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Pacific Science in Town

Island residents have the opportunity to soak up a little science education this summer, as Waimea hosts the American Academy for the Advancement of Science (AAAS) Pacific Division's annual meeting from June 15-20. Scientists from throughout the Pacific region, including the West Coast and Hawaii, will gather at Hawaii Preparatory Academy's campus for five days of meetings, lectures, field excursions, and special events. The community is invited free of charge to several of the scheduled events. Mark your calendars now for the following public talks:

Sunday June 15, 7:00 pm @ Gates Performing Arts Center

Following the Stars to Hawaii's Future: From Canoes to Telescopes and Back

Ka'iu Kimura, Associate Director, The 'Imiloa Center

Monday, June 16, 12:15 – 1:00 pm @ HPA Library

Wings without Borders: Tracking Albatross across the North Pacific

David Hyrenbach, Hawaii Pacific University

Photo: David Hyrenbach.

The Black-footed Albatross and the Laysan Albatross are long-lived seabirds susceptible to by-catch in long-line fisheries across the North Pacific Ocean. Little is known about the movements and threats faced by individual albatross at sea, especially during their post-breeding dispersal. Hyrenbach's team is using satellite tracking to investigate the movements and habitats of these two species. These studies are providing an improved understanding of the movements, habitats, and threats faced by albatrosses in the North Pacific.



Tuesday, June 17, 7:00pm @ Gates Performing Arts Center

Local Food Systems

Bill Berry, AAAS, and **Nancy Redfeather**, Hawaii Island Food Summit Coordinator

Photo: Nancy Redfeather talking with students in her Home Vegetable Production Class in spring 2008.

Self-reliant in food production until the 1940's, today Hawaii imports about 90% of its food. Redfeather will explore challenges and opportunities for local agriculture with respect to the environment, economics, and government policy. Dr. William Berry will discuss progress being made in Berkeley towards food self-sufficiency for that community. Come join in this lively discussion.

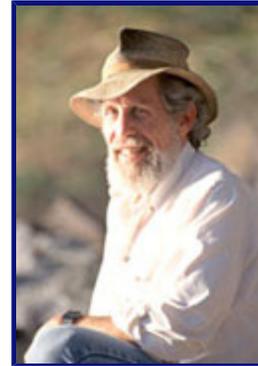
Wednesday, June 18, 12:15 – 1:00 pm @ HPA Library

Worldwide Implications of an Impending Varroa Mite Infestation of Honeybees on the Big

**Island of Hawaii
Richard Spiegel**

Photo: Richard Spiegel, owner of Volcano Island Honey Company.

Approximately 30% of food consumed by humans is dependent on honeybees for pollination. Honeybees worldwide have been decimated by the Varroa mite - a tiny, external parasite which feeds on the bees' hemolymph (blood). Hawaii Island is currently free of the Varroa mite, but in April 2007 the Varroa mite was discovered on the island of O'ahu. Hundreds of thousands of queen bees are bred yearly on Hawaii Island and shipped worldwide, so hundreds of thousands of bee colonies that pollinate food crops worldwide are dependent on the queens raised here. The Varroa-free queen breeding environment of Hawaii Island is now critically endangered.



Wednesday, June 18, 6:00 pm @ Gates Performing Arts Center

Philippine Coral Reefs: An Integrative Approach to Research, Education, Animal Husbandry and Public Outreach

Terrence Gosliner, California Academy of Sciences



Photo: Terry Gosliner in Mabini, Luzon, Philippines returning from a dive with specimens of new species of nudibranch mollusks he collected.

Concurrent with the building of new facilities in Golden Gate Park and a desire to reach new and more diverse audiences, the California Academy of Sciences embarked on an ambitious project focusing on Philippine coral reefs. Partnerships were formed with many research, conservation, and educational entities in the Philippines, as well as with entities in the U.S., including the large Bay Area Filipino community. This project serves as a model for how other institutions can employ scientific research as a foundation for developing educational outreach to large audiences, especially those that do not have a tradition of museum visitation and involvement in conservation activities. Terry Gosliner has been studying Philippine reefs for 16 years and will describe the integrative programs that have been developed by the Academy.

Thursday, June 19, 7:00 pm @ HPA Library

Current Affairs at the National Energy Laboratory of Hawaii Authority (NELHA)

Ronald Baird, Director, NELHA

Baird will review recent progress at NELHA made by its aquacultural, water bottling, and energy tenants. Baird will also discuss NELHA's vision for the future and its activities in the arena of alternative energy.

