



**'IMILOA**

Astronomy Center of Hawai'i

## Educational Highlights May-June, 2009

K-12 Student Field Trips				
Date	School / Youth Group	Location	Grades	Student #
5-1-09	Noelani Elementary School	Honolulu	4	73
5-1-09	Kamaile Elementary School	Waianae	5	34
5-2-09	Highlands Intermediate School	Mililani	8	50
5-5-09	Moore Grant/Keonepoko School	Pahoa	5 + 6	170
5-5-09	Moore Grant/Waikoloa School	Waikoloa	5 + 6	166
5-7-09	Moore Grant/Pahoa Elementary School	Pahoa	5 + 6	106
5-7-09	Moore Grant/Keaau Middle School	Keaau	6	100
5-7-09	Moore Grant/Mountain View School	Mountain View	5	70
5-8-09	Mountain View School	Mountain View	K	86
5-8-09	Keolu School	Kailua	4	8
5-8-09	Island School	Lihue	K-12	20
5-12-09	Moore Grant/St. Joseph Intermediate School	Hilo	5 + 6	51
5-12-09	Moore Grant/Kealakehe Elementary	Kealakehe	5	161
5-13-09	Kamehameha Pre-School	Hilo	Pre	38
5-13-09	Lanikai Elementary	Kailua	4	40
5-14-09	Moore Grant/Hawaii Academy of Arts and Science	Pahoa	5 + 6	58
5-14-09	Moore Grant/Kua O Ka La	Pahoa	5 + 6	7
5-14-09	Moore Grant/Christian Liberty School	Keaau	5 + 6	30
5-14-09	East Makaala School	Hilo	Pre-4	7
5-15-09	Voyager Charter School	Honolulu	6 – 8	39
5-15-09	Forest Charter School	Nevada City, CA	8	18
5-15-09	Honoka'a High School	Honoka'a	10	30
5-15-09	Kapaa Middle School	Kapaa	8	16
5-19-09	Moore Grant/Kapiolani Elementary School	Hilo	5 + 6	92
5-19-09	Moore Grant/Hilo Union School	Hilo	5 + 6	115
5-20-09	Moore Grant/Kanu O Ka Aina	Kamuela	5 + 6	27
5-20-09	Hilo Intermediate School	Hilo	7 + 8	46
5-20-09	Hauula Elementary School	Hauula	K-5	21
5-20-09	Hauula Immersion School	Hauula	4-6	8
5-21-09	Moore Grant/Kamehameha Schools	Keaau	K-12	106
5-21-09	Enchanted Lake Elementary	Kailua	K-5	49
5-22-09	Moore Grant/ Waiakeawaena Elementary	Hilo	5	133
5-22-09	Wilson Elementary School	Honolulu	K-5	85
5-26-09	Moore Grant/ Waiakea Intermediate School	Hilo	6	150
5-27-09	Moore Grant/ Keaukaha Elementary School	Hilo	5	80
5-27-09	Moore Grant/ Waiakea Intermediate School	Hilo	6	133
5-27-09	East Makaala Pre-School	Hilo	Pre	19
5-28-09	Moore Grant/ E.B. Desilva School	Hilo	5 + 6	109
5-28-09	Moore Grant/Haaheo School	Hilo	5 + 6	43
5-28-09	Moore Grant/ Mauna Loa School	Hilo	5	4
<b>May Total</b>				<b>2598</b>
6-2-09	Waimea Middle PCS	Waimea	6	95
6-3-09	Moore Grant/ Kaumana Elementary School	Hilo	4	36
6-4-09	Waimea Middle School	Waimea	8	52

