone, Fourth/Fifth Grade Teacher, RISE Community School, Oakland

> “I really believe in the necessity of kids thinking about water at a young age. I believe in the power of influencing families to take environmental action and connect with nature as well. Students should be naturally aware of water and their environment, and this program helps them understand that natural connection.”
> Chris Scharfenkamp, Fifth Grade Teacher, Lorin Eden Elementary School, Hayward

> “I deeply appreciate how KftB values equity in environmental education. The lessons sequentially build on and scaffold students’ prior knowledge for deep learning. Even my students learning English are able to make great connections! Before our KftB programs, many of my students had never heard of things like the Five Rs, and had never seen the ocean. I remember our KftB field trip to Muir Beach a few years back and seeing my students put their feet in the ocean for the first time...it was amazing! This year the program adapted to distance learning really well and didn’t lose the powerful, hands-on components. Students had materials at home for the experiments and those experiences were accessible to all my students. That’s huge! And the KftB program supported so many different styles of learning and gave kids an opportunity to shine. My students have now incorporated environmental action as a part of their daily lives!”
> Tracy Dordell, Third Grade Teacher, New Highland Academy, Oakland

2021 - 2022 School Year

Our partner schools are now back in person, and KftB is thrilled to be back in classrooms and in outdoor spaces, delivering our programs! Students are so excited to experiment with creating mini watersheds and three-dimensional models of the San Francisco Bay estuary, investigate fish, crabs and seaweeds that live in the bay, get outside and explore their local watersheds through scavenger hunts and nature games, and help their local environment with school campus trash cleanup projects, pollution surveys and pledges to reduce trash and waste at the source. After experiencing so much isolation and screen time during the pandemic, it is wonderful to see our young, inspired environmentalists engaging in hands-on activities in the classroom and outside, working together as an in-person learning community with friends and classmates!

With the support of our funders and donors, we will continue to adapt as needed to deliver engaging and equitable environmental education programs to our under-resourced partner schools throughout these changing times!