

**NEW AND EXCITING STEM COURSE! ONLY AT TOHS...**

## SCIENTIFIC RESEARCH



Science Fair experience is an asset!

**Pre-requisite: Algebra 1, Bio H/CP and Chem CP/H with B or better**

### RESEARCH

This course is the center piece for the STREAM pathway only offered at TOHS! Research conducted in this class will develop digital literacy using 21<sup>st</sup>-century technology. The research projects will involve tissue culture, biochemistry, chemistry, high-performance liquid chromatography (HPLC), microbiology, biotechnology, bioinformatics, cell biology, and physiology in plants, animals, bacteria, yeast, and *Drosophila*.

The deadlines and standards for this elective course will be aligned with the County and State science fairs. Students will research an authentic individual science fair project offsite, and also participate in a class research project on *DNA BARCODING*, Biotechnology and HPLC to build hands-on biotechnology and biochemistry skills.

**INTERDISCIPLINARY CURRICULUM:** This course prepares students for **STEM (Science, Technology, Engineering and Math) CAREERS with special emphasis on Research and Art!**

### AMGEN BIOTECHNOLOGY EXPERIENCE LAB PROGRAM

The Amgen Biotech Lab Program will be incorporated into the Scientific Research Course by using micro-pipetting techniques, DNA fingerprinting, recombinant DNA technology, protein purification, and PCR in the real life projects.

### HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (HPLC)

HPLC is the primary separation method used in the biotech industry, and a good understanding of this fascinating methodology will provide a lasting benefit to students. Skills will be developed through course work and hands-on training, and will then be applied to real life problems through lab work.

### SEMESTER PLAN

The first semester will be dedicated to lectures, labs, and training in basic HPLC, Chemistry, Biotechnology, Cell Biology, Microbiology and Tissue Culture modes and techniques. These lab skills will then be used in their research projects during the second semester when the students are expected to conceive, research, design, plan, execute, publish, and defend their own Science Fair projects. For the project, they will ask a question about their local environment, animals, microbes, plants, water quality or food samples and obtain real-world data. These research projects will be conducted under Dr. Malhotra's supervision with feedback from our local academic and industrial partners.

### OPPORTUNITIES

- Internships and job shadows in local industrial and Academic laboratories
- Collaboration and networking with local professionals
- Siemens Competition in Math, Science and Technology
- Ventura County and State Science Fair Competitions
- Qualify for science awards and scholarships in the industry!
- Learn about all the STEM careers while being involved in Research and Arts

OUR SCIENCE FAIR TEAM WINS 40%  
OF VENTURA COUNTY AWARDS

**We're taking the Science Fair Competition to the next level by integrating real laboratory research with STEM curriculum while incorporating Research and Art into a unique science pathway!**

We have compiled a high level, challenging and inquiry based elective course for our future scientists. Students will participate in the biotechnology program, receive HPLC training and learn cell and tissue culture lab techniques.



State Science Fair Team 2013

Set your foot into the Scientific World early!

**GET THE INVALUABLE RESEARCH EXPERIENCE!**

### TEACHER

Dr. Malhotra has a Ph.D. in Biochemistry and Cell Biology. As a graduate student and a postdoctoral fellow at UBC and UCSB, she performed extensive research and published her work in top scientific journals. She has been an advisor for the T.O.H.S. Health Science Major Program and also coordinates the school's amazing Science Fair and the Research program.

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