

UC Santa Barbara

Mentorship Program with an emphasis on multiple sclerosis, 8 years

Title

Medicinal Plant Mentorship Program

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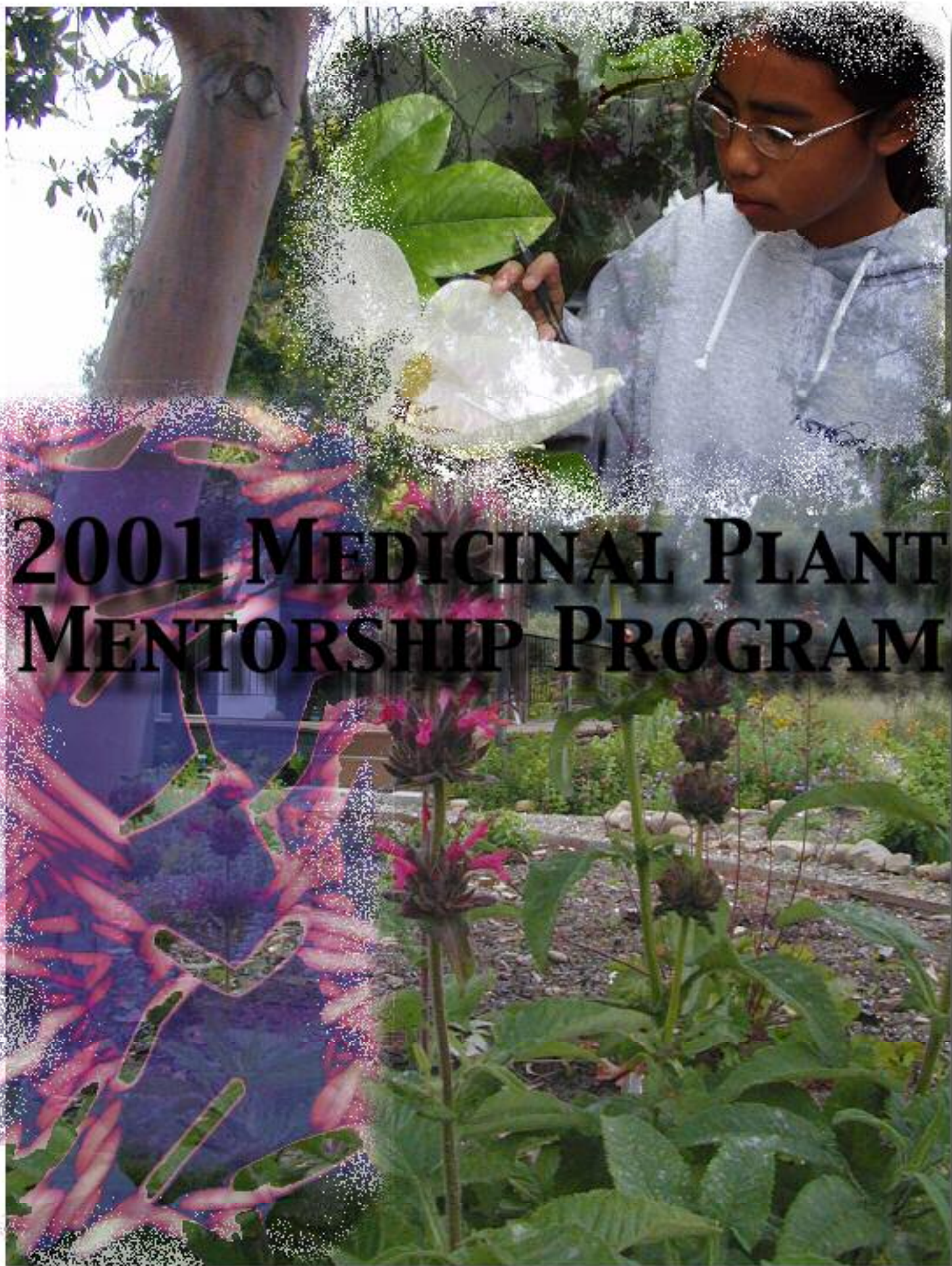
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**2001 MEDICINAL PLANT
MENTORSHIP PROGRAM**

2001 MEDICINAL PLANT MENTORSHIP PROGRAM

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ABSTRACT

In collaboration with local high schools and the University of California, Santa Barbara, Dr. Cynthia Husted's eight-year High School Mentorship Program allowed students to participate in biomedical research. The first four years were conducted in her lab at UCSB and the last four years were held at a Medicinal Plant Project on the private Dos Pueblos Ranch in collaboration with UCSB. During all eight years interns were required to provide a one year commitment that included a six-week summer intensive of 20 hours per week followed by 10 hours per week during the school year. The program included both educational and community service components. This paper describes activities during the last summer at the Medicinal Plant Project. This paper was written unsolicited by the high school students at the end of the summer to share their experiences from at the Medicinal Plant Project. A short video of the program is included.

