Cluster 3 of COSMOS has had an action-packed first week! Dr. Pomeroy has been leading discussions regarding climate change and Dr. Lai has been taking students to examine marine biology. Mr. Matt Ruppel, a former COSMOS graduate student, and current teacher at High Tech High North County, is happy to return to COSMOS this year and help teach the students about scientific communication. Rather than me going on about this though, I’ll turn it over to the students and their thoughts on week one!

“For Monday, Cluster 3 started off the day with a lecture from Professor Lai and afterwards he took us to the end of the pier that the public is not generally open to which was exciting to do. Everyone was excited to go outside and look at La Jolla's beautiful beach, as well as observing some sea life. Afterwards, we went to Professor Skip’s lab and learned about the greenhouse effect and global warming through labs and lectures. Then, we ended off the day with picking a theme for our skit in the Cosmolympics. Overall, everyone had a full and interesting day.” – Elisa Rivera

“We started off Tuesday with a discovery lecture from the world renowned Boubacar Kanté, a professor of Nanoscience and Engineering at UC Berkeley. Nanotechnology is a very popular emerging field of study, one that deals with particles so small that they are measured in nanometers - which are a billionth of a meter. We explored the possibility of bending light to create invisibility cloaks -- similar to the Harry Potter world -- and viewed real, functioning models of cloaks designed for other wavelengths outside the visible range.” – Sabrina Jin

“In Science Communications, our instructor started the class by breaking the tense air with some ice-breakers. Everyone got to know each other even better and to know a little bit of our teacher. Then there was a lectured by another professor named, “Skip.” He explained about hertz and their relation to wavelengths. As the day carried on, we finished our lab from the day before that we now understood. It was soon noon and we went to lunch with more knowledge on springs and their frequencies.” – Diana Paniagua

“The first few days of COSMOS has been so much fun! Today we picked out the projects we wanted to do. There were five groups of four. Each presentation focused on something new. It ranged from measuring the amount of brown carbon to examining respiration in animals. The project I chose had things involving coulometers and creating Bluetooth devices. I can’t wait to start my presentation and work with my group!” – Pauline Yang

“We began our Wednesday morning at SIO where Professor Lai taught a short lesson. Next, we went to the beach and discovered crabs, slugs, and sea anemones around the rocks. Then, we went back to SIO where Professor Lai taught us how to determine the gender of a cricket and gave a lecture about invertebrate life in the ocean. In the afternoon, we performed an experiment to learn more about surface albedo and climate. Afterwards, we watched the movie Merchants of Doubt.” – Michaela Ellis
Greetings! It’s hard to believe that we are already halfway through COSMOS! We have all been having such a great time – doing experiments in marine biology, learning about how our atmosphere works, writing essays on ethical issues in science, and even taking some time to visit the awesome Birch Aquarium. Again, I’ll let the students tell you more details.

“On Monday we started off in Dr. Lai’s class experimenting with crabs that we had seen in our previous week’s trip to the tidal pools. There were two control groups, one group who tested to see how many crabs would escape to land at certain temperatures, and one group who tested to see how many crabs would escape to land when they were put in completely fresh water. We later learned more about gills, sharks and adaptation and got to visit a marine biology lab. In Dr. Pomeroy’s class we learned about aerosols, clouds and the climate and performed labs to stimulate the things that we learned. It was overall very helpful and fun to do.” – Alyssa Liu

“We visited an invertebrate collection and got to hear more about different types of krill, shrimp, squid, and other cool animals. One of the research papers that they were doing involved sifting through whale poop to find krill teeth. The whale poop was purple!” – Emily Chu

“This past Tuesday we began to work on our group projects. My group is focusing on counting brown carbon and other organic aerosols in the air. We looked at the particle counters and walked around and did background research on the topic. We had discussions and came up with a hypothesis to test out in the field. We’ll be putting together a presentation for everyone at the end of the camp. Other groups were working in the lab with acids, or down at Scripps. Overall, very excited to finish the projects.” – Zach Wu

“At the aquarium, there was an exhibit "Feeling the Heat" dedicated to climate change. I was glad to see that the aquarium was educating the public about the effect of global warming on marine life, since it is a topic that has been relevant for decades. Outside of the exhibit, we were also able to learn interactively by feeding fish at the tide pool. My favorite part of the aquarium was the seahorse display. Though it was a hot day, the opportunity to explore the boundless wonders of the ocean was worth it.” – Cindy Vu

“Today, instead of going to our usual Wednesday classes, our cluster took a trip to the White Sea Bass hatchery where we got to see how populations of fish are regulated. It was fascinating to see how the scientists studied the fish using special tags. After that, we ate lunch with the beautiful scenery by the Gliderport. Then, we visited the Birch Aquarium where we learned a lot about global warming and it's effect on our oceans and biodiversity. It was really cool to see how the different traits of fish contribute to their survival!” – Alan Liu

With week two now a wrap, we are all super excited to dig in further on our individual projects and find some really cool scientific results! Stay tuned!
It’s hard to believe that we are at the end of week three! At this point, projects are in full swing, and all of us are getting the hang of lectures. As we begin the mad dash to complete our projects and prepare presentations, I’ll let the kids say more!