On-site registration for the full range of conference activities will also be available. Detailed information is available at [The Kohala Center's \(TKC\) website](#).

Kaulana Mahina: The Hawaiian Lunar Calendar

Photo: Hilo moon phase. Photo by Kalei Tsuha.

"What I hope to accomplish through my work is to bring pride to a people who deserve to know that their ancestors were just as smart as the Mayans, the Chinese, and the Egyptians. The environment was ingrained in our ancestors and therefore is in us. Science and math are in our heritage and should not be foreign to us." – Kalei Tsuha



On a trip to the island of Kaho'olawe in the early 1990s, Kalei Tsuha's curiosity about the Hawaiian calendar was first awakened. Watching young children playing a hand game which named the 30 phases of the moon, Tsuha was intrigued and began a research project into Hawaiian timekeeping which has occupied the ensuing years of her life. Tsuha interviewed *kupuna* (elders) and pored over archives of Hawaiian language newspapers to unlock the keys to the Hawaiian calendar, a complex heliacal system which tracks the positions of the moon, the sun, and the stars throughout the year to calibrate time. To provide some perspective, the Gregorian calendar used by most Western countries is based solely on the movements of the sun. By the time a Hawaiian child was six years old, he or she knew and understood the significance of all of the 30 moon phases. The phases of the moon governed the activities of daily life, such as when to plant which crops, when to fish for which species, and when to refrain from farming and fishing all together. The practices of daily life were intimately intertwined with the movement and luminosity of the heavenly bodies, which the Hawaiians tracked closely and carefully.

"During Uncle Harry Mitchell's time and David Ka'alakea's time (two living *kupuna* whom Tsuha had the privilege of talking with), folks still fished, farmed, and knew their environment because there was no weekly barge. They still lived off of the land and needed to know how they were going to optimize their time to gather, produce, or practice. The 30 phases of the moon dictated the nature of their activity," explains Tsuha.

Tsuha is hoping to share the wealth of her knowledge about the Hawaiian calendar with everyone who is interested. [Read more](#) about *Kaulana Mahina*. Or contact Kalei Tsuha directly via email at hawaiianmooncalendar@yahoo.com to learn more about her lunar calendar research.

Kahalu'u in the News



Photo: Underwater shot at Kahalu'u Bay taken by the KHNL TV crew.

The success of the Kahalu'u Bay Project has created quite a buzz, both in West Hawaii and across the State. KHNL TV crews visited Kahalu'u Bay last month to shoot a TV spot featuring restoration efforts at the Bay. The TV spot aired last month and is [archived online](#) as part of KHNL's "The Earth and Sea Project: Going Green in Hawai'i" series. The story focuses on the ReefTeach program, in which over 150 community volunteers take turns teaching proper reef etiquette, like not stepping or standing on corals. Some volunteers teach from their businesses and organizations, and others teach on the beach at Kahalu'u Bay. Sara Peck of the

University of Hawaii Sea Grant Program, and Rosanne Shank, a Kona Girl Scout leader, co-founded the Kahalu'u Bay ReefTeach program in the year 2000. The Kohala Center began managing ReefTeach in mid 2006, and in late 2007 Island businesses were first invited to Adopt a Day at the Bay. TKC is proud that KHNL TV recognized the significance of the conservation efforts currently underway at Kahalu'u Bay, and we invite you to view their report at the [Earth and Sea web page](#).

"Having the KHNL news crew at Kahalu'u Bay provides us an opportunity to share with everyone in Hawaii that we can make a difference by working together as a community," explains Kohala Center Outreach Coordinator Cindi Punihaole. "Educating visitors on proper reef etiquette has made a big difference in the way people engage with each other at our Bay. Regular visitors thank our volunteers for their work and

mention how much nicer the Bay looks this year," she says.

To volunteer or Adopt a Day, contact Cindi Punihaole at cpunihaole@kohalacenter.org. Read what some [volunteer ReefTeachers](#), young and old, have to say about this program.

Native & Introduced

Photo: Hand sculpted birds scatter seeds across a painted forest landscape. Kohala Elementary students learn about how native birds are uniquely adapted to feed on native plants and about how introduced species of birds and plants have altered the ecosystem and changed the face of the forest. Photo courtesy of Art In Sight.