I. COMMUNITY SERVICE

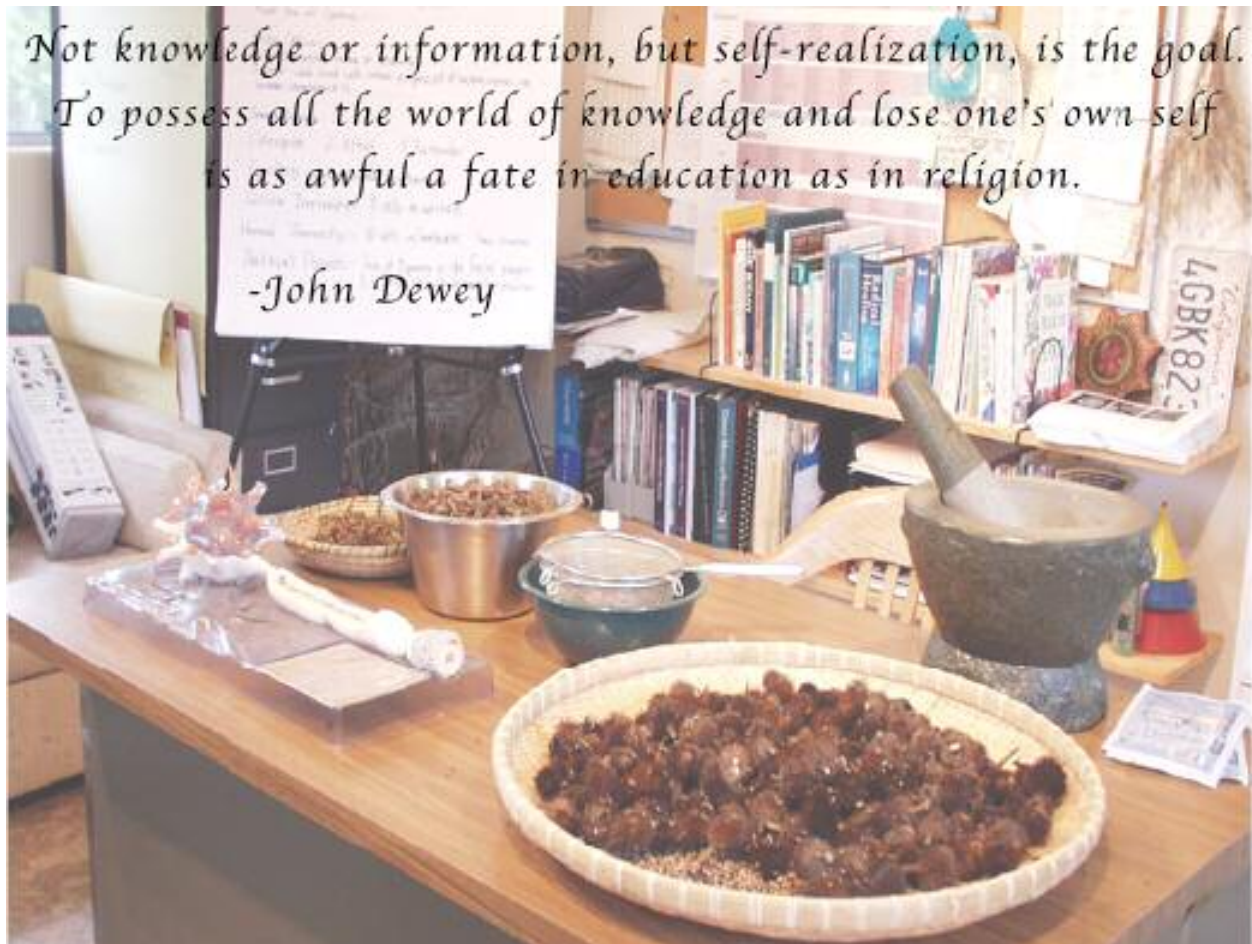


The Santa Barbara school district now requires all high school students to complete 60 hours of community service. With little guidance or direction from administration, many students view the mandate as a “chore” instead of an opportunity. Dr. Cynthia Husted provided several high school students an exciting

opportunity to complete their community service requirement at the Medicinal Plant Project at UCSB. The summer service experience was also a springboard for further participation in the Medicinal Plant Project during the school year. The students easily met the district service requirements, each contributing more than 100 hours to the garden.