6-4-09	Moore Grant/ Waimea Elementary School	Waimea	2	98
6-5-09	Waimea Middle School	Waimea	8	48
6-9-09	Kapa'a Elementary	Kapa'a	9	8
6-9-09	Boy Scouts Troop 159	Kaneohe	K-12	6
6-12-09	Small World Pre-School	Kamuela	Pre	41
6-16-09	Keaau High School	Keaau	9 + 10	12
6-16-09	Kamehameha Summer School: Kulia I ka Pono	Keaau	K-12	60
6-16-09	Na Pua Noeau Program	Hilo	8	10
6-17-09	Navy Youth Program	Honolulu	K-12	25
6-17-09	Kamehameha Summer School: Kulia I ka Pono	Keaau	K-12	30
6-18-09	Kamehameha Summer School: Kulia I ka Pono	Keaau	K-12	30
6-19-09	Waimea Elementary	Kamuela	8	100
6-19-09	Kamehameha Summer School: Kulia I ka Pono	Keaau	K-12	30
6-23-09	Kamehameha Summer School: Kulia I ka Pono	Keaau	K-12	30
6-24-09	Kamehameha Summer School: Kulia I ka Pono	Keaau	K-12	30
6-25-09	Pihana Na Mamo	Kealakekua	10 + 11	8
6-25-09	Kamehameha Summer School: Kulia I ka Pono	Keaau	K-12	30
6-26-09	Kamehemeha Summer School	Keaau	9	43
6-26-09	Upward Bound Program	Hilo	9 – 12	64
6-26-09	Kamehameha Middle School	Keaau	6 – 8	17
6-30-09	Kamehameha Summer School: Kulia I ka Pono	Keaau	K-12	60
6-30-09	Na Pua Noe'au	Hilo	5	54
<b>June Total</b>			<b>1017</b>	

## K-12 Student Programs

### Gordon & Betty Moore Grant Field Trips:

Year one of our Moore Grant field trips ended with a flourish of students. Many people worked very hard to make our first year (logistics and the experience) for all 9,482 Big Island students in grades 1-6 a huge success! Many thanks to Roberts Bus Company and their wonderful drivers who transported the students safely and promptly to the center. The students enjoyed delicious bento lunches prepared by our Sky Garden Restaurant. `Imiloa staff and volunteers worked together to deliver and improve the experience and had lots of fun with the students! Most importantly we want to thank the Moore Foundation for providing the funding to make this opportunity to bring the students to `Imiloa possible!! *(See "Thank You" Booklet attached)*



Whether students travelled on the large bus with air conditioning and video capabilities or on the yellow school bus, the ride was always safe and fun. For some students from the West side of our island, it was the first time they had ever visited Hilo, and certainly the first time visiting `Imiloa.



***Pictured above*** are restaurant staff busily preparing the bento lunch of chicken & rice for the students.  
***Below*** is Ahia Dye at the controls in the planetarium. Our facilities staff made sure everything was in its place and ready for each field trip.  
***At right,*** Sol helps students dispose of trash and recycle water bottles.



***Below left,*** staff and volunteers gather for a photo after a successful field trip. ***Middle*** is a shot of our Moore Field Trip Match Rocket. ***Right*** is student “Thank You” artwork.





Don Romero (Volunteer) takes students on a tour of `Imiloa's garden. Students are squeezing the awapuhi (shampoo ginger) to "see" the soap.



Shane Pea, Kamehameha School graduate, shares the canoe carving project with students. The canoes were carved onsite by Ray Bumatay.

### Science Rocks! After School Program:

A total of 4 different Science Rocks! After School sessions were offered during May and June covering the themes below:

- Earth Science*
- Science Theater*
- Geometry of Nature*
- Pico Workshop: Time to Tinker...*

### Earth Science:



**At Right:** Students use the red & blue glasses to view 3D aerial pictures of Planet Earth. They learned to write scientific questions using the Q-Matrix system.

**Left:** This young lady uses markers to color code a landform model of glacial terrain.





These folks are intent on color-coding the folded mountain landform model.



Students view Earth's tectonic plates as well as earthquake sites to see the connections on the Magic Planet display.



Students learn about rocks and minerals and how to identify minerals using the same methods geologists use: the hardness test, streak test, color, etc. and a flow chart. Participants view The Origins of Life planetarium show. **Above:** Students work to make their T-Rex tooth model look authentic by applying brown shoe polish and rubbing off the excess. This was a special take-home item from this after school session on Earth Science.

## Science Theater:

Students become demonstrators after they watch demonstrations, research the science concepts for their chosen demo, practice, then perform for an audience!