Over the past five years, a new institution has taken root at Kohala Elementary School. Starting with second graders in 2004 and adding one grade level each year, the Hidden Jewels enrichment program is building a new paradigm for art and science learning in our public schools. Master science educator Susan Lehner and master art educator Peter Kowalke have joined forces with elementary educator Calin Duke to create a novel, interdisciplinary approach to teaching students about the wonders of the world around them. Forest, Ocean, Stars, and Earth disciplines are introduced through project-based activities expertly designed by Lehner to engage the kids' imaginations and natural curiosity. Kowalke's art projects complement the science curriculum, reinforcing learning through hands-on creation of ecosystems and critters. Clay, paint, natural materials, movement, music and spontaneous connections are explored in the Hidden Jewels art classroom – a canopied tent on the grounds of the school. From classroom to tent and from tent to classroom, the science informs the art and vice versa.



"For many students at Kohala Elementary, Hidden Jewels has provided a new way for them to be especially proud of their knowledge. Through sharing their handmade books with family and friends at the end of the year, and successfully competing in knowledge-testing games in the classroom, their enthusiasm and pride are infectious. Next year we'll be adding first grade to our repertoire, at the request of all first grade teachers. Our new integrated studies building has been painted and stocked with materials. It will be ready to use in the fall for science classes. Many activities are planned for this building next year, including a wide range of after school programs in everything from science to Shakespeare!" – Susan Lehner, Hidden Jewels co-founder & science educator

Photo: Making her own chess set in the Personal Projects Area of the Art Tent. Photo courtesy of Art In Sight.

TKC and the Hidden Jewels team have been very fortunate to work with the wonderful staff and teachers at Kohala Elementary School. We extend a special thanks to Principal Ele Laszlo for spearheading this program at Kohala Elementary, and to the school staff for their help and support throughout the year. [Take a tour](#) of this year's projects, with guides Susan Lehner and Peter Kowalke.

Spotting Invasive Species

Photo: *Gracilaria salicornia* (Gorilla Ogo) is a very successful invasive species of red algae that outcompetes native seaweeds and coral. Photo courtesy of UH Manoa Botany Department.



Malama Kai Foundation invites conservation-minded community members to assist with early detection of marine invasive species around Hawaii Island. Malama Kai is sponsoring training workshops at locations around the Island, from August 2008 through January 2009. Experts from a variety of agencies will train interested volunteers to identify marine invasives. The hope is that workshop attendees will pass their new knowledge along to others, thereby expanding the pool of knowledgeable individuals who frequent our ocean and beaches. Fishermen, students, and anyone who'd like to learn more about aquatic invasive species are invited to attend. For details and to register, contact Anneke Scout at 808-990-1269 or via email at bigisleanneke@yahoo.com.

Congratulating Our Summer Scholars



Photo: Lynsey Montell, an incoming senior at Saint Joseph High School in Hilo, and recipient of a scholarship to the CURIE Academy at Cornell University this summer.

"Being able to provide support to our Island students to participate in these amazing learning and growing opportunities is something The Kohala Center really values. The enthusiasm and excitement of these students applying for and being accepted into these programs is very rewarding, and we encourage interested high school students to take advantage of these scholarships." – Samantha Birch, Kohala Center Program Services Coordinator

The Kohala Center is proud to sponsor four Island scholarship students this summer, two of whom will attend the **BELL (Brown Environmental Leadership Lab) Program** at Brown University and two of whom will participate in the **CURIE Academy** at Cornell University. The Kohala Center, Brown University, Cornell University are jointly supporting the scholarships, which include full tuition and partial reimbursement for travel expenses to and from the East Coast. Past scholarship recipients report that their participation in these outstanding science and leadership programs has proven to be a life changing experience – one that opened new pathways as they consider their options for the future. We congratulate this year's BELL scholars, Amber Datta and Dominique Saks, and this year's CURIE scholars, Amy Lynn Eriksson and Lynsey Montell. [Learn why](#) these young women are looking forward to spending their summers at Brown and at Cornell.

Sharing a Passion for Change

Photo: (from left to right) Chuck Greene, TKC Senior Scientist, oceanographer and Cornell University professor; Sara Peck, co-founder of the ReefTeach program; and Kostantinos Stamoulis, TKC's new Assistant Outreach and Volunteer Coordinator/Trainer, photographed at a recent TKC event by Randy Magnus, one of the many extraordinary volunteers with the Kahalu'u Bay Project.