The specific service work varied from day to day. Some days were spent transplanting, pulling weeds, collecting seeds and planting seeds; some students even learned how to operate a tractor. Although the work was often physically taxing, the students rarely showed a loss of spirit. The progress made in the garden was gratifying to both the students and Dr. Husted. The students spent four hours at the garden, five days a week for six weeks. Each day began with an educational component of the program consisting of a one hour lecture and discussion. The students spent the remainder of the time completing their service work in the garden, greenhouse and office. Although the formal aspect of the educational component ended after the discussions and lectures, the learning did not. The time spent by the students working with the plants, discussing their uses, growing requirements and history was often the most educationally valuable work of all. The students regularly discussed the importance of service to the community and the rationale behind the requirement imposed by the school district. Reflecting on their experience, they concluded that working at the garden was a rewarding experience because the nature of the mentorship program enabled them to see how they and the medicinal plant project benefited from their service. The students did not feel detached from the organization as they had been during previous community service assignments; they were regarded as valued members of the project, and envisioned how they can reach out to the community through further work. They hope to encourage additional students to participate.

II. EDUCATION



The subject matter studied by the students this summer covered a wide range of disciplines, as it was the goal of the program to help students see that the study of life and science is never fragmented by traditional subject boundaries. Each day the program began with a discussion of the previous night's readings, which led into a brief lecture/discussion on the current topic. As an introduction to integrative medicine and the medicinal plant project, the curriculum provided a balance between the social sciences and biological/chemical sciences, accentuating the relationship between the two. Beginning with an introduction to plant biology, agronomy, and discussions into organic farming and genetic engineering, the students began to study the history and ethnobotany of medicinal plants. Reading assignments prompted discussions on the safety, legal and political matters that often envelop the world of medicine. The lectures then shifted to the world of molecular biology,

specifically the nervous and immune systems as they pertain to Dr. Husted's study of multiple sclerosis at the Center for the Study of Neurodegenerative Disorders at UCSB.

Halfway through the program the students were given the opportunity to demonstrate their knowledge and enthusiasm by applying much of what they had learned through educating a younger audience. During a one-week period, nine elementary classrooms visited the garden and learned about medicinal plants in field trips designed and run by the student interns. Those who were mentored in turn became the mentors.

The educational part of the program also included several guest lectures from global futurist and columnist Dr. Bruce Anderson, Peace Corps Intern and African Studies Student, Jason Kravitz, and Chumash Herbalist Julie Cordero. The program concluded by studying the difficulties faced by indigenous communities in our modern world, including Chumash and other Native American and Tibetan cultures. To aid in transitioning the students into continuing their work during the school year, interns completed their own mini-research projects. They chose topics based on their interests, and the projects ranged from history and evolution to chemistry.

The curriculum emphasized the importance of utilizing scientific and historical understanding to solve current political and social problems. Interns discussed and debated the need for a patient's bill of rights, the regulation of the herb market and the rapidly expanding use of genetically modified organisms (GMOs). In these political and social discussions, interns were taught to support their claims from a scientific and philosophical perspective, thus linking the social and physical sciences in an applicable fashion. The study of plant biology and organic farming was applied directly to the service work at the garden. The student's applied the science they had learned about soil chemistry, plant biology and ethnobotany to enhance and understand the growing conditions for many of the plants at the garden. The interns enjoyed discussing controversial subjects, as it helped them engage and identify with a topic, often at a personal level.

Reading material usually focused equally on both the scientific aspect of the garden/laboratory and the social and personal aspects to healing. Selections in the reader were made from *Eco-Farm*, *Plants People and Culture: the Study of Ethnobotany, Brain, Mind, and Behavior*, and many magazines and journals including, *Cultural Survival Quarterly*, *Herbalgram*, and *Institute of Noetic Sciences Review*. As part of our study into

Native American culture, the interns all read *The Scalpel and the Silver Bear*, by Lori Arviso Alvord. In discussions led by Julie Cordero, the interns debated the underlying philosophies that comprise western medicine. Expanding on Arviso Alvord's topic of "walking in beauty," the interns determined that lifestyle--specifically our interactions with others and the environment--has a direct affect on our health. They concluded that the best healers reach the patient on a personal level, integrating many aspects of healing.