Air pressure will crush a can after it has been heated. First he heated the can with a small amount of water inside. The resulting steam displaced the air, after which the can was quickly dunked into cold water. The can was crushed when the steam condensed into water, thereby creating a partial vacuum. Excess air pressure from outside the can caused it to be **CRUSHED!**



The Doppler Effect can be demonstrated by swinging a whiffle ball that emits a constant pitch (frequency). The audience can hear the pitch become higher as the ball approaches them and lower as it goes away from them. This is because the sound waves are bunched up as the ball approaches and stretched out as it recedes.



This student uses the services of his dad to demonstrate the wave nature of sound using a long wire spring.



I hear and I forget. I see and I remember. I do and I understand.

[Confucius](#)

*Chinese philosopher & reformer (551 BC - 479 BC)*

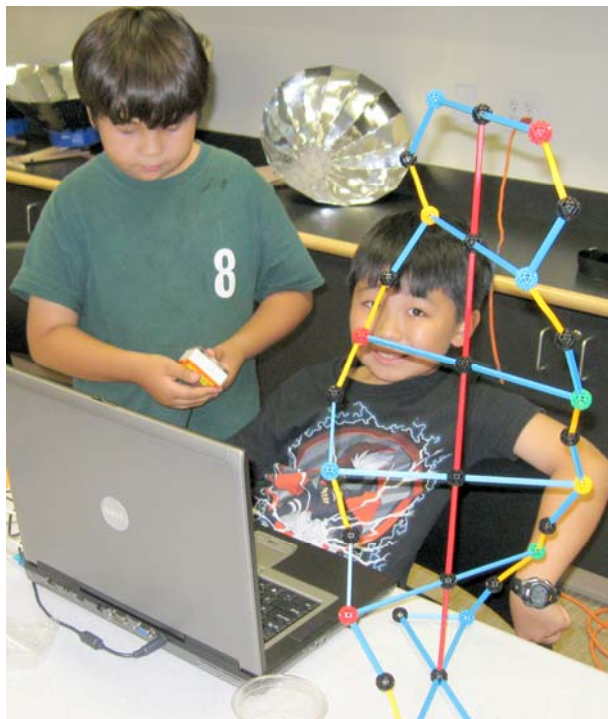


This team of students demonstrated the Bernoulli Effect. The Bernoulli Effect shows a relationship between the speed of a fluid flow (air in this case) and pressure exerted by the fluid. When the air speed is increased, the pressure will drop. **Above left:** Compressed air, flowing at high speed through the stem of an inverted glass funnel, will hold a ping pong ball in place without falling because of the Bernoulli Effect. **Above right:** A long cylindrical plastic tube can be inflated with only one or two breaths by blowing quickly into the tube and holding the edges slightly away from your mouth. This takes advantage of the Bernoulli Effect by creating low pressure which pulls in additional air to fill the tube faster!



A popular demonstration involved the Van DeGraaff Generator. A Van DeGraaff Generator is an electrostatic generator which produces a high voltage (our tabletop VanDeGraaff Generator produces 200,000 volts) by accumulating a large amount of charge on a hollow metal globe. When the above students placed their hands on the metal globe and stood on a non-conductive surface they acquired the same charge as that on the globe, which manifested a phenomenon in which the strands of hair on their head repel each other and therefore stand on end! If you don't have much hair to demonstrate this effect, you can use our streamer cap to show the repulsion.

## Geometry of Nature:



The mathematical archetypes of nature are explored in this after school session. Students learn about the Fibonacci Sequence by making Fibonacci calipers to take out into the garden and to use on their bodies. Students use Zome Tools to construct DNA and Buckyball models, then view 3D Buckyballs, nanotubes, DNA, and amino acids in the planetarium.



These students have completed their DNA models. The color-coded balls accurately represent the nucleotide pairing scheme discovered by Watson and Crick. *Above right:* This student discovers that by looking through the center of the DNA model, he can easily experience the spiral nature of the molecule.