In May Kostantinos Stamoulis, or Kosta for short, joined The Kohala Center (TKC) family as Assistant Outreach and Volunteer Coordinator/Trainer for the Kahalu'u Bay Project. Kosta will be assisting with public education, community outreach, and preparation and production of educational materials, including a soon-to-be-released training DVD. Kosta will also monitor and provide support to the many ReefTeachers who volunteer their time at Kahalu'u Bay to educate visitors about proper coral reef etiquette.

Photo: Underwater self-portrait of Kosta offshore of Honokohau Harbor.



Kosta is no stranger to the ocean. The son of a Greek ferry boat captain, Kosta has long been intrigued by Hawaii. "I knew that someday I would come here," he says. When Kosta was accepted into the Marine Science program at UH Hilo, he made the big move to Hawaii. After graduating with honors, Kosta landed a job as a reef monitoring technician/ GIS analyst for the State Department of Aquatic Resources (DAR) in Kona. Kosta will be splitting his time between his DAR research work and his new position with the Kahalu'u Bay Project. "I am very enthusiastic to be involved in such an integral part of conservation," he says. "I believe I can bring about positive change and growth to this program as well as share my passion for the ocean and reefs of this island."

We invite you to Kahalu'u to meet Kosta and our ReefTeach volunteers, and to see for yourself the positive changes happening at the Bay.

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All We Have Is Time

An Interview with Kalei Tsuha by Linda Copman

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Photo: Kalei Tsuha in Hana, Maui for a ceremony.

1) What are the major differences between the way Hawaiians organized time and the way Westerners organized time?

I will refer to the first five lines of the *Kumulipo* which say:

*"O ke au i kahuli wela ka honua
O ke au i kahuli lolo ka lani
O ke au i kuka'iaka ka la.
E ho'omalalama i ka malama
O ke au o Makali'i ka po"*



At this point in my education and experience these lines tell me what the Hawaiians were tracking in order to organize their time and space. Basically these lines say:

At the time when the earth was churning hot – This first line conveys an understanding that all life essence is due to the spark of heat or energy.

At the time when the heavens turn inside out - To me this line describes a solar or a lunar eclipse, and also a change from one lunar month to the next.



Photo: Mahina Uli, the total lunar eclipse on August 28, 2007.

At the time when the sun's shadow appeared - Muku, which is the last moon phase, rises at the same time as the sun. They both rise together and zenith together, but the sun sets before the moon. For a brief moment after the sun sets, the moon phase Hilo can be seen, which describes the next line.

The moon will be shining - This is the change of time from one lunar month into the next.

At the time when Makali'i rules in the evening - This fifth line ties all the other time references together. This happens when Makali'i, the Pleiades, rises in the evening. This coincides with the annual makahiki festival, when a cessation of all the stringent kapu occurs and the ceremonies and festivities that come with the time of Lono transpire. The makahiki begins when the Pleiades rise in the east, at the same time that the sun is setting in the west.

If we put these lines together, what we have is the sequence that is necessary for the recalibration of the Hawaiian calendar which happens during the makahiki festival. We need the sun to be setting in the west, the moon phase Hilo which starts the new lunar month to be seen in the west, and the Pleiades to rise at the same time in the east.

The Western or Gregorian calendar utilizes the cycle of the sun, with 29 to 31 days in a month, seven days to a week, 12 months in a year, and 365.25 days in a year. In the Hawaiian calendar there are 30 days to a month, ten days to a week (called an *anahulu*), and 12 to 13 lunar months a year. There are 360 days in a year except when there's a thirteenth lunar month. Hawaiians knew when to add this extra month by watching the sequential rising of the stars and by adjusting their calendar to ensure that the year flowed properly.

2) Your research shows that the Hawaiian lunar calendar was based on an understanding of the movements of the sun, the moon, and the stars. What is the significance of this to you, as a cultural practitioner and a scholar?

We see that the Hawaiian calendar tracks the cycles of the sun, the moon, and the stars and planets. Measuring the rising or setting of stars and planets to calculate time is called heliacal calibration. This puts Hawaiian knowledge of the heavens on par with the Mayans and the Incas.