Often, in student led discussions, they found themselves questioning fundamental values and belief structures. The Chinese use the same word for crisis, *Wei-chi*, as they do for opportunity. The interns chose to focus on positive solutions, medicinal and social, rather than dwell on the threat of ecological disaster and encroaching disease. The mentorship program not only provided an opportunity for students to complete their service requirement, it infused all who participated with a new way of looking at the world.




III. THE JAMS FIELD TRIP



The Junior Academy of Math and Science (JAMS) is a summer school program for students in 5th, 6th and 7th grades. The curriculum emphasizes understanding spatial geometry and contains an environmental science unit titled "There is No Away." The students study what is in garbage, discuss the distinction between natural and manufactured and the distinction between organic and inorganic. They build model dumps, landfills, and study the problem of contamination in the water supply, hoping to learn that human activity can negatively alter the environment.

During a weeklong period, 250 elementary students from 10 Santa Barbara schools in the the JAMS program visited the UCSB Medicinal Plant Garden. The high school interns in the mentorship program helped design and coordinate the field trip. Each classroom spent 45 minutes at the garden, and the students were lead through three different stations, in three different groups by the interns.

Students were shown the greenhouse, the garden and the laboratory. They were taught how Dr. Husted studies medicinal plants as possible treatments for diseases affecting the nervous system; the issue of safety using medicinal plants was heavily stressed. Within each group, the interns helped the students complete an identification worksheet of plants at the garden, as shown to the right. The field trips were an extraordinary experience for the interns. They learned first-hand how rewarding it is to teach and present a project that had been built through their efforts.

Name: _____ Date: _____	
Medicinal Plants at the UCSB Medicinal Plant Garden	
	Name: _____ Medicinal Use: _____ Parts Used: _____
	Name: _____ Medicinal Use: _____ Parts Used: _____
	Name: _____ Medicinal Use: _____ Parts Used: _____

IV. THE STUDENT INTERNS

RICHARD CHANG

12th Grade, San Marcos High School



The Medicinal Plant Mentorship Program has given me the chance to explore the aspect of plant biology, which had never previously caught my attention, and provided me with a good general foundation in biology. It has also given me a new experience with gardening and working hands on in an outdoors lab. Besides the whole gardening and plant biology aspect, this program is focused on research regarding neurodegenerative disorders and this has allowed me to develop my interests in molecular and human

biology. This program has also stressed a great deal in regards to philosophies and the study of different cultural medicines. This has given me a new approach to traditional western medicine and helped me open my eyes to the rest of the world. In completing this summer program, my interests have been so greatly developed I wish to remain and continue to aid in the fascinating research being conducted. I am now looking forward to experience in a lab and the process of research.

During this summer program, all students participating were provided an autobiography of Dr. Lori Arviso Alvord, the first Navajo woman surgeon, titled *The Scalpel and the Silver Bear*. This book journeyed from a Navajo reservation in New Mexico to the medical school of Stanford University and back while integrating all aspects of her journey. I particularly found interest in this book because I am interested in medicine and surgery, and even more specifically, I have an interest in pursuing medicine at Stanford someday. More importantly, the ways of her people, her conduct, and her principles regarding the ultimate form of medicine and healing appeal to my own way of thinking. My own interests in medicine have been greatly influenced by positive interactions with doctors who have treated me and they all reflect the actions of Dr. Arviso. I hope to one day follow in the actions and with regard to some of the principles put forth in this book.

Garden work was never something I was particularly fond of nor had I done much of prior to this summer program. However, upon seeing the vision in store for a display garden and even a pond with running waterways really sparked my desire to accomplish something to be proud of and presentable. By far the toughest aspect of the garden work was the tedious weeding that had to be done yet that was also the most rewarding aspect of it all. To be able to see what a difference you made before and after your work was really quite special. Another aspect that was also quite rewarding and enjoyable was the work in our greenhouse, which at times became a real oven, but it was always a pleasant deviation from weeding. Transplanting in the greenhouse was a constant and repetitive task but at the same time delicate and rewarding, especially in the end when you are able to see the plants continue to grow healthily and know you helped them and the environment. All of the garden work really paid off with the JAMS field trip conducted about half way through our summer program. It was really great to show what we had done and what we had learned to others in what I believe was the ultimate definition of community service.

JESSE CRUZ

11th Grade, Dos Pueblos High School



Science has fascinated me since I was only a few years old.