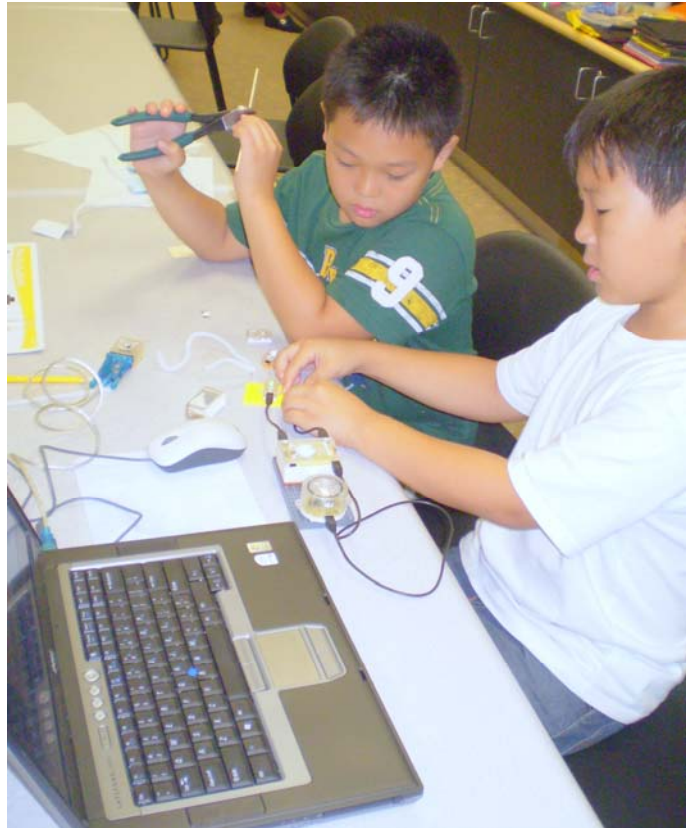


By creating a model students can explore the properties and applications of the unique Buckyball molecule. *Above left:* These boys experience the strength of the molecule, which is composed of 60 carbon atoms arranged in an approximately spherical shape with alternating pentagons and hexagons. *Above right:* This student uses his head to show how Buckyball molecules can be used to deliver drugs to specific sites in the human body.

## Pico Workshop: Time to Tinker...

A PicoCricket is a tiny computer that can be programmed to make things spin, light up, and play music. **Below:** Used CDs work great for wheels of a vehicle being constructed by this young engineer.

**Right:** These boys use the computer to program their invention.



The Pico system is designed to allow users to make artistic creations with lights, sound, music, and motion. It fosters creativity while teaching engineering skills and simple programming.

**Above:** This student designs a unique program to make his creation come to life.

## Family Programs

### Summer Science Rocks! (Formerly Camp `Imiloa):

This year's version of summer camp at `Imiloa highlighted basic science and math concepts such as observation, electricity and magnetism, density, heat, weather and earth science, astronomy, chemistry, flight, rockets, air pressure, inventions, and geometry.



*Above left:* After collecting specimens of bugs and plants in the garden, students looked at them under the microscope.