Photo: Sunset at Hapaiali'i, Kahalu'u. This site was restored and is located near the residence of Lonoikamakahiki, who was the last chief mentioned in the *Kumulipo* and born in Kahalu'u.



As a practitioner and a scholar today, during these times of disconnectedness from the environment, following the lunar calendar helps me to reconnect to the environment. All of a sudden I'm familiar with the Earth, wind, and ocean tides because of my understanding of the monthly and annual cycles of the moon.

As a Hawaiian child growing up in Hawaii, we were not taught about the intelligence that Hawaiians had. When the Hawaiian language newspapers were introduced to me and as I started reading article after article, they proved to me that Hawaiians were extremely intelligent. They felt a sense of urgency to record all of this knowledge contained in the newspapers.

I met Uncle Harry Mitchell on a trip to Kaho'olawe and then at a few *la'au lapa'au* (Hawaiian healing art) presentations he used to do at Maui Community College. He wrote a short two-page report about the lunar phases which also referred to a few star constellations.

Uncle David Ka'alakea was a *kupuna* (elder) for the Hawaiian immersion program in Pa'ia on Maui. He was a very kind man who enjoyed speaking Hawaiian to anyone who was willing to listen and try. He was very patient and would sit and listen to me stumble through my sentence patterns and then slowly respond so I could understand him. I got to talk story with him many times on Kaho'olawe and once in Kaupo. He spoke in the old East Maui dialect and shared so many stories with me. I was very fortunate.

Both of these men lived during fast changing times and it seemed easy for them to bridge the old philosophies and lifestyles with the new. They supported the Hawaiian Renaissance movement and inspired many along the way. They were great *kumu* (teachers) to many.

Hawaiian knowledge that had been forgotten for many years and was nearly lost is being revived now. Learning about the Hawaiian lunar calendar is part of that revival.

3) How would you like to share your knowledge of the Hawaiian lunar calendar with people today? Why is it important for you to revitalize this knowledge, and why is it valuable for us to learn more about the Hawaiian lunar calendar?

I want to write books and right now I'm fortunate to work with Dr. Pua Kanahale who is extremely dedicated to educating Hawaiians. Her enthusiasm is very infectious. We are creating a curriculum that will help reintroduce Hawaiians to our native intelligence.

Currently I am working on a project called *Papaku Makawalu*. It is a research and curriculum development project. My *kuleana* (responsibility) comes under a house of knowledge called *Papahulilani*. *Papahulilani* has to do with traditional Hawaiian study of everything in the atmosphere. This includes phenology, astronomy/astrology, meteorology, hydrometeorology, and basically all taxonomies that categorize knowledge about the stars, planets, moon, sun, wind, rain, clouds, atmosphere, and atmospheric activities. We find answers in our *mele* (songs) and in *mo'olelo* (stories) that are mostly found in the Hawaiian language newspapers.



Photo: Pi'ilani Heiau on winter solstice morning. This is the largest constructed heiau in Hawaii, located in Hana, Maui. It is one of the first sites we've researched for celestial correlations.

I was introduced, as all Hawaiian language students are, to the Hawaiian language newspapers in my Hawaiian 101 class. Hawaiian language newspapers are a large resource for those who are learning to speak Hawaiian. An organization called *Ho'olaupa'i* has collected over one million pages from Hawaiian newspapers and from volumes of literature spanning over 100 years and is currently digitizing each page to be available for use on the

Internet.

It is easy to find information in our proverbs. Folk customs and understandings were handed down from our elders through sayings like, "When one plants in month of Mahoemua, he will have irregularly shaped taro." We have tested this by planting taro in this month, and found it to be true.

According to our kupuna, specific plants were better suited to planting during specific moon phases. After full moon phases, liquid is drawn up out of the Earth and gets pulled up into plants, creating lots of sap. Medicines made at this time are especially potent. Our elders discovered that this was a good time to make medicines. How did they figure this out? I don't know for sure. It seems that they learned by trial and error when the good times to do certain things were.

Learning the lunar calendar and embracing this knowledge as my own, things which my ancestors understood and lived by, inspires me still. If I had time, I would teach this to everybody.

View a January 2008 [lecture by Kalei Tsuha](#) on Kaulana Mahina.

Empowering People

Photo: Student ReefTeachers from the Foundation School at the University of the Nations.