Unfortunately, the hands on science that I wanted had eluded me until my junior high and high school years. Biological sciences have always interested me and pulled me onward. Coming out to the UCSB medicinal plant garden was a completely new experience for me. I had never considered medicinal plants becoming a factor in what I learned, but all of the sudden I was in the middle of a medicinal plant garden, growing, tending, and harvesting medicinal plants. My hands-on interests were satisfied by the garden, and my scientific goals were

refocused toward plant biology by the end of this program. I hope now to continue studying and tending to medicinal plants and the UCSB garden.

A large factor of our time each day at the garden was spent doing garden work. The garden was completely overrun with weeds when the medicinal plant program began. Each day we would go out after our daily lecture or discussion and begin weeding, which was hard, laborious work. Later on in the program we began tending to the greenhouse more, harvested seeds, transplanted plants, and pulled weeds, weeds, weeds! Some of the work was fun on the contrary. I learned how to drive a tractor (something I had always wanted to do) and also got to use a roto-tiller. All of the work and weeding turned out to be quite rewarding. While working we learned the various plants of the garden, which helped greatly when we gave garden tours to busloads of young students from the Junior Academy of Math and Science. I was able to watch the garden as it went from a giant weed bed to a fairly organized garden. Overall, the physical work was not a negative force on my summer. The chance to spend time outside was somewhat enjoyable, and the end result was rewarding.

Each day at the garden usually started with a lecture or discussion pertinent to medicinal plants. Some days would be more fact-based, shedding light on difficult aspects such as genetics, or informing us of medicinal uses of plants towards disease such as Multiple Sclerosis. My favorite days were the discussions we would have that centered on current political issues. One of my favorite discussions, which had to do with a

political outrage, dealt with the ownership rights to medicinal plants, and the indigenous methods of use opposed to western medicine. Many of the plants we use for medicine were already in use by peoples of other countries, but are patented under the names of our western scientists. I was saddened to hear that even at our highest levels of research and education, theft still occurs on a daily basis. Even though many of today's political issues are sad or angering, I feel that it is important to discuss them to their full extent so that history's mistakes will not be repeated.

JAMES JOHNSON

12th Grade, San Marcos High School



Turnons: Chocolate ,White Fluffy Cats, Chocolate and White fluffy cats.

Turnoffs: Clowns.

Hi. As you probably have guessed from above my name is James. What originally attracted me to the garden was a number of things. One, I have an interest or perhaps you could say a devotion to biology so anything that could get me a running start in studying it is all right with me. Not only that but it incorporated something I knew absolutely nothing about, gardening or plants for that matter. This program not only gave me a lot of information about neurochemistry, the immune system and other systems in biology it taught me how to recognize some of the plants at the garden and understand their

medicinal value. In the process getting a healthy respect for how complex plants and their propagation can be.

This program will help in expanding my biological knowledge by providing me a chance to work with a graduate student on his thesis of religion and evolution (me mainly providing information with the evolution portion) and using math to analyze different biological structures Cindy is messing around with in her lab.

There were a lot of things I enjoyed while working as part of the program. Our discussions on Community Service really hit to the core of what I thought about being forced to do the Service. When we went into the lab I actually got to see some modern scientific equipment outside of a textbook and I got to see some scientific research in process as opposed to reading about in Discovery or Scientific America. Some of our readings really

brought a lot to light about medicinal plants and how much we really know about them. In the end, I thought it all came down to the kids and I think the JAMS trip was really a good way to expose them to some aspect of science and possibly turn their mind away from the stereotypical metal sterilized tables, test tubes, weird discombobulating machines and so forth and so on etc etc, yadda yadda yadda. And so forth.

The most enjoyable aspect of working in the actual garden, was the aspect of working in the garden. Destroying the invasive raids of weeds to ensure that the medicinal plants live healthy and free. Transplanting the plants so they could grow also being healthy and free. Putting little seed inside the trays, making sure they have enough soil, sun, water, and nutrients so they could live healthy and possibly free. Essentially helping in bringing the garden to a better state was really what had meaning for me. Hoping that in the future this work may help in bringing a showcase for medicinal plants and even better helping some people in fighting sickness is just a dream but a dream worth the work.