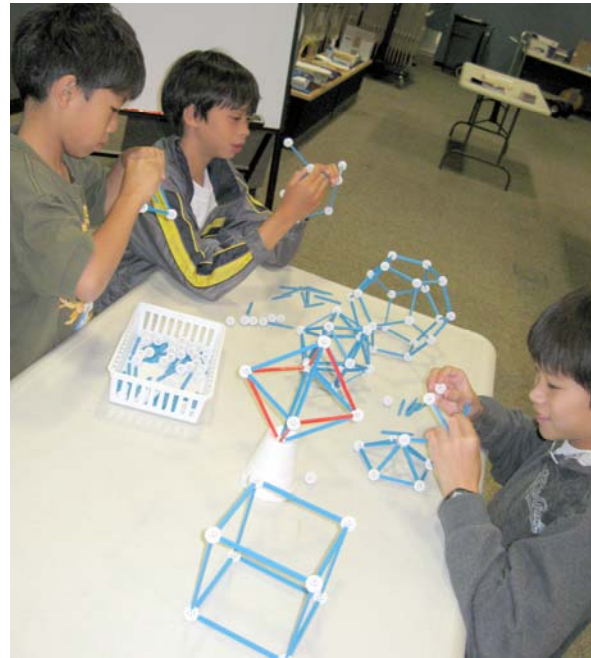
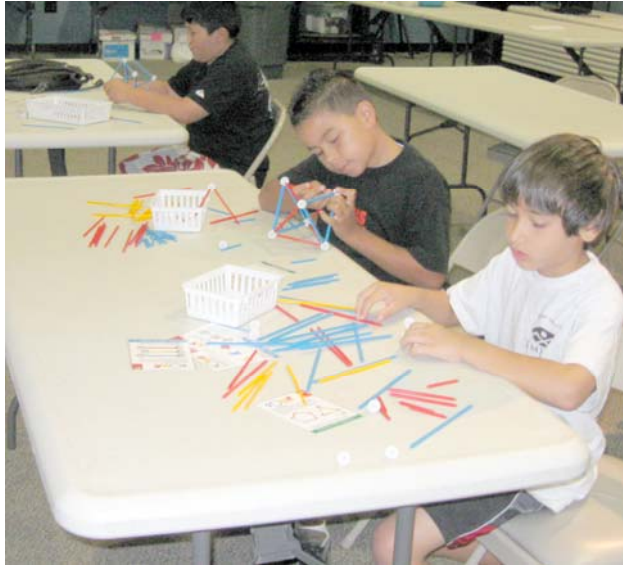
*Above right:* It takes concentration and teamwork to make a magnetic butterfly “fly high” using unseen magnetic force.



This young lady uses magnetic force to “push” her magnetic car along.



Electricity is explored using a Snap Circuits Kit.



Zome Tools are used to explore the Platonic Solids. The aesthetic beauty and symmetry of the Platonic solids have made them a favorite subject of geometers for thousands of years. They are named for the ancient Greek philosopher, Plato, who theorized that the classical elements were constructed from the regular solids.



A Solar Bag (50 feet long and 29 inches in diameter) is filled with air by running. We tied off the end and let the solar energy of the sun heat the air inside the bag. Within about five minutes, the bag rose high into the sky!



This young woman uses a bubble blower she designed and created herself.



The Buckyball crew with their completed models.

## Keiki Korner begins May 2:



Keiki Korner is an `Imiloa educational program developed to supplement the Saturday children's planetarium show schedule. Kids can learn before and after attending the 10:00 a.m. Saturday show.



**Above left:** `Imiloa volunteer Carl Barash helps children build their pop rockets using a paper template, scissors, tape and a penny for weight in the nose of the rocket. **Above right:** These boys prepare for liftoff by placing the rocket onto the launch assembly.



Rockets are “launched” by stomping on the attached 2-liter soda bottle to provide a “blast” of air pressure to send the rocket on its way. **Above left:** 5-4-3-2-1... **Above right:** While waiting for his brothers and sisters to build and launch their rockets, this little guy puts together a puzzle of a NASA rocket.

## Collaborations

### Subaru/Imiloa Workshop

On Saturday, May 30<sup>th</sup> from 9:00 a.m. – 4:00 p.m., Imiloa Astronomy Center and Subaru Telescope co-sponsored a workshop for the families and students in grades 6-8 called “You are Galileo.” Mr. Yasuharu Hanaoka from Orbys Inc. presented the workshop in which families learned the basics of optics and assembled their own telescope to take home and view the night sky. This presentation is part of the IYA (International Year of Astronomy) festivities planned for Hilo.



**Above:** Students assemble their telescopes. They need *no tools* to assemble, and it can be done in 5 minutes or less. The telescopes accept almost any optical accessory and can be mounted onto any tripod.



The Galileoscope was produced by the International Astronomical Union (IAU) as a cornerstone project for the International Year of Astronomy. It is a high quality (good lenses), low cost telescope kit that allows owners to see lunar craters and mountains, Jupiter’s four moons, the phases of Venus, and Saturn’s rings for themselves just as Galileo did 400 years ago.

**Above:** Participants try out their new telescopes!