One of the organizations in our community that has volunteered to Adopt a Day at Kahalu'u Bay is The Foundation School at the University of the Nations (U of N), an educational program for children of U of N students. Here's what Thor Stensby, Director of the Foundation School, has to say about the ReefTeach program:



"It has been a pleasure to join in with the ReefTeach program and both teach our students about preserving life on the reef and have them help others get the same teaching. The hands-on teaching we had at Kahalu'u Bay made me become much more aware of how I act when I'm out snorkeling or when I'm on the beach. The ReefTeach program not only helps the environment at Kahalu'u, but also educates those who meet the ReefTeachers to develop a more positive attitude towards the life in the ocean in general. Anyone who loves spending time in, by, or on the ocean, should get in contact with ReefTeach to learn more about

what it has to offer." - Thor Stensby, Director of Foundation School, University of the Nations

Stensby asked his students at Foundation School what they had learned from participating in the ReefTeach program. Here are a few of their responses:

"I've learned to not step on coral and stand on sand instead. It is also good to be able to help others help the environment, and change both them and Kahalu'u Bay." - Joseph (10 years)

"I've learned not to feed the fish and that the turtles need space. I won't do the stuff I used to do when I went to the beach." - Harry (8)

"I also learned not to feed the fish. I didn't know it could harm them." - Noah (9)

"I've learned not to touch the turtles." - David (8)

"I've learned not to throw litter in the ocean, since that can harm the fish when they eat it." - Nathan (7)

Some of our more mature volunteers shared these thoughts about their involvement with the ReefTeach program:

"It is indeed an honor to do what little we can to accomplish our goals for the Big Island. Mahalo for inspiring us all to do more." - Judy Wormington

"I appreciate the opportunity to help with the ReefTeaching." - Barbara Brown

"So very good to meet new people and make the new friends I have made at ReefTeach. By giving us the opportunity to help, you enrich all our lives." - Rich Osada

"Thank you for all you do for our island." - Deann Canuteson, President of Full Life (one of the organizations which has adopted a day at Kahalu'u Bay)

For additional information on ReefTeach and Adopt a Day to Save Kahalu'u, visit <http://www.kohalacenter.org/reefteach.html>.

The Magical Path to Science...

Photos & Text by Susan Lehner



Photo: Entrance to the magical path to the Science Room.

This year, all twelve sections of grades 2-5 were included in the Hidden Jewels program at Kohala Elementary School. In addition to creating their big books of weekly fold-outs, each class played games and created projects to reinforce what they were learning.

Photo: Part of a third-grade Hidden Jewels of the Ocean book.

Second-grade (Forest) students showed a keen interest in researching facts about native species. Many worked with their parents at home to find out information from books and the computer. Along with the Vertebrate Grab Game, they enjoyed playing a Science Quiz Game to test their new knowledge.





Photo: Third-grade Ocean mural.

Murals in the third-grade (Ocean) classrooms depicting the levels of Plankton, Nekton, and Benthos were especially impressive. The kids worked very hard - and accurately! - making zooplankton and phytoplankton out of cornstarch clay, which is displayed on a black foam-core background at the top of the mural. All classes drew wonderfully-detailed nekton animals and benthic plants and invertebrates to complete the murals. This grade level was introduced to the Latin names for ocean animals and learned about how knowing some Latin can help you to figure out the meaning of

new words.

Photo: Working on his Earth book.

Fourth grade (Stars) took a "voyage" through Oceania, playing a game using latitude, longitude, prevailing winds in July and January, and maps of island groups, to figure out their partner's island of origin and island of destination. They received Hawaiian star compass charts and learned how the first Polynesians used all this information to navigate without instruments.



Photo: I am still learning!

In the fifth grade (Earth), the students became experts at Jeopardy, with questions that covered a broad spectrum of Earth science. Their retention was amazing. These students uncovered fossils of predacious diving beetles and trilobites. They then used the Fossil Timeline booklets that they had created to pinpoint the age of each fossil. Each student in the fifth grade designed and made a large button (using the very popular Button-Making Machine!) with the words "Ancora Imparo." Translated from the Latin, this means "I am still learning," and many of these students plan to wear their buttons on their first day of Middle School.



The Magical Path to Art...