MATT WIENER

12th Grade , Dos Pueblos High School



I am interested in politics, history and the environment. The medicinal plant program got me thinking more about issues such as organic farming, genetically modified food, the health care system, and much more, helping me solidify and modify my views on these subjects. Broader societal and culture issues were brought closer to my attention as well. Issues such as indigenous intellectual property rights, the current conditions in Africa, and integrative medicine were all brought to the forefront of my attention. Non-western thought, and alternative approaches to life, have sparked my interest and reaffirmed my belief that Western society is moving increasingly in the wrong direction. This is especially true in regard to the environment. It has become increasingly clear to me that we must change our ways of thinking and acting and become more aware of what is going on around us. I also

enjoyed immensely learning about various medicinal plants, their names and uses, and learning how many options we as people have when it comes to medicine and healing.

My favorite lecture was our discussion of the pros and cons of genetically modified foods. In his lecture, Michael Jacob spoke about the benefits of genetically modified foods which include plants that are easier to grow, disease resistant, and have a longer shelf life. In addition, he spoke about the dangers that such plants may have to human, animal, and other plant life. He explained that DNA is the code for proteins, and by modifying it you change its make-up which often has unintended, unstudied, and unthought about consequences. One particularly interesting example he gave was the *Flavor Savor Tomato*. This particular tomato was genetically engineered to make the flavor stay longer in the tomato. To do this, a gene from a peanut was added to the tomato. It was deemed safe by the manufacturers and went on the market. The problem was, many people are allergic to peanuts, and people, thinking they were just buying a tomato, got very sick.

Mike made all of the discussions interesting, making sure everyone understood what he was talking about, and is a very good teacher. Another thing I especially enjoyed were the guest speakers. Bruce Anderson, Jason Kravitz, and Julie Cordero were all extremely knowledgeable, and fascinating to listen to.

I enjoyed all the aspects of garden work, in moderation. If you got tired of doing one thing, you could always do another. Transplanting was easy and kind of fun. Weeding was hard but the progress was easy to see and quite rewarding. Collecting seeds was relaxing and helped you learn the names of plants.

MAREN ROE · ASSISTANT MENTOR

Freshman, Occidental College



I had started doing volunteer work at the ranch last summer, and then worked there all throughout the school year as well. This summer, I returned to work for Cindy as a mentor with Mike for the four high school students.

When I started working at the ranch, very quickly I could tell this was different from other volunteer opportunities. The atmosphere was very positive, and I could really see the results of my work. Planting a seed and watching it grow, discussing the diseases you are helping to cure, is more rewarding than my other jobs of stacking cans on shelves, or picking up dog poo. I am very interested now in ethnobotany, herbal medicine, and growing medicinal plants.

One of the things I liked doing most at the garden was collecting plants, either for making medicine, or for gathering seeds. This is sometimes tedious work, but I enjoyed it because it kept my hands busy and my mind free to think.

Working with and learning from Julie Cordero and Cynthia Husted were so great for me. Very few people at my age get to work alongside professors and people working for their Masters. Those opportunities also helped me to get into Occidental College.

I would love talking to Julie, learning from her about all of the plants on the ranch, what they were used for, and how to make medicine from them. I also learned a lot about Native American cultures from her. Every day, we would work at sorting seeds, or drying plants, and she would tell me about each plant we worked with. How it got its name, what different cultures used it, etc. This is how I learned about plants. When Julie talked about a plant, it became more than a genus and species. Its personality grew as I gathered more information about it. Julie once told me that plants are like people: every one has a specific medicinal use, likes and

dislikes. For example, flaxseed can be eaten to lower cholesterol. Its bark is used to make linen. It grows in the sun and does not like too much watering. Now when I walk through the garden, I don't just see a collection of leaves and twigs, I see life.

Michael Jacob was the mentorship director for summer 2001. He participated as a high school intern in the medicinal plant mentorship program in the summer of 1999. He then continued to work with Dr. Cynthia Husted in both her UCSB laboratory and out at the garden. His findings into the study of possible fractal behavior of galactacerebroside nanotubes and their self-assembly at the air-water interface were included in Prof. Husted's most recent publication. As the director for the 2001 mentorship program, Michael designed the curriculum and planned the daily activities for the interns. He recently graduated from UC Berkeley, with a degree in Biochemistry.

Dr. Cynthia Husted worked with local high school students at UCSB for eight years. As a high school student in the 1970's she was interested in mathematics and physics, and being a young woman, was encouraged to study nursing. Thus she did, and after working in intensive care for five years, the last four during which she obtained a second bachelor's in chemistry, she returned to graduate school to obtain a doctorate in physical chemistry. She has had a longstanding interest in integrative medicine, especially through approaches in research. Through her mentorship program she seeks to help young students find their interests and define their path in this world. Service work and giving back to the community are emphasized.