“Over the past few days we have broken up into groups of four and worked on 5 different projects. Every Tuesday and Thursday afternoon we work with Lai, Chris, Colleen, or Matt and go in depth in our projects by doing different experiments. In the brown carbon group we have tested the air for aerosols by the beach, and three other places on campus. The machine we use takes in surrounding particles found in the air and measures the flow of darker particles. We have started to make the presentation that will be given at the end of COSMOS to our friends and family. These groups of four have also started on making scientific posters that show the progress we have made.” – Madeleine Wong

“The Bluetooth coulometer group could now perform titrations with ease and gathered data more efficiently. With the help of an electric current, students used electrons to neutralize acid and calculated the concentration of the acid used. They still needed to incorporate a way to control the titration remotely with Bluetooth, but after they do so they will gather all the data from the month and form a report to present to parents at the end of the month.” – Andy Zhou

“On Friday, we started the day by going to SIO. We learned about adaptations that created different marine species, including sharks and our great ancestors, the lungfish! We looked at different ecosystems and stressors they undergo. At the end of his class, we saw footage detailing the process of tagging sharks for research. In Dr. Pomeroy’s class, we learned more about photochemical smog and completed an experiment to look into how aerosols affect the way we see sunlight.” – Holly Helmuth-Malone

“On Monday, we all went to Lai’s class down at SIO again and went down to the tide pools again. It was even cooler than the first time because we applied our knowledge of the rocky intertidal and the creatures that lived there. It was really fun to see them in person. We even saw a sea hate ink! After that, we attended lecture and went to go eat. Then we went down to Skip’s class at NSB where we learned about ocean acidification and the chemistry behind it, including pH and alkalinity. We did an experiment where we created a buffer solution in a flask that acted like the ocean in terms of its pH.” – Aanchal Garg

“After two and a half weeks at COSMOS, students progressed further into their projects and started to know exactly what they were doing. The Bluetooth coulometer group could now perform titrations with ease and gathered data more efficiently. With the help of an electric current, students used electrons to neutralize acid and calculated the concentration of the acid used. They still needed to incorporate a way to control the titration remotely with Bluetooth, but after they do so they will gather all the data from the month and form a report to present to parents at the end of the month.” – Andy Zhou

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“Wednesday, we headed over to SIO for another class with Dr. Lai. We learned about the different zones of the ocean, as well as the different types of creatures that occupy them. Then we dissected various types of rockfish and other freshwater creatures to get a better idea of their physiology. In the afternoon, we had a lecture by Robert Pomeroy and participated in a titration lab. Overall, it was a very informative day of classes.” – Emma Auerbach
CLUSTER 3: LIVING OCEANS AND GLOBAL CLIMATE CHANGE

With our final week drawing to a close, Cluster 3 put in the extra effort to make their projects as awesome as possible. I’ll turn it over to them for the final word, but before that, I just want to thank all the staff, parents, and students that made the 2016 Cluster 3 such a great experience for everyone!

“In the morning, we had a discovery lecture on clusters 5, 7, 8, and 9. It was really interesting to see what activities and projects other clusters were doing. Afterwards, our teacher fellow Matt held a short seminar regarding our personal feelings. It was really nice of him to take on the role of not only academic leader, but personal mentor as well. We then worked in our groups to gather research for our final projects. In the afternoon, 8 of us drove down to Scripps to work with professor Lai and his assistant, Sam, on our temperature-respiration project. “On Monday we headed down to SIO and visited a marine vertebrate collection. Dr. Lai brought us to a fish collection where we were able to examine a myriad of fish species suspended in alcohol for preservation. In the larger jars, we studied a goblin shark. We were told about the fish preservation process. Afterwards, we dissected a frog in class. Although gruesome at first, learning about the anatomy of the frog was fascinating and hands-on. In the afternoon at NSB, we worked on our scientific posters.” – Gabriel Macias

“On Friday we drove down to Scripps Institute of Oceanography to work with Dr. Lai. First we conducted a salinity experiment on crabs using different percentages of seawater and freshwater. Afterwards, we headed down to La Jolla Shores to collect seawater samples to analyze at the lab. Following lunch at 64 Degrees, we went to the Natural Sciences Building to work on our final projects, mine being the Brown Carbon Counter project.” – Shifali Kerudi

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“My group project is really coming together now that we've finished our experiment in crab respiration in different salinity levels. We’re almost done with the digital poster and power point thanks to the time in class today and yesterday to work on them. Today we got some helpful tips from our teacher fellow, Matt, on how to present our project. He told us to practice presenting beforehand (to avoid reading off the slides word for word), to speak clearly and to summarize what our power point is stating. This way the presentation is clear and to the point. Overall I’m excited about sharing our experiment and results to the students of clusters 3 & 6 and parents! ” – Rosalinda Barcellona

“Wednesday was our last day at UCSD’s Scripps Institution of Oceanography (SIO). Dr. Lai started the day with a lecture on the dynamic, high-energy environment of the sandy shore marine ecosystem. We then headed to the La Jolla shores to experience the ecosystem up close. As we swam and waded in the clear water, were able to observe schools of fish, a seal and a couple of sharks. Back at SIO, Dr. Lai covered a myriad of topics that included the west-coast sardine fishery collapse, controversy behind tuna fishing methods and the piracy of Chilean Sea Bass. After lunch, we went to the Natural Sciences Building (NSB) and split into our project groups to continue working on our final projects.” – Ping Hsieh

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