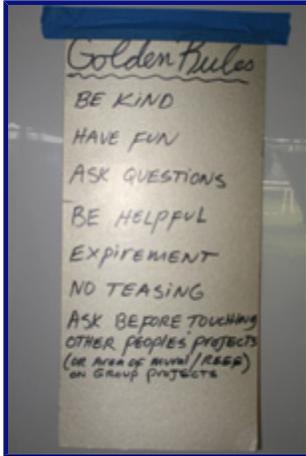
By Peter Kowalke

Photos Courtesy of Art In Sight

Photo: The Navigational Canoe Mural.

"Painting a mural - what more could you want? This is the best day of my life!" - Comment overheard in the Art Tent





Translating the Hidden Jewels science concepts, even with the after school kids, went smoothly as the science knowledge is now part of the grade level curriculum. We have created a common vernacular. It is remarkable that so many of the kids have now had exposure to the Hidden Jewels curriculum as we have expanded to more classrooms and grade levels over the past four years.

Photo: Ground rules of the Art Tent.

In art, we use the concepts of "multiple intelligence" learning, a phrase and approach coined by Howard Gardner. The idea is that kids learn in many ways: physically, musically, socially, etc. We also use the ideas from a preschool in Italy called **Regio Emilia**, which has been doing project-based learning for decades, creating public works of art ranging from a playground for birds to the main curtain for their town's Venetian-style theatre house.

Following the multiple-intelligence model, we set up eight learning stations in the Art Tent:

1. The Oceans Community Chess Set

2. The 1000-Pound Coral Reef

The reef emphasized the ocean ecosystem, especially categorizing organisms: coral, crustaceans, invertebrates, vertebrates, etc. As we built the reef, we emphasized how the organisms are interdependent on one another - predator and prey - herbivores and seaweeds, etc. The students also learned about the bio-strata in the sea: the Plankton, Nekton, and Benthos layers.



3. The 5-Foot Fiberglass Honu, a cooperative project with

www.itsahonuworld.com.

4. The Navigational Canoe Mural

The mural reflects elements of the curriculum covered as the students learned about the Hawaiian Voyaging canoe: star navigation, cultural practices, and introduced species of plants and animals. It also shows the concept of "Native" or endemic species - plants and animals which arrived here on their own with the aid of wind, water, birds, etc.



5. The Pottery - Shape Making Station

6. The Research and Sketching Area

7. The Paint Mixing Color Studies Area

8. The Personal Projects Area, for making their own chess sets and paintings.

Calin Duke, our school curriculum specialist, contributed dolphin and whale song CDs and several informative books. She also created signs for the work stations and printed out D.O.E. learning standards which correlated to our learning stations and to the curriculum Susan and I developed, adding a formal pedagogic element to the program.

Having an expanded art teaching team made for a wonderful experience for the kids and allowed us to maintain a very low student-to-teacher ratio. My assistants, Anna Clay Brandt and Phil Przybylski, did a fabulous job teaching our curriculum and providing focused attention for the students at the learning stations.



Photo: The Pottery – Shape Making Station.

The Hidden Jewels Team is planning to bring more language arts into the program, by incorporating literature and poetry relating to our topics, pertinent music and movies, plus written reflections and meta-cognitive exercises to enhance the learning experience. All of this behind-the-scenes planning fosters a sense of integrated learning and the interconnection between the arts and sciences.

We are looking forward to firing the Oceans Community Chess Set and the 1000-Pound Coral Reef in the coming months. The reef may be shown at an international coral reef conference on the Island, and we would like the reef to find a permanent home in an educational aquarium exhibit, hopefully in the Hawaiian Islands.

Photo: The 1000-Pound Coral Reef and one shark.

All our Hidden Jewels Community projects will be fired in our new Volcano Kiln. This is a low carbon-emissions kiln with vegetable oil burning capabilities which was featured in *Ceramics Monthly* Magazine's Sustainability Issue in December 2007. Designed by local inventor Hugh Jenkins in Honoka'a, this technology can make a huge environmental impact by reducing fuel use and carbon outputs of kilns by over 50 percent.



The Oceans Community Chess Set will return to Kohala Elementary School once glazed. The Navigational Canoe Mural needs more layers and richness, so we will continue working on that next year. The 5-Foot Fiberglass Honu needs a few more coats as well, and may be shared with another education group in Kohala, Project Venture.



Photo: The 5-Foot Fiberglass Honu.

Our final day was very special. We created a fun rain drop, wave, and ocean eel dance interacting with the 1000-Pound Coral Reef, the Navigational Canoe Mural, and the 5-Foot Fiberglass Honu. A reporter from Big Island TV is doing a story on [Art In Sight](#) which features the current Hidden Jewels program, and the videographers interviewed several of the kids about what they learned and what they created. I also handed out a survey form which elicited some wonderful responses, especially ideas for public art and science pieces the students would like to create on campus. Some of their ideas were to

create a fossil garden, a giant sized magnifying glass, and a satellite.

Parent feedback was very positive as well. Mrs. Georgette Kaluai'i explained how her two children benefited from the program and loved attending. Mrs. Kaluai'i shared that much of the student art, music, and health education has been cut from the school curriculum. She thanked the Hidden Jewels program for contributing to an improvement in her children's ability to use their minds creatively.

Photo: Making something out of nothing.

I'd like to extend a great big MAHALO to Bob and Margaret Simms of Big Island Tents, who made the Art Tent available to us at a deep discount. Next year, we look forward to having the integrated studies building to work from.



I hope this gives a bit of a peek at this year's program. But really, you gotta be there to feel the creative buzz of inquiry, fun, and beautiful materials in a creatively safe environment. You had to be in the Explorations Tent to know how great it felt to be there with all our young observer-creators. I was sad to have the session end. I miss the smiles and laughter of the kids and of my co-teachers.

Visit www.artinsight.us/hiddenjewels to learn more about the Hidden Jewels program.

Using Their Minds

Excerpts from BELL & CURIE Scholarship Essays

BELL Rhode Island Scholarship Recipients:

Amber Datta, incoming senior at Kealakehe High School



Photo: Amber enjoying the view at Hokitika Gorge, Westland, New Zealand in March 2008. The color of the water is due to suspended rock dust particles coming from the glaciers feeding the river.

"Sustainability and environmental protection have been a part of my life from the very beginning; I live on an organic farm with primarily solar power and a catchment water system. My uncle works in the field of bio-fuel, and I have done some work for his company; I know the importance of sustainability. I have explored sustainability primarily in the field of energy, but I am also interested in learning other ways to assist in maintaining a healthy environment. Also, I am interested in learning about environmental problems and solutions in places other than Hawaii."

Dominique Saks, incoming junior at Kealakehe High School

Photo: Dominique with Flame, the horse she rides in dressage and jumping competitions. *"With the growing necessity of addressing environmental issues such as air and water pollution, global warming and the need for renewable energy, and sustainable living, the responsibility for preserving the Earth is weighing down on mankind's shoulders. It is important for everyone to gain knowledge about the way humans affect the environment, so that we can have less of a negative impact. By pursuing studies that relate to the environment, my knowledge will grow and I will be able to aid humanity in living with harmony with the natural world. Opportunities such as BELL offer up knowledge as well as give me a chance to explore my interests."*



Cornell University's CURIE Academy Scholarship Recipients:

Amy Lynn Eriksson, incoming senior at Kea'au High School



Photo: Amy at the summit of Mauna Kea last December.

"Discovering what and how certain things are made up of and how my body functions are really important to me. I believe that the more someone knows about a subject the more that they can do to protect it. This is true for everything ranging from our bodies, nature, or even the oceans that surround us. This program interests me because I feel it would give me a chance to explore the many aspects of science and engineering that are not focused on in many high schools... I want to pursue a career in which I will be making a difference. Whether I'm engineering or fixing a broken bone, I feel

that I will be happy as long as I can use my mind. By participating in the CURIE Academy program I will not only gain new experience and knowledge, but I will also become better prepared for the world that awaits me after high school."

Lynsey Montell, incoming senior at Saint Joseph High School in Hilo

Photo: Lynsey doing her floor exercise at a gymnastics competition.

"I enjoy designing and building objects. Last year as a sophomore I was on the robotics team at my school, and I helped design and build an underwater robot. The robot was entered in a competition where I helped pilot it. I have also been very interested in medicine, specifically in orthopedics. Because I am a competitive gymnast, I have broken many bones and dislocated both my elbows. These incidents, which included many trips to the orthopedist, sparked my interest in bones, muscles, and the human body in general. About two years ago, my Dad told me about a field called Biomedical Engineering. I researched it and found it combined both of my interests. I am very excited that the CURIE program will give me a better idea of my field through hands-on experience."



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